**INTEGRATED COMMUNITY AND PARTICIPATORY GIS IN MANAGEMENT OF YALA WETLAND ECOSYSTEM, LAKE VICTORIA BASIN, KENYA**

**BY**

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**JUNE, 2021**

# DECLARATION

**Declaration by the Student**

This thesis is my original work and has not been submitted for any academic award in any institution; and shall not be reproduced in part or full, or in any format without prior written permission from the author and/or University of Eldoret.

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**Declaration by the supervisors**

This thesis has been submitted with our approval as University Supervisors.

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# DEDICATION

This study is dedicated to local community members of Yala Swamp and Africa especially those who pose this question, "Does my (village) community feel the value of my education? What change can I bring that can profoundly touch their lives positively?" And then seek to align their academic, entrepreneurial and development pursuits to provide solutions to their communities' complex challenges.

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# ABSTRACT

Wetlands are one of the world's most important environmental assets which provide homes for large, diverse biota as well as economic, social and cultural benefits. Optimal use of these benefits requires good planning and meaningful participation of riparian communities in their management. Yala Wetland ecosystem, located at the confluence of Yala and Nzoia rivers where they discharge into Lake Victoria in Siaya and Busia counties, is a valuable resource that directly benefits over 180,000 persons and covers approximately 20,276 hectares. Empirical evidence show accelerated Yala wetland ecosystem degradation with dismal community participation its management. Further, the dynamics of effective and meaningful community participation are not clearly understood despite wetland's continued loss in size and value. This research aimed at developing a framework to optimize community participation in the ongoing Yala LUP, which was using the Yala Public Advisory Committee (YPAC) as the principal route for public participation. Being a multidisciplinary research, the study used case study design that employed exploratory action research with both qualitative and quantitative methods of data collection and analysis, remote sensing and GIS analysis to determine land cover/landuse changes, and a Spectrum of Public Participation and World Bank 10 indicators to analyze the extent and effectiveness of community participation of the existing YPAC framework. The feedback was used to design an improved framework for optimizing community participation. A total of 410 respondents from 60 community organizations engaged in wetland conservation provided information through focus group discussions, 34 key informant interviews provided historical, contextual and indigenous ecological knowledge and 187 students from 18 schools provided wetland status and envisioned future through essays, debates and artworks. The Spectrum Model revealed community participation in SEA/LUP processes was at Inform (17%) and Consult (83%) levels while the 10 indicators of effectiveness revealed that YPAC framework was poor (20%) and unsatisfactory (80) and thus not meaningful and effective. Consequently, an improved Community Participation Framework (Yala RAPPEF-CF-IR-Hub Framework) was developed and tested to improve community participation, occasioning significant improvements in LUP (Consult 80% and Collaborate 20%) and designed in participatory manner an equitable benefit sharing mechanism of wetland resources. The Yala Hub Framework was further incorporated in Siaya County Integrated Development Planning 2018-2022 (CIDP), where it also occasioned a significant improvement (creation of a public participation directorate). It was also used in preparation of Yala Wetland Indigenous Community Conservation Areas Management (ICCA) Plan to implement LUP recommendations where wetland communities have so far planted 100 ha papyrus to restore degraded wetland areas. The study concludes that effective community participation determines and influences effective implementation of decisions made; and that increased participation will eventually increase the effectiveness of community development. The Yala Hub Framework is a tool that significantly improves local community participation in managing their wetland resources. The study recommends strengthening of Yala Swamp Management Committee governance; adoption of equitable benefit sharing mechanisms of wetland resources; and systematic documentation and preservation of Yala Wetland local communities' knowledge systems and integrating it with remotely sensed data to monitor Yala land use/landcover changes. The need for recognition and valuing of Community Facilitator (CF) and Information Resources Hub (IR-Hub); strengthening Yala Wetland Information System starting with IR-Hub sub-component; and deploying Yala Hub Framework in future LUP processes in other wetlands with similar challenges as Yala Wetland should be implemented.

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## ABBREVIATIONS, ACRONYMS, AND SYMBOLS

| | |
|---|---|
| 3AGT | Africa Accelerated Agricultural Growth and Transformation |
| AHADI | Agile and Harmonized Assistance for Devolved Institutions |
| AI | Appreciative Inquiry |
| AU | African Union |
| BMU | Beach Management Unit |
| BUCAWRUA | Bunyala Catchment Water Resource User Association |
| CAADP | Comprehensive African Agriculture Development Programme |
| CACs | Catchment Advisory Committees |
| CBOs | Community Based Organizations |
| CCAs | Community Conservation Areas |
| CCCMA | Canadian Centre for Climate Modelling and Analysis |
| CDM | Conventional Development Model |
| CECM | County Executive Committee Member |
| CF | Community Facilitator |
| CFSP | County Fiscal Strategy Paper |
| CGB | County Government of Busia |
| CGS | County Government of Siaya |
| CIDP | County Integrated Development Plan |
| CPST | Centre for Parliamentary Studies and Training |
| CS | County Secretary |
| CSIRO | Commonwealth Scientific and Industrial Research Organization model |
| DAI | Development Alternatives, Inc. (DAI) |

| | |
|---|---|
| DBRM | Directory of Business Research Methods |
| DETR | Department of the Environment, Transport and the Regions |
| DRSRS | Department of Resource Surveys and Remote Sensing |
| EANHS | East Africa Natural History Society |
| EIA | Environmental Impact Assessment |
| EMCA | Environmental Management and Co-ordination Act |
| EPA | Environmental Protection Agency |
| ESD | Education for Sustainable Development |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| FGD | Focus Group Discussion |
| GIS | Geographic Information Systems |
| GoK | Government of Kenya |
| GPS | Global Positioning Systems |
| ha | Hectares |
| HadCM3 | Hadley Centre Coupled Model, version 3 |
| IAP2 | International Association of Public Participation |
| ICCA | Indigenous Community Conservation Areas |
| ICRAF | World Agroforestry Centre (ICRAF) |
| ICSC | Inter-County Land Use Plan Steering Committee |
| IGA | Income Generating Activities |
| ILACO | Dutch Consulting Company |
| IMTC | Inter-Ministerial Technical Committee |
| IR | Information Resources |
| IR-Hub | Information Resources Hub |

| | |
|---|---|
| IUCN | International Union for Conservation of Nature |
| IWMI | International Water Management Institute |
| JICA | Japan International Cooperation Agency |
| KEFRI | Kenya Forestry Research Institute |
| KFS | Kenya Forest Service |
| km | Kilometer |
| KWS | Kenya Wildlife Service |
| KWTA | Kenya Water Towers Agency |
| LA | Local Authorities |
| LBDA | Lake Basin Development Authority |
| LUP | Land Use Plan |
| M&E | Monitoring and Evaluation |
| MCA | Member of County Assembly |
| MEA | Millennium Ecosystem Assessment |
| MUWERICWRA | Muweri  Catchment Water Resource User Association |
| NACOSTI | The National Commission for Science Technology and Innovation |
| n.d | No date |
| NEMA | National Environment Management Authority |
| NGO | Non-Governmental Organization |
| NIB | National Irrigation Board |
| NK | Nature Kenya |
| NLC | National Lands Commission |
| NMK | National Museums of Kenya |
| OD | Organization Development |
| ODPM | Office of Disaster Preparedness and Management |

| | |
|---|---|
| OECD | Organization for Economic Co-operation and Development |
| ORS | Organizational Research Services |
| PAR | Participatory Action Research |
| PPGIS | Participatory Geographic Information Systems |
| PREPARED | Planning for Resilience in East Africa through Policy, Adaptation |
| PRLA | Participatory Rapid Learning Appraisal |
| RAI | Retouch Africa International |
| RIVM | National Institute for Public Health and the Environment |
| RUAs | Resource Users Associations |
| SDG | Sustainable Development Goals |
| SEA | Strategic Environmental Assessment |
| SES | School of Environmental Studies |
| STRP | Scientific and Technical Review Panel |
| TL | Transformative Learning |
| TMAR | Total Mean Annual Rainfall |
| TOF | Training of Facilitators |
| UN | United Nations |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environmental Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| USAID | United States Agency for International Development |
| UWN | University World News |
| WARMA | Water Resources Management Authority |
| WCT | Wetland Conservation Toolkit |
| WI | Wetlands International |

| | |
|---|---|
| WRA | Water Resources Authority |
| WRI | World Resources Institute |
| WSA | Whole School Approach |
| WUF | World Urban Forum |
| WWF | World Wildlife Fund |
| YPAC | Yala Project Advisory Committee |
| YSLWMC | Yala Wetland Land and Water Management Committee |
| YSSG | Yala Site Support Group |
| YSCAMC | Yala Management Conservation Areas Management Committee |

## OPERATIONAL DEFINITIONS OF TERMS

**Community** refers to persons living in Yala wetland or those who were born in the in Yala wetland but currently reside outside the area and are identified by common history, common interests, common culture or common experiences, and may comprise representative members of organized institutions in the community, private sector or the civil society.

**Participation** refers to the involvement of individuals and groups that could be positively or negatively be affected by (or that are interested in) a proposed project, program, planned legislation or policy that is subject to a decision- making process.

**Community participation** refers to a situation where decision-making originally vested with authorities is devolved to the people who have interest and are affected by those decisions.

**Optimized Community participation** refers to a situation where local communities consider they co-own the wetland, have rights of access and use to the resources, equitably share benefits from wetland resources and participates in decision making of Yala Wetland affairs.

**Framework** refers to a simplified mechanism that allows for the involvement of communities in the management of Yala Wetland Ecosystem; from mobilization, organization, actual participation, outcomes of implementation, follow-up, and a support system to minimize any barriers.

**Environmental planning** refers to types of planning whether social, economic, political and or technical interventions that give environmental considerations priority in decision making and enhance development opportunities in the Yala Wetland.

**Environmental management** refers to systematic processes, guidelines and procedures put in place to control and organize environmental programmes and projects in Yala Wetland.

**Environmental governance** refers to planning and management, institutional structures, frameworks, policies, legislations and operations, participating stakeholders to mitigate environmental challenges and risks in Yala Wetland.

**Wetland** refers to areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (GoK, 2015a).

**Ecosystem** refers to a dynamic complex of plant, animal and microorganism communities and their non-living environment (water, air, mineral soils) interacting as a functional unit.

**Ecosystem services** refer to the benefits people and life support systems obtained from ecosystems including provision of services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; support services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious, and other non-material benefits.

**Yala Wetland** refer to an ecological feature found at the confluence of rivers Yala and Nzoia in Lake Victora Basin shared between Siaya and Busia counties. It is commonly to referred as Yala swamp but has many features like the swamp, lakes, rivers, papyrus, riverine vegetations, and various biodiversity.

**An ecosystems approach** is a strategy for the integrated management of land, water and living resources that provides sustainable delivery of ecosystem services in an equitable way which requires mindset-change, government buy-in, sound planning and effective action based on the latest science (CBD, 2006).

**Action research** is a disciplined process of inquiry conducted *by* and *for* those taking the action and the primary reason is to assist the "actor" in improving and/or refining his or her actions (Stringer, 1999).

**Conservation** means the protection, maintenance, rehabilitation, restoration and enhancement of the environment for sustainable use.

**Wetland Conservation** is the use of measures and strategies to promote wetlands protection to maintain its original (pristine) state and control the wetland resources over-exploitation to ensure sustainability.

**Stakeholder** is a person, group or organization that has interest or concern in an issue.

**Yala RAPPEF-CF-IR-Hub Framework**. This the framework developed to optimize community participation in Yala Wetland Ecosystems Management. The letters describe the 5 steps of the applying the framework. For ease of reference, the framework shall be called framework shall be called the Yala Hub  Framework.

**CHAPTER ONE**

**INTRODUCTION**

**1.1 Overview of the Chapter**

This chapter lays out background information to the study, which entails the statement of the problem, general and specific objectives of the study, research questions, scope of the study and justification of the study.

**1.2 Background Information**

Wetlands occur where the ground water table is at or near the land surface, or where the land is covered by water (Ramsar Convention Secretariat, 2016), and are one of the world's most important environmental assets which provide homes for large, diverse biota as well as significant economic, social and cultural benefits related to timber, fisheries, hunting, recreational and tourist activities.

The Convention on Wetlands (Ramsar, 1971a) 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 metres (Ramsar Convention on Wetlands, 1996)".

The Kenyan Environmental Management and Coordination Act 2015 defines Wetlands as "...areas permanently or seasonally flooded by water where plants and animals have become adapted" (GoK, 2015a).

Wetlands are therefore the link between water and land and the zones of transition between these different environments with water being the most important factor affecting its environment and the associated plant and animal life (Springate-Baginski *et al.*, 2009).

Wetlands cover about 6-7 per cent of the world's surface; 44% of the wetlands are located in the northern latitudes, 30% in the tropical and sub-tropical areas of which 30% occur in arid and sub-arid ecosystems (Melton *et al.*, 2013; Lehner and Doll, 2004; OECD, 1996).

Wetlands in Africa, Asia and South America are estimated to cover between 125 and 131 million hectares (Mha), between 204 and 286 Mha and approximately 179 Mha respectively (Harmsen, 2018; Melton *et al*., 2013; Lehner & Döll, 2004; Finlayson *et al*.,1999). About $1.3X10^6$ $km^2$ of the world's wetland area is located in Africa (Beuel *et al*., 2016), and Kenya has 2,737,790 ha of wetlands (Harmsen, 2018).

Wetlands are invaluable elements of a functioning earth system as they provide a range of environmental services including provisioning, regulating, cultural and supporting services (EANHS, 2018, Finlayson & D'Cruz, 2005; Harmsen, 2018; Ramsar Convention, 2016, Gordon, 2009). The global value of wetlands was estimated to be US $ 70 billion a year (Schuyt and Brander, 2004). Wetlands are known to be among the most productive ecosystems of the Earth (Mitsch and Gossellink 2000; Dugan, 1993). They have high potential for all season agricultural activity that provides both food and income as well as a wide range of other ecosystem services for riparian communities (Millennium Ecosystem Assessment Report 2005; Barbier *et al.,* 1998)

Despite their importance in providing ecological services and supporting livelihoods of local communities, wetlands are currently threatened by degradation. The estimated inland wetland loss in some parts of the world is placed at more than 50% as a consequence of human activities with resultant wetland species loss and negative impact on the livelihoods of local communities (EANHS, 2018; Springate-Baginski *et al*., 2009; Millennium Ecosystem Assessment, 2005; Otieno *et al*., 2001).

Empirical evidence shows that enabling local communities living in and around wetlands to share ideas, knowledge, skills, and labour, to meaningfully participate in managing the resources and the ecosystem services they provide ( Ramsar Convention Secretariat, 2016; Zsufa *et al*., 2014) is key to attaining their sustainable use.

Effective community participation is therefore central to sustainable natural resource management at all levels. Community participation in natural resource management has evolved from the realization that people who live adjacent to natural resources should be responsible for their management, and benefit by using the natural resources (GoK, 2010a; Lockie and Sonnenfeld, 2008; WWF, 2006; Ostrom,1990). The Aarhus Convention of

1998 states that citizens must not only have access to information but must also be entitled to participate in decision making and have access to justice in environmental matters (DETR, 2000; Stec *et al*., 2000). However, community participation remains a challenge as facilitators of participation processes engage in low level consultations that do not translate into real empowerment of local communities to co-manage shared resources such as wetlands including Yala Wetland alongside government agencies with legal mandates to do so (GoK, 2010a; Springate-Baginski, *et al*., 2009; World Bank, 1999). Cumulatively, small wetlands play a significant role in supporting both livelihoods and biodiversity, and reducing poverty (IWMI, 2014).

Wetland's degradation and loss has been a persistent global challenge mainly because of population growth, which exerts great pressure on water resources, leads to excessive resource exploitation and poor ecosystem management and undeveloped land areas for settlements, higher agricultural and industrial production and infrastructure expansion (IUCN, 2009; Ruthenberg, 1976; Binswanger and McIntire, 1987; Pingali *et al.,* 1987; Harmsen, 2018; Ogello *et al*., 2013). Additionally, governance of wetlands has been characterized by under representation of local communities. Rather than representing the interests of those who use them for provision of 'public goods', this has favoured those whose interests are to convert the wetlands to increase private gain (Springate-Baginski *et al*., 2009).

Even though wetlands cover only around 6 per cent of the Earth's land surface, 40 per cent of all plant and animal species live or breed in wetlands, but they are disappearing three times faster than forests due to human activities and global heating (UNEP, 2020). According to Convention on Wetlands Secretariat, we have lost 87% of the world's wetlands since 1900 and that we are losing them faster than forests, making them the most threatened ecosystem on Earth (Convention on Wetlands, 2020).

Wetlands form an important part of nature and are valuable multifunctional habitats that nurture a great diversity of life, provide water and other resources, control flooding and act as giant filters easing pollution. But nature is declining globally at rates unprecedented in

human history—and the rate of species extinctions is accelerating, with grave impacts on people around the world (UNEP, 2020).

In Africa, with wetland area  estimated between 1% to 16% of the total area of the continent, wetlands degradation is on the increase as wetland ecosystems are relied upon to lessen industrial, urban and agricultural pollution and supply numerous services and resources ( Nasongo *et al*., 2015; Kansiime *et al*., 2007; Millennium Ecosystem Assessment Report, 2005; Spiers, 1999; Hughes and Hughes, 1992). Similarly, lack of recognition of the traditional values of these wetlands, desire for modernisation and failure to appreciate their ecological role aggravates their degradation (Panayotou, 1994; Maclean *et al.,* 2003).

Wetlands in Kenya are experiencing unprecedented threats due to human activities and impacts of climate change. Kenya has seven main delta-wetlands, namely Tana, Yala, Omo, Malewa, Nyando, Sondu-Miriu and Nzoia whose conflicts have increased over the years due to increasing population, competition for land, declining natural resources, encroachment into fragile ecosystems, escalating poverty and climate change (Odhengo *et al*., 2018a, 2018b).

Lake Victoria basin has many wetlands that cover extensive area and support a wide range of economic activities that sustain a significant proportion of the population and biodiversity in western Kenya region (Raburu, 2012; Kairu, 2001). The wetlands support plants, animals, birds and provides physical stability to the shores besides performing critical filtration functions for Lake Victoria which is presently facing a major threat of pollution from land based human activities (Ondere, 2016).

Yala Wetland is the largest freshwater delta wetland in Kenya and is crucial to Lake Victoria's survival. It is Kenya's largest papyrus wetland, acting as a filter for rivers flowing into Lake Victoria. In addition, it is an Important Bird and Biodiversity Area (IBA) for its large flocks of birds and species restricted to papyrus swamps (EANHS, 2018; IUCN, 2018; Envertek Africa Consult, 2015; CGS, 2019; CGB, 2014; GoK, 2013b; Okondo,1989; JICA, 1987).

Yala Wetland Ecosystem is threatened by over-exploitation of its natural resources by competing local communities and the establishment of large-scale agricultural operations. The agricultural conversion work carried out to date has destroyed natural habitats directly and caused detrimental hydrological changes over a wider area. Issues that the wetland currently faces include: high human population density with low agricultural productivity and widespread poverty; drainage for commercial irrigation at the swamp and upstream; intensified use of agrochemicals; alien invasive species; biodiversity loss; water and air pollution; soil erosion and siltation; burning and haphazard harvesting of papyrus; persistent and prolonged drought; wetland reclamation and encroachment for development projects without assessment of potential impacts on environment and society; declining water levels, soil erosion and silting of the dams and water pans; climate change and weak frameworks for stakeholder participation especially the local communities in resources management which has created suspicion and tension among various interest groups; (Odhengo *et al*., 2018a; County Government of Siaya, 2018; Raburu, 2012;Onywere *et al*., 2011; Kenya Wetland Forum, 2006; Lihanda *et al*., 2003; Otieno *et al*., 2001). Most of these challenges have wetland communities' inclination to them, they are either exploiting the resources for their livelihoods or undertaking development which they use the wetland resources but which affects its ecological value. Their participation in decision making, frameworks, policies, institutions, development and implementation of plans is crucial for sustainable management of Yala ecosystem.

## 1.3 Statement of the Problem

A synthesis of research and policy priorities for papyrus wetlands presented at the Wetlands Conference in 2012 documented by van Dam *et al*, (2014) concluded that (1) there is a need for better estimates of the area covered by papyrus wetlands. Limited evidence however, suggests that the loss of papyrus wetlands is rapid in some areas; (2) there is a need for a better understanding and modelling of the regulating services of papyrus wetlands to support trade-off analysis and improve economic valuation; (3) research on papyrus wetlands should include assessment of all ecosystem services so that trade-offs can be determined as the basis for sustainable management strategies ('wise use'); and (4) more research on the governance, institutional and socio-economic aspects

of papyrus wetlands is needed to assist African governments in dealing with the challenges of conserving wetlands in the face of growing food security needs and climate change.

Nearly 65% of Yala wetland is occupied by papyrus dominated vegetation (Odhengo *et al.*, 2018a). Yala wetland and the livelihoods it sustains have become more threatened and their ecological integrity endangered by various anthropogenic and hydrodynamic causes during the last half of the century. The anthropogenic causes include land use, increased human population and the relations between lake/water level dynamics, weak wetland management and coordination frameworks, underrepresentation of local communities in wetland decisions making processes. Cumulatively, these have created the enabling environment that is accelerating degradation and loss of these ecosystems, loss of livelihoods and increased poverty among the wetland resource dependent communities (Odhengo *et al.*, 2018a; Davis, 2010; Krhoda, 1992). Further, there has been a weak framework of coordination among the Yala Wetland stakeholders to ensure effective wetland communities' participation in wetland ecosystems management processes.

According to Onywere *et al.* (2011) the overall loss in the area under Yala Wetland was 54 $Km^2$ from 186 $Km^2$ in 1973 to 132 $Km^2$ in 2009. Wetland encroachment had significant changes on the wellbeing of Yala Wetland ecosystem. Various studies done in Yala Wetland and River Nzoia Basin (Raburu, 2012; Kenya Wetland Forum, 2006; Ondere, 2016; Muoria *et al.*, 2015; van Heukelom, 2013; Odenyo *et al.*, 2018; Odero, 2015a, 2015b) recommended that the governance of Yala Wetland should have local communities as co-owners and managers; resolve conflicts of wetland resources use, improve quality of community participation in wetland resources management, and develop of an integrated watershed management plan for effective management of Yala Wetland .

Studies on Yala Wetland by KEFRI (2015) has pointed the reasons for under representation of local communities in Yala Wetland management to include dispossession of community lands by a Dutch company and LVBDA without compensation and wetland residents' denied access to their ancestral lands. Other reasons include incidences of water pollution causing sickness to community members; death of livestock and poultry as result of contact with agro-chemicals; lack of awareness / baseline information on Yala wetland

inventories and variable climatic conditions and destructive practices by community like perennial flooding; and overharvesting wetland plants. As result locals have no interest in Yala wetland management.

Evidence from literature reviewed shows that in Yala Wetland the population of wetland residents are increasing constantly as they carry out their livelihoods activities that are dependent on natural resources from the wetland. The County Governments of Siaya and Busia and the National Government are interested in uplifting the wetland communities' livelihood and have planning and inventory techniques for valuing wetland resources that local  people do not know. The riparian communities also have vast local knowledge which can be of benefit to government planning. The challenge therefore is how to combine all these to uplift their livelihoods and  not degrade resources in  Yala Wetland Ecosystem of Lake Victoria, Kenya.

Further, the dynamics of community participation that would make their participation effective and meaningful in Yala  ecosystem management as their population increase and many stakeholders increasingly get involved in the wetland are yet to be clearly understood. If they are not well understood, then design for sustainable management actions will not be attainable thereby posing a major threat to the existence of the Lake Victoria wetland ecosystem.

This brings into sharp focus the role riparian communities in the continued wetland degradation as well as the change needed to reverse this trend. However, the dynamics of communities' participation and their activities on the wetland are not clearly understood despite wetland's continued degradation in size and value (Dobiesz *et al.,* 2009; Dugan 1993). This study therefore sought to bring clear understanding on and enhance community participation in the planning and management of Yala Wetland ecosystem.

The Yala Wetland challenges discussed above pointed to the need for a well-considered Land Use Plan (LUP) that would provide a rational and scientific basis for future development and use of Yala wetland resources. This situation prompted and encouraged the County Governments of Siaya and Busia, and the Inter-ministerial  Technical Committee on the Sustainable Management of Kenyan Deltas (IMTC) to initiate processes

that culminated in the effort to prepare a LUP that will help resolve these challenges so that Yala Wetland will be able to sustainably support livelihoods of local residents while its ecological integrity and that of its associated ecosystems is protected.

Preliminary processes implemented by IMTC prepared a LUP Framework to guide the planning process and was agreed upon by stakeholders. The IMTC's responsibility is coordination, policy and planning processes of major deltas in Kenya. The Framework was a result of a participatory and collaborative process that involved various stakeholders at the local, county and national levels. As required by Kenya Constitution article 69(1) and part VIII section 87-92 and 115 of County Government Act, 2012 on devolution provisions, and part 2 section 6 (1-2) Public Participation Bill, 2020 provided for participation of local communities in the Yala SEA and LUP process through a Yala Project Advisory Committee (YPAC) (GoK, 2020; GoK, 2012a, 2012b; GoK, 2010a, 2010b). The LUP process also benefited from a concurrent Strategic Environmental Assessment (SEA) process that served to assess the environmental implications of the LUP. However, participation of local communities in seeking solutions to wetlands resources use remains a grave challenge as managers of participation processes engage in low level consultations that do not empower them to co-manage these resources alongside government agencies mandated to do so (GoK, 2010a; Springate-Baginski, et al, 2009; Okello *et al*., 2009; Thenya, 2001; Olson, 1965). Therefore, this research sought to fill the knowledge gap on how to improve effectiveness of wetland communities' participation in managing Yala wetland ecosystem resources sustainably.

This study sought to contribute towards improving the livelihoods of Yala Wetland communities by offering a greater understanding on community participation in wetlands' planning and management processes and then designed a community participation framework that optimizes their participation in planning and subsequent management of the Yala Wetland land use plan and integrated management plans.

**1.4 Objectives of the Study**

**1.4.1 General Objective**

The general objective of the action research was to assess and strengthen participation of Yala Wetland communities so that they can co-own the outcomes of the LUP/SEA process and ensure their stake in future implementation of the results in the management of the wetland ecosystem.

**1.4.2   Specific Objectives**

1. To assess the status of community participation in Yala Wetland ecosystem management.

2. To identify environmental issues using Remote Sensing and Community GIS for inclusion in Yala Wetland Land Use planning and management.

3. To develop a framework for optimizing community participation in the Yala Wetland ecosystem management.

**1.5. Research Questions**

**Objective 1: To assess the status of community participation in Yala Wetland Ecosystem Management.**

**Research Questions**

1. Do the local communities participate in Yala wetland ecosystem management?

1.1 What is the historical account of the formation of Yala wetland and how has that history informed current utilization of its resources?

1.2 What benefits do the local communities derive from Yala wetland and how has this influenced their participation in its management?

1.3 What indigenous knowledge systems are used by local communities to manage Yala Wetland ecosystem?

1.4 What participation structures and processes exist in carrying out Yala wetland LUP/SEA processes?

1.5 What is the current level of community participation in Yala Wetland LUP processes measured using the spectrum model of public participation?

1.6 How effective is the community participation framework in Yala Wetland LUP measured using the 10-point World Bank indicators of public participation effectiveness?

1.7 What governance structure exists for managing Yala Wetland ecosystem?

**Objective 2: To identify environmental issues using Remote Sensing and Community GIS for inclusion in Yala Wetland Land Use Planning and Management.**

**Research Questions**

2.What are the environmental issues of Yala Wetland to be considered in Yala Wetland Land Use planning and integrated management plan?

2a. i.What are environmental issues to be considered, in Yala wetland LUP and management plan?

ii. What is the communities' vision for Yala Wetland Ecosystem in 50 years' time? And what should be done to attain this envisioned future?

iii.What role will local knowledge play in the management of the envisioned Yala Wetland ecosystem?

2b. What are the local communities' environmental issues (spatial data) for inclusion in SEA/LUP and Yala wetland ecosystem management plan? using Public Participatory GIS

2c.i. What are the environmental issues/challenges related to Yala Wetland landcover/landuse changes between 1960 and 2014?

ii. What is the extent and (ecological) impact of Yala Wetland landcover/landuse changes between 1960 and 2014?

iii.What is the extent of the ecosystem and threats to biodiversity, impact on global warming and impact on water use?

**Objective 3: To develop a framework for optimizing community participation in Yala Wetland Ecosystems Management.**

**Research Questions**

**Part one: Designing the framework**

3a. What mechanism would optimize community participation in Yala Wetland planning and management processes?

i. What are the weakness and challenges identified in the YPAC participation mechanism?

ii. What kind of community participation in Yala Wetland planning and management would make the communities feel that they co-own the wetland (by owning some land, having access to the swamp and having rights of access and use to the resources from the swamp, and are fully involved in decisions for managing the swamp affairs)?

**Part Two: Applying the framework in SEA/LUP processes**

3b. Target for evaluation: i. Local community leaders ii. Wetland community members iii. SEA/LUP Technical team members iv. Government officials v. other Yala Wetland stakeholders

i.What is the feedback from testing the modified framework for optimizing community participation in Yala Wetland Planning and Management?

ii. How can this framework be improved to make it even better and to be applied in planning other wetlands?

**Part Three: Deploying the framework in Siaya County Integrated Development (CIDP)**

3c. How can this framework be applied in community development programs particularly County CIDP development?

**Part Four: Deploying the framework in developing Yala Wetland Indigenous Community Conservation Areas Management Plan (ICCA)**

3d. How can this framework be applied in community development programs particularly County CIDP development?

## 1.6 Scope of the Study

The study focused on communities living inside the wetland and within 5km from the wetland boundaries because their propensity to use the wetland is inversely related to travel distance (Abila, 2003, 1998). The study also extended to communities living in the upper Yala cluster (lower catchment of river Yala) whose activities affect the Yala Wetland water flow and quality

The study extended to Yala Wetland catchment areas of Yala and Nzoia rivers and a number of constructed dams such as Ufinga, Giriwa, Oranga, Lebo, Tinga Kuodo, Mwer and Kalenjuok Tinga and activities happening on smaller streams that drain into the wetland and Lake Kanyaboli. Other wetlands included Nyamawin-Luand river feeding into Lake Kanyaboli and Oking River feeding Yala river (IMWI, 2014; Owuor, *et al.,* 2012; Abila, 2003, 2005).

The planned activities on Nzoia River catchment like the location and the type of development and management plans for the whole of Lake Victoria North Catchment area (LVNCA) were also considered in the study (GoK, JICA, 2013; GoK, 2007); IUCN, UNEP, WWF, 1991).

Whereas geographic focus is Yala Wetland and its surroundings, the study incorporated some of the communities' members residing outside the wetland who could make significant contributions to improve on the outcome of Yala Wetland ecosystems management.

## 1.7 Justification of the Study

The study aims at contributing towards improving the livelihoods of Yala Wetland communities by studying the effectiveness of community participation and availing a framework that shall optimize their participation in the management of the ecosystem and accruing benefits. While conceptualizing the research topic and study area, the Yala Wetland Land Use planning processes had started and therefore offered an opportunity to anchor the study to provide real time feedback, improve the process and eventual outcome.

The process of conducting SEA to inform subsequent Yala Wetland LUP was a collaborative effort between the National Government, County Governments of Siaya and Busia, and Conservation Non-Governmental Organizations. The study was thus carried out alongside the Yala Wetland SEA and LUP process. This influenced the choice of research (Action Research method) to ensure that its outcomes informed the final LUP that eventually had local communities' meaningful contribution on how to sustainably manage Yala Wetland ecosystem. The action research type choice with its learning element provided advice and support for practitioners and policy makers in the two counties of Siaya and Busia and in the broader conservation sector.

Moreover, global competitiveness demands that universities should work in conjunction with research agencies, industry, governments and non-governmental organizations (NGOs) to collaboratively generate knowledge and innovation which are essential ingredients for economic growth in the twenty first century (de la Reyn, 2018; UWN, 2014). This was a major consideration for this research type and methodology.

Thus, this study brought in teamwork in research by bringing on board the University of Eldoret, School of Environmental Studies, Development Organizations (USAID/DAI/Africa Lead) my co-supervisor, and other key stakeholders not identified when the processes started like professionals from the Yala Wetland community, students, religious leaders and change makers. Furthermore, since there were multiple stakeholders with varying interests, this promoted the need for a sound coordinating framework for sustainable management of Yala Wetland ecosystem.

## CHAPTER TWO

## LITERATURE REVIEW

### 2.1 Introduction

This chapter reviews literature relevant to the study and is organized into subsections as wetlands, participation, participation paradigm and public participation; policy, legal and institutional framework; and related studies. Thereafter, theoretical and conceptual frameworks of the study are presented which integrates systems theory and transformational learning theory in a wetland ecosystems management context.

### 2.2 Wetlands

For billions of people throughout the world, especially the rural poor, wetlands are critical for livelihoods, providing vital supplies of water, food and materials as well as ecological services. However, wetlands are suffering from extreme levels of degradation, a wetland loss and drainage at more than 50%  resulting not only in a tragic loss of the wetland species but is also impacting heavily on those people whose livelihoods depend upon wetlands(Springate-Baginski *et al*., 2009). Additionally, national and regional economies also lose from the loss of hydrological services, such as flood control and water purification, and of material goods such as those provided through fisheries.

The ecological value of wetlands results from the sum and interaction of biological, physical, and chemical components that maintain wetland characteristics and functions. The interaction of these components and the high productivity of wetland ecosystems typically lead to rich and varied habitats and food resources for numerous types of organisms (IWMI, 2014;Springate-Baginski *et al*., 2009; Khorda,1912).

There are two types of wetlands: natural and artificial wetlands.  Natural wetlands are either permanent or seasonal because they take the characteristics of a distinct ecosystem. Their vegetation cover consists of aquatic plants adapted to the unique hydric soils. They are the most biologically diverse of all ecosystems, serving as a home to a wide range of plants and animal life. They can further be categorized as inland and coastal wetlands (Harmsen, 2018). Inland wetlands include: permanent and temporary rivers and streams; permanent

lakes and reservoirs, seasonal lakes, marshes, and swamps including floodplains, forested wetlands, Alpine and tundra wetlands, springs and oases, geothermal wetlands and underground wetlands, including caves and groundwater systems. Coastal wetlands on the other hand include estuaries and marshes, mangroves, lagoons, including salt ponds, intertidal flats, beaches and dunes, kelp, rock and shell reefs, seagrass beds and coral reefs (Harmsen, 2018; Springate-Baginski *et al*., 2009).

Artificial wetlands on the other hand are water storage areas; reservoirs, barrages, hydro-electric dams' impoundments and are designed to simulate the water quality improvement function of natural wetlands to treat and contain surface water runoff pollutants and decrease loadings to surface water. They can be used to treat municipal and industrial wastewater as well as storm water runoff. Besides, they do not replicate all the ecological functions of natural wetland (Harmsen, 2018; Ramsar Convention, 2016).

The complexity of wetland landscapes thus involves interplay of several key factors: hydrology and topography of the physical wetland, biodiverse wetland ecosystems, and ecosystem services to human communities both local and more distant, local livelihood systems, policies, governance, institutions, and markets. Each of these elements needs to be understood to understand the overall management challenge (Springate-Baginski *et al*., 2009; Ramsar Convention on Wetlands, 1996).

Wetlands can be classified based on the environment where they are found and the nature of their formation. In Kenya they are marine, estuarine, lacustrine, riverine palustrine and human-made (Crafter *et al.,* 1992).   Marine wetlands are exposed to waves and currents of the open ocean and include mangroves, mudflats, coral reefs and salt marshes. Examples include the Mombasa Marine National Park and the Watamu Marine National Reserve. Estuarine wetlands occur where fresh water and salt water mix and this results in deltas, mangroves and tidal marshes. Examples are the Tana River Delta, Turtle Bay and Shimo La Tewa. Lacustrine wetlands occur in and around lakes; examples are Lakes Nakuru, Elementaita, Baringo, Bogoria, Naivasha, Victoria, Jipe, Chala, Magadi and Turkana. Riverine wetlands are found along rivers and streams; examples are the Athi, Ewaso Ng'iro, Nyando, Yala and Tana rivers. Palustrine wetlands are characterised by the absence

of flowing water and tides and  this results in marshes, swamps, bogs and floodplains. Examples are the Nyando floodplains and King'wal swamp. Lastly, human-made wetlands include rice paddies, saltpans, gravel pits, water treatment ponds, dams, reservoirs and canals (Harmsen, 2018; Ramsar Convention, 2016).

## 2.3 Public Participation

### 2.3.1The Concept of Public Participation

"Participation" is one of those words that can be interpreted in many different ways – it can mean finding something out and proceeding as originally planned; or developing processes of collective learning that change the way that people think and act (Harrison *et al*., 2001). Essentially, public participation is the process of ensuring that those who have an interest or stake in a decision are involved in making that decision. The many ways that organisations interpret and use the term public participation has resulted into a range of different types of participation. These range from passive participation, where people are told what is to happen and act out predetermined roles, to self-mobilisation, where people take initiatives largely independent of external institutions (Table 2.1).

**Table 2.1 Types of Participation**

| Types of Participation | Characteristics |
| --- | --- |
| Informing | People participate by being informed what has been decided or has already happened. Or participation is used to gather information from those involved to develop solutions based on their knowledge. The decisions however are made by those initiating the participation process |
| Consultation | People participate by being consulted or by answering questions. The process does not concede any share in decision-making, and professionals are under no obligation to take on board people's views |
| Implementing | Participation is seen by those initiating it as a means to achieve their goals, especially reduced costs. People participate to meet objectives decided by those starting the process. |
| Shared Decisions | People participate in the joint analysis of situations and the development of plans to act. Such a process involves capacity building – the formation or strengthening of local groups or institutions |
| Self Determination | People participate by taking initiatives independently to change systems– such as plans and policies. They develop contacts with external institutions for resources and technical advice they need but retain control over how resources are used |

Source: Harrison *et al.,* 2001

In essence the types of participation move from situations in which stakeholders are largely passive in the process and the power lies with those in control to stakeholders becoming active and in control of the process themselves.

One type of participation may not in itself be 'better' than another. Different types of public participation are appropriate in different situations, with different objectives and with different stakeholders. Some stakeholders have a greater right to more control of the process than others, some have greater capacity to participate than others and some are quite happy to participate less in some decisions- allowing others such as representative organisations or politicians to take decisions for them.

According to the International Association of Public Participation (IAP2, 2008) public participation consist of five levels: Information (lowest level, where participation does not go beyond information provision), consultation, involvement, collaboration and empowerment (highest level, where the public are given a final say on the project decision.

Participation has become a key element in the discussion concerning development particularly in natural resources management (Cooke and Kothari, 2001). The concept is seen as a magic bullet by development agencies who are making participation one, if not the core element of development (Michener, 1998). As Cleaver (1999) in her various studies on participation notes the drive for participatory approaches seems to stem from the perceived paradigm shift in development that supports participation as a way forward in development. Promoters of participatory approaches observe the traditional top-down management style to be inefficient, corrupt, and exploitative as far as the poor and the marginalized are concerned (World Bank, 1998). As a result, participation is presented as a feasible response to these problems.

Participation has been defined variously depending on who is doing the defining and what the objectives are for participation. Wilson (2003) posits that different types of participation are more important than defining it, while other scholars prefer evaluating participation according to the nature and quantity of benefits derived. For example, Michener (1998) defines participation as a process that lies on a continuum from a planner-centred to a people-centred approach. A planner-centred approach focuses on

administrative and financial efficiency. From this viewpoint, the motivation for promoting participation is that user involvement makes projects more likely to succeed in meeting their objectives. It is also perceived by planners that this form of participation increases local people's acceptance of new interventions promoted from outside.

In contrast, the people-centred participation is based on the perception that participation is both a means and an end in itself. According to Chambers (1997), participation is supposed to be a means to meet locally felt needs and to redistribute scarce resources. It is also seen as having a practical value as a process that empowers the poor and the marginalized by enhancing local management capacity, increasing confidence of participants, and raising collective consciousness. In this regard, the people-centred participation is closely related to the concept of "strong" participation, as initially promoted by Chambers (1983). From these viewpoints, the people-centred participation is seen as a way to substitute emancipation to empower the deprived and the excluded to take their own decisions.

Although other classifications of participation have been developed (for example Wilson, 2003; Deshler and Sock, 1985 Cohen and Uphoff, 1980), it is the people-centred participation that is highly promoted, by donors and development agencies. This is mainly because it embodies powerful and appealing terms such as "community", "empowerment", and "poverty reduction" (Cleaver, 2001). Nevertheless, those who argue for the people-centred participation have been criticized for their simplistic approach to society. For example, Brett (2000) argues that those who claim that mere peoples' participation can fundamentally alter the nature of power structure that sustains complex societies are simply ignoring the well-established in-sights of modern social science. In particular, leading authors of participatory approaches assert that participation has shown how local people understand the socio-political conditions under which they live and possess the relevant knowledge for solutions to many local level problems (Doelle and Sinclair, 2005; Narayan, 2002; Chambers, 1997; Chambers, 1994; Uphoff, 1992). However, the authors point out that in some cases, local people can become a "ghostly" presence within the planning process. They are visible, can be even heard but in essence they are only there because their involvement lends credibility and legitimacy to decisions that have already been made. It is also observed that people-centred participatory theorists often make unrealistic

assumptions about the ability of the poor to access joint decision-making processes (McCay and Acheson, 1987).

Jacobs (1961) documented how neighbourhoods attain vitality through the collective efforts of individuals who care about their common place. Castells (1983) provided evidence that community-based action has occurred in a wide variety of cultures and is universal. Participants in such organizations see opportunities to achieve individual goals through collective action (Thomas *et al*., 2016; Miriti, 2016; Raburu *et al.*, 2012; Olson, 1965).

### 2.3.2 Participation Models

Participation has been studied and different models offered to show the levels and challenges therein. The models include the ladder of citizen participation (Arnstein, 1969) which show the hierarchies of participation from non-participation, to tokenism and to citizen power with meaningful happening at the apex (citizen control); to the *wheel* model with four levels namely inform, consult, participate and empower (Davidson,1998); and the spectrum model with five levels from inform, consult, involve, collaborate and empower (Stuart, 2017; ODPM, 2004). Finally, there is citizen as partners model which has five levels from Information and transaction, consultation, deliberative involvement, government – led active participation and citizen-led active participation (OECD, 2001).

Participation in policy formulation and strategic planning is a recent phenomenon. This is where decision making originally vested with authorities is being taken down to the people who have interest, and are affected by those decisions (OECD, 2001). Participation is also related to the theories of communication, which emphasize that the rationale of decision-making is also expressed through communication that is constitutive of social identity. In the Hebermas theory, the rational action does not come from expected results of action, but it only derives from communication itself. Therefore, one can already consider key role of information (i.e. understanding) and moral aspects (i.e. honesty, truth, correctness) in any participatory processes (Niskanen and Vayrenen, 1999).

Public participation is important in community planning and has been practiced in ways that range from evasion to full empowerment. This is seen in the ladder of increasing of

public participation where on the lowest rung the citizens are (sometimes) provided with requested information and at the top of the rung, the public has full voice in the final decision making usually through a community organization.

The barriers to participation by the poor include among other things, gender, class, poverty or access to social, political and economic resources and the fact that participatory processes can also be subverted by small groups whose interests do not coincide with those of society as a whole (Agrawal and Gupta, 2005). Studying forest management in India, Agrawal (2002) observes that social status was a crucial point in determining who could and who could not participate. The study concludes that the key factor affecting the performance of governance is not the degree of participation per se; rather the nature of the institutional constraints that determine who can participate, how, and when.

### 2.3.3 Spectrum Model of Public Participation

The Spectrum of Public Participation was developed by the International Association of Public Participation (IAP2) to help clarify the role of the public (or community) in planning and decision-making, and how much influence the community has over planning or decision-making processes (Stuart, 2017). It identifies five levels of public participation (or community engagement) as shown in Figure 2.1.
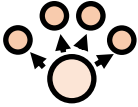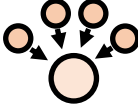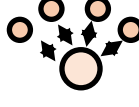
| | INFORM | CONSULT | INVOLVE | COLLABORATE | EMPOWER |
|---|---|---|---|---|---|
| **GOAL** | To provide balanced and objective information in a timely manner. | To obtain feedback on analysis, issues, alternatives and decisions. | To work with the public to make sure that concerns and aspirations are considered and understood. | To partner with the public in each aspect of the decision-making. | To place final decision making in the hands of the public. |
| PROMISE | "We will keep you informed" | "We will listen to and acknowledge your concerns" | "We will work with you to ensure your concerns and aspirations are directly reflected in the decisions made | "We will look to you for advice and innovations and incorporate this in decisions as much as possible" | "We will implement what you decide" |

**Figure 2.1: Spectrum of Public Participation (Adapted from IAP2 Spectrum of public participation, Stuart, 2017)**

The further to the right on the Spectrum, the more influence the community has over decisions, and each level can be appropriate depending on the context. It is important to recognise that these are levels, not steps. For each level it articulates the public participation goal and the promise to the public. The first level of public participation which is the **Inform** level does not actually provide the opportunity for public participation at all, but rather provides the public with the information they need to understand the agency decision-making process. Some practitioners suggest that the Inform level should be placed across the Spectrum (e.g. above or below it) to demonstrate that "effective engagement with stakeholders at all levels on the Spectrum requires a strategic flow of information" (Chappell, 2016).

Since Arnstein (1969) proposed a ladder of citizen participation almost 50 years ago (ranging from manipulation and therapy, to delegated power and citizen control) there have been several attempts to classify levels of community engagement with the Spectrum of Public Participation gaining more popularity (Stuart, 2017).

### 2.3.4 Participation Paradigm

There are two main sociologist epistemological models for participation in decision-making. The first is the rationalist model, which is based on deductive chain of decision taken by the public authority in charge of making public choices for society. In this model, common interest is defined by a rationalist norm in extra-societal way, without any considerations on the needs and interests expressed by the users. The second one is the incremental model, which considers decision as a set of actions taken by a network of relations between the stakeholders and the representative structures of public authority (Niskanen and Vayrenen, 1999). This framework defines common interest as the results of all needs and interests expressed by stakeholders. The public authority has a passive role of translation of social expressions. Some of the position expressed will be opposite; hence, the solution is not a consensus, but a compromise. Therefore, the paradigm of participation theoretically refers to either of the two frameworks, but it is generally used in the frame of incremental viewpoint.

Citizen-led active participation is the ultimate aim of public participation in which citizens are actively engaged in decision-making processes, alongside government and or facilitating agency; citizen decisions become binding; citizens share ownership and responsibility over outcomes (OECD, 2001). Although participation is a process, and one that may have a temporal component to it, participation is not linear. Issues are frequently place-based and so are participants.

## 2.3.5 The Place of Public Participation in Environmental Planning and Management

Why is public participation important in planning and management? A key factor that underscores the role of public participation is the political nature of most decisions. Even decisions on strictly technical choices are often not made exclusively based on logical and independent analysis of technical data and multicriteria equations. Instead, they are regularly the result of political expediency, a bargain element in the negotiation of other goods and agreements, a market opportunity, a rapport of forces between vested interests (Ferraz de Abreu, 2002). In such situations, the active participation of the community itself in the planning and management processes brings some balance into the decision process and thus avoid decisions that will harm community interests (i.e. the "common good") (Hardin, 1968).

Decision-making processes on technical matters are therefore attractive situations to study the community participation occurrence. In particular, they raise inevitably the issue of the role of the expert. Ordinarily seen as the source for an independent, objective, interest-neuter, rational planning by some, and as the voice of the interests that appoint them by other. Experts are nevertheless at the centre of the decision process because expertise and technical knowledge is required, and because expertise will be called to defend each side. So, the question of what public participation becomes, is a great measure of the question of how a lay community can give a meaningful, valid input, with real weight in a final decision based on technical arguments and evidence (Ferraz de Abreu, 2002). This brings the corresponding question on the importance of a modified framework: "can a proposed modified community participation framework in Yala Wetland contribute in a significant way to "level the field by optimizing community participation", reduce the gap between

local communities, the experts and policy makers, and thus facilitate a more informed and knowledgeable input from local communities?"

## 2.3.6 Objectives of Community Participation in Decision Making

Selznick identified two views about the purpose of participation namely administrative and substantive participation. "Administrative participation" attempts to transform the citizen into a reliable instrument for the achievement of administrative goals (as cited in Ferraz de Abreu, 1992). "Substantive participation" on the other hand attempts to provide citizens with an actual role in the determination of policy. Whereas there are different ways to promote community participation, and that understanding of these agendas are essential to understand the tactics and techniques adopted for public participation; the formulation of dual views tends itself to weaken the argument, because it is also reasonable to expect circumstances where both strategies are not contradictory.

Vlachos (1993) proposes a model that focuses on levels of participation, instead of objectives of participation. The difference is creative since it does not imply a prior judgment on intentions. He makes a distinction between public awareness, public involvement and public participation.

Public awareness implies one-way information and alerting to community issues. Public involvement implies two-way communication and a means of engaging community members in the exchange of information (dialogue). Finally, public participation is the most intense form of interaction between authorities, experts and citizens and implies more than anything else truly joint planning and democratic delegation of power and shared leadership.

Another critical issue in the literature is "Public vs. Expert" dichotomy. According to Frankena (1988) there is "the emergent social role and political impact of the voluntary technical expert". In some circumstances, this distinction becomes irrelevant. Kennard points out that "when it comes to values, we are all experts" (as cited by Ferraz de Abreu, 2002), therefore, if the issue is essentially dependent on value judgments, everyone is qualified. Besides Frankena's and Kennard's arguments, citizens and NGOs can engage their own experts; and the exponential mass access to education and science increased the

likelihood of finding qualified experts among individual citizens in the targeted locations. Inspite of the foregoing, this remains an open issue, because of the inequalities in the distribution of human and institutional resources, and in the scope of the projects being assessed. Vlachos, for instance, differs from Frankena on the relevance of the voluntary expert.

Within the last decade or so, society has tended to advocate the simultaneous growth of participatory democracy and of expertise in decision-making. It becomes difficult to maximize both of these value preferences and strains appear between the idealized conceptions of citizen participation and the harsh demands of public policy making and implementation (Vlachos, 1993). If both Frankena and Vlachos have a point, what is the major pattern? It is important and relevant to collect evidence of the level of expertise reached in public participation processes.

Additionally, Glass (1979) proposed a model focusing on the *function* of each kind of public participation. He itemized five objectives of citizen participation: information exchange, education, support building, decision-making supplement and representational input. Considering Glass approach, Ferraz de Abreu (2002) added by suggesting a way of evaluating the scope of each objective by assessing the way it relates to the potential problems resulting from not having public participation namely: weak legitimacy of some decisions (interests of majority may be neglected; interests of minorities may be ignored); weak accountability, easier corruption; weak constituency to support development effort and costs; no public help and cooperation in development tasks; project plan and its review may miss aspects dependent on local knowledge that otherwise would have been an improvement;  later antagonism may block project, with added costs; and no public education gains. An important task of developing a land use plan in an area that has experienced grave conflicts with investors in Yala Wetland would wish to benefit from minimizing potential participation problems starting with weak legitimacy of fundamental land use decisions.

The identification of the objectives of community participation and respective problems associated with each is crucial in developing "criteria of success", which forms the basis

of improving the *process* framework of public participation. Similarly, it can help to identify the specific requirements that an improved community participation framework should satisfy.

### 2.3.7 Forms of Participation

Sarah White's (1996) work on the forms and functions of participation distinguishes four forms of participation: nominal, instrumental, representative and transformative. She reasons that each form has different functions, and argues actors 'at the top' (more powerful) and 'at the grass roots' (less powerful) have different perceptions of and interests in each form. **Nominal participation** is often used by more powerful actors to give legitimacy to development plans. Less powerful people become involved in it through a desire for inclusion. However, it is little more than a display, and does not result in change. **Instrumental participation** sees community participation being used as a means towards a stated end – often the efficient use of the skills and knowledge of community members in project implementation. **Representative participation** involves giving community members a voice in the decision-making and implementation process of projects or policies that affect them. For the more powerful, representative participation increases the chances of their intervention being sustainable; for the less powerful, it may offer a chance for leverage. **Transformative participation** results in the empowerment of those involved, and as a result alters the structures and institutions that lead to marginalisation and exclusion.

White's work helps us to think about the politics of participation that is hidden agendas and the dynamic relationships between more and less powerful actors. It is only in 'transformative participation' that the power holders are in solidarity with the less powerful to take actions and shape decisions. White emphasizes that this framework needs to be seen as something dynamic, and that a single intervention can include more than one form of participation.

### 2.3.8 Techniques of Public Participation and their Challenges

The different techniques used in public participation include focus groups discussions, advisory committees, dedicated telephone lines, interviews, talks, conferences, workshops,

surveys, and referendum (Sapienza cited by Ferraz de Abreu, 2002; World Bank, 1998; Joanaz de Melo, 1993; Innes, 1992; EPA, 1990). Many factors are considered in choosing which technique to apply in each situation. However, they have challenges that efforts to improve community participation should consider namely: it requires full-time dedication from members, for a long period of time (advisory committee); if it allows to estimate emotional responses, it does not provide any indication about the duration of focus groups, it depends on public willingness to call (dedicated phone line); it does not facilitate dialogue; it allows exacerbation of differences of opinion (talks); dialogue is still limited and may require even more time (and people) to organize (e.g. conferences); it is not adequate for large audiences, organizing in several places and on several topics, requires plenty of people and time (e.g. workshops); provides a still image of public opinion, requires professionals and a very expensive technique (e.g. survey); requires long and expensive phase of information and debate, community susceptible to emotional assertions than to reasoned opinions (e.g. referendum).

Other emerging techniques that help with capturing diversity and complexity of issues and dynamics for the local community as documented by Smith (2002, 2006) and Odero, (2015a) include:

**a. Open space technology.** This uses plenary circles (i.e., participants sit in a circle) and has a few, simple rules. Breakout sessions are organized, led and reported on by self-selected participants. This technique can maximize the creativity, energy, vision and leadership of all participants, and is egalitarian and inclusive. It can be used to set strategic direction, plan or initiate a project, and develop standards, criteria or regulations. It has the ability to maximize teamwork.

**b. Future search conferences** are workshop conferences at which 40-80 people join forces to visualize a desired future and then design the steps needed to get the organization there. This technique uses a whole system approach and places emphasis on self-managed, small-group discussions. It can be used when the solution to an issue or problem resolution may require a change in organizational mission, functions or structure.

**c. E-participation** includes a wide range of specific individual techniques, including e-mail, provision of Web site information, bulletin boards, chat and news groups, dialogue groups and virtual communities. These low-cost approaches are only available to those who have access to a computer and are useful when the policy community is spread over a broad geographic area, or where open information-sharing is important.

**d. Public policy dialogue** involves in-depth, detailed work with a variety of stakeholders in a committee or workshop format, usually to achieve consensus on diverse views, interests and values. In the policy development process, dialogue is especially useful at the value and goal clarification stage and during option selection if tradeoffs are required. Dialogue may last from two days to two years, commonly two days per month for three to 12 months. Inclusive representation of key stakeholders, often including the sponsor, is essential.

**e. Appreciative inquiry** focuses on the positive aspects of a situation, opportunities, strengths, proven capacities and skills, resources and affirms, appreciates and builds on existing strengths. Appreciative inquiry is a very effective way to get people to think about their demonstrated abilities instead of listing and dwelling on problems or challenges (Copperrider, 2008).

**f. Study circles** explore a critical public issue in a democratic way; analyze a problem, develop strategies and actions; and look at issues from multiple viewpoints. Small-group discussion among peers is often facilitated. Study circles have eight to 12 members and meet regularly over a period of weeks or months. This technique is especially useful at the problem definition, values and goal clarification, option generation, and selection stages of policy development.

In the use of the above techniques, remotely sensed data and resultant spatial information can be used to help communities visualize the status of natural resources, trends, causes, effects and model future scenarios to animate the discussions (Odero, 2015a). These analyses show evidence of some obvious key factors for enhancement through improved frameworks and better use of technology to help minimize time and staff requirements. However, it also points to other important element of how can improved community

participation framework help to facilitate reasoned and in-depth debates, and to enlarge the space of solutions versus the space of conflicts?

### 2.3.9 Critique of Community Participation

Several decision makers are cynical towards community participation and have, pointed to typical problems found in current community consultations. One, the foundation for a decision being of technical nature, it is best left for qualified experts. Second, the scope of the projects being assessed are vast, therefore they need expert multidisciplinary facilitators not always available to most local communities, or even to most CBOs/NGOs, sometimes not even to government agencies. Third, credibility in the process is low as people do not believe that their input will make a difference regarding the final decision. Fourth, citizen perspective is often limited sometimes due to lack of interest whatsoever or local or individual bias leads to a limited view of the impact of a development decision (i.e. no "common good" perspective). Fifth, discussions turn to generic or ideological debate "off the mark" of the relevant issue (which may also reflect a deficit on forums for another level of debate); and finally, time consumed in public consultation is expensive, particularly from the point of view of developers.

Is the current justification of many decision makers against more public participation - particularly one with more weight over the final decision outdated? Better decision-making processes and better use of available technology may not only allow improving on fairness, but there may also exist many situations where there is a larger space of dialogue and compromise leading to acceptable solutions that are not being investigated. Conversely, it is a fact that there have been many decisions, serving the public interest prudently well, without any public participation; and it is questionable, at least in some cases, whether the conflict of multiple narrow-minded interests would have obstructed any decision at all, had the public been called to participate. It is therefore helpful to briefly characterize classes of problems, from both the point of view of decision makers and citizens (Ferraz de Abreu, 2002).

Most decision-making processes fall within one of the following cases:

a) When more community participation is mandatory for a more authentic decision, for instance, in high-risk projects. There are clear-cut cases where there is a well-defined population whose lives will be deeply affected by the decision. Therefore, a better-informed population and improved community participation will be a better guarantee of the adequacy of the decision by those affected by it. This may not be welcome by decision makers but they are increasingly aware of the potentially high political costs of alienating the people.

b) When too much information to the community is feared because it will generate stronger opposition from people that will suddenly realize that some of their interests will be put in question; it is possible that these fears are well founded, meaning, more access to information and more diluted decision powers will paralyze some developments needed for the common good, or at least increase difficulty and costs.

c) When people's interests will not be put in question by a decision or will be even favoured by it, but people may fear it anyway, because of fear of change and the always existing degree of doubt of outcome. In these cases, decision makers also tend to avoid too much community participation, too much spread of information, at least beforehand, or in the least they try to control the process limiting the boundaries for the community participation like one month of access to a non-technical summary in some hard-to-reach place, and where there is little room for changes.

Except for the type a cases discussed above, where decision makers will probably welcome better frameworks, and better use of technology, meaning institutional processes more suitable for this technology, the challenge is to show that in any event people today have already a wide access to information, and given the competition between political forces and/or economic interests, it is likely that at least one of them will use and spread the information; and precisely because it will be used with a narrow political/or economic motivation, it may very well be filtered out in a less favorable and more hostile fashion than the original data would have been (Vasconcelos, 1993). Vlachos reminds us that "the communication revolution is making more central the observation that public officials and

public decision makers are now existing in a fishbowl compared to earlier times" (Vlachos, 1993).

In the first class of cases (a), if there is an irreducible conflict of interests, that becomes essentially a matter of democracy, and the interests of the majority should prevail over less legitimate interests. The other cases are more interesting by the greater challenge they represent. When there is a fear of conflicting interests (well-founded or not), there is a space of contradiction, of conflict; but the use of adequate public participation processes may also uncover a previously unknown and unexplored space of solutions that could be more satisfactory or at least increase the legitimacy of the decision. This could happen by increasing in a significant way the number of people positively affected, as well of the spread of different communities (minorities, for instance) that will be favored by a better decision emerging from this larger space of solutions.

### 2.3.10  Emerging Lessons and Good Practices of Public Participation

Good practices and lessons learnt in public participation are vital in improving community participation practice. From  six project areas carried in Participation in Planning Water management options, the European Union (EU) life environment wise use of flood plain project notes  that the following six early lessons are emerging on when to do participation (Harrison *et al*., 2001).

One, scale: Participation exercises have taken place at a variety of scales with some areas involving communities to consider issues at river catchment level whilst others have broken down into sub catchments or even more local areas along the catchment. Catchment level discussions have generally taken place more with organisations than with individual members of the community. Second, Context: Always the degree to which participation has been successful in involving people, getting views, or even aiming at consensus, has depended greatly on issues of context. These include political contexts, employment contexts, issues contexts, such as flooding, water quality and on cultural contexts relating to a history or not of co-operation and participation. Third, Transferability: Many of the methods including mapping, surveys, timelines etc.) have been used in the WUF project areas and the experience has been valuable to test different techniques for different issues

and with different stakeholders. Flexibility of using techniques is essential and so it is important to have a wide range of techniques. Techniques are transferable but need to be applied and adapted to local circumstances.

Fourth, Training/ capacity/resources: Participation can be resource hungry though some areas have saved costs through using local networks and facilities. The main resource investment is usually time. Techniques for participation vary and the more complex ones need careful training and professional implementation. Fifth, Processes of participation – early involvement of communities in the decision making process has led to gradual decision making and planning and helped achieve consensus amongst stakeholders. Sixth, partnership working – using local host organisations can not only save time and money but also help build up trust and ongoing relationships – especially in cross border situations if the host has a history of cross border working. These parameters will be used in evaluating the effectiveness of Yala wetland community participation framework.

## 2.3.11 Evaluation of Public Participation using Emerging Lessons and World Bank Indicators

From the application of participatory approaches in various projects and subsequent emerging lessons and the World Bank public participation lessons (World Bank, 1998:2002, Harrison *et al*., 2001) some 10 indicators have been identified as key in evaluating public participation effectiveness namely: 1. Objectives **– why do participation**? what are the objectives – this is a vital reference point for evaluation. 2. **Contexts** for the participation – helps evaluation. Was participation, for example, part of a larger strategy. Political contexts, economic. 3. Levels of Involvement – all to do with how **early you involve** people, how **much power** is handed over and when. 4. **Who was involved,** how chosen – mistakes made (by who?) 5. What **method**s were used, maps, interviews etc. – did they work? 6. **Innovation** –of method or just participation itself for the area 7. **Commitment** – to use or not? 8. **Inputs** – time, money etc. and results in relation to those inputs 9. **Outputs,** hard outputs, reports, posters, press, completed survey forms 10. **Outcome** – most important culmination of the evaluation.

The above indicators point at different elements of public participation and this study used these 10 indicators as well as the spectrum of public participation to evaluate the community participation framework of Yala Land Use Plan. The synergy of the two methods was envisaged to  bring the best of each other as well as complement each where they have weaknesses.

The World Bank's Internal Learning Group on Participatory Development conducted a study in 1994 to measure the benefits and costs of their participatory projects. A total of 42 participatory projects were analysed and compared with equivalents. The principal benefits were found to be increased uptake of services; decreased operational costs; increased rate of return; and increased incomes of stakeholders. But it was also found that the absolute costs of participation were greater, though these were offset by benefits: the total staff time in the design phase (42 projects) was 10-15% more than non-participatory projects; and the total staff time for supervision was 60% more than non-participatory projects (loaded at front end). It is increasingly clear that if the process is sufficiently interactive, then benefits can arise both within local communities and for external agencies and their professional staff (World Bank, 1998, 2002).

## 2.4 Policy, Legal and Institutional Framework

The relevant policies, laws and institutions that guide wetland planning from the global, regional, national and county levels are discussed below.

### 2.4.1 Global and Regional Context

The Aarhus Convention of 1998 avers that citizens must not only have access to information but must also be entitled to participate in decision making and have access to justice in environmental matters (DETR, 2000); and thereby assert their right to live in a safe environment and protect and improve the environment for the benefit of future generations (Stec *et al*., 2000).The Convention stipulates three basic pillars of public participation namely: access to information, public participation in decision making and access to justice (Hartley and Wood, 2005).

The global development agenda of sustainable development goals (SDGs) provide global context for this study as 11 out of 17 goals relate to issues within the Yala wetland including hunger, good health and wellbeing, clean water and sanitation, gender equality, climate action, life below water and on land, sustainable cities and communities, and peace and justice strong institutions (United Nations, 2015).The Africa Union Agenda 2063 provide continental relevance and the aspirations include a prosperous Africa based on inclusive growth and sustainable development, an integrated continent, politically united and based on the ideals of Pan Africanism and vision of Africa's Renaissance, an Africa of good governance, democracy, respect for human rights, justice and the rule of law; a peaceful and secure Africa; Africa with a strong cultural identity, common heritage, values and ethics; Africa as a strong, united, resilient and influential global partner and player; and an Africa whose development is people driven, relying on the potential of the African People, particularly its Women and Youth and caring for children (African Union, 2013).The Yala wetland's aspirations of a sustainable ecosystem management is in compliance with the AU Vision 2063.

In 2005, Countries across the globe adopted the Hyogo Framework for Action in Japan (UN, 2005). In 2015, lessons from the progress review of The Hyogo Framework revealed that more dedicated action needed to be focused on tackling underlying disaster risk drivers such as poor land management and compounding factors such as demographic change, weak institutional arrangements, non-risk-informed policies, lack of regulation and incentives for private disaster risk reduction investment, complex supply chains, limited availability of technology, unsustainable uses of natural resources, declining ecosystems, pandemics and epidemics. Additional risk drivers are the consequences of poverty and inequality, climate change and variability, and unplanned and rapid urbanization.

The Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted at the Third United Nations World Conference on Disaster Risk Reduction in Sendai, Miyagi, Japan (UN, 2005). Building on the Hyogo Framework for Action, the Sendai Framework aims to achieve the following outcome over the next 15 years: The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. This

will be achieved by preventing new and reducing existing disaster risk through the implementation of integrated and inclusive measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery and thus strengthen resilience (MacOpiyo, 2005). These frameworks support the need for Yala wetland as fragile ecosystem to be given the urgency for its planning and subsequent management that responds to these global framework's timelines.

The African Union (AU) adopted the "*Malabo Declaration*", a Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods (Doc. Assembly/AU/2(XXIII) (The Africa Union Commission, 2014). The Malabo Declaration launched the second generation of 10 years of Comprehensive African Agriculture Development Programme (CAADP) by adopting the following seven key commitments encompassing the 2025 vision and goals of Africa Accelerated Agricultural Growth and Transformation (3AGT) (The Africa Union Commission, 2014); Recommitment to the Principles and Values of the CAADP Process; Commitment to Enhancing Investment Finance in Agriculture; Commitment to Ending Hunger in Africa by 2025; Commitment to Halving Poverty by the year 2025, through Inclusive Agricultural Growth and Transformation, Commitment to Boosting Intra-African Trade in Agricultural commodities and services; Commitment to Enhancing Resilience of Livelihoods and Production Systems to Climate Variability and other related risks; and Commitment to Mutual Accountability to Actions and Results. The CAADP Results Framework for CAADP commitments implementation has three levels of results namely: Level one: To contribute to wealth creation, reducing poverty, improving food and nutrition security, creating jobs, and increasing resilience of individuals and communities to various shocks; Level two: Sustained agriculture growth, jobs and poverty reduction; Level three: Strengthening systemic capacity for effective execution and delivery of results. The overall goal of CAADP is to "Help African countries reach a higher path of economic growth through agriculture-led development. The results framework above itemizes the following chain of results which provide grounding for this study on wetlands management: Increased ecosystem resilience and sustainability (level 1) and Improved governance and management of natural resources (level 3). The Yala wetland being  a host to the third largest oxbow lake in Africa as indicated earlier presents an opportunity for this study to

contribute development of sound management plan and governance that will respond to the CAADP  commitments above and ultimately improve the livelihoods of Yala wetland communities while maintaining the ecological integrity of the wetland and associated ecosystems.

## 2.4.2 Policy and Legal Context in Kenya

A review of Kenya's policies and legislations below shows how participatory natural resources management is guided in the country.

### 2.4.2.1 The Kenya Constitution, 2010

The Constitution 2010 created a new governance dispensation, creating county governments and devolving management of some resources which were initially managed by the central government while some are shared (GoK, 2010a). The Constitution is robust and gives guidance to legal, policy and institutional frameworks for managing the country and its resources and how public participation shall be conducted. The key aspects of the constitution that gives frame to the current Yala wetland ecosystem study include: Article 1(2) which states that "all sovereign power belongs to the people of Kenya. The people may exercise their sovereignty directly or through their elected representatives". Article 10 (2) a, b and c elaborate on the national values and principles of governance which include democracy and participation of the people; inclusiveness; good governance, integrity, transparency and accountability. Article 27 guarantees equality and non-discrimination, hence, public participation should ensure equality and non-discrimination while Article 33 directs that public participation should respect the freedom of expression of all participants. Further Article 35 guarantees the right to access information by citizens.

The Constitution 2010 lays out the  principles of public participation in Articles 1(2), 10(2), 33(1)(a), 35, 69(1)(d, 118, 174(c) and (d) 184(1)(c), 196, 201(a) and 232(1)(d) while Public Participation Bill 2020 gives details on operationalizing these in Kenya's governance processes. The County Government Act 2012 also spells out how the county governments are to conduct public affairs in their jurisdictions.

Article 60 sets the principles on which land be held, used and managed that is equitable, efficient, productive and sustainable. Article 66(1) regulates the use of land in the interest of defense, public safety, public order, public morality, public health, or land use planning. Article 67(1) (h) establishes National Land Commission in charge of monitoring and have oversight responsibilities over land use planning in Kenya. Article 69 empowers the government to ensure sustainable exploitation, utilization and management of natural resources (GoK, 2010a).

Article 42 of the Bill of rights provides that every person has the right to a clean and healthy environment, thus environment is recognised as an inherent resource and article 70(1) provides for citizen's redress mechanism. Chapter 5 of the Constitution (Articles 70, 71 and 72) recognises the need for sustainable utilization, exploitation, management and conservation of environment and natural resources including protection of ecologically sensitive areas like Yala Wetland. Thus, the 2010 Constitution has spelt out the powers of the wetland communities in the ownership and delegated responsibility given the government agencies like National Land Commission and the County Governments. It has provided the right for public participation in management of government affairs including land use planning and management which this study sought on how to improve its effectiveness.

### 2.4.2.2 Relevant Policies and Laws

The National Land Policy 2009 guides the country towards efficient, sustainable and equitable use of land for prosperity (GoK, 2009a). It deals with access to land, land tenure, land administration, land use management and land information management thereby gives guidance on how to handle Yala Wetland ownership issues.

Kenya Vision 2030 (GoK, 2007) is Kenya's development blueprint to help the country transform to a middle income and newly industrialized county by the year 2030. It is anchored on three pillars namely social, economic and political. Water is a key driver in sustainable management of the wetland and thus ecosystems management plans must factor that and eventually contribute to Vision 2030 goals. Therefore, Yala wetland LUP and other related ecosystem management plans will be contributing to attainment of this vision.

The National Environmental Policy 2013 provides an appropriate legal and institutional framework for the management of environmental issues and seeks to integrate environmental issues in national economic and social development goals. The revised EMCA of 2015 goes further to expand the definition of wetland as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (GoK, 2015a).This revised definition would help in delineating the extent of Yala Wetland to provide the basis for the LUP development.

The National Land Commission Act (2012) established the National Land Commission (NLC) which facilitates the linkages between the commission, county governments and other institutions dealing with land and land related resources (GoK, 2012a) .

The Agriculture, Fisheries and Food Authority Act 2013 (GoK, 2013c) provides for consolidation of laws on the regulations and promotion of agriculture, establishment of Agriculture and Food Authority, promotes soil and water conservation and prevents destruction of vegetation. This will guide agricultural activities envisaged in Yala wetland, its buffer zones and watershed catchments.

The Intergovernmental Relations Act, 2012 provides the framework for consultations between National and County governments. Yala Wetland ecosystem management requires transboundary/inter-county collaboration among the two counties of Siaya and Busia who share the wetland and other neighbouring counties (Uasin Gishu, Nandi, Kakamega and Vihiga, Kisumu) whose activities affect Yala Wetland such as the water catchment areas for river Yala that affect environmental flows into the wetland (GoK, 2012c).

The Forest Conservation and Management Act (2016) gives effect to Article 69 of the Constitution by providing for development and sustainable management of forest resources (GoK, 2016a). This includes conservation and utilization of forest resources; restoration of watershed, restoration and conservation of riparian areas, and promotion of agroforestry practices in Yala Wetland, its buffer and watershed catchment areas.

The County Government Act (2012) section 87-92 and 115 provides for County Planning framework that shall integrate economic, physical, social, environmental and spatial planning (GoK, 2012b). This legislation mandates Siaya and Busia counties to develop and implement Yala Wetland land use plan and other plans for managing the wetland ecosystem.

The Community Land Act (2016) lays the framework for recognizing, registering, administering and management of community owed land. The law further guides on how to convert community lands to private or public land and vice versa. The rights and entitlements of community members and principles for natural resource management and dispute resolution. It is worth noting that most wetland communities have not registered their ancestral lands as community lands, thus still being managed by respective county governments (GoK, 2016b).

The Climate Change Act (2016) seeks to ensure that development, management, implementation and regulation mechanism to enhance climate change resilience and low carbon development for sustainable development of Kenya (GoK, 2016c). The Act seeks to mainstream climate change in all sectors of Kenya's economy and in the school curricula.

The Physical Planning Act, 2012 and its Amendment No. 3 of 2019 provides for preparation, approval and implementation of physical development plans. The Act mandates Local Authorities to regulate development within their areas of jurisdiction to foster orderly and sustainable development. Section 36 guides on how to conduct an EIA for any development likely to have negative effect on environment (GoK, 2012d, GoK, 2019).

The Water Act (2016) which repealed the Water Act 2002 seeks to ensure sustainable water management which has devolved water and sanitation services to county governments (GoK, 2016d). It further created Water Resources Authority (WRA) for regulation and Basin Water Resources Committee to replace Catchment Advisory Committees (CACs). The legislation provides for catchment protection, drainage of land, carrying out soil conservation measures or control of vegetation of effectively preserving purity and quantity

of water. Water reserve is defined in the legislation as the water that must be retained in the environment to guarantee sustainability of water supply for proper ecological and biophysical functions. Thus, determination of Yala Wetland water reserve is critical in various proposed land uses to ensure ecological water balance.

Wildlife Conservation and Management Act (2013) provides for sustainable use of land and prohibits all activities that may have adverse effects on the environment (GoK 2013b). It further provides declaration of a wetland as an important habitat or ecosystem for wildlife conservation a protected wetland such as Yala Wetland Indigenous Community Conservation Areas (ICCA), declaration of a national reserve for conservation of biodiversity like Lake Kanyaboli, migratory routes or catchment protection. The regulations recognises nationally threatened species such as Sitatunga antelopes, hippos and other threatened fish species found in Yala wetland.

### 2.4.2.3 Legal and Institutional Framework for Wetlands

The Kenya Government does not have one ratified legally binding institutional framework for managing wetland ecosystems. Rather, different government agencies and departments have handled different aspects of wetland conservation and management. A review of twenty natural resources conservation and management functions indicate sharing of these functions by  Kenya Wildlife Service (16 mandates), Kenya Forestry Service (13 mandates); NEMA (9 mandates) and KWTA (6 mandates); NMK (7), KEFRI (6) and DRSRS (4).

The Environment Management and Coordination Act (EMCA, 2015) provides for the conservation and management of wetlands while NEMA only coordinates as the principal custodian of the environment (GoK,1999; GoK, 2015a). With their various mandates and priorities, the different government agencies and departments often clash in their attempts to use, protect and restore degraded wetland areas. The Inter-Ministerial Technical Committee (IMTC) on Sustainable Management of Deltas in Kenya was formed to coordinate wetlands management and had put forth its Delta Planning Framework in 2012 within which Tana Delta's Land Use plan was developed preceded by a SEA.

The IMTC coordinated the development of Yala Wetland Land Use Plan and SEA between National Government and the County government of Busia and Siaya and key stakeholders (NGOs, Development partners). The Kenya Constitution 2010 with new systems of governance (Article 14 Devolution and Public Participation) presented yet another fresh set challenges and opportunities to wetland management in Kenya (GoK, 2010a). There was therefore an urgent need to harmonize the different roles played by different departments and agencies. These fragile ecosystems will also benefit greatly if the counties came up with appropriate co-management approaches for the same.

## 2.4.2.4 Legal and Institutional Framework for  Community Conservation Areas

Indigenous Community Conservation Areas (ICCA) refers to areas set aside that were previously used for other purposes but are now protected by local communities through stakeholder consultations. ICCAs can include ecosystems with minimum to substantial human influence as well as cases of continuation, revival or modification of traditional practices or new initiatives taken up by communities in the face of new threats or opportunities. Their sizes may range from very small to large stretches of land and waterscapes (IUCN, 2009).

Three important features that define CCAs are: one or more communities closely relate to the ecosystems and species culturally and/or because of survival and dependence for livelihood; the community management decisions and efforts lead to the conservation of habitats, species, ecological services and associated cultural values, although the conscious objective of management may be different (e.g. livelihood, water security, safeguarding of cultural and spiritual places); and the communities are the major players in decision-making and implementation regarding the management of the site, implying that community institutions have the capacity to enforce regulations; in many situations there may be other stakeholders in collaboration or partnership, but primary decision-making is with the community. Indigenous local communities have for millennia played a critical role in conserving a variety of natural environments and species. They have done this for a variety of purposes such as economic, cultural, spiritual or aesthetic appeal.

Today, there are many thousands of **Community Conserved Areas** (CCAs) across the world, including sacred forests, wetlands, and landscapes, village lakes, catchment forests, river and coastal stretches and marine areas. In Kenya there are various types of CCAs such those in: **Pastoralist Landscapes** such as where pastoral communities like Borana, Turkana, Maasai protect and conserve critical resources like pasture and water sources for their livestock; Loita Forest in Narok District where the Maasai communities living alongside it have protected the forest it from external encroachment and other development threats; **Forests** the sacred forests of the Mijikenda people of the coastal zone. These groves, known as Kayas, range in size from about 30 to 300 ha and are found along much of the Kenyan coast in Kilifi, Kwale and Mombasa Counties. Eleven representative Kayas spread along the coast were officially inscribed in 2008 as one of Kenya's six World Heritage Sites (UNESCO, 2011); **Community Conservancies (e.g.** land explicitly for wildlife, often on the basis of tourism investments made by outside companies that enter into contractual agreements with the local community. Examples are found in Maasai Mara, Amboseli, Laikipia, NRT in Northern Kenya and Kenya's North Coast, and; **Locally Managed Marine Areas (**e.g. Kuruwitu, Iweni, Kibuyuni, Mradi, Bureni, Mwarembo and Wasini formed to improve the health of reef ecosystem, reduce over exploitation and improve livelihoods. See http://www.icriforum.org/sites/default/files/Grant_Kenya_Briefing_note.pdf

## 2.4.5 Policy and Legal Framework   for Public Participation

The Constitution calls for Public Participation under article 69(1) and part VIII section 87-92 and 115 of the County Government Act, 2012 (GoK, 2010a; GoK, 2012b) and part 2 of Public Participation Bill, 2020 (GoK, 2020). The Yala LUP processes sought public participation to ensure statutory compliance and also  to enhance the quality envisaged in the final outcome. Public participation would therefore;  create awareness and interest in LUP, provide public opportunity to influence decisions on development planning matters that affect them, ensure sustainability through community ownership of the plan, empower the stakeholders to take responsibility for sustainable management of the wetland, minimize conflicts during plan preparation and implementation and increase transparency,

inclusivity and accountability in land use planning process (GoK, 2010a; Busia County Government, 2015,  Siaya County Government, 2015).

However, studies and development interventions prior to the commencement of Yala SEA/ LUP showed challenges with community participation in Yala Wetland ecosystem management. The challenges included:   community's reduced interest in wetland's management, strained relationship between the community and  the investor (i.e. Dominion Farms Ltd) whom they accused of having been  allocated their ancestral land without adequate consultation, previous lack of a comprehensive Yala Wetland LUP, lack of political goodwill (choice of community activities versus political leaders priorities) (personal communication with the Vice Chair Luo Council of Elder and a former councilor (elected leader and petitioner during Yala Wetland phase 3 expansion in May 2016), limited awareness on ecological and economical importance of the wetland and resultant contribution to the unsustainable utilization of the wetland (Nature Kenya, 2015; GoK, 1987).

Participation therefore seeks to provide for matters necessary or convenient to give effect to chapter eleven of the Kenya Constitution 2010 and the Public Participation Bill 2020. Public participation seeks to provide a framework for the direct exercise of sovereignty by the people through actively informing the form and content of legislation, policy and development plans. It provides for a framework for informed, effective, efficient and sustainable engagement of persons in policy, legislation and development plans and programmes. Finally, it gives effect to the principles of public participation as set out in Articles 1(2), 10, Chapter 4, Article 35, 61, 69, 118, 119, 196, 174, 184, 201, 232. Fourth Schedule of the Constitution; and the Principles of Public Participation under Section 87 of the County Governments Act.

## 2.5 Overview of Related Studies

A study of public participation during environmental assessments in Kenya by Okello *et al*., (2009), noted  the barriers of public participation in environmental decision making to include: inadequate enforcement of regulations that promulgate public participation in EIA, information inaccessibility in terms of readability and physical access; inadequate

awareness of the public on their roles and rights during EIA; and incomprehensible language and incomplete regulation for public participation during SEA. The researchers recommended that these undoings have to be surmounted if public participation was to improve to collaboration and empowerment levels. This study sought to contribute to improving public participation levels by designing a framework that will help improve the various models that are applicable but still falling short of the expected quality of public participation.

Studies on Yala Wetland among them Odenyo *et al*., (2017); Owiyo *et al*., (2014), Raburu *et al.,* (2012), Raburu (2012) van Heukelom (2011), Guya *et al.,* (2006); Abila (2006, 2005,1998); Awange *et al*., (2007); Osumba (2010), Otieno (2004), Otieno *et al*., (2001), Thenya *et al*,.(2001) reveal that the wetland integrity has been affected adversely over the last 60 years through diversion and other uses of water in the upper and middle catchment of the River Basin and by irrigation schemes and clearance for agriculture within the wetland itself. Additionally, there has also been a very important external influence through the construction of the Owen Falls dam on the outfall of Lake Victoria to the White Nile and operation of a hydropower plant in Uganda (Wehling, 2020).  At the beginning, these engineering works led to a rise of more than 2 metres in the overall lake level, but recently increased power generation has contributed to a fall (Abila, 2003; Odhengo *et al*., (2018a), Odhengo *et al*., (2018b).

The studies by Obiero *et al*. (2012) and KEFRI (2015) point that community participation Yala Wetland management has been affected specifically by lack of interest in wetland management due to disposition of land without compensation and later denying them access to their ancestral lands (currently block 899) locally known as *Ojuk Chuon,* lower camp and upper camp, lack of wetland management plan, lack of political goodwill, unclear land tenure and ownership of the wetland, lack of baseline Information on comprehensive inventories on Yala wetland to equip communities to participate with data, limited awareness on ecological/economical importance of wetland thus use skewed on limited consumptive use of some of the wetland resources, variable climatic conditions and destructive practices by community i.e. the Yala wetland is situated in an area which experience extremes in climatic conditions with perennial flooding during the rainy and

drought during the dry seasons and consequent resources use conflicts. Additionally, lack of appropriate Institutional Framework- no ratified and legally binding institutional framework for management of wetland ecosystems (but a draft wetland policy is awaiting ratification as of May 2021). Different aspects of wetland conservation and management are currently handled by different government agencies and departments such as Kenya Wildlife Service, Ministry of Fisheries, Water Resources Management Authority; Ministry of Agriculture, National Environment Management Authority (NEMA), County and communities without a clear legal framework. The Environment Management and Coordination Act (GoK, 1999) provides for the conservation and management of wetlands while NEMA only coordinates as the principal custodian of the environment.

Researchers Davis *et al.* (2013) note that there is increasing attention to formal recognition of indigenous and community conserved areas (ICCAs) as part of national and/or global protected area systems where they are generating novel encounters between the customary institutions through which indigenous peoples and local communities manage these traditional estates and the bureaucratic institutions of protected area management planning. Although management plans are widely considered to be important to effective management of protected areas, little guidance has been available about how their form and content can effectively reflect the distinctive socio-cultural and political characteristics of ICCAs. This gap has been particularly apparent in Australia where a trend to rapidly increased formal engagement of indigenous people in environmental management resulted, by 2012, in 50 indigenous groups voluntarily declaring their intent to manage all or part of their estates for conservation in perpetuity, as an indigenous protected area (IPA). Development and adoption of a management plan is central to the process through which the Australian Government recognizes these voluntary declarations and invests resources in IPA management.

Davis and team identified four types of innovations, apparent in some recent IPA plans, which reflect the distinctive socio-cultural and political characteristics of ICCAs and support indigenous people as the primary decision makers and drivers of knowledge integration in IPAs. These are (1) a focus on customary institutions in governance; (2) strategic planning approaches that respond to interlinkages of stewardship between people,

place, plants, and animals; (3) planning frameworks that bridge scales by considering values and issues across the whole of an indigenous people's territory; and (4) varied communication modes appropriate to varied audiences, including an emphasis on visual and spatial modes. Further research is warranted into how governance and management of IPAs, and the plans that support these processes, can best engender adaptive management and diverse strong partnerships while managing the risk of partners eroding local control. Since Yala wetland conservation is gearing towards having more wetland community control in managing it's resource, these global emerging good practices would be vital lessons to consider in Yala Wetland ecosystem management plans.

Research by Newaz and Rahman (2019) in Bangladesh on wetland resource governance where rural communities depend on natural resources and cause their over-exploitation. In response to centralized resources management system, community-based co-management emerged mainly to ensure the sustainability of natural resources through benefiting the local communities. Based on the study in Tanguar Haor, a unique wetland ecosystem in the northeastern region of Bangladesh, the research revealed that co-management approach can promote greater participation of the local community in resource management but establishing such governance arrangements take time depending on the potential of community organizations.

The study revealed the initiative of establishing co-management is still a challenge in Tanguar Haor, where there is a high dependency on resources given the socio-economic conditions. Also, the ineffectiveness of the existing community organization, largely due to a lack of leadership at the local level, is an obstacle to governing this wetland. Therefore, the findings of this study broadly highlight the necessity for strengthening the community organization through a collaborative process. In line with the commitment of government as well as its realization at the community level, the need for responsible, legitimate and effective roles of the community people including leaders has been further urged towards sustainable management of the wetland resources.

These Bangledesh unique wetland study lessons will be relevant to Yala Wetland as they study seeks to understand the dynamics of local communities in managing the wetland and design a mechanism that will eventually optimize their participation in its management.

Khan and Hannan (2011) in their study of Participatory wetland resource governance in Bangladesh found that the community-based organizations (CBOs) were capable of contributing effectively to the community-based or co-management approach in wetland resource management. Establishing a multi-level stakeholder governance system as an institutional structure and process was necessary to sustain CBOs' operations in decision-making. The participation of local resource users would require appropriate degree of integration of the "bottom-up" and "top-down" approaches to include all relevant stakeholders in the decision-making processes at multiple levels of social organizations.

This alternative approach could be an effective instrument to facilitate the deliberations of stakeholders and to strengthen institutional linkages to engender benefits to the local resource users. A set of PRA methods, which included baseline surveys, focus group discussions, key informant interviews, semi-structured interviews, individual discussion meetings, addah (informal chatting with friends and fellows), and workshops, was used during the research to attain the objective of the study.

A rapid assessment of anthropogenic disturbances in East African wetlands was conducted by Beuel *et al,*(2016) using WET Health. WET-health is an indicator-based rapid wetland assessment approach developed in South Africa. It allows determining the conditions of wetlands in four assessment modules (hydrology, geomorphology, vegetation, and water quality) by observing the degree of deviation of a wetland from its anticipated natural reference state.

Researchers tested the transferability of the WET-health concept for East African inland valley swamps and floodplain wetlands based on 114 assessment units at four study sites. Due to large wetland areas and different environmental settings in East Africa, they modified the original approach using a random selection of assessment units and an assessment scheme based on disturbance types. Estimated WET-health impact scores were

matched with biophysical and socioeconomic variables using a generalized linear mixed model.

The researchers found that the use of East African freshwater wetlands for agriculture has increased in recent decades, raising concerns about potential impacts on wetlands and the long-term sustainability of such land use trends. Land use included largely undisturbed wetland units occurring side by side with seasonally cropped or grazed units, and drained, permanently cultivated units. A strong differentiation of impact scores between the four assessment modules was apparent with highest scores for vegetation and lowest scores for geomorphology. Vegetation and water quality responded most sensitively to land use changes. The magnitude of wetland disturbance was predominantly determined by management factors such as land use intensity, soil tillage, drainage intensity, and the application of agrochemicals and influences vegetation attributes and the provision of ecosystem services.

The proposed modification of WET-health enables users to assess large wetland areas during relatively short periods of time. While further studies will be required, WET-health appears to be a promising concept to be applied to wetlands in East Africa and possibly beyond. These parameters that WET health assesses would be looked with respect to how Yala wetland communities engage with them in the course of managing the wetland and their impacts of their actions with respect to its degradation level.

## 2.6 Theoretical Framework

Theories are constructed in order to explain, predict and master phenomena such as behaviour, events, scenarios, or relationships. A theory makes generalizations about observations and consists of an interrelated, coherent set of ideas and models. The theoretical framework of a study is the structure that can hold or support a theory of research work. It shows the theory that explains why the problem under study exists. It helps in bringing understanding of how the world is experienced. It provides a lens that shapes and frames what the investigator looks at and includes in a study and how the study is conducted (Murgor, 2015; Mertz and Anfara, 2006).

This study is grounded on  the Systems Theory and its related Ecosystems, the Post-Modernism and Green Social Theories for handling complex systems, Theory U and Transformational Learning Theory for initiating and nurturing fundamental changes. Whereas systems, ecosystem approach  and transformative learning were the main theories guiding the study, other theories  related with different aspects of the study was brought help the study deal with complexity of the issues in Yala Wetland and in designing the framework for optimizing community participation.

## 2.6.1 Systems Theory

This study is guided first by the Systems Theory  advanced by Von Bertalanffy (1968). Free Management Library defines a system as an organized collection of parts (subsystems) that are highly integrated to accomplish an overall goal. The system has various inputs which go through certain processes to produce certain outputs, which together accomplish the overall desired goal for the systems. If one part of the system is changed, the nature of the overall system is changed as well. Examining the system by observing the component parts is a reductionist approach. A systems approach, by contrast, implies that we need to think in terms of the whole, while paying attention also to the parts of the system and how they interact with each other (UNEP, 2016; Hayombe, 2010).

A system approach posits that the performance of the whole is greater than the sum of the performance of its parts. It seeks to identify all parts of the organized activity and how they interact. The fundamental systems-interactive paradigm of organizational analysis features the continual stages of input, throughput and output, which shows the concept of openness or closedness. A closed system does not interact with its environment. It does not take in information and therefore is likely to vanish. On the other hand, an open system receives information, which it uses to interact dynamically with its environment. Openness increases its likelihood to survive and prosper (UNEP, 2016).

This study takes the view that Yala Wetland ecosystem as a whole system with various components (people, animals, plants, water, other wetland components) which need to work together to give proper functioning of the wetland and this combination requires good care to eventually deliver sustainable management of the wetland (Newaz and Rahman,

2019). The people part of the system is where public participation come in and this study seeks investigate and propose how to secure optimal community participation in the planning and management of Yala wetland ecosystem.

Further, this study is grounded on theories that explain complex subsystems aspects of the wetland mainly ecological, economic and social subsystems and they include Ecosystem Approach Theory, Post Modernism Theory and Green Social Theory.

**2.6.2 The Ecosystem Approach Theory**

The Ecosystem Approach Theory for wetland management is anchored in the Convention on Biological Diversity (2006) which explains that the ecosystem approach is a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way.

According to Shepherd (2004) ecosystem approach is framework for thinking ecologically that results in actions that are based on holistic decision-making but not a set of regulations to manage various ecosystems. It combines all the wetland stakeholders and depicts a holistic interdisciplinary perspective with the wetland as the core in ecosystem approach implementation. It furthers shows linkages between society and the natural environment; and environmental management (Hahn *et al*., 2007). The relationship should be realized by way of the role wetlands have in ecosystem functioning, the water cycle, spatial associations and policies and fit into the management of water resources, use and conservation of wetland resources, connectivity and vulnerability in the landscape, social significance and the economic values of wetlands in providing ecosystem services. The environment and society interrelate and priority concerns of society, linking natural and social science thereby achieving good management of the ecosystems.

Environmental problems are often described as "wicked problems" to highlight their complexity and the difficulties they entail. Finding answers to current crises such as fisheries collapse, climate change, biodiversity loss, infectious diseases, and inequitable access to resources will be among the greatest challenges of our time. The ecosystem approach applies systems thinking to gain a better understanding of how ecosystems

function. It can help identify potential solutions to a myriad of problems inspired in part by the complex dynamics of ecosystems themselves (UNEP, 2016).

Thus, Yala Ecosystem management plan needs to give due consideration to the ecological, economic and social subsystems as vital foundations for sustainable management of the ecosystem. As such, social sustainability of the wetland system can only proceed from meaningful involvement of the local communities through a participation procedure. This study analyzed this procedure, YPAC, and proffers ways to optimize communities' meaningful participation in its planning and subsequent implementation.

Similarly, by adopting an ecosystem approach to the wetland's planning, a strategy that provides for the integrated management of land, water and living resources that provide sustainable delivery of ecosystem services in an equitable way further buttresses the application of the system theory for complex systems. This requires change of mindset, government buy-in, sound planning and effective action based on the latest science which should be considered in the study to obtain a framework that optimize communities' participation in Yala Wetland planning and management. Further elucidation of these subsystems' theories are Post-Modernism Theory and Green social Theory for natural sciences on one hand and, Theory of Change, Theory U and Transformational Learning Theory for the social sciences aspects of the wetland ecosystem management.

### 2.6.3 Post-Modernism Theory

This emerging theory of social and environmental relations seeks to replace the modernism theory which has been associated with deterioration of the environment. Beck and Wynne (1992) the proponents of post-modernism and environmentalism thoughts on present day environmental crisis (known as Risk Society Hypothesis) postulate that the environmental crisis associated with modernity cannot be solved within modernity but requires a postmodern solution.

They further note that environmental risks are side effects or cost of development and modernization. Consequently, they itemize the four categories of risks: (i) ecological risks which include biodiversity loss, global warming, ozone depletion and ecosystem

destruction; (ii) health risks which include skin pollution related illnesses such as asthma, cancer and heart diseases, and genetically modified foodstuff; (iii) economic risks, including unemployment and lack of job security, and (iv) social risk including increase in crime, family break downs and deviant behaviours. The Risk Society Hypothesis describes modern sense of fear, distrust and unease with scientific and technological development as seen in Yala wetland communities' relationship with the commercial farming investor the Dominion's farms and implicitly supports the Precautionary Principle in Sustainable Development (Barry, 1999).

Therefore, the failure of modernism theory to cater for environmental concerns led to the new post modernism theory, where the Risk Society Hypothesis calls for Precautionary Principle (Barry, 1999; O'Riodan and Jordan, 1995). The principle avers that development within the modernization process leads to injury to the environment and requires that precautions be taken. The principle is based on environmental risks assessment where uncertainty provides for a justification to prevent environmental injury before it occurs. Likewise, the development of Yala wetland LUP and associated ecosystems management plans are therefore being guided by environmental assessments like SEA, Environmental Impact Assessments (EIAs) and Environmental Audits (EAs) to bring environmental caution into the overall governance of the ecosystem.

### 2.6.4 Green Social Theory

Barry (1999) proposes the **Green Social Theory** as a pivotal social theory and a body of knowledge that methodically analyzes the modernization and its internal dynamic processes. The theory is applied in sustainable development principles namely: by reducing the separation between society and environment, appreciating the biological linkages of human beings and human society, viewing human being as natural being with particular species-specific needs and characteristics, and accepting ecological scarcity, finite natural resources and fixed limits of the environment to absorb human produced wastes (Kituyi and Wakhungu, 2004).

Green Social theory is therefore a critique of economic growth that dominates modernization with no moral concern for environment. To change course demands

restructuring social, economic and political institutions to produce a more ecologically sustainable world (Allmendinger, 2001). The concerns for future generations based on ecological science that guarantees sustainability is embedded in the principle. The Green social theory is critical in analyzing the sour relationship between local communities and the commercial farmer (Dominion farms) whom they accused of reneging on the agreements they had with the company and further denying them access to some their ancestral shrines for warship like Sigulu. It will also be used in showing the local communities the interrelationships between their livelihood provisions from the wetland and the urgent need for their participation in conserving the wetland natural resources as in individual and groups including learning intuitions to instill ecological values and ethos to students.

The Conventional Development Model (CDM) shows that the interaction of economic and social system creates pressure to the environmental systems resulting in unsustainable development (WRI, 2002; RIVM/UNEP, 1997). Thus, the Green Social Theory champions a philosophy and an ethical underpinning that should influence the formulation of environmental plans and management of sensitive ecosystems like wetlands. The philosophy is also entrenched in the emerging sustainable development paradigm and Yala Wetland planning takes cognizance of this and thereby carries SEA to inform ongoing Yala Wetland LUP. This study underlines this by seeking to ensure local communities concerns are seriously taken on board in Yala Wetland planning and subsequent ecosystems management plan implementation processes.

## 2.6.5 Theory of Change

A theory of change defines the building blocks required to bring about a given long-term goal. This set of connected building blocks–interchangeably referred to as outcomes, results, accomplishments, or preconditions is depicted on a map known as a pathway of change, which is a graphic representation of the change process. Stakeholders value Theory of Change as part of program planning and evaluation because they create a commonly understood vision of the long-term goals, how they will be reached, and what will be used to measure progress along the way (Organizational Research Services (ORS), 2004).

The Theory of Change differs from other methods of describing initiatives in a few ways. It shows a causal pathway from one point to another point by specifying what is needed for goals to be achieved; it requires one to articulate underlying assumptions which can be tested and measured; and changes the way of thinking about initiatives from what one is doing to what one wants to achieve and starts from that point. Ultimately, the Theory of Change and associated frameworks are direct responses to the urge for results and impact. The Theory of Change helps identify the specific combination of action areas expected to deliver the desired change and transformation (Rhydderch *et al*., 2004; Bushe, 1998).

In this study, the Theory of Change aided in the development of the desired vision of Yala Wetland and subsequently guided SEA as a precursor to LUP development and finally LUP and other wetland management plans implementation to attain sustainably managed wetland ecosystems. For this study the main activities were obtaining contextual and historical information about the Yala wetland from the communities to inform LUP/SEA processes, generating their desired vision of the wetland and what actions to carry to realize that, co-creating the LUP/SEA with government technical team and ensuring their concerns were embedded in the final LUP and SEA and eventually factored in related wetland ecosystem management plans like the ICCA and creation of wetland wide governance system with communities at the centre.

### 2.6.6 Theory U

Further demands of developing participation framework that optimizes community participation as noted earlier require change of mindsets and effective action based on the latest science, thus provides the principles of Theory U to guide the process. Since it emerged around 2006, Theory U has come to be understood in three primary ways: first as a framework; second, as a method for leading profound change; and third, as a way of being- connecting to the more authentic of higher aspects of our self (Scharmer, 2016). The theory proposes that the quality of the results that we create in any kind of social system is a function of the quality of awareness, attention, or consciousness that the participants in the system operate from (Monkelbaan, 2019).

The iceberg image in Theory U captures this deep territory of change in the form of a model that depicts the symptoms of the problem at the surface, and underneath them the deeper root issues and sources that give rise to them. To address the pressing challenges of our time at the level of source requires us to "turn the lens back at ourselves," by going through the U process—that is, by shifting the awareness that we are operating from (Scharmer, 2016).
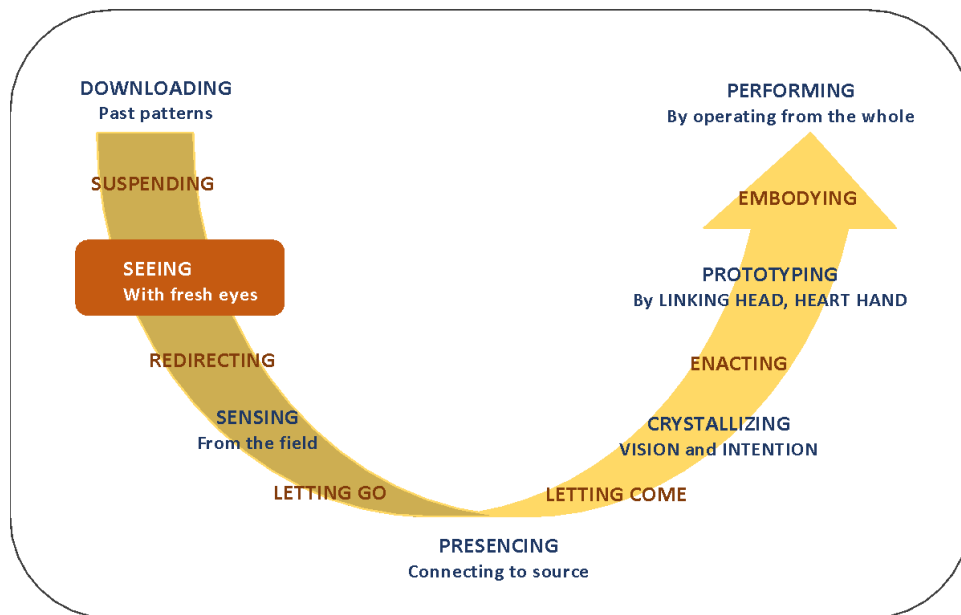


**Figure 2.2: Components of Theory U**

**(Source: Scharmer, 2016 )**

Most learning methodologies focus on learning from the past, Theory U proposes a framework and methodology for understanding and practicing another learning cycle per root issues and sources that give rise to them.

Within this study, Theory U helped the researcher to look at communities from the point of a deeper understanding of themselves, their aspirations and how they would undertake profound change they desire (i.e. sustainably managed Yala Wetland ecosystem) and then bring that to bear in the proposed framework to optimize their participation in the process. This would act as the mirror for the local community to help them check themselves, confront what is not positive about them, what has negative repercussion on the wetland

and bring out what is good from within themselves to the world and use that to improve the planning and management of the Wetland. Their behaviours on Yala Wetland, their attitudes and beliefs that are responsible for the current challenges and then what mindsets would be required to cause profound change as contained in the new vision for Yala Wetland Ecosystem. In this study, the use of participatory methods that apply emotional intelligence like sympathy walks and appreciative enquiry methods were used to help respondents and researchers delve into the root causes of the Yala Wetland challenges and their contributions therein; their aspirations of the future (next 50 years) in line with the Africa Union aspirations of Agenda 2063 of a prosperous Africa and how they could co-create that future. These methods enabled the community to confront their attitudes responsible for the current challenges and to make bold decisions on what profound changes they should make to attain that new vision.

### 2.6.7 Empowerment Theory

If power means control, then empowerment means the process of gaining control (Sen, 1997). Empowerment is primarily about power; changing power relations in favour of those who previously exercised little power over their own lives. This means that facilitating empowerment means supporting people in becoming agents in their own development (Duveskog, 2013). Lightfoot (2002) showed that local communities like farmers cannot be empowered by order from above, but that empowerment, comes through self-realisation, self-organisation and collective action.

The debate on power and knowledge postulates that power is not a zero-sum game but a process that occurs in relationships. Thus, if power is created in relationships, then power and power relations can change (Page and Czuba, 1999). Empowerment should not be seen as equal to decentralization, participation or "bottom-up" approaches. It is a more powerful process (Sen, 1997) that relates to the outcome or the end product of the meanings of such terms.

For community participation in land use and natural resources' planning, this concept is important since community organizations include individuals of mixed ages, gender, occupations and abilities who strive to gain more power over their own lives and

surroundings. It is thus interesting to explore to what extent gaining power might have on the management of natural resources where they are involved.

Community organizations' empowerment is further seen to be important for developing land use plans with households articulating their concerns on the basis of improved knowledge and analysis of their situations. Further, in implementation, these communities are expected to lead in the management of Indigenous Community Conservation Areas (ICCAs) where the government cedes control to the communities and just provide technical support (UNESCO, 2011; IUCN, 2009). Consequently, communities' substantial involvement in the zonation of land use plan to agree on the conservation areas and the principles of managing these during land use plan development is *sine quo non* for successful implementation of ICCAs management plan. This leadership requires officials to demonstrate their love for conservation and transformative and authentic grassroot leadership skills. Shamir and Eilan (2005) defined authentic leaders as genuine, principled, and original while George (2003) points five characteristics of authentic leadership namely having a clear purpose, having strong ethical values, establishing trusting relationships, demonstrating self-discipline and action, and having passion. Linked to community organisations, this can secure better service delivery and more efficient use of public resources they have co-created.

The term empowerment is often difficult to define in action as it takes different forms in different people and contexts (Page and Czuba, 1999). Some of the definitions of empowerment suggested in recent literature are: a multi-dimensional social process that helps people gain control over their own lives. It is a process that fosters power in people for use in their own lives, their community, and in their society by acting on issues that they define as important (Page and Czuba, 1999).

A person's capacity to make effective choices; that is the capacity to transform choices into desired actions and outcomes (Alsop and Heinsohn, 2005). Empowerment, therefore, is a social process because it occurs in relationships with others. It can happen at individual, group and community levels. Besides, it can be seen as an advanced form of participation. However, the concepts are to some extent contradicting in the sense that participation

means people being *given* a greater role in *our* agenda, while empowerment is all about them *taking* control of their *own* agenda (Bartlett, 2005).

In the various levels of participation developed by Pretty (1997) the highest level of participations mentioned is self-mobilization where people participate by taking initiatives independently of external institutions to change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. When participation goes to this level, a process of empowerment can be assumed to be underway. In reality though empowerment is often promoted under some kind of boundaries, which in fact end up restricting the level of empowerment.

Development agents, aiming to facilitate and support empowerment must accept to engage in a process of transformation of themselves, since if we want local communities to gain power, we must accept to lose some ourselves. Programmes also have to be flexible and open-ended to allow people to take control and exercise agency. This means that development partners cannot decide the precise outcomes of empowerment. Predetermined desired outcomes of SEA planning such as conservation, development and hybrid scenarios etc. thereby contradict empowerment since the opportunities for self-determination among stakeholders are limited from the outset (Bartlett, 2005).

### 2.6.8 Transformative Learning Theory

In seeking to understand the change in the daily lives of Yala Wetland communities, particularly how they make sense of their learning experience, Transformative learning (TL) theory provides useful lens for analysing the findings of this study. The TL theory was pioneered by Jack Mezirow with influences from Paulo Freire and Habermas and is one of the most established theories for making sense of the adult learning process (Taylor, 2007). While there are multiple dimensions of TL, this study draws mainly on Mezirow's and Freire's thoughts. Human beings naturally tend to make meaning of their daily lives and continuously change their perceptions based on new experiences.

Transformative learning (Mezirow, 1997, 1996, 1995,1991; Cranton, 1996) focuses on the process of change in individuals' interpretation of a new experience. A central concept in this theoretical approach is *frame of reference;* i.e. the mental structures by which new

experiences are filtered such as values, associations, feelings and conditioned responses. This frame of reference both limits and shapes individuals' perceptions, filtering the experiences they choose to give meaning to and how they construct that meaning. Individuals often tend to reject ideas that do not fit in the existing frame of reference labelling them as irrelevant or not making sense, within their worldview.

A frame of reference is composed of two dimensions: *habits of mind* and a *point of view*. Habits of mind are habitual ways of thinking, feeling, and acting based on the cultural, social, education, economic, political or psychological standpoints of the learner. Habits of mind become articulated in a specific point of view—the assemblage of belief, value judgment, attitude, and feelings that shape a particular interpretation (Mezirow, 1997).

The commonly observed gendered and conservation roles and responsibilities among wetland communities is an example of habit of mind, where a conditioned response is triggered based on deep held cultural beliefs linked to the societal group that the individual belongs to. While points of view are subject to continuing change accessible to awareness and to feedback from others; habits of mind are more durable, since they often are tacit and operate outside the awareness of the individual. They reflect collectively held, unintentionally or assimilated shared cultural values and beliefs.

## 2.7 Conceptual Framework

The conceptual framework attempts to lace together relationships that the study considers are critical for the expansion of community participation in the management of wetland ecosystem.

The status of today's wetland ecosystems reflects intricate interactions of physical and biological processes, as well as human activities over time. Virtually all of the earth's wetlands have been influenced and changed by patterns of intense human use. There has been increased consciousnesses about areas where indigenous and traditional people live, and have done so for hundreds of years, the authority for resource and ecosystem management should be devolved as much as possible to the local level (Macharia *et al.,* 2010; Claridge *et al.,* 1997).

For a  community-based wetland management program to be effective the following variables have to be put into consideration within the context of sustainability model of social, economy and environmental pillars. The social context  includes historical and contextual information, indigenous knowledge, attitudes, mindsets and practices/behaviors towards wetlands ecosystems management, participation processes and capabilities, institutions. The environmental context includes ecological health, water levels, biodiversity, wetland's unique resources, carbon sequestration, socio-economic and technological). The economic context includes community livelihood improvements/economic activities such as employment, wealth creation, income generation.

The understanding of the past and current, wetland communities' participation in the management of the wetland ecosystem; understanding the environmental factors at play in the conservation of the wetland ecosystem; and the livelihood improvements arising from communities' participation coalesce together through a modified framework to optimize community participation and ultimately result in improved wetland conservation. The outcome is evidenced by an improved wellbeing of the wetland communities, community centred multistakeholder governance framework, ecosystem management plans, improved biodiversity and water levels, adoption of positive attitudes and growth mindsets by communities and technicians on wetland ecosystem management equitable benefit sharing mechanism as shown in Figure 2.3.

**Community Participation in Wetland Ecosystem Management**
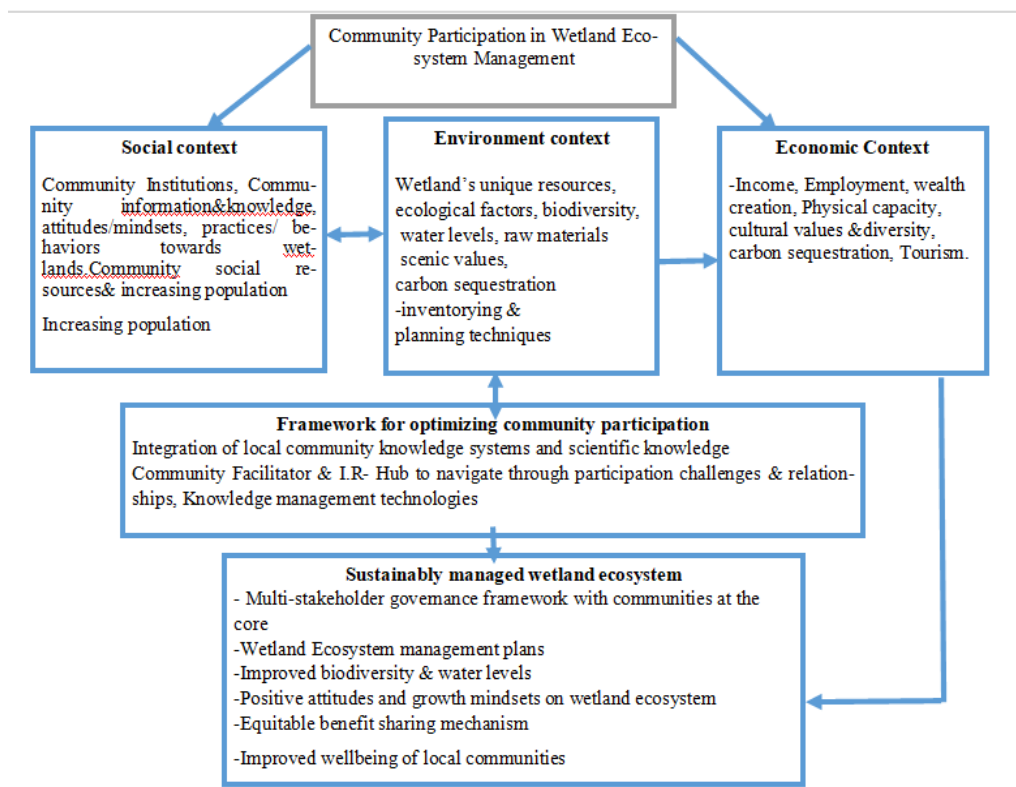


Figure 2.3: Conceptual Framework of the study

## 2.8 Conclusions and gaps in knowledge

From these analyses, there are both conceptual and data gaps on how to secure optimal community participation in planning and management of Yala Wetland ecosystem. Due to wetland ecosystem's sensitivities, there are high stakes and as a result there has been more overt top-down approach in management. Consequently, the wetland communities see management actions as being imposed on to them by policy makers from National and County Governments. This has created a fixated mindset in some of the Yala Wetland communities that does not augur well with the co-management principles required to realise sustainable management.

The chapter has unpacked the meaning of community participation in management of natural resources and models of participation, namely: spectrum model of public

participation and the 10 indicators of evaluating public participation effectiveness, which will be used in analysing the community participation in Yala Wetland ecosystem.

The theories to ground the study were two, namely: systems theory and its related adaptations to deal with complex systems including Ecosystems Approach Theory, Post-Modernism, Theory U for leading profound changes; and Empowerment and Transformational Learning Theory to anchor the learning element of the social sustainability of aspect the wetland management. Also, these theories will used designing the framework that seeks to optimize community contribution in Yala wetland management.

This chapter has also reviewed the legal and policy framework for the study. The Kenya Constitution 2010 that gives sovereign power to the people and how they can exercise their sovereignty directly or through their elected representatives, national values and principles of governance, bills of rights including the right to a clean environment and participation of communities in any development interventions that affect their lives as well as Public Participation Bill 2020 and County Government Act 2012 which spells out procedures for conducting public participation as envisioned in the Constitution 2010. Besides, it looked at various legal and policies regimes that guide wetlands management and how people and institutions interact in wetlands management. Thus, largely there was an enabling policy and legal environment for Yala Wetland management except for studious, innovative implementation.

This study sought to contribute towards improving the livelihoods of Yala Wetland communities by offering a greater understanding on community participation in wetlands planning and management processes and then designed a community participation framework that optimizes their participation in planning and subsequent management of the Yala Wetland land use plan and integrated management plans.

## CHAPTER THREE

## RESEARCH METHODOLOGY

### 3.1 Introduction

This chapter presents the study area, the type of research and methods adopted for the study. Specifically, it describes the research design and finally methods used to collect and analyze data. Given the nature of the problem that needed to be solved, it was clear that the most relevant route was through Action Research. This chapter therefore explains what action research is and then presents research methods used in the study.

### 3.2 The Study Area

### 3.2.1 Location of Yala Wetland and challenges

The study area is Yala Wetland  located on the north eastern shoreline of Lake Victoria between $33^0$ 50' E to $34^0$ 25'E longitudes to $0^o$ 7'S to $0^o$ 10'N latitude (Figures 3.1 and3.2). Yala wetland   is highly valued by local communities (NEMA, 2016) and is Kenya's third largest wetland after Lorian Swamp and Tana Delta and has a very delicate ecosystem. It is shared between Siaya and Busia counties and covers an area of about 20,756 ha (about 207 $Km^2$) (Odhengo *et al*., 2018a; LBDA, 1989; JICA, 1987).  Yala Wetland is situated on the deltaic sediments of the confluence of Nzoia and Yala Rivers where they enter the north-eastern corner of Lake Victoria. The Yala Wetland, which is the largest papyrus swamp in the Kenyan portion of Lake Victoria, is an exceptionally rich and diverse ecosystem, containing many rare, vulnerable and endangered species of plants and animals (EANHS, 2018). The wetland is almost entirely covered in stands of papyrus.

The benefits from the Yala Wetland include food production which made the people food secure in the region in the 1970s and early 1980s; abundant wetland resources which they use for food, income generation, house construction, production of multiple papyrus products for local use and sale, a variety of fish, including rare fish species, and multiple social benefits (Thenya & Ngecu, 2017; Onywere *et al*., 2011; Kareri, 1992).

Despite these benefits, Yala Wetland faces numerous challenges and threats. One, the reclamation of the land for agriculture has led to habitat loss thereby affecting the endangered species. The wetland is a habitat to 41 fish species (IUCN, 2018; Aloo, 2003). Most of the species that disappeared from the main lake (Lake Victoria) are found in the Yala Wetland and mostly in Lake Kanyaboli. Seeger *et al*. (2003) and Witte and Van (1995) have documented the list and status of fish species in the wetland. There is also inadequate freshwater flow replenishment from river Yala after it was diverted to Lake Victoria and dammed by the Dominion Group for commercial farming. This has changed the water chemistry in the wetland, consequently affecting the fish population by interfering with breeding zones (Nature Kenya, 2015; OSIENALA, 1998). Other factors that have led to the decline of endemic species include intensive non-selective fishing, extreme changes in the drainage basin and increased eutrophication (Aloo, 2003). Use of unorthodox fishing methods has also been a major challenge in Lake Kanyaboli, leading to harvesting of fingerlings and breeding stock. Other studies on the wetlands have pointed out that ecosystem services are not optimal thereby denying utilisation of the wetlands' full potential and thus threaten biodiversity forms and welfare of surrounding communities (Thenya, 2012; Raburu, 2012). These communities, mainly the Luo and Luhya in Siaya and Busia counties respectively, are from Kaugagi-Hawinga, Usenge, Obaro, Rukala Magombe, Rugunga, Kadenge, Senje, Othach, Kanyango, Bar Kanyango, Got Ramogi, Usigu, Usenge Got Agulu, Nyomonye, Bar Olengo West, Bulwani and Lugare (CGS,2015; CGS, 2019; CGB, 2015; CGB, 2019). Figures 3.1 and 3.2 show the location of the study area.
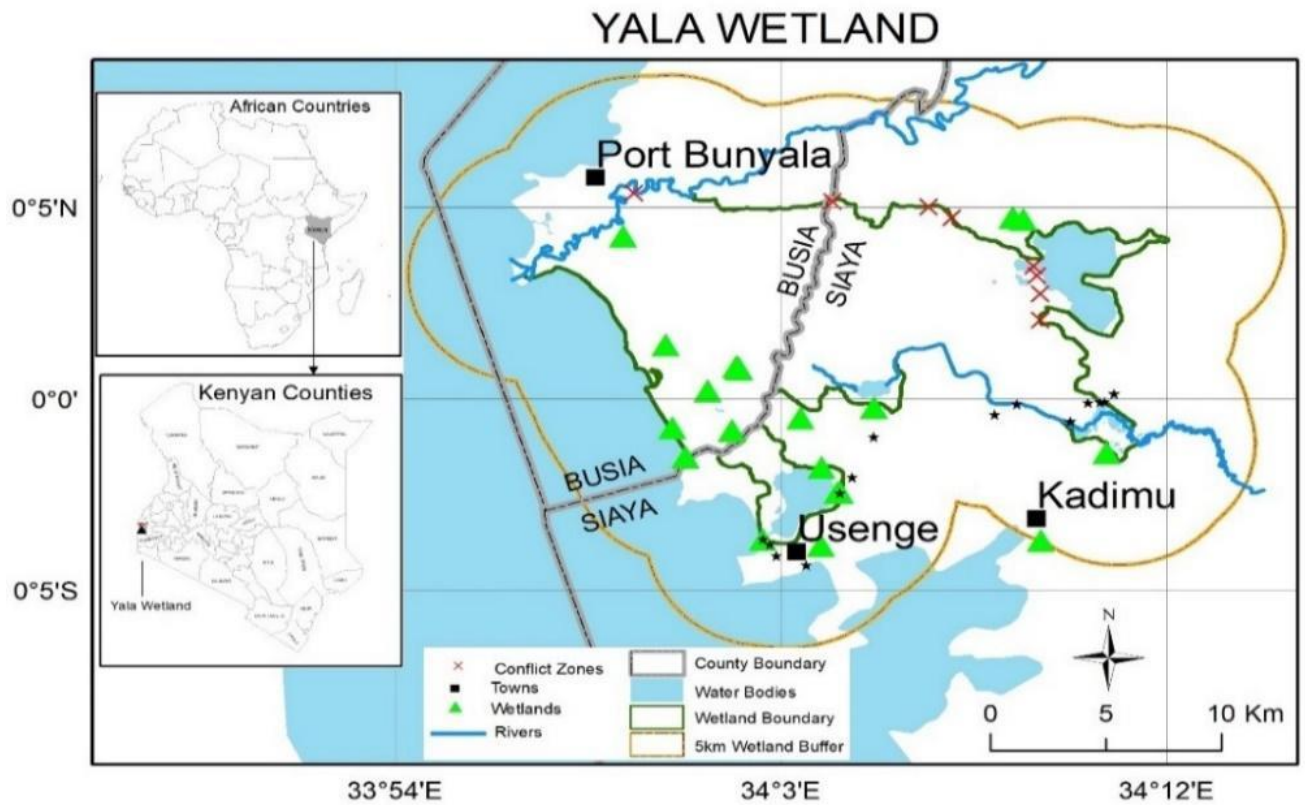
**Figure 3.1: Location of Yala Wetland in Lake Victoria Basin**

**(Source : Author, 2019)**
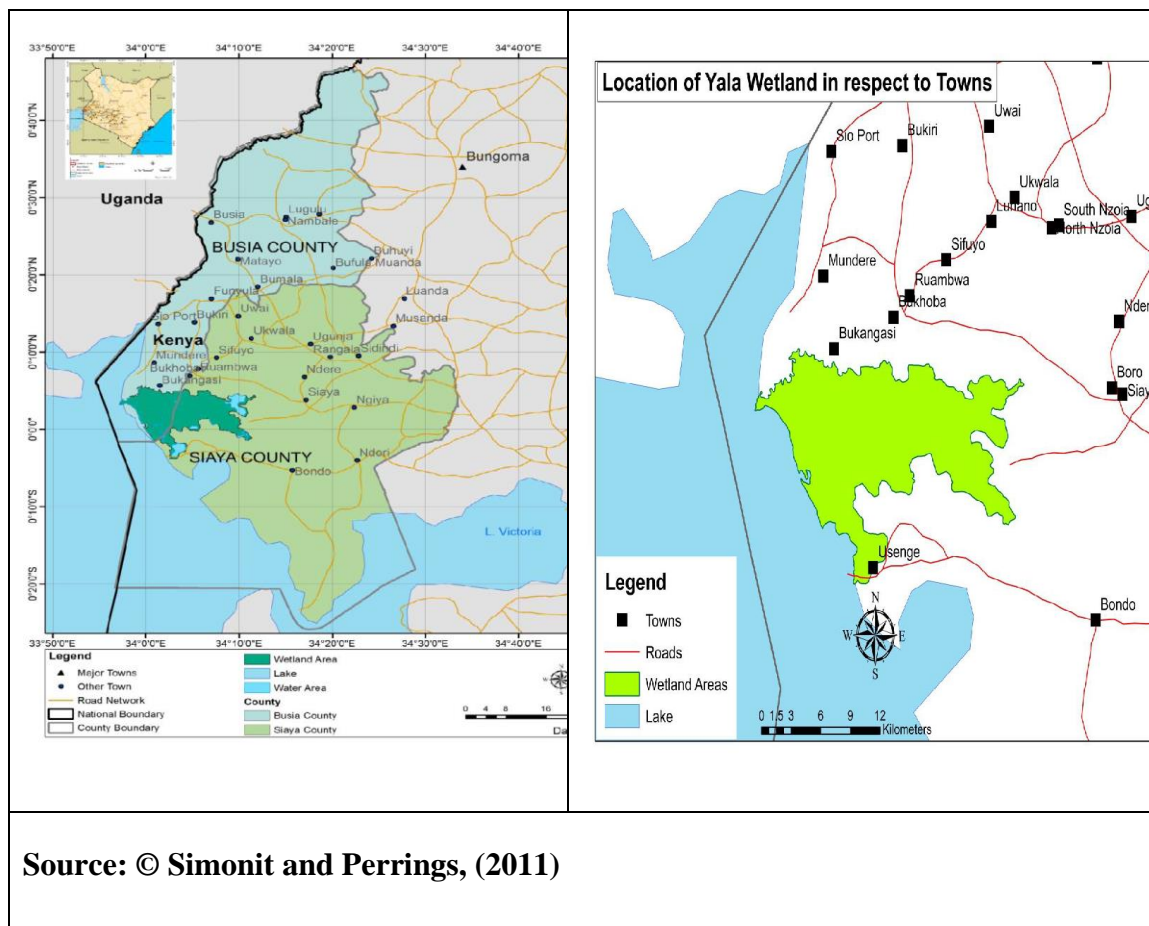
**Figure 3.2: Yala Wetland across two counties and key towns within the wetland**

### 3.2.2 Population and Demography

Yala Wetland and its environs have a high population density. The Siaya County side had human population density estimated at 393 per Km² in 2009 (KNBS, 2009; GoK, 2009) while Busia County had a higher concentration of up to 527 persons per Km². The population of the planning area (wetland and its buffer of 5km radius) was estimated at 130,838 in 2014 and is projected to be 171,736 in 2030 and 241,280 in 2050 (GoK, 2009). The mean household size was 5.05, although population density in the wetland and adjacent areas were not uniform. High population concentrations were found in the Busia County side around the banks of Nzoia River and to the South in Siaya County side around Usenge town and north of Lake Kanyaboli. Based on the 2019 National Census Results which was done after end of study period , the population of Siaya County was 743,946 with a growth

rate of 1.7% while Busia was 833,760 with a growth rate of 3.1%. The population of Yala wetland had risen to 185,756 (Siaya 104,148 and Busia 81,608 (KNBS, 2020). Figure 3.3 shows the distribution of settlements in and around Yala Wetland.
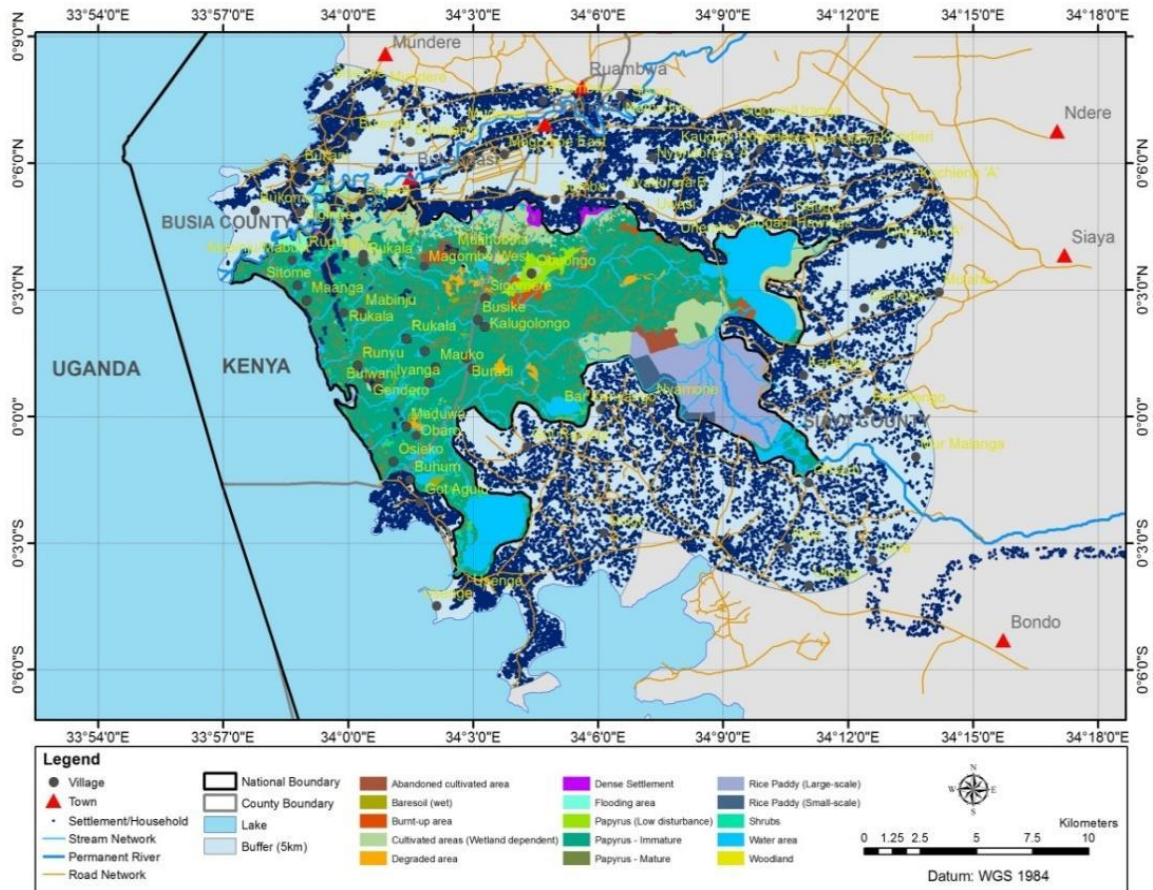


**Figure 3.3: Population settlement in the Yala Wetland and its buffer zone**

 **(Source: Odhengo *et al.*, 2018a)**

### 3.2.3 Topography

The digital terrain model  showed that the current land surface of  Yala Wetland fell very gradually from around 1148 metres above sea level in the vicinity of Lake Bob (artificial dam created and named after the Dominion Farm manager) to 1134 metres, which was one metre below the current level of Lake Victoria (Odhengo *et al*., 2018a). This was a fall of

only 13 metres over a distance of 21 kilometres, representing a ratio of 1:1615. There was also a slight cross gradient from north to south but with the dense cover of papyrus and other wetland vegetation these changes are hardly detectable and the entire wetland appears to be flat to the casual observer as shown in Figure 3.4.
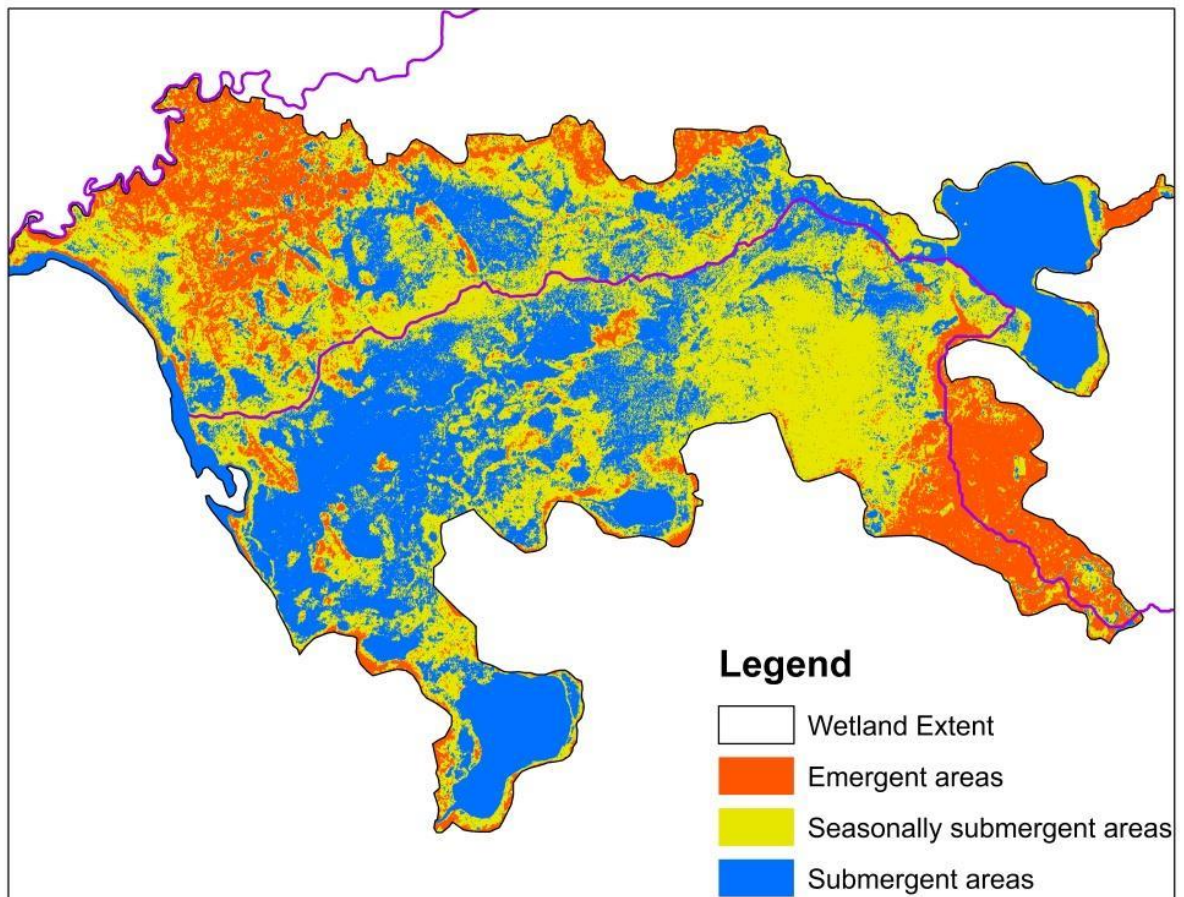


**Figure 3.4: The topography of the Yala Swamp**

 **(Source: Odhengo *et al*., 2018a)**

### 3.2.4 Soils and Geology

The soils in lower Yala Basin (i.e. Yala Wetland) are mostly fertile alluvial clays derived from both lacustrine and river deposits (Schmidt, and Jaetzold, 1982; FAO, 1997). The clay soils of the reclaimed part of the wetland have highly favourable physical and chemical properties. Many roots penetrate beyond a depth of 1.5m and throughout the root zone; the

soil is friable with fine sub-angular blocky structure and high visible porosity (Odhengo *et al*., 2018a; NEMA, 2016).

Large quantities of silt are carried down the main rivers during annual floods and thus the floodplain is comprised of silt and other deposited material and is very fertile. The floodplain as well as the swamp receives high nutrients and fertilizer from upstream sub basins making them attractive for agricultural encroachment. Some spot measurements of sediment and stream flow discharges in the Yala at Kadenge gauging station in the months of September and November of 2017 were 1355 tons/day and 1195 tons/day for flows above 353m$^3$/s and 360m$^3$/s respectively (Odhengo *et al*., 2018a).

### 3.2.5 Biodiversity

The Yala Wetland is an exceptionally rich and diverse ecosystem, containing many rare, vulnerable and endangered species of plants and animals. Four vegetation types, i.e. Aquatic plants, Riparian plants, Grassland and Terrestrial weeds, characterize the wetland. This unique system therefore holds species of diverse ecological significance and specialised habitat and micro-habitat needs.

The most ecologically important vegetation in Yala Wetland is the papyrus (*Cyperus papyrus*) with *Phragmites mauritianus* in shallower areas and swamp grasses around the periphery. Over 100 vascular plants have been recorded within Yala Wetland of which 13 are invasive (Thomas *et al*., 2016; Mulwa *et al*., 2014). A checklist of plant species found within the Yala Wetland and lower Yala Basin is presented in Appendix 6.

Almost the entire area of the remaining wetland comprises of stands of papyrus which requires high temperatures and constantly saturated soil or stagnant water to thrive. The growth of papyrus results in the formation of a dense vegetation matt which impedes surface water movement and helps to create ideal wetland conditions. It also traps sediment and acts as a natural water purifier, which is of great importance in protecting the water quality of Lake Victoria. Papyrus is, however very demanding in terms of water and evapo-transpiration which exceeds 4.5 litres a day from one square metre, which is 40% higher

than the already high evaporation from open water (Odhengo *et al.*, 2018a; Thomas *et al.,* 2016; Osumba, 2010; KWS, 2010; Nature Kenya, 2009; Boye *et al.,* 2008).

The analysis of soils, topography and vegetation confirms that roughly a quarter of the wetland lying closest to Lake Victoria is maintained by a combination of river flow and back-flow from Lake Victoria. Any reduction in lake level or inflows from upper parts of the wetland would therefore threaten the existence of this permanently flooded area. The remaining two thirds are extending back to Lake Kanyaboli is totally dependent on water which flows into the area from the River Yala and on seepage which occurs from the River Nzoia which flows into the wetland.

### 3.2.5.1 Mammalian Species

Over 30 mammal species have been recorded in Yala Wetland. They include the Sitatunga (*Tragecephalus spekeii*), a shy and rare semi-aquatic antelope that is nationally listed as Endangered (Wildlife Act, 2013). The Sitatunga is endangered with high level of threats from unsustainable hunting and draining of swamps in the country (Thomas *et al.*, 2016, KWS, 2010).

The other mammalian fauna found in Yala Wetland include Hippopotamus, wild pigs, vervet monkeys (*Cercopithecus aethiops*) also listed as vulnerable in Kenya by IUCN (IUCN, 2016). A checklist of mammal species recorded in Yala Wetland is presented in Appendix 10. Few species of herpetofauna such as snakes, lizards and chameleons and frogs among others have been recorded largely due to the fact that few studies have been conducted for these taxa (See Appendix 9). Little invertebrate surveys have been conducted at Yala Wetland and include for example a rapid assessment conducted by Kenya Wetland Forum in 2006 indicated the presence of Oligochaetes (*Branchiura sowerbyi*), Stoneflies (Plecoptera), Dragonflies (Odonates), and May flies (Ephemeroptera).

### 3.2.5.2 Fish Species

The Wetland provides an important refuge for Lake Victoria cichlid fish, many of which have been exterminated in the main lake by the introduction of Nile Perch *(Lates niloticus),* a non-native predatory fish. Recent surveys in Lake Kanyaboli recorded 19 fish species

within nine families, which included all the two critically endangered cichlids species thought to be extirpated in Lake Victoria; namely *Oreochromis esculentus* and *Oreochromis variabilis* (IUCN, 2018; KWS, 2010; Njiru *et al*., 2005; Ogutu, 1987a, 1987b). The fishes use the wetland as a breeding ground, nursery, and feeding grounds (CGS, 2015; CGS, 2019; CGB, 2015; CGB, 2019; Aloo, 2003). A list of fish species recorded in Yala Wetland is presented in Appendix 8.

### 3.2.6 Climate

The Yala Wetland climate is largely typical of the Lake Victoria region without a clear distinct dry season. The region has a variable rainfall pattern that generally increases from the lake shore to the hinterland (Awange *et al*., 2007; Ekirapa and Kinyanjui, 1987). Annual rainfall pattern in Lake Victoria Basin is bimodal, with 'long rains' from March to April and 'short rains' from October to November. The Yala/ Nzoia catchment has high precipitation in the Northern highland (1,800-2,000 mm per annum) and low in the South-Western lowlands (800-1,600 mm per annum). With the average rainfall around lowland Yala Wetland being approximately 760mm (Odhengo *et al*., 2018a; Kiluva *et al.*, 2011). The long rains and short rains contribute 44% and 25% of the total mean annual rainfall (TMAR) respectively while January-February and June to September contribute 11% and 20% TMAR respectively. The mean annual daily maximum and minimum temperatures are 28.9º C and 15.9º C respectively – giving a mean annual temperature of 24.4º C (Luedeling, 2011; Semenov, 2008).

Yala Wetland residents have been experiencing many climate change impacts including frequent flooding, droughts and increased incidences of diseases. A healthy wetland would help local communities adapt to these impacts of climate change by regulating diseases, controlling flooding and providing alternative livelihoods through ecotourism, papyrus products industry and fishing. Climate change is also expected to impact biodiversity conservation negatively. The various Yala Wetland management plans should therefore recognize the importance of environmental conservation as a means to build the resilience of the ecosystem and the dependent local stakeholders and biodiversity to the impacts of climate change.

### 3.2.7 Hydrology and drainage

The hydrological conditions within the Yala Wetland are characterized by five main water sources namely: inflows from the Yala River, seepage from River Nzoia, flooding from both rivers, backflow from Lake Victoria, local rainfall and lakes within Yala Wetland as shown in Yala and Nzoia Rivers catchments map in Figure 3.5 (JICA, 2013; Githui, 2009; Okungu and Sangale, 2003). River Yala is the main source of water for the Yala Wetland and other satellite lakes. The naturalized mean monthly discharge is 41.1 m$^3$/s. The lowest flows barely fall under 5m$^3$/s in the months of January to March while the highest discharge of 300 m$^3$/s occur in the months of April/May and August/ September. The minimum suspended silt load of River Yala Water is 543 ppm (BirdLife, 2018; Sangale *et al*., 2012; Okungu & Sangale, 2003).
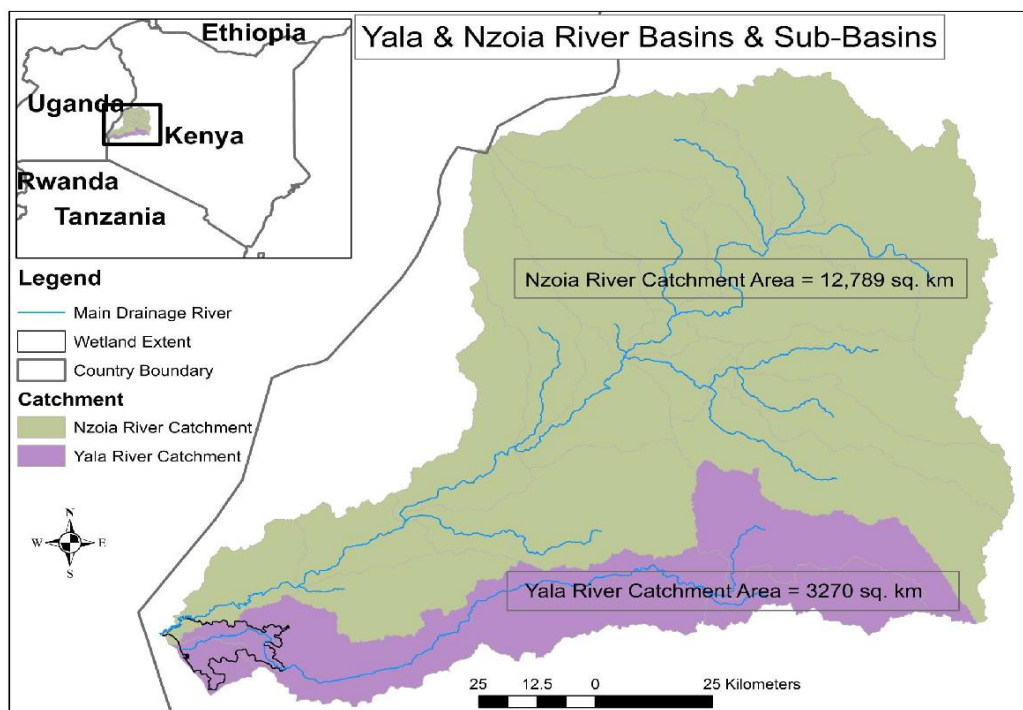


**Figure 3.5: Yala Wetland Catchment**

**(Source: JICA, 2013)**

Originally, the Yala river flowed through the eastern part of the wetland (now 'reclaimed') into Lake Kanyaboli, then into the main wetland, and finally into Lake Victoria via a small gulf. The Yala river flow is now diverted directly into the main wetland, and a silt-clay dike cuts off Lake Kanyaboli, which receives its water from the surrounding catchment and through back-seepage from the wetland. A culvert across the mouth of Yala river, some metres above the level of Lake Victoria, has cut off the gulf on the lake and, through back-flooding, created Lake Sare (BirdLife, 2018; Gichuki *et al.*, 2005).

This river flows on a very shallow gradient through small wetlands and saturated ground over its last 30 kilometres before entering Lake Victoria through its own delta. Although the soils in this region have a very high clay content that impedes ground water flow, there is seepage of water into the northern fringes of the Yala Wetland. Proposals to use the intervening area for irrigation will have a significant bearing on how water from the River Nzoia reaches the Yala Wetland (BirdLife, 2018; Sangale *et al.*, 2012; Githui, 2009).

Flooding occurs annually and the very high discharge rates overtop the river channels with floodwater passing into Yala Wetland. Efforts are made to prevent floodwater reaching areas of habitation and drained agricultural areas, but in extreme events, even the flood protection dykes are often overwhelmed. Flooding is an entirely natural and necessary process for contributing vast quantities of nutrient-rich silt to the wetland. Parts of the western side of the wetland lie below the level of Lake Victoria and are constantly filled with backflow in addition to being subjected to flooding from the lake and upper catchment.

The water balance for Yala Wetland also includes the water retained within the three freshwater lakes found within the wetland namely, Kanyaboli, Sare and Namboyo (Figure 3.2). Of these lakes, Lake Kanyaboli is the largest covering 10.5 $Km^2$ with a catchment area of 175 $Km^2$ and a mean depth of 3 metres. It lies to the northeastern end of the wetland in Area I (Figure 4.5). Lake Sare which now forms the southern outlet of River Yala covers 5 $Km^2$ and is an average of 5 metres deep. Lake Namboyo is only 1 $Km^2$ and has a depth of between 10 to 15 metres (NEMA, 2016; Owiyo *et al.*, 2014; Dominion Farms EIA, 2003).

In terms of water quality, recent studies indicate presence of high levels of nitrates in some parts of the Yala Wetland as evidence of eutrophication that confirms deteriorating water quality (Mulwa *et al*., 2014). For example, in Lake Bob, where Yala river stagnates before diverting into Dominion farm and Lake Kanyaboli then flows further on. On the converse, phosphates were within the expected limits but still highest in Lake Bob. This calls for checks in the use of inorganic fertilizers along the river Yala basin.

Lake Sare distinctly showed high water quality characteristics such as high dissolved oxygen, low nitrates and low turbidity compared to other sites upstream implying that the papyrus vegetation indeed does play a role in purifying the water. All the sites with running water had lower nitrates and higher dissolved oxygen levels compared to still waters. Running waters were also less turbid showing that there is proliferation of phytoplanktons in still waters (BirdLife, 2018).

A detailed description of some water bodies in the lower Yala is given in Appendix 11.Yala Wetland performance is  also be influenced by a number of constructed dams such as Ufinga, Giriwa, Oranga, Lebo, Tinga Kuodo, Mwer and Kalenjuok Tinga and activities happening on smaller streams that drain into the wetland and Lake Kanyaboli. Other wetlands include Nyamawin-Luand River feeding into Lake Kanyaboli and Oking River feeding  Yala River.

### 3.2.8 Infrastructure and Development

The first proposal to reclaim Yala Wetland for food production and other agricultural purposes was in 1950. However, it was not implemented because conservationists wanted the wetland conserved due to its biodiversity. The first feasibility study for the reclamation commissioned by the Kenya Nile Water Resources and undertaken by Sir Alexander Gibbs in 1954 recommended reclamation of Yala Wetland due to its agricultural potential (Reconcile, n.d).

In 1963, the feasibility report was used by the Kenya Government to appeal to UNDP to facilitate a pilot irrigation scheme. In 1965, the Kenyan government and the UNDP made an agreement on the plan for the reclamation of the wetland and a partnership was

established setting the stage for the actual work, which started in 1967 when UNDP brought FAO on board. During this phase, Area I of the wetland (Figure 4.5) was reclaimed before the project ran out of funds in 1970. There was no opposition encountered from the community during the first reclamation activities and communities were involved and consulted. The following activities were undertaken during that phase.

First, diversion of River Yala and construction of the protection dyke (this was 7.2 km long). The diversion of the river led to the change of natural boundaries between Alego and Yimbo. Given that all these developments were falling under Siaya district, it was not an issue then. However, in the wake of the creation of Bondo District and the coming of Dominion Farms into the wetland, it became a thorny issue in that the size of the wetland falling within the districts was used to calculate the revenues each county council would get from Dominion Farms Limited. Siaya County Council ended up getting more than 70% of the revenues. Bondo District felt that it was unfair.

Secondly, the construction of Lake Kanyaboli retention dykes (2.5km long) on the western part and Lake Kanyaboli feeder canal (7.2 km long). Thirdly, reclamation of 2,300 ha of land in the wetland and establishment of Bunyala Irrigation Scheme. These last two were responsible for displacement of local population from using the reclaimed land, access to their shrines like in Sigulu, lack of access to grazing areas in the reclaimed areas during dry season and birds poisoning by wetland communities in the irrigation schemes.

During the period of 1970-1975, there was not much work done in the wetland. There was cat clay soil –site- evaluation for the Kenya soil survey by WG Sombroek and RF van de Veg from the Netherlands Wageningen—Kenya Soil Survey Project (Report of a site evaluation of cat clay hazards, Yala Wetland June 1972).

Then Ekirapa and Kinyanjui (1987) did a semi detailed soil survey of the Yala Wetland farm and found that the reclaimed section of the wetland remained idle and lay fallow. The wetland communities and those in the buffer zones started using the reclaimed area for grazing their livestock during the dry seasons. In 1975, the government revisited the reclamation of the wetland and contracted the Dutch Consulting Company, ILACO, to

undertake further feasibility studies on the potential of the wetland; which came up with the current identity of the wetland in terms of area, I, II, III (Figure 4.5). ILACO divided the wetland into three development sites using hydrodynamic and topographic criteria: Area I was the land already reclaimed (2,300 ha), Area II (9,200 ha) was the yet to be reclaimed but with huge agricultural potential when reclaimed. Area III was the area determined to remain as the buffer zone, thus never reclaimed, it was concluded that reclaiming this area was not economically viable.
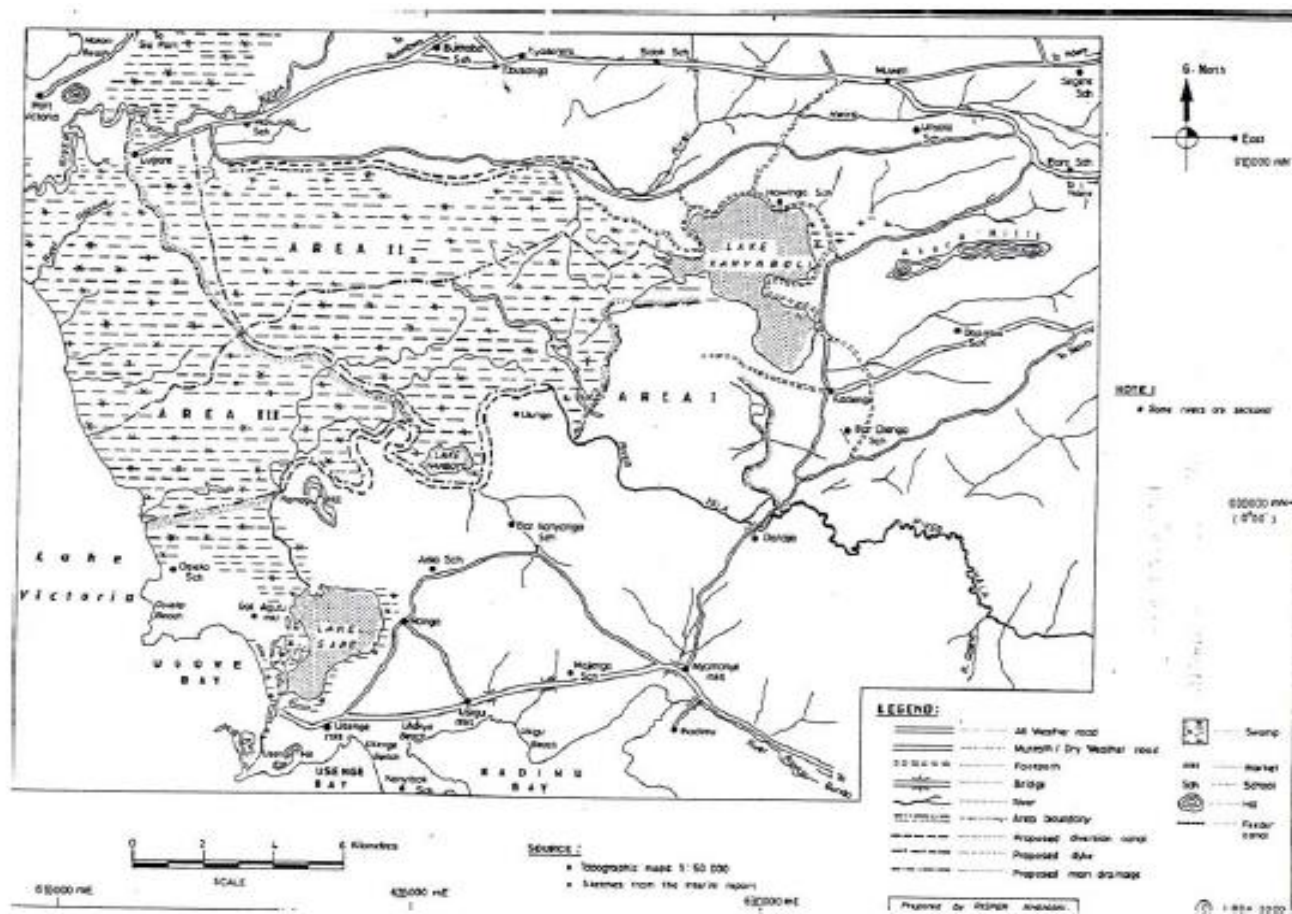


**Figure 4.5: Original subdivision of Yala Wetland into three Areas I, II and III**

**Source: Kenya Wetlands Forum; February, 2006**

After this work, the government embarked on another feasibility study on Area II and FC Weger Infra Consult and Kitolo (Metha Group International) was contracted for this

purpose in 1979 and commissioned by the government to prepare a final design, and tender the documents for engineering work. The group submitted that Area II had a lot of potential and gave recommendation for its reclamation. The findings were however, not implemented due to constraints in resources and proper management. Having failed to exploit the opportunities identified, Lake Basin Development Authority (LBDA) was established in 1979 and the government allowed them to work on Area I of the wetland on a pilot basis. LBDA started working in the wetland in early 1980s (Kinaro, 2008).

In 1982, Bish International B. V designed and installed a pumped irrigation system covering 159 ha but the project failed due to high operating costs. LBDA commissioned a study on the wetland in 1985, which proposed irrigation of 500 ha of Area I through gravity irrigation. The gravity irrigation project started in 1988 by the West Kenya Rain Fed Development Project under LBDA, and Yala Wetland seed rice farm, measuring about 50 ha came about under this project. Between 1996 and 1998, LBDA took more interventions to extend the number of ha under Area I in use from 50 ha to 500 ha. The construction of weir across river Yala was put up to help extend the acreage under production and another 1500 ha for paddy rice. Lack of funds stalled this expansion in 1999.

LBDA worked in the wetland until 2003 when Dominion Farms came into the wetland. LBDA entered an arrangement, which effectively handed over its 2,300 ha to Dominion Farms Ltd. The company thereafter entered into lease agreement with Bondo and Siaya county councils to reclaim and use the wetland for agricultural production initially for 3,700 ha and hoped that council will set apart an additional 3,200 ha which they would again lease but with additional years and land rates. In all these arrangements, the county council and communities' representative councilors discussed and sealed the deal without substantial community participation on the implications of their decisions including benefit sharing and compensation for communal lands.

Some parts of Yala Wetland have high agricultural potential and has attracted private sector players to invest in commercial agriculture by the Dominion Farms doing rice and limited aquaculture. There are also proposals for sugar production (Dominion Farms Limited, 2015) and the pressure for increased commercial food production in the wetland is expected

to grow with increase in human population. On the lower side of the wetland is Bunyala Irrigation Scheme along the Nzoia river delta whose activities also affect the wetland.

Yala Wetland and its core zones have limited infrastructure and social services. The connectivity between the upcoming urban and market centres is limited due to lack of all-weather roads. The existing schools in this area/region lack educational facilities and there is a high dropout rate among primary school students, particularly among the girls; health centres lack basic facilities such as water, drugs, diagnostic equipment and well-trained staff; Yala River, with heavy silt loads, is the main source of drinking water. Sanitation facilities in most of Yala catchment are limited (Odhengo *et al.*, 2018b; Odenyo *et al*., 2017).

Planned developments on Yala catchment side include Nandi Hills multi-purpose dam is planned to produce 50 mw of electricity in order to facilitate the development of 10,000 ha of irrigated rice in Kano plains and supply water to Kisumu town and environs (Odhengo *et al.*, 2018b; Odenyo *et al*., 2017). It is expected that the dam will stimulate industrial development in the region, encourage the development of agro-businesses and agricultural processing plants, alleviate poverty in the region and raise the standards of living, stimulate industrial development in the region, reduce silt reaching the dam, control flooding in Yala river basin in addition to increasing food production thereby reducing food insecurity. The location and the type of development and management plans for the whole of Lake Victoria North Catchment area (LVNCA) is shown in Figure 3.6 (GoK, JICA, 2013).
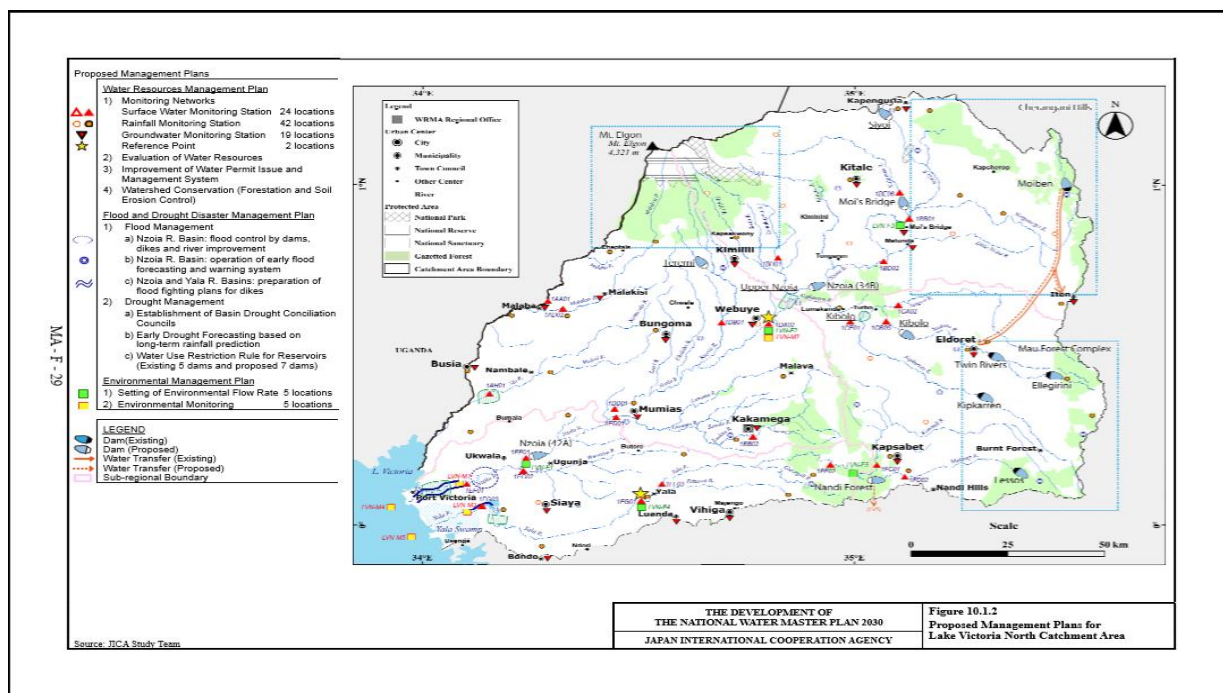
**Figure 3.6: Lake Victoria North Catchment Area (LVNCA)**

**( Source: Extract from NWMP 2030)**

The infrastructural development expected on the River Nzoia basin include a proposed Lower Nzoia Irrigation Scheme (LNIS) is expected to bring approximately 4,043 ha of land under irrigation (Figure 3.7) and benefit more than 2,100 small scale farmers through improved production of food and provision of incomes (GoK, JICA, 2013).  Irrigated area in the region will increase from the current 705 hectares to 4043 hectares and household economies will gain approximately Kshs 392,000 from irrigated farming annually. The project is expected add more than Kshs 1.27 billion to the local economy. The project is however, expected to cost more than Kshs. 4.4 billion. This LNIS will affect both the pattern of surface and subsurface flow and also the quantities and quality of water discharged from the River Nzoia to  Yala Wetland (Odhengo *et al.*, 2018b).
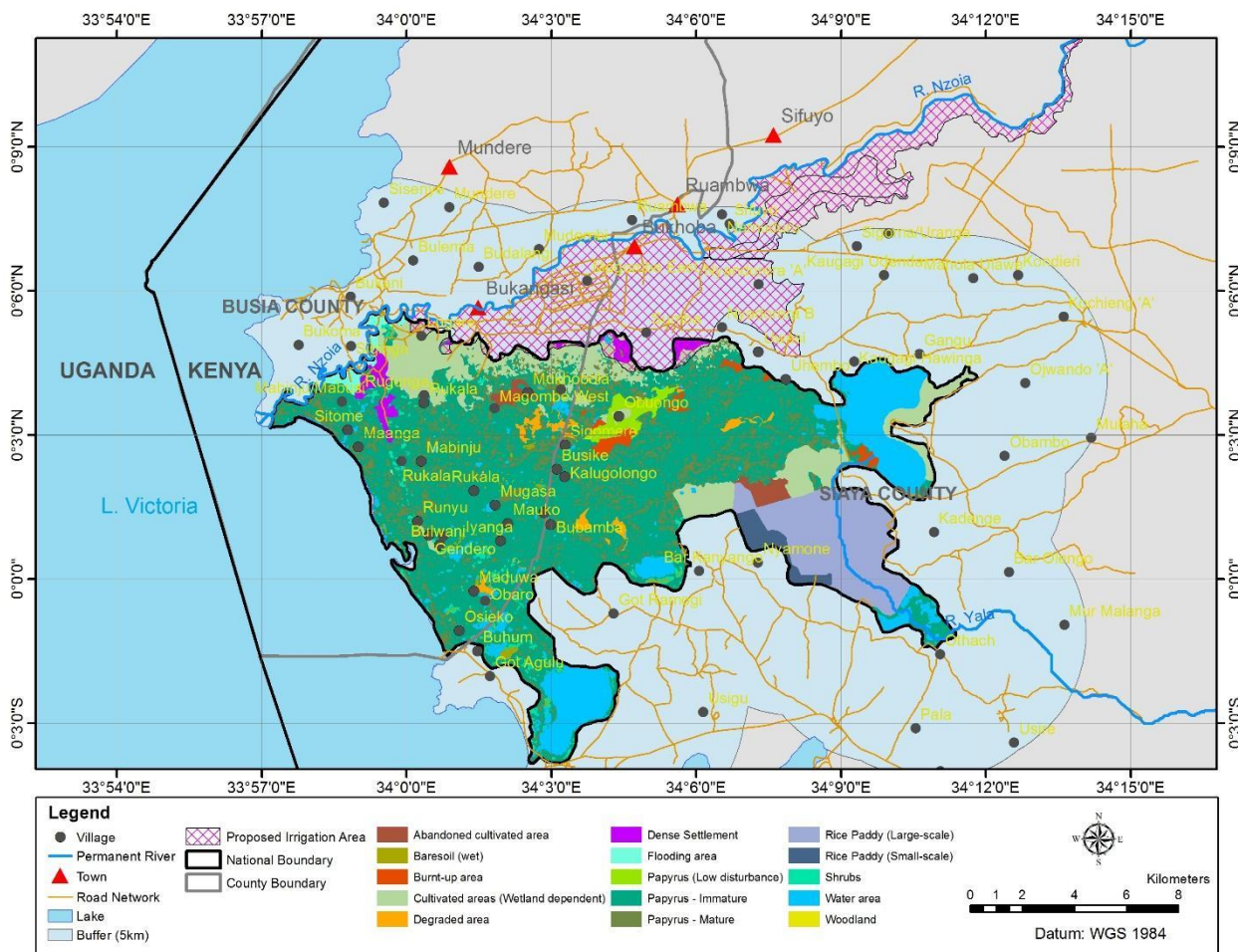
**Figure 3.7: Proposed Lower Nzoia Irrigation Scheme in relation to Yala Swamp**

**( Source: Odhengo *et al.*, 2018b )**

### 3.2.9 Carbon sequestration

Wetlands are very effective ecosystems for carbon storage. The Yala Wetland vegetation takes up carbon from the atmosphere and converts it into plant biomass during the process of photosynthesis. The Yala Wetland can therefore be seen as a giant 'sink' which is recovering the greenhouse gas, carbon dioxide, from the atmosphere. In many wetlands, waterlogged soil conditions prevent decomposition of the plant material thereby retaining carbon in the form of un-decomposed organic matter (i.e. Peat) (NEMA, 2016). The long retention of carbon in wetlands prevents excessive amounts of atmospheric carbon, thereby reducing global warming. The retained carbon is easily released into the atmosphere wherever peat lands are drained and exposed to fires. A detailed study of carbon storage in

the Yala Wetland in 2015 confirmed that the present wetland is storing close to 15 million tonnes of carbon within the papyrus wetland, with less than 1 million tonnes stored in the remaining areas of reclaimed farmland and immature papyrus (Muoria *et al*., 2015).

### 3.2.10 Legal status of Yala Wetland Land

According to the Kenya Constitution 2010, the ownership of Yala Wetland is currently vested under the County Governments of Siaya and Busia under a previous Trust land Act. However, some areas are perceivably communally owned while others are privately owned. Some local people have acquired land through self-allocation and later passed it on through inheritance along their kinship (Thenya, 2006).

The Kenya Constitution 2010 and the Community Land Act 2016 requires that all Trust Lands must be registered according to the Act (GoK, 2010a; GoK, 2016b). If communities do not register their lands themselves, the law indicates that County Governments must plan to register community lands but they might include local people in the registration process and communities might lose some of their lands and might not be able to make their own rules for governing and managing their lands.

The Dominion Farms Ltd leased about 6,900 hectares (about 40%, of the wetland) to undertake agriculture from 2003 for 25 years (Dominion Farms, 2015; Owiyo *et al.*, 2014b; Kenyan Wetlands Forum Report, 2006).This matter has often resulted in numerous conflicts and tensions, partly due to the lack of information on how the process of leasing actually took place. Consequently, many people in the communities feel that the process was flawed and rid by corruption and bribery (van Heukelom, 2011). The conflicts surrounding the Yala Wetland revolves around three structural problems: poor communication, cultural and social misunderstanding, and political involvement (van Heukelom, 2013). Dominion Farms ceased its operations in 2017 in Yala Wetland and its place taken up by the Lake Agro Limited who have vast interest in sugar in Western Kenya.

Lake Kanyaboli was gazetted as a National Reserve through Legal Notice No 158 of 2010 (GoK, 2010b). The total area of the reserve is 41.42 $km^2$ and is legally under the management of Siaya County Government with technical and policy support from Kenya

Wildlife Service. In addition, Kenya Wildlife Service has initiated the process of having the site listed as a Wetland of International Importance under the Ramsar Convention.

Responsibility for the management of water resources within Yala Wetland falls under the Water Resources Authority (WRA), although other agencies like the Kenya Wildlife Service have parallel commitments and the private sector plays a disproportionate role in directing water flows to different parts of the wetland. The Yala LUP proposes formation of a Land and Water Management Committee to oversee both land and water management in the Yala Plan Area (Odhengo *et al*., 2018b; NEMA, 2016). A task force of specialist of Yala Swamp Water management committee shall record and regulate water flows and water availability in all areas of the Plan Area.

## 3.3 Research Design

### 3.3.1 Action Research

Action research is a disciplined process of inquiry conducted by and for those taking the action (DBRM, n.d). The primary reason for engaging in action research is to assist the "actor" in improving and/or refining his or her actions (Stringer, 1999).

Best and Kahn (1998) define "Action research as an inquiry that is focused on the immediate application and not on the development of theory. It places its emphasis on a real problem in a local setting. Its findings are to be evaluated in terms of local applicability, as opposed to universal validity".

Action Research seeks transformative change through the simultaneous process of taking action and doing research, linked together by critical reflection. Kurt Lewin, then a professor at MIT, first coined the term "action research" in 1944. In his 1946 paper "Action Research and Minority Problems" he described action research as "a comparative research on the conditions and effects of various forms of social action and research leading to social action" that uses "a spiral of steps, each of which is composed of a circle of planning, action and fact-finding about the result of the action.

According to the Association for Supervision and Curriculum Development (ASCD) and Sagor (2000) Action Research has seven main steps. These include: first, selecting a focus - What element(s) of our practice or what aspect of student learning or another field do we wish to investigate. Secondly, clarifying theories- identifying the values, beliefs, and theoretical perspectives the researchers hold relating to their focus. Thirdly, identifying research questions- generating a set of personally meaningful research questions to guide the inquiry. Fourthly, collecting data- data used to justify their actions as *valid* (i.e. meaning the information represents what the researchers' say it does) and *reliable* (i.e. meaning the researcher is confident about the accuracy of his/her data). Action research uses a triangulation process to enhance the validity and reliability of their findings i.e. using multiple independent sources of data to answer one's questions. Fifthly, analyzing data- identify the trends and patterns in action research data. The researcher methodically sort, sift, rank, and examine the data to answer two generic questions: *What is the story told by these data? and Why did the story play itself out this way.* Sixthly, reporting results- the reporting of action research most often occurs in informal settings that are far less intimidating than the venues where scholarly research has traditionally been shared.

More and more action research results are being written up for publication or to help fulfill requirements in graduate programmes. Ultimately, contributing to a collective knowledge base regarding teaching and learning. Seventh, taking informed action- action researchers find that the research process liberates them from continuously repeating their past mistakes. More importantly, with each refinement of practice, action researchers gain valid and reliable data on their developing virtuosity. Figure 3.8 depicts the Action research cycle.
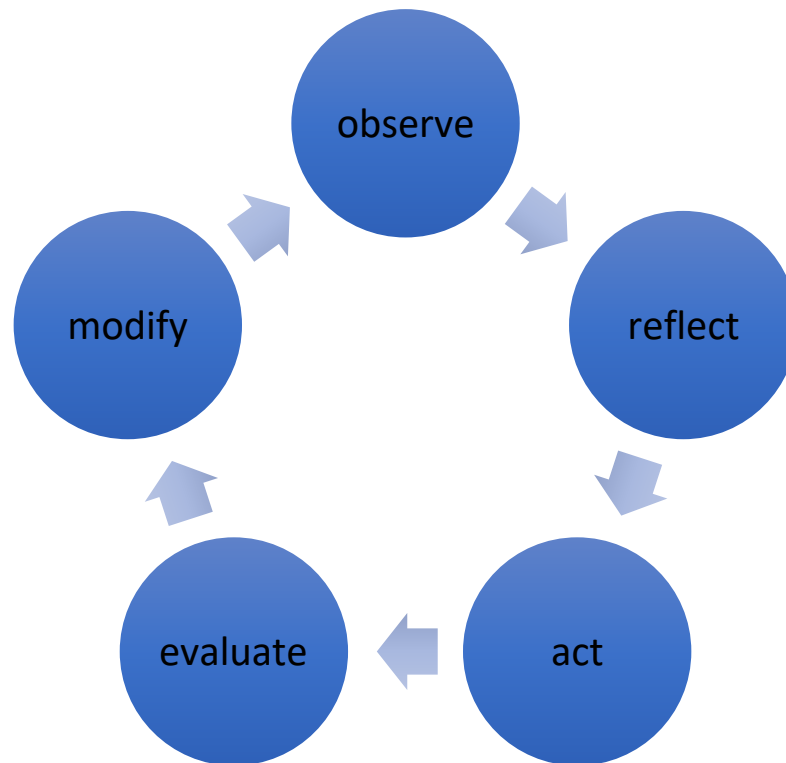
**Figure 3.8: Action research cycle**

 **(Source: Senge,1990)**

An individual, a collaborative group of colleagues sharing a common concern, or an entire school faculty, can do action research. These three different approaches to organizing for research serve three compatible, yet distinct, purposes namely: building the reflective practitioner, making progress on institutional priorities and finally building professional cultures. The latter for example school faculties who wish to transform themselves into "communities of learners", often empower teams of colleagues who share a passion about one aspect of teaching and learning to conduct investigations into that area of interest and then share what they have learned with the rest of the school community, which Senge (1990) labeled "team learning".

There are four main types of action research design namely individual research, collaborative research, institution-wide research and region-wide research (DBRM n.d). Individual action research is research conducted by one  staff member to analyze a specific

task. The researcher alone performs research by implementing a group activity for a certain length of time. After the action is performed, the researcher analyzes the results, implements changes, or discards the programme if not found to be helpful.

Collaborative research involves a group of people researching a specified topic. Many times, collaborative research involves both researchers and team leaders of institutions. This type of research offers the collaboration of many people working jointly on one subject. The joint collaboration often offers more benefits than an individual action research approach.

Institution-wide action research design are created for a problem found within an entire institution. This can be lack of parental involvement or research to increase students' performance in a certain subject. The entire staff work together through this research to study the problem, implement changes, and correct the problem or increase performance.

Region-wide action research is used for an entire region or a specified geographical area such as Yala wetland. This action research is usually more community-based than the other types of action research design. This type may also be used to address organizational problems within the entire region.

### 3.3.2 Paulo Freire's Participatory Action Research

Participatory Action Research (PAR) has lately appeared as an important methodology for intervention, development and change within groups and communities. Many international development agencies, university programs and local community organizations around the world are not only promoting but also implementing it with satisfactory transformative results.  PAR builds on the critical pedagogy put forward by  Freire Souto-Manning (2010) as a response to the traditional formal models of learning where the "teacher" "researcher" stands at the front and "imparts" information to the "students" "wetland communities" who are passive recipients. This was further developed in "adult education" models throughout Latin America.

 Fals-Borda (1925–2008) was one of the principal promoters of participatory action research in Latin America and published a "double history of the coast" book that compares

the official "history" and the non-official "story" of the north coast of Colombia. For Yala wetland PAR would bring out the two perspectives of issues from wetland communities and the technical team to inform the planning and implementation of wetland management plans.

Duveskog (2013) in her doctoral research titled "Farmer Field Schools as transformative learning space in the rural African Setting" used participatory action research methodologies, which called for the need for investment in human capacity and the importance of an appropriate mix of technological and social advancement for development. It contributed knowledge on how to measure empowerment in a poverty setting. For Yala Wetland PAR will be key in establishing the nexus between the poverty level and wetland degradation and subsequently design mitigation measures in a participatory manner with the communities.

### 3.3.3 Action Research in Organization Development

According to French and Bell (1973) Organization Development (OD) is simply "organization improvement through action research". Moreover, Lewin's (1958) conceptualization aptly summarizes OD's underlying philosophy which was later elaborated and expanded on by other behavioral scientists. Concerned with social change and, more particularly, with effective, permanent social change, Lewin believed that the motivation to change was strongly related to action. If people are active in decisions affecting them, they are more likely to adopt new ways. Likewise, if Yala Wetland communities are actively involved in planning for sustainable wetland management, they would adopt the news ways the plan requires of them and their governance institutions would have to change accordingly. "Rational social management", he said, "proceeds in a spiral of steps, each of which is composed of a circle of planning, action and fact-finding about the result of action" (Lewin, 1958).

Lewin's description of the process of change involves three steps: First, Unfreezing, faced with a dilemma or disconfirmation, the individual or group becomes aware of a need to change. Second, Changing, the situation is diagnosed and new models of behavior are

explored and tested; and Third, Refreezing, involving application of new behavior is evaluated, and if reinforcing, and adopted.

| Input | Transformation | Output |
|---|---|---|
| **Planning**<br><br>Preliminary diagnosis<br>Data gathering<br>Feedback of results<br>Action Planning | **Action**<br><br>Learning processes<br>Action planning<br>Action steps | **Results**<br><br>Changes in behavior<br>Data gathering<br>Measurement |
| Unfreezing | Changing | Refreezing |

Feedback loop A      Feedback loop B

Feedback loop C
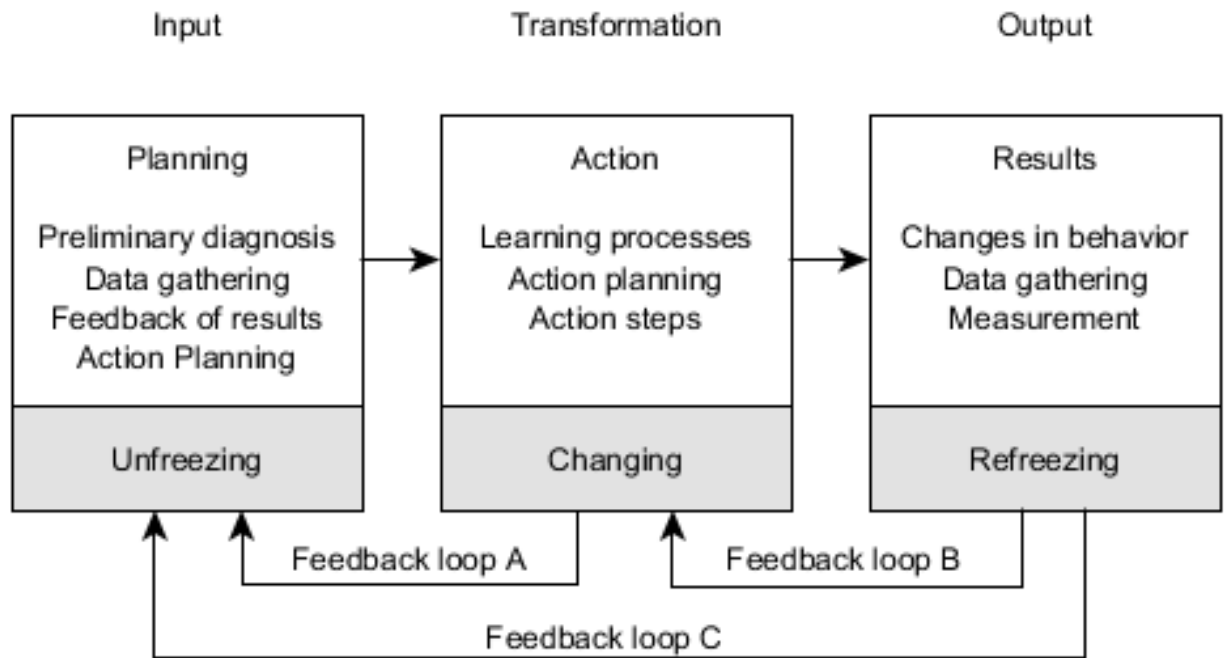
**Figure 3.9: Systems model of action-research process**

**( Source: Lewin, 1958)**

The above diagram (Figure 3.9) sums up the steps and processes involved in a planned change through action research. Action research is illustrated as a cyclical process of change where:

The first cycle begins with a series of planning actions initiated by the client and the change agent working together. The key elements of this stage include a preliminary diagnosis, data gathering, feedback of results, and joint action planning. In systems theory, this is the input phase, in which the client system becomes aware of problems yet unidentified, realizes it may need outside help to effect changes, and shares with the facilitator the process of problem diagnosis.

The second stage of action research is the action or transformation phase. This stage includes actions relating to learning processes perhaps in the form of role analysis and to planning and executing behavioral changes in the client organization. As shown in Figure 3.9 feedback at this stage would move via feedback loop A and would have the effect of altering previous planning to bring the learning activities of the client system into better alignment with change objectives. Included in this stage is action-planning activity carried out jointly by the facilitator and members of the client system. Following the workshop or learning sessions, these action steps are carried out on the job as part of the transformation stage (Johnson, 1976).

The third stage of action research is the output or results phase. This stage includes actual changes in behavior (if any) resulting from corrective action steps taken following the second stage. Data are again gathered from the client system so that progress can be determined and necessary adjustments in learning activities can be made. Minor adjustments of this nature can be made in learning activities via feedback loop B (Figure 3.9).

Major adjustments and re-evaluations would return the OD project to the first or planning stage for basic changes in the program. The action-research model shown in Figure 3.5 closely follows Lewin's repetitive cycle of planning, action, and measuring results. It also illustrates other aspects of Lewin's general model of change. As indicated in the diagram, the planning stage is a period of unfreezing or problem awareness. The action stage is a period of changing that is, trying out new forms of behavior in an effort to understand and cope with the system's problems. There is inevitable overlap between the stages, since the boundaries are not clear cut and cannot be in a continuous process.

The results stage is a period of refreezing, in which new behaviors are tried out on the job and, if successful and reinforcing, become a part of the system's repertoire of problem-solving behavior. Action research is problem centered, client centered, and action oriented. It involves the client system in a diagnostic, active-learning, problem-finding and problem-solving process. Thus, this Yala wetland study seeks to understand the challenges of

community participation in Yala wetland ecosystem management and collaboratively solve those challenges through action research methodology.

### 3.3.4 Justification for Action Research Methodology

From an analysis of low levels of communities' participation in Yala Wetland management to date as demonstrated in reviewed studies and in the ongoing land use planning processes up to generation of draft one copies of SEA and LUP, it was clear that some further investigation of the participation process and its subsequent improvement would add value to the community participation framework and final outcome. The value addition to an ongoing Yala LUP could be best done by action research and not fundamental research. The researcher, therefore chose action research methodology for this study.

Action research accorded the opportunity to bring changes into the planning process arising from critical reflection of wetland communities based on their increased levels of involvement in the various stages of SEA/LUP and ICCA. They became learners and doers and the final plan benefitted from the processes with its feedback loops A, B,C of action research methodology as indicated in Figure 3.9 above.

In addition, Yala wetland represents unique ecological system and therefore an interdisciplinary research that would avail real-time feedback from multiple perspectives to the planning process and to inform next course of action added great value to wetlands ecosystem management. Action research unlike fundamental research provided this rare opportunity.

### 3.4 Research Strategy

The study used the exploratory research strategy to investigate, clarify and test the modified community participation framework in Yala Wetland planning and management. As Olsen (2008) argues, "to explore is to observe and to invent useful information about the situation and the elements in a research question. Adopting an explorative approach entails, among other things, wanting to understand a phenomenon and shed light on a complex situation." Ideally, exploratory research strategy has three main characteristics which are very useful for this study.

First, it does not primarily focus on numbers, it mainly focuses on understanding social reality through qualitative methods, such as focus group discussions, observations and in-depth interviews. Second, exploratory research strategy opens the research problem to allow in-depth investigation of factors by using different types of data and explanations from different participants (Baxter and Jack, 2008; Vaus, 2005). In-depth investigation of the problem is especially possible by using a case study research design like the Yala Wetland case study.

Lastly, exploratory research strategy permits studying problems that are interdisciplinary in character (Vaus, 2005) – for instance unique ecological systems like. Wetlands; land use planning and participatory processes (land, water and biodiversity therein in the wetlands), and information systems used by the local communities interacting with the wetlands (Indigenous knowledge, community maps, students' artworks and their mosaic data). Interdisciplinary studies are especially very useful as they often provide higher quality scientific findings and a broad understanding of social reality from the point of view of two or more disciplines (Nissan, 1997). Additionally, other types of research strategy, especially descriptive research strategy was occasionally used to respond to questions that required documentation of the historical information about the Yala Wetland.

## 3.5 Case Study

This action research focused on public participation in Yala Wetland Ecosystem. Being region-wide type of action research, it defined it reach as Yala Wetland and its buffer zone region to enable it address governance and management challenges within the entire wetland ecosystem.

Yin (2009, p. 18) defines case study research design as:

"An empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident." It "copes with the technically distinctive situation in which there will be many more variables of interest than data points and one result". Additionally, case study research design "relies on multiple sources of evidence, with data needing to

converge in a triangulating fashion, and as another result" and "benefits from the prior development of theoretical propositions to guide data collection and analysis."

The definition of case study research design by Yin (2009) captures at least three interrelated aspects that are associated with this study. First, it explores in-depth the extent of community participation in Yala Wetland management. The second point of this study is that of employing qualitative research methods like in-depth interviews, Focus Group Discussions (FGDs), content analysis and observation of social and physical artifacts to fully understand and document the wetland management dynamics and land use conflicts therein. The final part of the definition of case study according to Yin (2009) in relation to this study is that case study research designs benefit from theoretical propositions that guide data collection and analysis.

## 3.6 Research Assistants and training on data collection

Five Research Assistants were trained to equip them with requisite skills for fieldwork tasks mainly co-facilitating community level meetings, interviewing respondents, moderating focus group discussions, using participatory tools for community data capture, field observations and reflection, journaling, data capture through Geographic Positioning Systems (GPS), photography and videography on key issues relevant to the study. The training focused on seeking background information on wetland ecosystems, key challenges and how to turn those into opportunities; visioning skills; facilitation skills including handling difficult respondents; data capture; empathy walks methods; assessment of key environmental issues in the wetland; organizing essays competitions and designing artwork briefs.

## 3.7 Target Population, Sampling Procedures and Sample Size

### 3.7.1 Target Population

The Yala Wetland and its buffer zone had a population of 130,834 persons in 2014 (KNBS, 2009) and 185,766 persons in 2019 (KNBS, 2020). The Wetland over 200 community organizations with ony 70 active on environmental conservation;  64 primary schools and 13 secondary schools. The study data was collected from 34 key informants, 410

respondents drawn from 60 community organizations and187 students from 19 learning institutions in the study area.

The study targeted local communities through leaders of their various community formations like beach management units, women groups, youth groups, smallholder farmer's cooperatives, religious leaders' associations, and sand harvestors living in Yala Wetland and its buffer zone. The groups' qualification and criteria selection criteria included: active in conservation for the last 5 years; has been affected in one way of the other with projects undertaken within Yala Wetland, has been a member of an interest group during a LUP/SEA studies in Yala Wetland and has been involved in research and training in in Environmental conservation, EIA or SEA.

Additionally, the LUP project formed a Yala Project Advisory Committee (YPAC) where Yala Ecosystem Site Support Group (YESSG), whose members acted as the communities' voices in the planning and management of the Yala Wetland, represented communities. The schools in the upper Yala catchment where river Yala draws its water were also involved in the study because of the direct effect of their activities on the wetland water flows.

### 3.7.2 Sampling Techniques

The study used both non-random purposive and stratified sampling techniques to select respondents from whom data was collected.

### Non-Random Purposive Sampling

Key informants who provided information on historical and current state of community participation in the management of Yala Wetland were selected purposively. These included elders and change makers (highly respected individuals by communities for bringing changes in their community) who had great wealth of knowledge particularly historical, cultural and indigenous knowledge on Yala Wetland. The YESSG members and village elders helped in identifying the elders and changemakers who were thereafter interviewed in their homesteads. In the course of interacting with groups, the researcher further identified other key informants who were subsequently added to the initial list.

Cumulatively, 34 key informants purposively selected were interviewed and were drawn from Usenge, Usigu, Kombo, Hawinga, Uhembo and Bunyala.

The second category were community organizations who carried out conservation activities in the study area. Yala Wetland planning process had done stakeholder an analysis and provided a list of groups. These processes also identified groups whose leaders formed the YESSG who represented communities in SEA and LUP processes. The researcher started with these groups but later expanded to 60, deliberately ensuring all community groups considered active in conservation of Yala Wetland were represented and that every sublocation in the wetland and adjacent buffer zone were represented in the study.

The 60 community organizations were drawn from all the sub-locations/wards of Yala wetland and buffer zones. Each community organization had only one group of 10 persons participating in FGD irrespective of its total membership. The community organizations' membership ranged between 8-60 persons with mixed economic abilities but drawn by the mission and ideals of the specific group. The age of members ranged between 15-85 years; the youngest organization was five years while the oldest was 30 years old. The 10 respondents invited to participate in the FDGs were chosen to represent diversity within the groups and the FGDs were held in locations convenient for local communities. They were mainly group members, active and retired civil servants, teachers, retired teachers, respectable elders who were deemed as custodian of communities' information and religious leaders. Natasha *et. al.* (2005) maintains that FDGs are very advantageous as they allow collecting substantial data from many people within a very short period. The structure of these FGDs was kept open, allowing feelings and characterizations to emerge from the participants themselves (Yin, 2009; Krueger and Casey, 2008; Dawson *et al*., 1993) on background information about the wetland, their opinions, ideas, perceptions, and beliefs and experiences that influenced their interactions in the wetland and their involvement in its management over the years (Likert,1932).

In total, 410 respondents from  local community groups participated in focus group discussions  of 7-10 persons per FGD and included Men, Women, Youth (under  35 years old) and persons with disability as shown in Table 3.1.

**Table 3.1: Breakdown of community members who took part in the study**

| Gender | Number | Over 35 years | Youths (under 35years) | Persons with disability |
|---|---|---|---|---|
| **Male** | 223 (54.3 %) | 116 (52.0 %) | 106 (47.5%) | 1 (0.5 %)) |
| **Female** | 187 (45.6 %) | 96 (51.3 %) | 91 (48.7 %) | 0 |
| **TOTAL** | 410 | 212(51.7%) | 197(48.1%) | 1(0.2%) |

Details of community organizations and their members, schools and key informants were captured in a database and formed the basis for real time consultation on LUP and ecosystems plan implementation issues (Appendix 3).

Figure 3.10 shows a geopositioned map of community organizations and schools involved in Yala Wetland study.
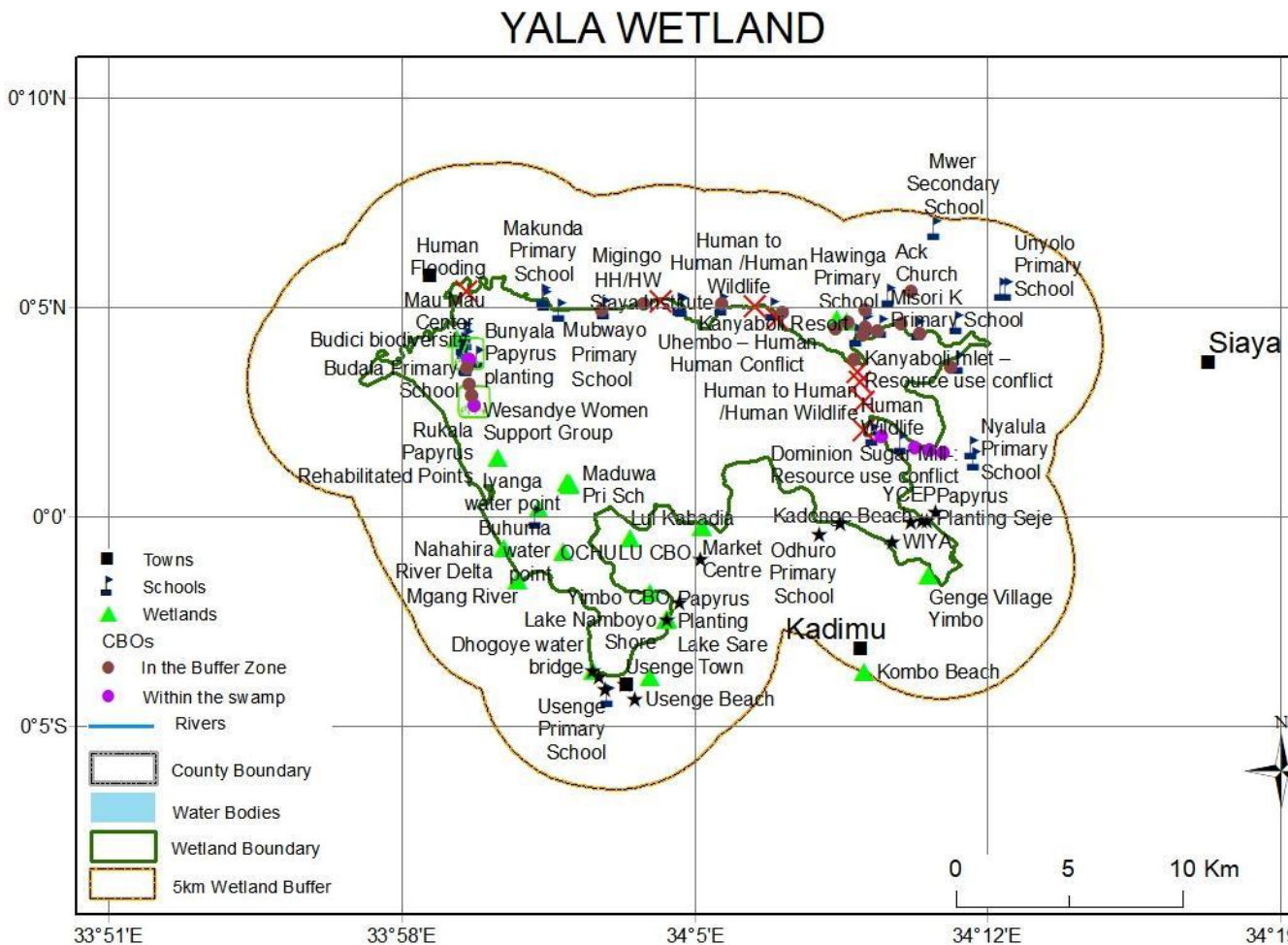
**Figure 3.10: Geolocations of Community Organizations and Schools in Yala Wetland Ecosystem mapped during the study.**

**( Source: Author, 2019)**

Sample size determination for key informant interviews and FGDs was based on judgment with respect to the quality of information desired and the respondents' availability that fit the selection criteria (Sandelowski, 1995). According to Neuman (1997) it is acceptable to use judgment in non-random purposive sampling and hence reiterates that there is no 'magic number'.

**Stratified Sampling**

Data was also collected through stratified sampling from institutions of learning which were clustered as: primary (11), secondary (5) and post- secondary polytechnics and colleges (2) and a total of 187 submissions received from students.   Learning institutions were brought on board as part of the modified participation framework which brought data on wetland challenges and what they envision of Yala wetland in 2063 through essays, debates, songs and artworks.  It accorded students an opportunity to become co-creators of SEA/LUP and other wetlands plans, provided intergenerational perspectives Yala wetland issues. Therefore, learners would be involved in  implementation of plans they understand as translation of images of possibilities into realities, and, beliefs into practice as value added by appreciative enquiry methodology applications to the wetland ecosystem management. Primary schools sampled were: Mukhobola, Usenge, Bridge International Academy (Usenge), Musoma A.I.C, Bubamba, Hawinga, Misori Kaugagi, Nyakado, Maduwa, Thomas Burke and the Cottage School. Secondary schools included Hawinga Girl's High school, Musoma Mixed Secondary School, Uwasi Mixed Secondary, Bunyore Girls School and St Mary's School Yala, while post- secondary schools were Siaya Institute of Technology and Busagwa Youth Polytechnic (Figure 3.10).

## 3.8 Data Collection Methods

The study mainly used qualitative research data collection methods supported by quantitative methods whenever necessary. Strauss and Corbin (1990) note that quantitative and qualitative methods are tools that complement each other. Quantitative methods can be used to obtain patterns of various aspects of interest to the study, whereas qualitative methods can provide means of exploring perceptions and gaining deeper insights of specific issues. This study employed both tools and this provided an understanding of how contextual factors and processes affected the planning and management of Yala Wetland ecosystem.

Qualitative studies are especially very useful as they allow "exploring and understanding the meaning of individuals or groups ascribe to a social or human problem" (Creswell,

2009) such as wetland resources and how humans interact with them to pursue their livelihoods.

### 3.8.1 Focus Group Discussions (FGDs)

Sixty focus group discussions of 7-10 community members per session from community organizations operating in the study area were conducted to collect data as guided by the focus group discussions (FGDs) schedule (Appendix 2). The target organizations were those identified as active in wetland conservation, drawn from the 60 villages spatially spread in the study area and were therefore considered representative of the Yala Wetland. Figure 3.10 shows their locational map while Appendix 4 provides their GPS coordinates. The total number of FGD respondents was 410. The 10 respondents per group invited to participate in the FDGs were chosen based on women, men, youth, responsibility such as official and membership to represent diversity within the group.

The FGDs were held in convenient locations for local communities.  The FGDs are very advantageous, as Natasha *et. al.* (2005) maintains since they allow collecting of substantial data from many people within a very short period. The structure of these FGDs was kept to open, allowing feelings and characterizations to emerge from the participants themselves (Krueger and Casey, 2008; Dawson *et al*., 1993) on background information about the wetland, their opinions, ideas, perceptions, and beliefs and experiences that influenced their interactions in the wetland and their involvement in its management over the years (Likert, 1932). Data was recorded both by written notes and by video recordings.

### 3.8.2 Key Informant Interviews (KIIs)

Key informant interviews with 34 highly respected elders and change makers from Usenge, Usigu, Kombo, Hawinga, Uhembo, Bunyala were conducted between April and June 2016. The elders identified by communities were considered as custodians of  Yala Wetland historical, cultural and indigenous knowledge information. Information received was corroborated with other literature on Yala Wetland to provide historical and contextual information.

The Luo Council of Elders was represented by its Deputy Chairperson from Yimbo. The elders were from Kombo beach management unit who had also established a Yala Wetland community museum in Kombo beach at the shores of Lake Kanyaboli; an elder from Misori Kaugagi; and an elder and a youth from Bunyala. They narrated the history of the Wetland, significant events and trends, and their implications.

An interview schedule which had open ended questions that included understanding the formation of the Wetland, local /or indigenous knowledge used by local communities to manage Yala Wetland; challenges in Yala Wetland, their causes and what could be done to turn them into opportunities for sound management of the wetland, their thoughts on the level and effectiveness in the communities' participation in Yala Wetland land use planning processes was used.

They narrated the history of the wetland, significant events and trends and their implications. These interviews were video recorded and later used for analysis of the research data. At the end of each interview session and end of the day the researcher set aside time to record research activities for the day, his observations and experiences for the day and critical reflection  in the researcher's journal (Deveskog, 2013; Leggo, 2008; Greene, 1995).

### 3.8.3 Appreciative Inquiry Methodology

Appreciative inquiry (AI) is a mobilizing philosophy built on the recollection of peak experiences, recognition of strengths and qualities in the most debilitating circumstances, and a belief in better future possibilities. It is commonly defined as the "art of discovering and valuing those factors that give life to an organization, community or group." As a capacity building approach, AI supports innovation and change by translating images of possibility into reality and beliefs into practice (Dweck, 2008; Cooperrider, *et al*., 2008; Cooperrider, *et al*., 2000). Groups were facilitated to develop proactive propositions that expressed their boldest ideals and commitments to deal with the challenges that Yala Wetland pose in their lives.

Appreciative Inquiry methodology was applied in framing the questions and discussion set up to get what local communities and students envisioned as their desired future Yala

Wetland in 50 years' time. Appreciative inquiry in organizational and community development has successfully been used worldwide to cultivate hope, build capacity, unleash collective appreciation and imagination, and bring about positive change. It is premised on the fact that human beings move in the direction of what researchers and practitioners ask about. Therefore, AI deliberately asks *positive questions* around affirmative topics to ignite constructive dialogue and inspired action within organizations and communities. Change research shows that innovative methods that evoke stories, and affirm and compel groups of people to envision positive images of the future that is grounded in the best of the past; have the greatest potential to produce deep and sustaining change and inspire collective action (Browne, 2015; Cooperrider *et al*., 2008; Smith, 2003; Cooperrider, *et al*., 2000).

### 3.8.4 Schools Creative Essays, Debates and Artworks Competitions

Data was also collected from 18 learning institutions, secondary schools (5), primary schools (11) and post-secondary technical vocational institutions (2) found within the wetland and its buffer zone. Students' data were presented in essays , debates, poems, and artistic works on the Yala Wetland issues and they were rewarded for outstanding performance as shown in Plate 3.1. This data was part of what the modified community participation Yala community participation framework brought to the SEA/LUP processes as intergenerational perspectives.

Plate 3.1: Yala SSG Chairperson (right) presents a certificate of merit to a pupil of Nyakado Primary School.

**( Source: Author, 2018)**

### 3.8.5 Religious Leaders Conservation based Sermons

Eight religious leaders purposively identified as key conservationist and representing various religious groupings in the study area were tasked to develop sermon themes that extolled the values of wetland ecosystem as well as their vision for a future sustainably managed Yala Wetland. The leaders from religious leaders' network were drawn from the Catholics, Protestants, Evangelicals, Indigenous churches and Muslims.

### 3.8.6 Direct Observations

Direct observations played an important role throughout the research period in contextualising findings and understanding contexts (Patton, 1990) and also to understand

relationships and interactions among individuals, community groups and institutions involved in Yala Wetland Ecosystem Management.

The observations were made during focus group discussion sessions, en route to villages visited, and stakeholder and community events attended. The researcher also made observations while moving around the wetland on key environmental issues such as land degradation, landuse/landcover changes, papyrus cover and used camera, GPS device and video to capture some of those. In particular, observations were useful in understanding gender dynamics by observing the interactions between men and women group sessions and events and government officials and local communities during consultative meetings at various stages of the LUP development.

### 3.8.7 Remote Sensing and GIS

The researcher used satellite images from Google Earth which provided detailed photographic evidence of the condition of the wetland and various land use changes in Yala Wetland for years 1984,1989,1994,1999, 2001, 2014 and 2016. Remote sensing was used to determine the current size of the wetland in line with revised definition of the wetland and various land cover/use changes in the wetland over the years (GoK, 2015; Ampofo *et al*., 2015; Chambers, 2006; Turner, 1998; Liverman *et al*., 1998; Lillesand and Kiefer, 1987).

The GPS locations of the various community organizations and institutions involved in data collection were recorded and later used to create a presence map with their contact details using Google Earth. This map allows for instant identification and seeking participation of local communities in LUP implementation and other Yala Wetland ecosystem conservation matters as seen in Figure 3.10. Google Earth computer programme provides valuable records of historic land use change throughout the world.

### 3.8.8 Community maps

During focus group discussions and community meetings, some community organizations were asked to map out their villages and the resources they have in their villages. This was a basis for determining the wealth and recognition of community assts which they need to

manage effectively on their part to conserve Yala wetland. Community mapping was done in 8 villages in Siaya and Busia Counties locations namely (Central Alego, South Central Alego, Usonga and North Yimbo) and eight sub-locations (Ojwando "A", Kadenge, Kaugagi Hawinga, Nyadorera "A", Nyadorera "B", Nyamonye and Bar Kanyango).

### 3.8.9 Experts Panel Review and Input

The expert panel professionals from the area among them land use planners, environmentalists, spatial planners and strategic planners were also contacted t to give input and review the drafts before adoption. Collaborative tools such as google document were used to moderate the discussions and to solicit inputs from these experts on the SEA and LUP drafts contents.

### 3.8.10 Spectrum of public participation model and the 10 indicators of evaluating public participation effectiveness

To determine the extent of wetland community participation in SEA/LUP processes, the researcher used spectrum model of public participation and its five levels from informing, consulting, involving, collaborating to empowering; and the 10 emerging good practice for indicators for measuring public participation to determine the effectiveness of YPAC framework (Stuart, 2017; World Bank, 1998, 1999, 2002).

### 3.8.11 Explorative Participatory Workshop

The researcher conducted a workshop with key community organization leaders at the start of the study for a more in-depth review and framing for key informant interviews and focus group discussion data collection tools. The team refined the tools to enable easy comprehension by the Research Assistants and leaders who were then eventually involved in the data collection.

**3.8.12 Journal Writing by the Researcher**

In the context of viewing the study as an action research alongside Yala Wetland LUP development, a journal (diary) was used recording descriptive accounts of the researcher's activities, experiences and in-depth reflections. Journaling one's experience and using that to reflect and make meanings during the research has been used in various collaborative research studies (Deveskog, 2013).

Journal writing helps one to write freely, to learn about oneself and to find his/her own voice. Greene (1995) who used journaling as one of the methodologies in her doctoral research says, "learning to write is a matter of learning to shatter the silences, of making meaning, of learning to learn" (p.108). The researcher kept a journal where he recorded his experiences and events that captured the entire duration of fieldwork. The journal was used to corroborate reflections and experiences with emerging themes and issues from communities and other stakeholders that the research team interacted with.

Leggio (1995) in her PhD dissertation titled *Magic* wand notes:

> Over the years, I have kept track of my work thoughts and notes about activities in work journals. I have also kept personal journals to help me think through directions and decisions about where to go next in my work and life. In the last decade, I made some major transitions in my life and the process of writing has helped me think through some of the decisions involved. Writing is a powerful way to create one's life as well as to record and reflect on it (p.82.)

**3.8.13 Photographic Documentation**

The researcher also used digital photography to record observable features that helped in explaining the various issues addressed by the objectives of the study. Photographs are accurate and reliable as they reflected the actual situation on the ground. The photographs enhanced the perception of results from other data collection procedures to show, for example, the form and type of land use activities, key activities local communities undertake in conserving the wetland, the vegetation loss in the wetland, students'

conservation activities and communities' involvement in Yala wetland planning processes. The data helped to pictorially explain the results.

### 3.8.14 Secondary Data Sources

Literature review was conducted on public participation, policies, laws and relevant studies that provided secondary data and a valuable source of additional information for triangulation of data generated by other means during the research and this has also been used by many researchers (IYSLP, 2017; Friis-Hansen and Duveskog, 2012;).

Documents reviewed helped with understanding the subject matter, issues within the Yala Wetland and studies that were conducted as a precursor to land-use planning processes. Secondary data was gathered at various stages of the research, reviewed and analysed, including that on policy and legal frameworks, wetland ecosystem management guidelines and procedures, relevant studies to Yala Wetland and other sensitive ecosystems elsewhere. The aim was to gain a deeper understanding of Yala Wetland management processes and how institutional issues had influenced its management. Additionally, background materials about the biophysical, socio-economic and cultural contexts of the study area were analysed to gain a better understanding of the local situation and validate information provided through key informant interviews, FGDs, and observations.

### 3.8.15 Land Use Plan Methodology

The Yala LUP was prepared following the land use planning framework (Figure 3.11) developed by Busia and Siaya County Governments and relevant stakeholders with technical support from the National Government. The development of the Yala LUP adopted FAO (1993) guidelines to the site and county and national legal, policy and political circumstances. The process was informed by  lessons learnt during Tana River Delta LUP (Odhengo *et al.,* 2014) formulation process. According to the revised EMCA (2015) all Policies, Plans and Programmes both at national and county level that are likely to have significant effect on the environment shall be subjected SEA. The LUP falls in this category and as such the LUP process ran parallel to a SEA process such that SEA

processes informed LUP. The planning framework outlined the steps to be followed to arrive final LUP (Waweru and Muoria, 2015).

### Consultations for Plan Development

Public participation is a constitutional requirement under article 69 (1) of the constitution of Kenya and Part VIII section 87-92 and 115 of County Government Act, 2012 and Part 2 section 6 (1) a-e, 2(1) of Public Participation Bill, 2020. Yala LUP process was therefore made as participatory as possible. The planning team made deliberate efforts to ensure public/or stakeholder participation with YPAC as the primary vehicle for communities participation in order to: create awareness and interest in Yala LUP; provide public opportunity to influence decisions on development planning as to what, where, when and how, matters that affect them; ensure sustainability through ownership of the plan, empower the stakeholders to take responsibility for sustainable management of Yala Wetland, minimize conflicts during plan preparation and implementation; increase transparency, inclusivity and accountability in land use planning process.

Therefore, the researcher's entry point into the process was at "consult with public" where the modified Yala Community participation framework integrated into the process to arrive at the final LUP benefiting from  improved community participation.
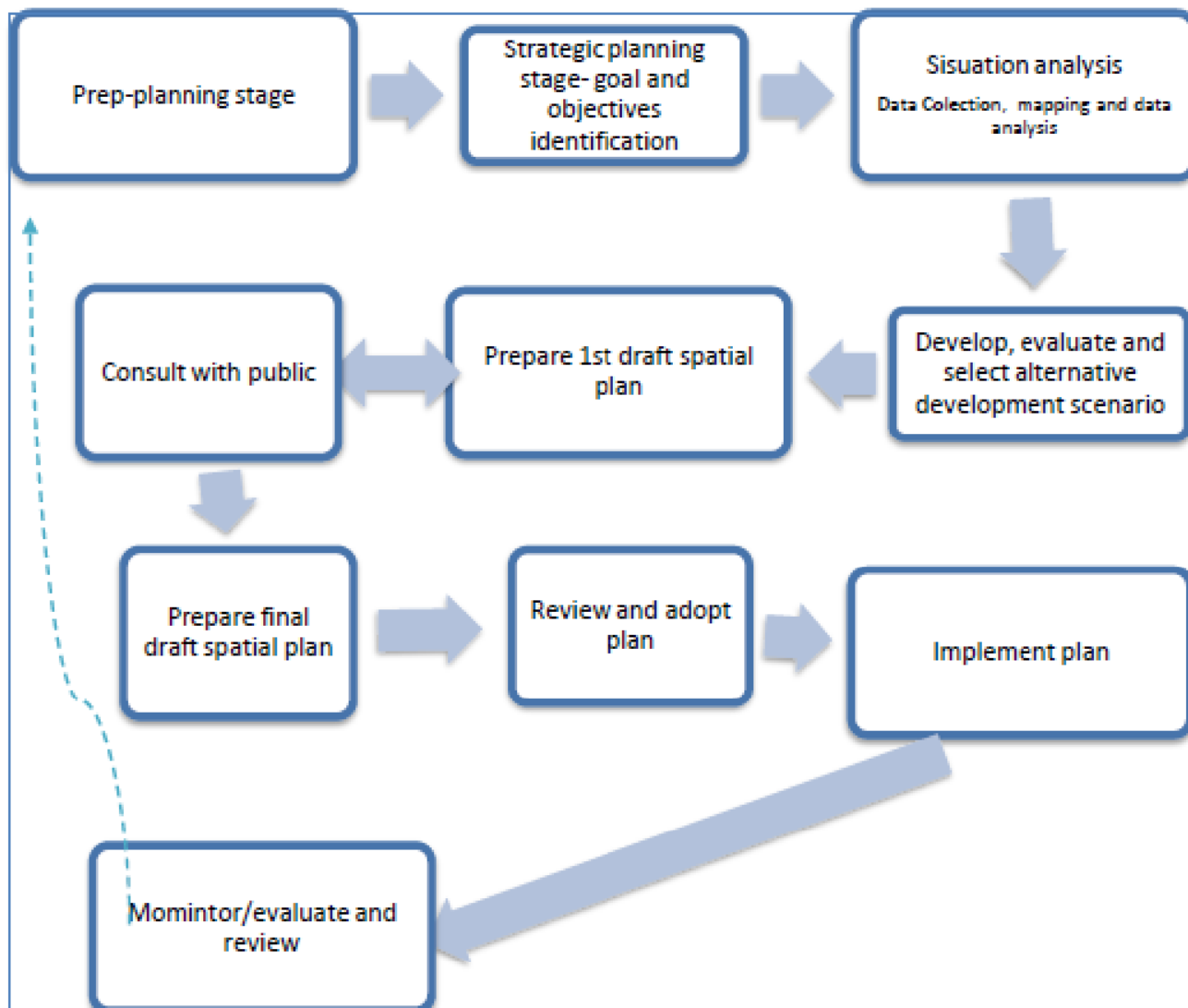
**Figure 3.11: Planning framework**

**( Source: Waweru and Muoria, 2015)**

Stakeholder participation was designed to be continuous throughout the planning process. However, three key stakeholder meetings were be held as part of public participation processes. During the inception stage, consultative meetings were held between the County governments of Siaya and Busia, the planning technical team, the national government agencies and community leaders to create awareness of the intended preparation of the Yala Wetland Land Use Plan.

The purpose of the first stakeholder meeting which included local community leaders sought to create awareness among stakeholders on the land use plan; to build consensus on key issues; capture stakeholder aspirations and expectations, and set the vision of Yala Wetland and objectives of the land use plan.

The purpose of the second stakeholder meeting was to present the situation analysis, validate baseline report and review vision and objectives of the spatial illustration of Yala Wetland. Wetland communities were consulted in some of the technical team's activities and were therefore required to validate the outcomes at the meeting.

A third stakeholder meeting was held to present the draft Yala Wetland land use plan for review, receive comments to add value to the draft and finally adopt the plan. Thereafter, a validated draft land use plan was subjected to debate and finally approved by the Siaya and Busia County Assemblies.

### 3.8.16 Summary of Methods Used

The research methods used by the study are summarized in Table 3.2.

**Table 3.2: Summary of Research Methods used**

| Research Objectives | Research Question | Research Data Collection Methods | Theoretical Base |
|---|---|---|---|
| 1. To assess the status of community participation in Yala Wetland ecosystem management | 1. How have local communities participated in Yala Wetland Ecosystems management over the years? 2. What role will the indigenous knowledge help in the management of the envisioned Yala Wetland ecosystem? 3. What is the current level of community participation in Yala Wetland LUP processes using spectrum of public participation? 4. How effective is the community participation framework in Yala Wetland LUP? | Key informant interviews from elders and change agents; Focus group discussions Explorative Participatory Workshop Oral traditions; Journaling and researcher's reflections; Secondary sources review FGDs using the 5 levels spectrum of public participation model FGDs using the 10-point indicators of evaluating public participation effectiveness | Systems theory and Ecosystems approach theory |
| 2. To identify environmental issues for inclusion in Yala Wetland Land Use planning and management. | 2.1 What are the environmental issues that should be considered in Yala Wetland Land Use planning and integrated ecosystem management plan? | Focus group discussions, community mapping, priority ranking, Key informant interviews Participatory methods (visualisation through schools' competition in essay writing, debates and artworks, | Systems theory (for complex systems: Ecosystems approach theory, Post modernism |

| | | | |
|---|---|---|---|
| | 2a. What are the communities' vision for Yala Wetland Ecosystem in 50 years' time/vision 2063? And what should be done to attain this envisioned future? | community dream and community maps; conservation sermon essays<br><br>Remote sensing and GIS | and Green social theory)<br><br>Transformative |
| | 2b. What role will local knowledge play in the management of the envisioned Yala Wetland ecosystem? 2c. What are environmental issues to be considered, in Yala wetland LUP and management plan? | Direct observations<br><br><br>Community maps | Learning Theory |
| | 2d. What are the local communities' environmental issues (spatial data) for inclusion in SEA/LUP? using Public Participatory GIS | | |
| | 2 c. What is the extent and (ecological) impact of Yala Wetland landcover/landuse changes between 1960 and 2014? Extent of the ecosystem & threats to biodiversity, impact of global warming, impact on water use. | | |
| 3 To develop a framework for optimizing community participation in Yala Wetland | 3a. What mechanism would optimize community participation in the on-going | Analysis from objective 1 and 2 Researcher journaling and reflections; | Systems theory for complex systems (Ecosystems |

| | | | |
|---|---|---|---|
| Planning and Ecosystem Management | Yala Wetland planning and management processes?<br><br>**3b**. What is the feedback from testing the modified framework for optimizing community participation in Yala Wetland Planning and Management?<br><br>**3c.** How can this framework be deployed/applied in community development programs particularly County Integrated Development Planning (CIDP) development?<br><br>**3d**. What is the feedback from using modified participation framework on CIDP development? | Action research participatory methodologies to test the framework<br>Secondary sources review<br>Experts Panel Review<br>Designing the modified framework design using principles | approach theory, post modernism, Green Social theory, Theory of Change & Theory U) & Empowerment &Transformative Learning Theory |

**(Source: Author, 2019)**

**3.9 Data Analysis and Presentation**

Data collected through interviews, FGDs, essays writing and document reviews was analyzed using content and contextual analysis techniques. Content analysis as a method, according to Babbie (2015) is useful since it captures well the content of communications generated through interviews, essays and FGDs. Content analysis technique allowed the researcher to categorize and code the collected information based on participants' responses to each question or major themes that emerged from in-depth interviews, essays and FGDs (Kumar, 2011). This made it easy according to Creswell (2009, 2012), Natasha *et. al*. (2005) and Likert, (1932), to interpret and explain the meaning of respective themes and perspectives raised by respondents. Contextual analysis, on the other hand was used to analyze participants' shared meanings and images on Yala Wetland challenges, its formations and resource use conflicts in respective contexts of Busia and Siaya counties. Likewise, essays were analyzed to itemize common themes and key messages.

**3.9.1 Analysis of Interviews, Focus Group Discussions and Community Meetings**

Interviews, focus group discussions and community meetings' data were analysed in an inductive manner and themes generated based on emerging similarities of expression in the data material. All individual interviews and focus group discussions were recorded. Many of these elements provided quotations in the write-up of research findings and other similar elements were quantified using descriptive statistics to give a sense of the emerging themes and their relative importance according to the respondents. Direct quotations from the interviews were used for presentation to justify conclusions about various ideas and themes.

All the transcripts were systematically reviewed and responses coded based on common themes identified and sub grouped thematically. Analysis continued until there was a consensus on interpretation and each category was '*saturated*' which meant further analysis appeared to yield no new information (Lincoln and Guba, 1985). Many of the sub-headings in the findings section of this thesis represent themes that emerged through this analysis process.

Secondary data reviewed and analyzed included: legislations, policy documents, strategies, management guidelines and procedures and study site related studies at the local and national level, and background materials about the biophysical, socio-economic and cultural contexts in the study area. These secondary data provided a valuable source of additional information for triangulation of data generated by other means during the research (IYSLP, 2017; Friis-Hansen and Duveskog, 2012).

Great care was taken to ensure that necessary information regarding research questions was collected, noted and properly verified before subsequent report writing. Data that needed numerical calculations was analyzed by the SPSS software and was presented in form of tables and charts.

The study dealt more with respondents' perception rather than with statistically quantifiable outputs. Data analysis to guide perceptions in spectrum and evaluating public participation effectiveness was done by calculating percentage responses (Neuman, 1997). The response rates were calculated using the following formula.

$$Response(\%) = \frac{x}{y} * 100$$

Where x-respondents who gave feedback and y total number of respondent groups.

To grade the percentage response, a modification of Lee's (2000) EIS study report review package was used as shown in Table 3.3.

**Table 3.3: Grading Responses for YPAC effectiveness on 10 indicators**

| Serial No. | Grade (%) | Rank |
|------------|-----------|------|
| 1 | 1-16 | Very poor |
| 2 | 17-33 | Poor |
| 3 | 34-50 | Unsatisfactory |
| 4 | 51-67 | Satisfactory |
| 5 | 68-83 | Good |
| 6 | 84-100 | Excellent |

**(Source: Modified from Lee, 2000 )**

### 3.9.2 Adjudication of Yala Swamp Competitions

A select team of panelists that adjudicated entries by schools and religious leaders comprised the Research Supervisor from School of Environmental Studies (SES) University of Eldoret, Program Manager from Nature Kenya, Research Assistant from SES; Siaya County Director of Education and the Principal Researcher from SES. Each panelist marked the 187 essays and art works, guided by the following parameters: background information, context, creativity, vision and dream all seen as identification of appropriate key challenges of the swamp and prescription of potential solutions that address the identified challenges with the potential highest score being forty (40) marks. Table 3.4 shows the adjudication criteria for student's submissions.

**Table 3.4: Adjudication criteria for Yala Swamp Essay writing, Poems, Artworks and Sermons**

| Information | Marks |
|---|---|
| Background Information (understanding of Yala swamp) | 10 |
| Context (problems/challenges and solution identification) | 10 |
| Creativity (new ideas, simple to implement, behavoiur) | 10 |
| Vision/Dream (desired future, compelling case/strong advocacy/ | 10 |
| **TOTAL** | **40** |

The study applied qualitative analysis method on the essays and artworks submitted by institutions of learning to derive emerging themes and then quantified the weight of identified issues.

**3.9.3 Analysis of Remote sensing, GIS and Community maps data**

Land cover/use changes were determined through the combined use of both remote sensing and GIS techniques. The images obtained from institutions in Nairobi the Regional Centre for Mapping of Resources for Development (RCMRD); Landsat ETM images with a 30m Resolution were used. Satellite data remains the most current at affordable cost covering wide area and perhaps the most consistent and reliable in change detection and trend analysis in a way important for environmental analysis, the return period for LANDSAT is 16 days.

LANDSAT ETM imagery was the primary data source was used to determine and map the landscape characteristics particularly plant communities of Yala Wetland. The study utilized, ARC GIS 10, and ERDAS 9.3 in combination with ENVI 4.7 or IDRISI. Landsat-ETM images acquired were already corrected.

Since each image consists of about six bands. Resampling of the images was the undertaken in ERDAS using the "Layer Stack" module. Layer stacking enables band combination thus enabling the image combination in true color combination (bands 3, 2, 1) or false color composition (4, 3, and 2).

The images were then clipped using the subset module as defined above so as to attain only the study area to be classified, this was done in ARC GIS 10 with the aid of a shape file of the study area, this was done in the data management module-raster processing – clip module in ARC GIS or the subset module in ERDAS 9.3. The shape file used in sub setting the image was obtained from the boundaries of the locations surrounding the wetland.

Image classification was then undertaken, unsupervised classification was undertaken for the clipped images using ERDAS 9.3 software to generate classes that are found in area. This was  computer generated and gave a general view of the number of classes that were within the study area. Using the classes obtained and the prior knowledge of the area, tentative classes of ten land uses were assigned to the auto generated classes.

ERDAS 9.3 maximum likelihood module method was adopted to undertake supervised classification and  the method assumed that the training area digital numbers were normally distributed. The probability of a pixel value occurring in each class would then be computed therefore assigning the pixels to the class with the highest probability (likelihood of being a member). This was repeated for all the images and the results were presented as figures. This process was also aided by a Google earth image for the area, which was considered real time and ensured that the classified class was a true representation with the situation on the ground.

## 3.10 Validity and Reliability

Validity is the ability of measures such as in-depth interviews and FGDs to measure what they are envisioned to measure (Yin, 2009). In particular, did the key informant interviews and FGDs respond to the stated study objectives and questions? Reliability on the other hand is the 'dependability or consistency' of a research approach across other studies. According to Yin (2009, p. 38) reliability helps to reduce bias and errors by ensuring that "if a later investigation followed the same procedures as described by an earlier researcher and conducted the same case study all over again, the later researcher should arrive at the same findings and conclusions." Multiple qualitative research methods namely key informant interviews, FGDs, community mapping, artworks, essays and debates and document reviews were triangulated to ensure that the selected measures and findings were valid.

The use of multiple methods of data collection was a key feature of the action research on Yala Wetland ecosystem. The researcher and his assistants spent more time in the field in order to familiarize themselves with participants, wetland environmental issues and community dynamics in the study area. The researcher being a native of the wetland, enjoyed some legitimacy to discuss the identified issues frankly knowing that ultimately, it was for their betterment as one of their own sons worked with technical teams from the National Government, County Government and University of Eldoret in developing Yala LUP. The population data was obtained from KNBS census data, the custodian of government data and Siaya and Busia County statistical offices. LANDASAT-TM images were considered appropriate for the study due there relatively good resolution of 30 metres which were further be resampled to a higher resolution to cost effectively cover the needs of the study.

From the onset the researcher conducted a reconnaissance of the study area, pre-tested the data collection instruments among them interview schedules, FGDs guides and observation checklist and used feedback to refine the tools in line with the study objectives and questions. During data analysis, the researcher involved doctorate student colleagues who

were not involved in the previous the study, in order to provide a continuous check on the research findings and conclusions to contain researcher biases.

## 3.11 Justification of the Methodology and Action Research within Workspace

The study focused on communities and their activities as they interact with Yala Wetland ecosystem and its buffer zone. The buffer zones were restricted to a distance of 5km from the wetland boundary because the propensity to use wetland resources is inversely related to travel distance (Odhengo *et al*., 2018a; Abila, 2003). Besides, the wider Yala and Nzoia basins and adjacent Lake Victoria key interconnected activities and their impact were considered in wetland plans development and governance framework arising from this study

The application of participatory methodologies among them FGDs, Key informant interviews, visualization of the future through artworks, songs, debates, community mapping fused with appreciative enquiry framing of questions, trainings, coaching, empathy walks with communities, lived with the people/total immersion helped to get very deep people issues and infuse creativity in the process (Dweck, 2008; Involve, 2005; Cooperrider *et al*., 2000; Piaget, 1950; Likert, 1932).

### Action Research within the Workspace

Some components of research were carried out as an action research process within workspace. For much of the study period the researcher played a multi-faceted role as investigator, an advisor to SEA/LUP development and a mentor to Siaya County Integrated Development Plan (CIDP) development and implementation. To some extent while these multiple roles provided challenges in terms ensuring true objectivity of the research, it also provided a range of opportunities for ensuring direct impact of the research in informing practice. The aim was to generate concrete and practical knowledge to enable those responsible for making policy, managing programs and delivering services to make more informed judgements about their activities, thereby making services more appropriate and effective for the people they serve.

The above perspective is fully consistent with the intentions and objectives of participatory action research as Stringer (1999) and Reason (1994) explained where apart from producing knowledge and action useful to the community, it also emboldens people to construct and use their own knowledge. This denotes less emphasis on uncovering generalizable truths but puts more focus and emphasis on the realities of individuals and communities in local contexts (Stringer, 1999). This action research perspective allowed the investigator to be a researcher while at the same time acting as a change agent and assume benefits related to his role as 'insider' (transformational learning). As noted by Stringer (1999), research that operates at a distance from the everyday lives of practitioners largely fails to penetrate the experienced reality of their day-to-day work. Reason (1994) points out the fact that "we can only understand our world as whole if we are part of it, as soon as we stand outside, we divide and separate". In action research there is no functional distinction between the researcher and the researched. They are all defined as participants, and have equal footing in determining which questions to be asked, information to be analysed, and conclusions to be made (Stringer, 1999).

To mitigate the possible drawbacks of problems in objectivity, the researcher deliberately teamed up with research colleagues (i.e. doctorate student colleagues who did not have any involvement with the Yala Wetland) for data analysis and this provided a continuous check on researcher's findings and conclusions, ensured that the researcher's own biases did not undermine the research. Reason (1994) argues that true objectivity does not exist and that the observer is always inseparable from what is observed. Instead, he refers to the term 'critical subjectivity', arguing that the validity of our encounters with experience rests on the high quality, critical, self-aware, discriminating and informed joint judgements of the research actors and subjects (Scharmer, 2016).

## 3.12 Ethical Considerations

The researcher was conscious of ethical issues related to the study and to himself, participants and institutions which he was affiliated to particularly University of Eldoret and Retouch Africa Consulting (RAI) and institutions where data were collected. In order to ensure trust by participants and organizations in which data was collected from, an

official letter introducing the researcher was provided by University of Eldoret and a research permit from The National Commission for Science Technology and Innovation (NACOSTI) (Appendix 5). Respondents' information was treated with utmost confidentiality and were informed that they were free to disclose or conceal their identities. To avoid misinterpretation and distortion of information, the researcher ensured that no other person(s) had access to the data during the data collection process. There were short debriefing sessions after every interview or FGD in order to cross check the collected data. This helped eliminate wrongly presented or recorded data. The researcher was so conscious on the use of words or phrases to avoid asking questions, which, according to Creswell (2009) would sound offensive or discriminatory in terms of "gender, sex, race, disability and ethnic minorities."

Research questions were pretested with peers and other experts to ensure that they were not offensive. Since this study also examined wetland's resource conflicts that could have contributed to deaths, injuries and bad memories; questions touching these very sensitive issues were carefully handled. The issue of acknowledgment was considered and any piece of work consulted was acknowledged. The identities of interviewees have been concealed in the thesis report and resultant publications to ensure no victimization for any contrarian opinions expressed during the study. The researcher also acknowledged the contribution of individuals in the execution of this study. Most importantly, any piece of information that is deemed classified/or confidential by the government or non-government organizations was not to be accessed unless consent was granted by respective institutions.

# CHAPTER FOUR

# RESULTS

## 4.1 Introduction

This chapter presents the results of the study. The results are presented based on the study objectives and include results on the assessment of the status of community participation in Yala Wetland management, those on identified environmental issues for inclusion in Yala Wetland Land Use planning and management and the development of a modified framework for optimizing community participation in Yala Wetland ecosystem management.

## 4.2 The Status of Community Participation in Yala Wetland Ecosystem Management

The first objective of the study was to assess the status of community participation in Yala Wetland Ecosystem management and this section presents the results on communities account of Yala Wetland's formation and how that affects their involvement in its management. The essential indigenous knowledge system used by the communities in managing the wetland, their level of participation in SEA/LUP processes, effectiveness of community participation in SEA/LUP processes and the governance framework for managing Yala Wetland ecosystem are discussed.

### 4.2.1 Communities' Historical account on the Formation of Yala Wetland

According to the key informants in the study, the history of Yala Wetland dates back to many years ago when the wetland was a flat ground inhabited by the local people. Things changed in the 1960s with heavy rains which became the climax of the wetland's formation according to the local communities' recollection.

Before the 1960s, the wetland was a water body, which later disappeared allowing the local populations to move in and undertook cultivation. There have been three cycles of water drying/reducing significantly namely cycle one of 1917-1920s; cycle two of 1960-1970s and cycle three of the 1980s onwards. Likewise, the communities also reported that they

had heard from their forefathers that Lake Victoria had also dried completely twice in its history of existence. This proposition has been corroborated by studies on Lake Victoria by Awange and Obiero-Ong'anga, 2001.

 Secondly, the wetland partly formed from the flooding experienced in the 1960s which was believed to be a curse from the gods by the local communities. The flooding continued until 1972 causing malaria and other challenges that forced most people to move to high grounds.  Yala Wetland residents recalled that in December 1962 and much of 1963 there were heavy rains (*kodh uhuru* meaning the rain at independence) which is equivalent to today's *El Nino* rains. Initially, there was a small opening by the lakeside at Goye in Usenge, but with the 1963 rains for two years widening the two sides and later a causeway was built to link the two landmasses in Usenge. The ferry was brought but with increased rains, the ferry was swept to Mageta islands. The local people then continued using boats to link the two areas. The inhabitants of Mageta were driven away by tsetse fly infestation in 1929 but returned after successful government tsetse eradication project in the islands in the mid-sixties. Respondents stated that the local communities created beliefs out of some experiences and some believed going back to Mageta was not was not going to be fraught with bad omen. The families in Yimbo dispersed over time and some of them moved to other places in Bunyala, Alego, Gem and other far off places. They retain the names from Yimbo like Nyamonye, Usenge, and Uriri in Alego.

Respondents reported that Lake Kanyaboli is a mystery (*en hono*). When the water dried from Sigulu area an elder known as Wanjiri Kosiemo discovered the dried land and people of West Alego moved in to farm. There were a lot of indigenous fish species like mudfish (*Kamongo),* a lot of food from the farms and there was no stealing." An elder from Kombo beach remembered this and stated that *Ikwaloga mana kaonge* meaning people steal food only when there is lack of it. In 1968, a road was constructed through Yala Wetland and Lolwe Bus Company passed through the wetland while River Yala drained into Lake Kanyaboli at Wango Chula.

Respondents from the community further explained that Lake Sare was formed as  a result of the backflow of River Yala entering Lake Victoria. Later, River Yala course was

diverted forcefully into Lake Namboyo and the wetland communities attributed this act to wetland expansion as the waters spread into the wetland without going directly into Lakes Kanyaboli and Victoria as was before.

A third respondents' explanation on the formation of Yala Wetland was linked to the construction of Owen Falls dam in Uganda in 1954 thus resulting into the beginning of a backflow water challenge that was due to flooding in 1960, 1962 and 1963 with water from Kasese in  Uganda.

The Bunyala respondents provided an additional explanation, linking the flooding to River Nzoia channel expansion during Webuye Paper factory construction. In Musoma where river Nzoia enters Lake Victoria, there is a backflow that is partly responsible for submerging villages in the wetland. There were 10 Yala wetland islands inhabited by 36 clans spread across 39 villages. Among the Banyala subclans living in those 10 wetland islands include: Bulwani, Maduwa, Bukhuma, Siagiri, Iyanga, Khumabwa, Maanga, Bungeni, Runyu, Rukaza, Kholokhongo, Nababusu, Gendero, Mauko, Bubamba, Buongo, Siagwede, Siunga, Bunofu, Busucha, Mugasa, Isumba, Ebukani, Bumudondu, Erugufu, Ebuyundi and Khamabwa.

These wetland formation and expansion propositions determine how the wetland communities use and manage the wetland resources and the current level of degradation will require their active involvement to reverse course.

### 4.2.2 Wetland Communities interest in Wetland management and participation

FDGs and key informant interviews identified the following reasons in order of priority 1-7 for their interests and participation in Yala wetland management: Major source of water, food and income; benefits  present and future generations(a tourist site); conservation of environment,  flood control, awareness on environment and rainfall, Fish farming and farming in the swamp, papyrus reeds, papyrus products, raw materials for building, firewood, alternative source of income; a community land for development purpose; and Shelter for wild animals such as Sitatunga and breeding ground for fish.

They also expressed how they wanted to be involved in management as follows: Community involvement and be part of conservation; creation of awareness/sensitization/advocate sustainable management of the swamp including use of right fishing gears; Improve species diversity by planting trees, fruit trees and papyrus; Farming at the swamp; management of canal for easy flow of water and control of floods; implement land use plan/policy at Yala swamp; employment, register the swamp as a community land; participate in Swamp reclamation, and protect wild animals.

## 4.2.3 Yala Wetland Ecosystem Benefits derived by Wetland Communities and how these influenced their Participation in its Management

The wetland communities identified the following benefits which they derive from the wetland and in turn affect their level of participation in the wetland's management.

### Food Provisions

Yala wetland has been a source of plenty and a variety of foods including crops, animals, and fish from both commercial and smallholding farming all year round for the local communities. All the 60 FGD groups confirmed they get various foods from the wetland which include: arrow roots, sweet potatoes, millet, maize, pumpkins, traditional vegetables like *nyasigumba*, and  fish lung fish (*kamongo*).

### Papyrus Resources

The papyrus resources were used by 80% of the FDG groups  in various ways such as thatching houses, making granary (*dero*) for storing foods, ropes (*togo)*, baskets, utencils (*adita, andiw*), hats and mats *(par)*.  Mats are used for a variety of things including drying farm produce, as sleeping accessories and roof boards for houses. The wetland also serves the purpose of water filtration and some wetland residents prefer its water to Lake Victoria's.

### Biodiversity Hotspot

Yala Wetland has been a biodiversity hot spot with a rich source indigenous knowledge on resources such as birds, butterflies, sitatunga and monkeys. It is considered as remnant

ecosystem which hosts some endemic Cichlid fish species. Lake Kanyaboli is a critical habit for two endemic species *Oreochromis variabilis* and *O. esculentus*; the wetland is also a wildlife corridor and brings nature to communities by providing recreational opportunities, supporting learning environments and creating economic benefits.

During a bird count held in March 2016 in Goye causeway the researcher together with Yala Site Support Group (YSSG) and Wetland International (WI) visitors from different African and Asia countries managed to identify 60 bird species including the following: *usofi, siwiri, owiny, nyamaha, aging, opir, obirgogo, oningo, okok, opija.* Table 4. 6 shows various birds found in the wetland and their values to the local communities.

Various bird species known to perform various functions were also found in Yala Wetland among them *Magungu* for early warning on the onset of rains. During the study, the communities cited seeing the birds in the fourth week of March, 2016 and then the rain began in the first week of April 2016 confirming their beliefs on applying their indigenous knowledge. Other birds were Owls (*Tula nyangoro*), Shoebill *(Arum)* and (*Munglu* which spell death and calamities;(*Tel tel)* good fortunes but also indicates bad fortune when it chirps repeatedly (*anouya*), and *Arum koga* denotes bad omen. The communities while explaining the beliefs noted that these beliefs were rooted in some previous experiences and therefore had been taken forward as a representation of what was likely to happen. There was absence of a systematic way of sharing benefits from the wetland especially where a private entity (investors) had leased the swamp for commercial purposes. As a result, the local communities could neither access some of the birds in the leased lands and therefore could not conserve them as they did not benefit them but would want to trap them and use for food.

**Cultural and Spiritual Services Provision**

The communities of Yala Wetland had diverse cultural practices and beliefs, some of which could be exploited for tourism and conservation. Local communities had strong attachments to the wetland because of their social, cultural and spiritual importance. They had shrines such as Sigulu and Muduha which they used for baptism, traditional passage rites and cleansing of evil spirits. The communities also promoted indigenous knowledge

and practices on environmental functions and values that are essential for their survival such as the use of medicinal herbs.

Some places in the wetland were considered homes of clan spirits hence the residents took it as their duty to protect them. Some of these were shrines and grave sites. However, some of these sites like Sigulu had been taken by Dominion Farms and were inaccessible for local communities.

**Benefits Prioritization and how it determines Community Participation in Wetland Ecosystems Management**

During community consultations and meetings, the following were identified as what the local communities valued most of Yala Wetland. First, the provisions wetland communities obtain from the wetland were papyrus ranked as the highest at 35%. It was used by local communities in multiple ways ranging from thatching houses, filtration of water for use by wetland communities; basketry and habitat for numerous biodiversity found in the wetland like the endangered sitatunga, birds, butterflies and monkeys. Second, farming (30%) which provided food for local communities living within and outside the wetland. When water level receded in the wetland local people moved in started farming here. Third, for settlement within the wetland particularly on the Busia County side in Bunyala and within the buffer zone of the wetland on the Siaya County side (20%). Fourth, medicinal value for herbs to treat various ailments as well as other wetland resources such as ant bear dung (*chieth muok)* to treat cholera (15%).

The role of communities has been mainly wetland resource users. They have been organized in different formations at community levels and always strove to ensure sustainable use of the wetland's resources. However, this cautious use has changed over time due to increased population and entry of commercial investors.

 **Equitable Benefit Sharing and Utilization of Yala Wetland Resources**

While appreciating the diverse benefits from the wetland, the communities were unequivocal in having equitable benefit sharing of Yala Wetland resources. They recommended that the benefits accruing from investments in the Yala Wetland should be

shared among the investors, wetland communities and county governments at the proportion of 70%:30%. The wetland communities and County government portion thereafter should be shared at 60%: 40%. This was done through priority ranking at group level and then validated at communities' workshop which brought together representatives of the groups. The financial benefits should then be utilized on the following community priorities:

1. Provide safe and portable water for communities in Yala Wetland and its surroundings within a radius of 5km. The water should be at designated points such as water kiosk where wetland communities can easily access it. However, wetland residents with requisite resources to tap could extend it to their homes while over time the county governments should strive to extend to all homesteads. They suggested that investors in the wetland should contribute to this Water Provision Fund.

2. Allocate part of high potential agricultural areas of the Wetland as guided by the final land use plan for food production; and adopt modern and sustainable farming methods to raise the food and nutritional security in the region. The investors should have mechanisms for providing mechanized labour and warehousing on pro-rata basis. The agricultural produce should be accessible at subsided rates and regulated to tame abuse while guaranteeing food and nutritional security as well as food safety. Food security organizations could help support this mechanism and continuously innovate on it.

3. Provide health care support for the local community by equipping and operationalizing the existing health facilities especially provision of medicines, health equipment and medical staff. On the health front glaring gaps that compromise effectiveness and efficiency such as inadequate staff, drastic timely measures such the investors' kitty could be used pay for the remuneration of the medical staff while the government provides the drugs and equipment including high-level capacity to handle medical emergencies including novel diseases.

4. Support education fund to help the needy children pay for school fees and maintenance. The contributions for education bursary scheme should be channeled to schools where students can pursue their education and be exposed to enabling environments. This support

should target students to complete secondary education and their absorption in post-secondary education and mentorship programs in their areas of interest and talent. The fund should be synchronized with other existing bursary systems to ensure efficiency and high impact of the education benefit.

5. Support centres and mechanisms that seek to improve social life and environment of the disadvantaged children from the communities and eventually strive to see that all children enjoy favourable environment and opportunities to develop their minds. This intervention is supported by Eric Turkheimer's research on heritability that found that environmental factors are the major cause of Intelligent Quotient (I.Q) disparity and therefore deliberately improving social life and environment of the poor and disadvantaged children has the potential of increasing their I.Qs significantly within short period of time (Turkheimer *et al.*, (2003).

6. Support action research in learning institutions that address key challenges of the local people in the wetland and its environs. Funding county's centres of excellence in Siaya County, translating research into practice to address counties key challenges such as extension programmes and environmental education for sustainability.

7. Support community projects of the investor's choice which address the local communities felt needs and in line with their aspirations as itemized during the LUP study.

**4.2.4 Indigenous Knowledge Systems used by Communities to Participate in Managing Yala Wetland Ecosystem**

Local communities and key informant respondents reported having been managing the wetland ecosystem using various indigenous knowledge systems that promote wise utilization and concern for the other users like the government, wildlife and aquatic animals. However, not every community member ascribes to these ideals hence conflicts over the wetland resources. For example, the traditional totems and taboos system which are positive conservation practices arising from attaching some significance to the various animals and birds and thereby regulating their exploitation is close to the culling practice of sustainable harvesting of wildlife resources practiced in formal wildlife management.

For example, the Nyasonga clan regard hippopotamus as their totem hence do kill nor eat it while the Nyaugagi clan do not eat doves thus propagate their conservation even with wetland communities from other sub-clans. Table 4.1 shows various birds and their associative conservation values by wetland communities as recounted by key informant respondents. Yala Wetland is an Important Bird Area (IBA) with migratory birds as far as Europe passing by at certain times in the year therefore wetland communities traditional conservation practices are key if this IBA status is the be maintained.

**Table 4.1: Birds in Yala Wetland and Communities Attached Values**

| No | LUO NAME | ENGLISH NAME | SCIENTIFIC NAME | ATTACHED VALUES |
|----|----------|--------------|-----------------|-----------------|
| 1 | Ajul | Hamerkop | *Scopus U. Umbretta* | Predict where one can possibly marry from. |
| 2 | Akuru | Red dove | *Streptopelia Semitorquata* | Symbolizes peaceful marriage |
| 3 | Arum | Shoebill or Whale-Headed stork | *Balaeniceps rex* | A sign of bad omen, symbolizes death of an elderly person in village |
| 4 | Ochwinjo | African piled wag tail | *Motacilla aguimp vidua* | When killed the house rooftop burns (the victim) |
| 5 | Ogonglo | African open billed stork | *Anastomus L. Lamelligerus* | A sign of rainfall coming |
| 6 | Opija | Bam Swallow | *Hirundo R. Rustica* | A sign of rainfall coming |
| 7 | Achwall | Black headed gonolek | *Laniarius Erythrogaster* | Agent of seed dispersal |
| 8 | Ochongorio | Common bulbul | *Pycnonotus Barbatus* | Agent of seed dispersal |

| 9 | Hundhwe | Rupel robin chat | *Cossypha Seminara Intercedens* | Predicts time |
|---|---|---|---|---|
| 10 | Chiega-tho | Red chested cuckoo | *Cuculus S. Solitarius* | Associated with rainfall |
| 11 | Orepa | Long tailed widow bird | *E Piogne delamerei* | Associated with wetlands |
| 12 | Tula | African wood owl | *Strix woodfordii nigricantor* | Brings bad omen |
| 13 | Odwido | White Browed coucal | *Centropus s Superaliosus* | Predicts time |
| 14 | Owuadha | Yellow wag tail | *Motacilla flara* | Associated with cows |
| 15 | Angwayo | White winged turn | *Chlidonias Leucopterus* | Indicators of fish in the lake |
| 16 | Obur ngogo | Common house martin | *Delichon U. Urbica* | Water bird |
|  | Nyamwenge | Africa Sacana | *Actophilornis Africanus* | Shows presence of water lilies |
| 17 | Miree | Quelea | *Quelea quelae aethiopica* | Symbolizes good harvest |

Source: Researcher, 2019

### 4.2.5 Participation Structures and Processes in Yala LUP/SEA

The Yala Wetland communities' participation in SEA/LUP was organized around a framework and pre-identified steps where they would be involved. The SEA/LUP process was led by the Lands and Physical Planning Departments in Siaya and Busia Counties supported by an Inter-County Land Use Plan Steering Committee (ICSC). A national

government Inter-ministerial Technical Committee (IMTC) on Deltas team worked with ICSC and Yala Swamp Planning Advisory Committee (YPAC), to help in drafting and review of the Yala Wetland Land Use Plan. The YPAC was formed as the vehicle where communities would participate in SEA/LUP processes. Figures 4.1 and 4.2 present the steps involved and where local communities were designed to participate in the processes.

## Planning process
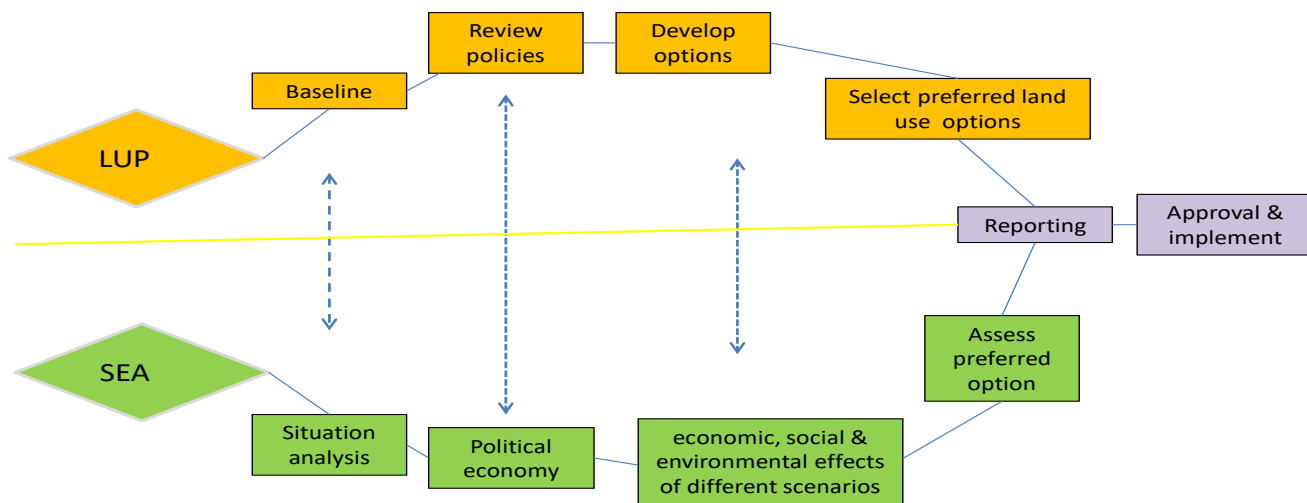


**Figure 4.1: Key steps in both SEA and LUP Processes and how they mirror each other**

**( Source:Odhengo, *et al.,* 2018a)**

The Yala Wetland LUP preparation process planned to take one year and had 11 distinctive steps of sequential activities and milestones as enumerated below:

1.      Issuance of notice of intention to plan

2.      First stakeholder meeting to build consensus

3.      Base map preparation

4.      Data collection

5. Second stakeholder meeting to validate data collected

6. Data analysis, Development and evaluation of development scenarios using agreed sustainability criteria and selection of preferred development option

7. Third stakeholder meeting to present preferred option

8. Preparation of draft plan

9. Publication and circulation for comments

10. Approval by County Assemblies

11. Launch, dissemination and implementation

From this process Yala wetland communities were designed to interact with the process at steps 2,5,7,9, 10 and 11 implying 6 out of 11 steps.

Community participation in the SEA/LUP processes was designed to be carried out through consultative meetings to SEA/LUP technical team through YPAC framework. YPAC drew its membership from diverse interest groups and geographic representation that was spread within the wetland. The following diagram shows the various players in the SEA/LUP process and how they interacted (Figure 4.2).
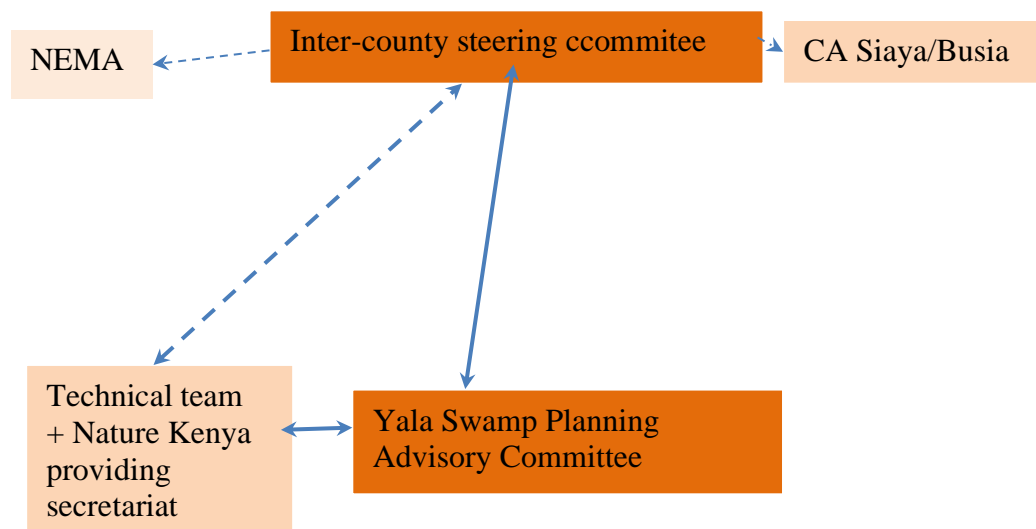


**Figure 4.2: Key Players for Conducting Yala Wetland SEA/LUP and their interactions**

**(Source: Author, 2018 )**

Table 4.2 shows all the consultations that took place during the life of the SEA/LUP processes with slight modifications to the initial plan particularly in timing and the number and breath of community consultations.

**Table 4.2: Consultations on Yala Land Use Plan**

| Date | Venue | Key Event Results |
|---|---|---|
| 19th -20th August 2015 | Siaya | Validation of Land Use Planning (LUP) method (framework) and Strategic Environment Assessment (SEA) scoping report. |
| 25th-26th November 2015 | Busia | Presentation of baselines. Formation Inter-County technical coordination team Agreement on composition of Yala Wetland Planning Advisory Committee (YPAC). |
| 9th March 2015 Monday | Kakamega Town | Threats and vulnerability assessment for Upper Yala River catchment. |
| 10th March 2015 Tuesday | Yala Market | Threats and vulnerability assessment for Mid Yala River catchment. |
| 11th -13th March 2015 | Siaya Town | Threats and vulnerability assessment analysis of Lower Yala catchment. |
| 16th March 2015 Monday | Bondo Town, Siaya | Threats and vulnerability assessment for Lower Yala catchment. |
| 22nd -23rd March 2016 | Siaya Town | Formation of YPAC Presentation and validation of Planning Scenarios. Adoption of planning scenario by Inter-County Technical Committee and YPAC. |

| | | |
|---|---|---|
| 24th -25th April 2016 | Busia | Presentation and inputting into the draft SEA and LUP by Inter-county Technical Committee and YPAC |
| 14th-15th September 2016 | Siaya | Presentation of the second draft SEA and LUP by ICSC and YPAC.<br><br>Enrichment of the second draft SEA and LUP by ICSC and YPAC. |
| 7th-8th December 2017 | Siaya | Presentation of the third draft SEA and LUP by ICSC and YPAC.<br><br>Discussions and/feedback of the third draft SEA and LUP by ICSC and YPAC. |
| January 2018 | | Draft LUP and SEA advertised and publicized for comments from the public for 60 days. |
| December 2017 -– March 2018 | Siaya and Nairobi | Incorporating comments and Editing |
| 28th March 2018 | Siaya | Presentation of the finalized SEA and LUP to stakeholders. |
| July 2019 | Siaya | Final LUP and SEA signed by H.E Cornel Rasanga, Governor Siaya County and H.E. Sospeter Ojaamong Governor Busia County. |
| September 2019 | Nairobi | Final LUP and SEA signed by H.E. The Rt. Hon. Raila Odinga, former Prime Minister, Republic of Kenya (2008-2013) |
| December 2019 | Nairobi | December 2019 – LUP and SEA design, layout and publishing |

**Inter-County Steering Committee (ICSC)**

This organ was responsible for overseeing the development of Yala Wetland Land Use Plan. The 87 members were drawn from both the Executive and County Assembly of Siaya and Busia Counties, NEMA, National Government, KWS, Kenya Forestry Research Institute, Kenya Forest Service, National Lands Commission and Jaramogi Oginga Odinga University of Science and Technology. The organ conducted its business through meetings and on demand consultations.

**SEA /LUP Secretariat and Funders**

Nature Kenya, a conservation NGO provided the secretariat to the process, which became an interface for the technical team, wetland communities, development partners and other players in SEA/LUP process.  The funding support for SEA and LUP processes came from the PREPARED Program of the United States Agency for International Development (USAID) East Africa Regional Mission; Darwin Initiative; and MacArthur Foundation to the Counties of Siaya and Busia.

**Yala Wetland Project Advisory Committee (YPAC) and the Community Participation Framework**

YPAC was the main mechanism for representing Yala Wetland communities in the SEA/LUP processes and its   role was to discuss the findings of the SEA/LUP and obtain views from wetland communities. The YPAC members were tasked to guide and instruct their own communities on the role and purpose of the LUP and SEA; to provide effective communication vertically and horizontally; to minimize misinformation and were collectively responsible for common good.

YPAC consisted of 46 members drawn from local communities and reported to the Inter-County Technical Committee (ICTC). The YPAC organ represented various interests namely ecotourism, cultural groupings/heritage; conservation; religion; islanders; fisherman; hunters; persons with disability, transporters; handicraft; farmers; investors; wildlife (honorary warden); county technical officers of Lands, Livestock, Water, Fisheries, Crops and  Forests); sand harvesters;  youth; administration (ward, sub-county);

and voluntary scouts.The National and the County Government officers participated in YPAC meetings as observers, adjudicated on any internal disagreements and gave a greater sense of the government's commitment to listening to the views of the communities.

The meeting chairpersons rotated between the different counties and interest groups. Additionally, routine meetings were scheduled and held at monthly intervals to review progress and give advice on specific outputs while ad hoc meetings were called from time to time for specific needs. However, the meetings did not take place every month as planned but rather as agreed upon by the members during its consultative meetings. In these meetings, the technical team presented various SEA/LUP outcomes and sought their inputs. They were expected upon return discuss the same with the communities they represented and provide feedback to the technical team.

The role of the committee was defined by the technical team and entailed discussion of findings of the LUP and SEA as each draft was prepared and discussed the views emanating from the individual communities. There was Yala Wetland Planning Secretariat that was housed and headed by Nature Kenya that supported the process to all the organs working towards developing the SEA and LUP. Nature Kenya played a facilitating role to the County Governments of Siaya and Busia to come up with a LUP for Yala Wetland. The aim of facilitating the SEA and LUP process was to ensure that sustainable management regimes are established, supported by relevant stakeholders, and ensured that the needs of the industry, local people and biodiversity are met.

The YPAC members were expected to act as ambassadors to SEA/LUP processes. Every YPAC member was tasked as guide and instructor in their own community to explain the role and purpose of the LUP and SEA; to provide effective communication vertically and horizontally; to minimize misinformation and collectively responsible for common good. The YPAC members were reimbursed actual cost of transport to attend meetings and provided with lunch during the meetings. There was no provision for sitting allowance.

In spite of this, YPAC members had challenges with this arrangement on how to play their expected roles effectively. They noted that they needed facilitation beyond transport to

move around, call for meetings to debrief their communities after YPAC meetings. Likewise, they needed the technical materials printed to be shared with communities which they were never facilitated to do and this hampered their dual communication roles.

During the period of SEA/LUP development, YPAC held over six meetings. Their challenges were how to reach a large number of their constituencies to report the deliberations from the YPAC meetings. Likewise, they could not meet their constituencies to seek inputs and relay their views to YPAC meetings. As such they presented their views and inputs from those around them into the process hoping that it represented their constituencies.

**Siaya and Busia Members of County Assembly**

This was another component of this framework and aimed at getting wetland communities representatives at ward level to articulate their constituents' issues and also get their opinions as their leaders. The Members of County Assembly (MCAs) involved came from wards that were located in Yala Wetland and its buffer zones.

As reported earlier, SEA and LUP key steps that wetland communities had to position themselves to meaningfully participate through YPAC framework were at steps 2, 4, 5, 7, 8, and 11 which was done with mixed results on the participation levels and effectiveness of wetland community participation in SEA and LUP as shown in Table 4.3. MCAs participated in the ICSC consultations and provided their feedbacks to the SEA/LUP drafts reports. They did not get opportunities for level ward discussions over these draft SEA/LUP documents with their representatives. Their feedback was merely their own views as representatives of the wetland communities without further public participation as required by Public participation requirements in the County Government Act (2012) and public participation guidelines of the Busia and Siaya Counties.

The researcher having reviewed the community participation framework and the challenges inherent in it including inclusivity and inability to reach out to the significant number of intended communities and obtain their voices, further mapped the representation of local communities and reached out to them as a way of increasing community

participation occasioned by the necessity of taking action to improve practice which is the essence of action research.

## 4.2.6 Level of Communities' Participation in LUP/SEA Process using Spectrum of Public Participation

FGD respondents were introduced to the spectrum model of public participation and its five levels of informing, consulting, involving, collaborating and empowering. Table 4.3 shows key SEA/LUP activities and FGD respondents' feedback on their levels of participation based on the spectrum model while Figure 4.3 shows the effect of applying the modified Yala Community participation framework on SEA/LUP processes.

**Table 4.3: Level of Yala Wetland Communities' Participation in SEA/LUP activities using the Spectrum of Public Participation Model**

| Yala Wetland SEA/LUP Activities | Level of participation based on spectrum model before Yala Community Participation Framework was introduced (N=60) | Level of participation based on spectrum model after Yala Community Participation Framework was introduced | Process Description |
|---|---|---|---|
| 1.Baseline Studies | Inform 21(35% and consultation 39(65%) levels of participation. | Done before | SEA/LUP team briefed the stakeholders (intention to carry our SEA/LUP and its associated process). |
| 2.Participatory rural learning appraisal report on Yala Wetland | Consult (50%) and involvement (50) levels. | Done before | -Communities were extensively involved. <br><br> - The PRLA was conducted in five locations and in 14 villages adjacent to Yala Wetland. |
| 3.Ecosystem services assessment study | Inform 21(35%) and consultation 39(65%) levels of involvement. | Done before | |
| 4. Stakeholders initial consultative meeting on Yala Wetland land use planning | Inform 60 (100%) | Done before | YPAC meeting <br><br> Shared Yala LUP planning framework |

| 5. Draft one of SEA-LUP presented in Busia in April 2016. | Inform 10 (17%) Consult 50 (83%) | Done before | YPAC consultative meetings. <br><br> SEA/LUP issues have taken community through participating YPAC consultative meetings. <br><br> Lack of facilitation limited dissemination and obtaining feedback from communities |
|---|---|---|---|
| 6. Draft 2 of SEA-LUP presented in Siaya in September 2016. | Done after | Consult 30(50%) and Involve 30 (50%) Done after | YPAC meeting <br><br> Community meetings with researcher and issues/feedback taken on board while revising SEA/LUP draft 1. |
| 8. Draft 3 of SEA and LUP presented in Siaya in <br><br> December 2017. | Done after introducing modified framework | Involve 48(80%) and Collaborating 12(20%) | YPAC meeting <br><br> Community meetings with researcher and issues/feedback taken on board while revising SEA and LUP draft 2. |
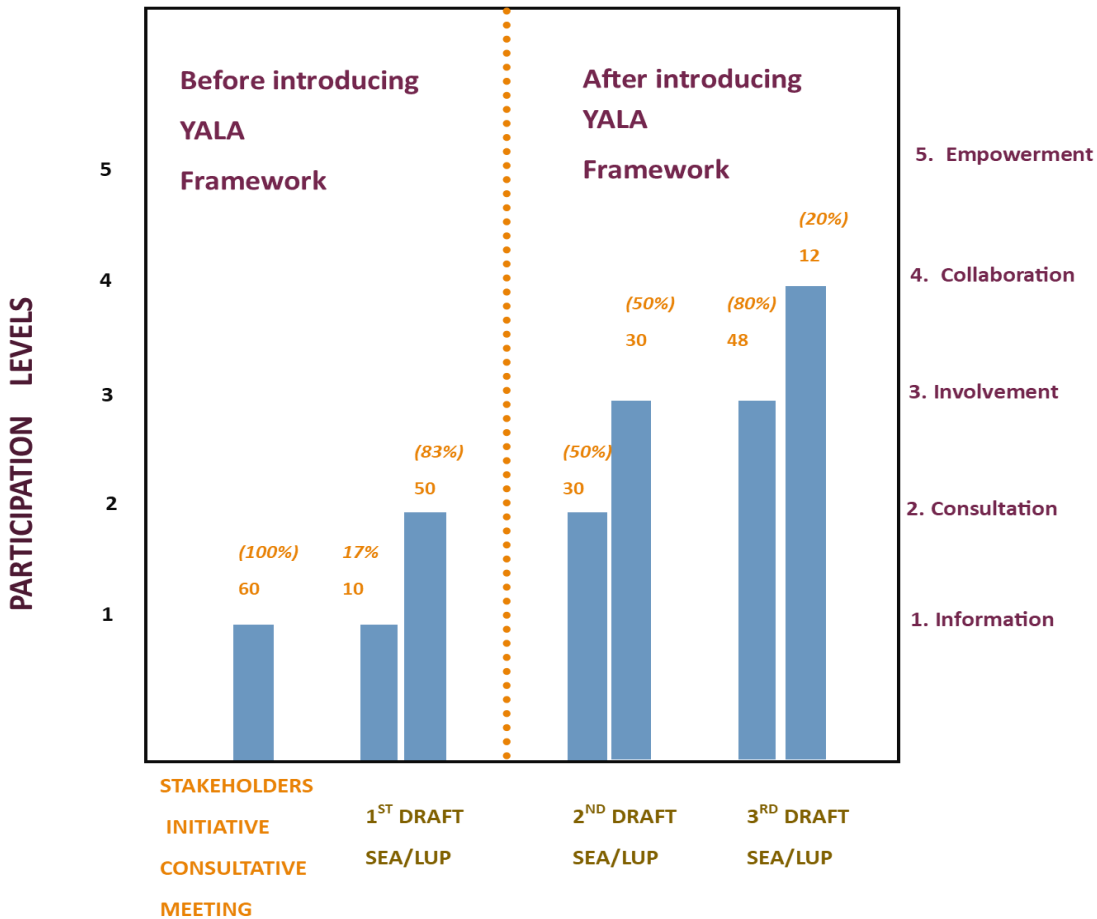
**Figure 4.3: The effect of applying modified Yala Community Participation Framework to SEA/LUP activities**

( **Source: Author, 2019**)

Figure 4.3 shows the level of wetland communities' participation in SEA/LUP process through YPAC which was at information and consultation levels of the spectrum of public participation (lower levels). However, with modification in RAPPEF-CF-IR Hub (Yala Hub) framework the levels of participation moved to involvement and collaboration levels indicating improved wetland communities' participation.

**4.2.7 Determination of effectiveness of Community participation in SEA/LUP process**

The YPAC framework was assessed to determine its effectiveness using the 10 Indicators of good practices/World Bank for evaluating effectiveness of public participation and the results are shown in Table 4.4.

**Table 4.4: Community Participation effectiveness in SEA/LUP using 10 best practice indicators**

| Parameter | Questions | Score 1-10 1-lowest and 10 highest level of effectiveness before the Yala modified Framework (mean score from the 60 FGDs N=60 | Score 1-10 1-lowest and 10 highest level of effectiveness after the Yala modified Framework (average score from the 60 FGDs) | Findings |
|---|---|---|---|---|
| 1.Objective of participation | Why participate? What was the context for this community participation? | 5/10 | 7/10 | Participation met the legal compliance threshold as per the principle of SEA as indicated in the , revised EMCA 2015; Kenya Constitution 2010 and County Government Act 2012, VIII section 87-92 and 115. Created awareness and interest in Yala Land Use Plan. |
| 2. Contexts for the participation | Was participation, for example, part of a larger strategy? What is the practice of community participation in the area? What is the perception of community participation? | 4/10 | 7/10 | Participation was part of the larger strategy that is enshrined in the Constitution of Kenya 2010, Public Participation Bill 2020 & in devolved units of governance. -County integrated plans to guide their development affairs requires public participation. - County Public Participation Bills for the two counties developed but are yet to be operationalized. - Done for legal compliance with minimal meaningful public participation. No facilitation (refreshments during the discussions & reluctance to conduct public participation). "Hijack "by some politicians who then dominated the consultations. |

| | | | | Politicians' opponents did not attend those public consultation events thereby missing the contrary and diverse opinions. |
|---|---|---|---|---|
| 3. Levels of Involvement | How early do you involve people? How much power is handed over and when? | 3/10 | 6/10 | YPAC meetings with technical, ICSC teams and members of County Assembly.<br>Their level of participation and powers were primarily raising concerns, pointing to omissions, informing and consultations.<br>Steps 2 (first stakeholder meeting) and 5 (second stakeholder to validate) of 11 LUP steps required some technical knowledge on some aspects of the processes and data collected on for example environmental floss of river Yala which communities were not having then at the time.<br>-The modified framework processes allowed for intense levels of involvement on all organs of SEA/LUP development |
| 4. People involved- who was involved? | How are they chosen? What mistakes were made (by who?) | 5/10 | 8/10 | -IMTC oversees policy direction, the planning and conservation of major deltas in Kenya by the National Government.<br>-County Governments of Siaya and Busia were the leaders of the process through ICSC, local communities through YPAC (as co-managers of the wetland;) development partners interested in sustainable wetlands' management and Nature Kenya as the facilitator of the various actors to play their roles effectively and conservation interested parties.<br>The structures created to deliver LUP were:<br>-Inter-county steering committee (ICSC), Planning Advisory Committee (YPAC); SEA/LUP Secretariat, Members of County Assembly (MCAs) and other key stakeholders.<br>The missing stakeholders were schools (students), religious leaders, professionals from the area; private enterprises like microfinance institutions, existing forums, networks and platforms like Alego Usonga professionals' online platform, the media, Water Users Association, Sand harvestors, Motorcycle transporters *Boda boda,* small and medium scale Investors and Community health workers |
| 5. Methods used | Were maps, interviews used? | 4/10 | 7/10 | YPAC meetings; interviews and community maps used. |

| | Did they work? **Was there Innovation in the** method or just participation itself for the area | | | The feedback loops to local communities were neither systematic nor guaranteed through their representatives as evidenced by court injunction placed to National Land Commission by YSSG on new land allocation of 2,564 acres of the swamp to Godavari Enterprises Ltd on behalf of the County Government of Siaya on August 2, 2016 without waiting for Yala LUP to guide those decisions. Modified framework provided village level focus group discussions and interviews with key custodians of wetland information Essays, Artworks, debates and sermons on Yala Wetland were introduced |
|---|---|---|---|---|
| 6. Commitment | Was there commitment to use or not to use community participation in the program/intervention? | 3/10 | 6/10 | The commitment to use community participation was demonstrated by having a facilitator for the processes-Nature Kenya (NK). -NK sought resources to help with the task and being an advocate for conservation availed her expertise to the process. There was a dedicated Nature Kenya office/LUP Secretariat housed at the Kenya Forest Service (KFS) in Siaya town to support all the organs working SEA/LUP and manage stakeholder relations with technical team, Inter-county steering committee, YPAC and other stakeholders. -However, YPAC was not sufficiently resourced to undertake meaningful local community contribution and ownership of the process. |
| 7. Inputs | What inputs time, money etc. were brought in for participation? What were the results in relation to those inputs? | 4/10 | 7/10 | The SEA/LUP project was planned for 12 months starting in 2015 to 2016 but delayed completion due to deferral in starting processes; buy in by in-county steering committee and the two counties' leadership. Cost overruns due to delays, additional cost centres and further technical support (international SEA expert who was involved in Tana Delta SEA/LUP) for the team thus Nature Kenya brought on board towards the tail end to help with finalizing the SEA/LUP. Quality control was inbuilt in the process to help in finalizing the LUP. |

| 8. Innovation | Is the method of participation innovative or just participation itself for the area? | 4/10 | 6/10 | The ITMC received an international award on the innovation of developing Tana Delta Land Use Plan using the dual planning approach of SEA and LUP concurrently. These processes still presents grey areas of how community participation takes place in the nexus of SEA and LUP and how to optimize without overburdening local communities.<br>Proposed framework for optimizing community participation in chapter six, presents another opportunity for innovating community participation. |
|---|---|---|---|---|
| 9. Outputs | | 4/10 | 7/10 | Official notices for land planning projects; background study reports, baseline study reports, meeting reports; SEA and LUP draft reports for discussions with the YPAC and ICSC.<br>Draft reports from SEA and LUP were not repackaged hence were not suited for most CBO members<br>The researcher availed some copies to community representatives. The softcopy option availed by technical team was not preferred and a substantial number of YPAC members did not download. The LUP secretariat attributed it to budgetary constraints. |
| 10.**Outcome** | What are the outcomes from the project goal?<br> What are outcomes in the **longer term** too as partnerships are formed and integrated planning for wetland begins? | 5/10 | 8/10 | The process the communities went through to provide their inputs into the processes and the outcome of SEA/LUP has covered these concerns.<br>However, the implementation of LUP will be the true test, given what wetland communities' stand to benefit.<br>An equitable benefit sharing mechanism and policy to ensure communities co-management of the wetland is grounded on their concerns is still lacking. |

The evaluation of the effectives of public participation using YPAC framework was introduced was poor (2 indicators) and unsatisfactory (8 indicators). YPAC's weakest points were in levels of involvement of people (30%) and commitment to community

participation (30%). However, the effect of applying the modified community participation (Yala Hub) framework moved effectiveness by 3 points to satisfactory (3 indicators) and good (7 indicators) in SEA/LUP processes as illustrated further in Figure 4.4.

| PARAMETER | SCORE 1-10 1-lowest and 10 highest level of effectiveness before Yala modified Framework (*average score from the FGDs*) | GRADING | SCORE 1-10 1-lowest and 10 highest level of effectiveness After Yala modified Framework (*average score from the FGDs*) | GRADING |
|---|---|---|---|---|
| Objective of participation | 5/10 *(50%)* | | 7/10 *(70%)* | |
| Contexts for the participation | 4/10 *(40%)* | | 7/10 *(70%)* | |
| Levels of involvement | 3/10 *(30%)* | | 6/10 *(60%)* | |
| People involved- Who was involved? | 5/10 *(50%)* | | 8/10 *(80%)* | |
| Methods used | 4/10 *(40%)* | | 7/10 *(70%)* | |
| Commitment | 3/10 *(30%)* | | 6/10 *(60%)* | |
| Inputs | 4/10 *(40%)* | | 7/10 *(70%)* | |
| Innovation | 4/10 *(40%)* | | 6/10 *(60%)* | |
| Outputs | 4/10 *(40%)* | | 7/10 *(70%)* | |
| Outcome | 5/10 *(50%)* | | 8/10 *(80%)* | |

KEY

| | VERY POOR | (1-16%) | | SATISFACTORY | (51-67%) |
|---|---|---|---|---|---|
| | POOR | (17-33%) | | GOOD | (68-100%) |
| | UNSATISFACTORY | (34-50%) | | | |

**Figure 4.4: The effect of modified Yala Community Participation (Yala Hub) on SEA/LUP**

**( Source: Author, 2018 )**

**4.2.8 Governance structures for community participation in Yala Wetland Ecosystem Management**

Local communities have participated in the governance and management of Yala Wetland alongside other actors. They had done this through their community-based organizations, religious networks, schools and cooperative societies. Political institutions which included local Members of Parliament and civic leaders were found to dominate key decision making on the wetland as evidenced in the decision to lease part of the wetland to Dominion Farms Limited which was done solely by the political class through the then local authorities, formerly County Council and District Development Committees of Siaya. This process did not include direct participation of the wetland communities. Likewise, communities had been consulted at Inform level of the spectrum of public participation through existing community based organisations (CBOs), chiefs' meetings/or open public gatherings and religious groups without having a substantial stake in the management of Yala Wetland Ecosystem. The participation of some meetings were determined by the relationship one had with the meeting convenors further compromising the quality of participation.

The FGD and key informant interview respondents confirmed that there has been no organized wetland-wide functional institutional framework where their Yala Wetland issues are discussed and channeled for decision making in the management of the Yala Wetland. Rather, small group community formations such as CBOs, sector specific groups that lack the larger wetland clout to influence key environmental decisions have been the norm. Instead, political players have dominated key decision making on the wetland ecosystem issues and decision done solely by the political class. This weak framework and low-level community participation in the management of Yala Wetland ecosystem affairs have continued over time despite significant increase in wetland challenges. This has led to continued utilization of wetland resources for immediate livelihood needs with less concern for other users hence continued Yala Wetland degradation.

Therefore, it was necessary to deal with those concerns, demonstrate how those concerns had been dealt with, and give assurance that their voices/issues would be taken seriously.

In this situation, local communities' sour relations with the first major investor (the Dominions Farms) in the wetland made them to be wary of any other investor. The FGD respondents had concerns of unfulfilled promises of sharing farm produce at subsided cost; training locals at Dominion Farm's agricultural training centre and farming around the investor's farm and an assured market from the investor. This led to the need to design of a governance framework and process of operationalizing so to deal with these weaknesses and others comprehensively (Figure 4.5).

The governance structure, membership, eligibility criteria to serve in the management committee, roles and responsibilities and implementation secretariat are presented below. These have been validated with community representatives from the wetland at the development of Yala ICCA Plan 2019-2029 in March 2020 and adopted in November 2020 and responsible government agencies from both county and national governments.
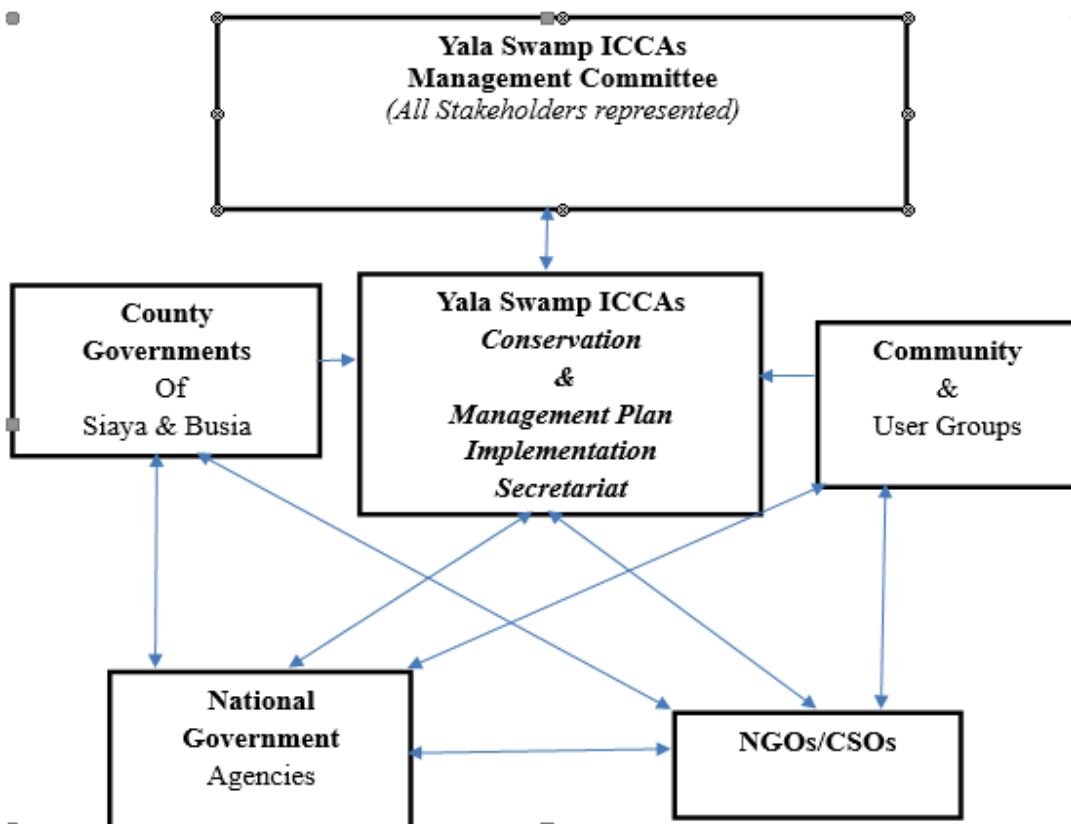


**Figure 4. 5: Governance Structure for Managing Yala Wetland Ecosystem Conservation Areas**

Source: Researcher, 2018

The committee that has 47 members as shown in Table 4.5 has been derived from various community groups representing different interests namely County Village Natural Resource Land Use Committees (VNRLUCs), Inter-County ICCA Steering Committee, Yala Ecosystem Site Support Group members (YESSG), Civil Society organizations (CSOs) guided by fair ecosystem and equity-based representation between Busia and Siaya Counties. Strategically, it provides for co-option of 3 members to bring some unique value addition to ICCA such resource mobilization leverage. In addition, technical staff from the various county and national government sectors and other agencies (e.g. Agriculture, Fisheries, Tourism, Wildlife) will be co-opted in the committee as need arises. The Yala Swamp Management Committee shall provide strategic leadership, mobilize resources, provide oversight on conservation areas' programs implementation. The membership is from the conservation area zone of the Yala Land Use plan initially, but other zones (i.e. Settlement and Agricultural), would join too.

**Table 4.5: Yala Swamp ICCAs Management Committee Membership**

| Position | Number |
|---|---|
| Representatives from each of the 5 CCA cluster sites namely Kanyaboli-2, River Yala corridor-1, Lake Namboyo-1, Lake Sare-1, Bunyala Central-1, Bunyala South-2, Islands-2 | 10 |
| Beach Management Unit-Alego Usonga BMU Network-1, Bondo BMU Network-1, Bunyala-1 | 3 |
| Farmers (Small holders and Commercial farmers) | 4 |
| Water Resources Users Association-MUWERI-1, Lower Nyandera-1, BUCAWRUA-1 | 3 |
| Community Forest Association | 2 |
| County Wildlife Conservation & Compensation Committee-Siaya-1, Busia-1 | 2 |
| Sand Harvesters Associations | 2 |
| Community Warden/scouts | 2 |
| Community tour guides association | 2 |
| Handicrafts (papyrus, palm leaves weavers) | 2 |
| Medicinal gatherers/Herbalists | 2 |
| Cultural/religious groups | 2 |
| Traditional conservationists (formerly hunters) | 2 |
| Chairs of County Environment Committees | 2 |
| Civil Society Organization/Network | 2 |
| Private Sector/Network | 2 |
| Coopted members (including strategic and conservation friends committed to ideals of ICCA and as agreed by the ICCA management committee. | 3 |
| **Total** | **47** |

Source: Researcher, 2019

The Yala Swamp Management Committee shall be organized as follows: Chairperson,Vice chairperson; Secretary, Assistant Secretary, Treasurer, Community Facilitator (Head of ICCA secretariat) and Committee members.

**Eligibility to serve in Yala Wetland Management Committee**

To be elected and /or nominated in the committee a member shall fulfill these conditions: shall be of good character and high integrity, honest, trustworthy, transparent, accountable,

and with a good track record. There shall be co-opted members who will be called upon on a need basis. These are members from County government and National government agencies as technical matter specialists and advisors) namely: NEMA, KWS, KFS, WRA, relevant departments; Agriculture, Livestock, Fisheries, Tourism, Lands, Education, Culture; MCA, Schools/Learning institutions, National Irrigation Board (NIB).

**The Functions of Yala Swamp Management Committee**

The specific roles and responsibilities to include:

1) Facilitate the development and implementation of Yala Swamp community conservation area management plans.

2) Organize Yala conservation area members to perform the communities' functions effectively in terms of election and co-option of members to perform their duties-chair, secretary, assistant secretary, treasurer, Program Coordinator/Community facilitator.

3) Provide strategic leadership, mobilize resources and offer oversight on programs implementation.

4) Recommend/issue user-rights in line with the management guidelines and government legal framework.

5) Monitoring and provision of general oversight role over activities and resource use taking place within Yala community conservation areas.

6) Provide mediation or arbitration on disputes arising from the use of resources within the Yala community conservation areas.

7) Ensure that benefits derived from the use of Yala community conservation areas resources are distributed in accordance with the provisions of the agreed guidelines to ensure fairness and equity.

8) To ensure compliance to Yala community conservation areas rules and guidelines

9) Maintaining up-to-date records for all permits, licenses and fees paid including RUAs

10) Seek to amend Yala community conservation areas guidelines in line with the its vision and mission.

11)    To tap other emerging issues critical to improving the Yala ICCA such as circular and blue economies and  nominate persons to be coopted to serve in the ICCA management committee.

**The Yala Community Conservation Area Secretariat**

The Community Conservation secretariat will be headed by Community Facilitator and technical staff including Environmentalist/Ecologist, Agriculturalists, Enterprise development specialist to ensure the plan is implemented. The secretariat shall develop organizational systems to operationalize its implementation functions. The secretariat shall be the primary vehicle to support the Yala Swamp ICCA Management Committee to implement the ICCA management plan. It shall promote communication, education and public awareness among stakeholders to enhance their appreciation and participation in Yala Wetland conservation and participatory management. For a start, ICCA management committee shall consider outsourcing from established conservation organization to initially provide secretariat services while it mobilizes resources.

## 4.3 Environmental Issues  using Remote Sensing and Community GIS for inclusion in Yala Wetland Land Use Planning and Management

This section presents results of environmental issues for inclusion in the Yala LUP from two perspectives. One from local communities and two from remote sensing and GIS analysis on landcover/landuse cover, the envisioned future of Yala Wetland and their roles in the envisioned Yala Wetland.

### 4.3.1 Environmental Issues facing Yala Wetland and their causes as identified by Wetland Communities

The FGD groups identified key environmental issues that should inform SEA and LUP development processes of the wetland management. The main environmental challenges identified in order of priority (from the highest to lowest) are: encroachment and reclamation of the wetland by the local people  for development projects (83 %); burning of papyrus resulting in the loss of biodiversity, fish breeding grounds, bird habitats and livelihoods (80%; high human population density (76%); resource use and related conflicts

such as human and wildlife conflicts (75%); conflicts among the local communities on boundary issues and perception of unequitable benefit sharing from Dominion Farm among Alego and Yimbo communities (66%); conflicts between the local community, the investors, government and third parties like NGOs, CBOs and Media (66%)); disappointment and apathy due to unfulfilled promises by Dominion Farms like subsidized price of rice; broken promises to pastors fellowship forum (50%); declining water levels in Lake Kanyaboli (46%); flooding and its negative effects (45%); weak framework for local communities participation (50%); incoherent implementation of wetland policies(41%); Nile Treaty constraints on Lake Victoria catchments and River Nile utilization (33%); low agricultural productivity and resultant food insecurity (33%); threats to wetland wildlife species as large chunks of land have been taken by Usonga communities in Migingo for agriculture (30%); birds poisoning using chemicals around Bunyala irrigation scheme(26%); and pollutants channeled into the wetland; poverty and associated inequalities (25%); and alien invasive species (21%). Figure 4.6 shows prioritisation of environmental issues by FGD respondents.
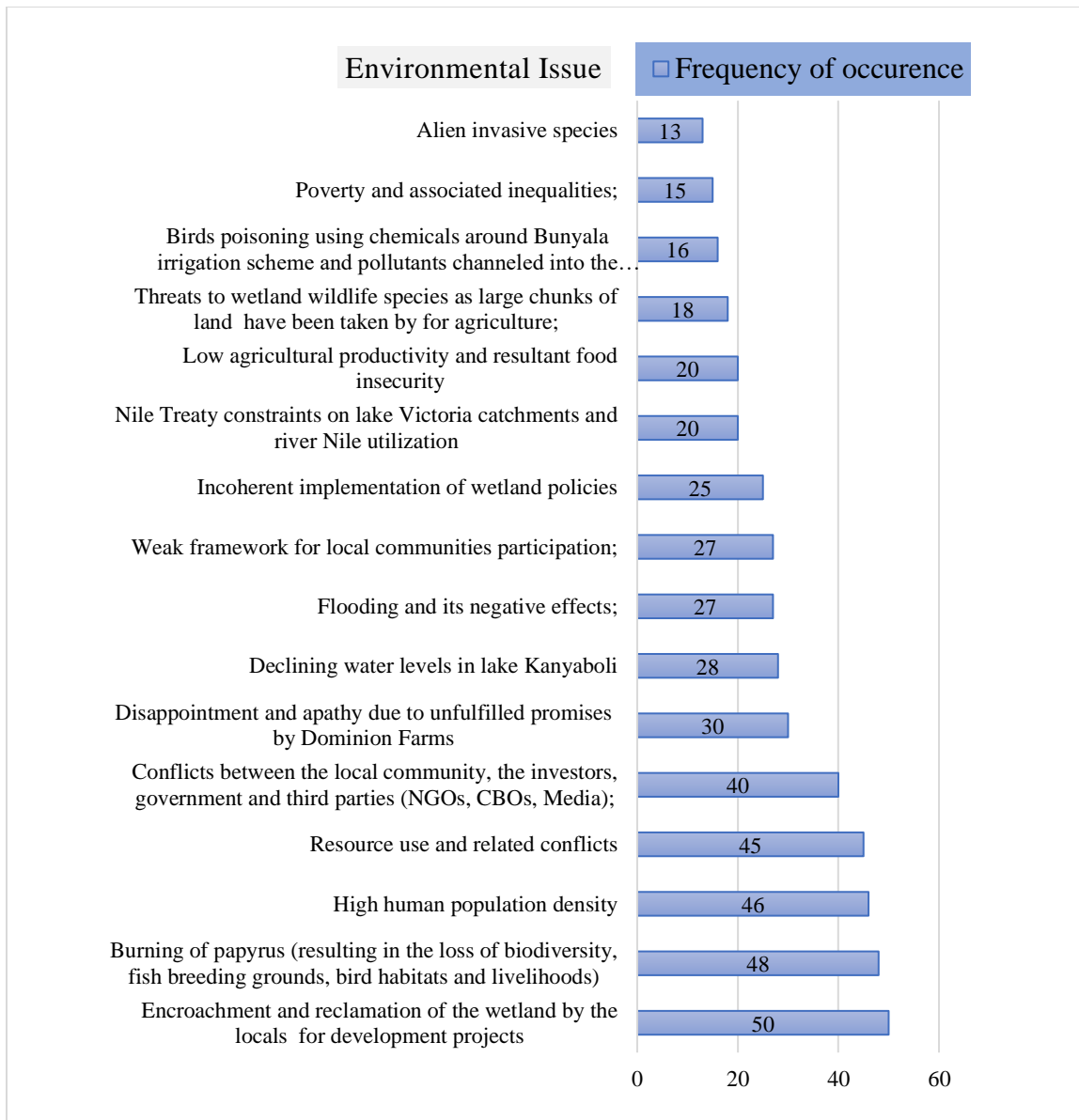
**Figure 4.6: Environmental Issues identified by Wetland Communities**

**N=60**

**( Source: Author, 2018)**

## 4.3.2 Causes of Environmental Challenges identified by Wetland Communities

FGD respondents identified some of the root causes of the above environmental challenges as: increasing population with its resultant increased demand for food to cater for the population projected at 171,736 in 2030 and 241,280 in 2050 based on the 2009 census;

underground streams flowing back into the wetland causing flooding; high cases of malaria due to breeding zones for mosquitoes created by the wetland during rainy seasons; the drying of Lake Kanyaboli attributed to diversion of water for use by the Dominion Farms and absence of proper inlet of water into the lake as shown in Figure 4.24; water contamination by effluents discharged from the commercial farm; reduced rainfall due to climate change over years; direct flow of Yala River water into Lake Namboyo causing flooding from its back flow and displacement of wetland residents; wetland residents intruding into fish breeding zones and other sensitive sites causing loss of biodiversity; conflicts between the local community, the investors, government and other parties; absence of research institution to undertake action research on the wetland challenges to inform its management; lack of relay of research feedback to wetland communities and management; burning the papyrus to create land for agriculture leading to habitat and biodiversity loss; laxity in implementation of wetland policies; and conflicts among the local communities on boundary issues (Figure 4.7).

## CAUSES OF ENVIRONMENTAL CHALLENGES IN YALA WETLAND

■ No of occurrence  ■ % Occurence

| Cause | No of occurrence | % Occurence |
|---|---|---|
| LACK OF RELAY OF RESEARCH FEEDBACK TO WETLAND COMMUNITIES AND MANAGEMENT | 45 | 8.0 |
| CONFLICTS AMONG THE LOCAL COMMUNITIES ON BOUNDARY ISSUES | 30 | 5.4 |
| LACK OF DISCIPLINE TO IMPLEMENT WETLAND POLICIES | 10 | 1.8 |
| BURNING THE PAPYRUS TO PROVIDE LAND FOR AGRICULTURE LEADING TO HABIT AND BIODIVERSITY LOSS; | 55 | 9.8 |
| ABSENCE OF WETLAND RESEARCH INSTITUTION IN THE SWAMP | 10 | 1.8 |
| HUNTING WILDLIFE SPECIES | 30 | 5.4 |
| CONFLICTS BETWEEN THE LOCAL COMMUNITY, THE INVESTORS, GOVERNMENT AND THE THIRD PARTIES | 40 | 7.1 |
| WETLAND RESIDENTS INTRUDING INTO FISH BREEDING ZONES AND OTHER SENSITIVE SITES CAUSING LOSS OF BIODIVERSITY | 55 | 9.8 |
| DIRECT FLOW OF YALA RIVER WATER INTO LAKE NAMBOYO-CAUSING FLOODING FROM ITS BACK FLOW AND DISPLACEMENT | 35 | 6.3 |
| REDUCED RAINFALL DUE TO CLIMATE CHANGE | 40 | 7.1 |
| WATER CONTAMINATION BY COMMERCIAL FARMS EFFLUENTS DISCHARGES | 55 | 9.8 |
| DRYING OF LAKE KANYABOLI DUE TO DIVERSION OF WATER | 45 | 8.0 |
| HIGH CASES OF MALARIA - MOSQUITOES BREEDING ZONES | 55 | 9.8 |
| UNDERGROUND STREAMS FLOWING BACK CAUSING FLOODING | 50 | 8.9 |
| INCREASING POPULATION( INCREASED DEMAND FOR FOOD) | 60 | 10.7 |

N=60

**Figure 4.7: Ranked Causes of Environmental Challenges in Yala Wetland**

**( Source: Author, 2018)**

### 4.3.3 Environmental Issues facing Yala Wetland through Community Mapping

During focus group discussions and community meetings, some community organizations were asked to map out their villages and their resources and discussed on environmental issues with respect to their management. Community mapping was done in 8 villages in Siaya and Busia Counties locations namely Central Alego, South Central Alego, Usonga and North Yimbo, Ojwando "A", Kadenge, Kaugagi Hawinga, Nyadorera "A", Nyadorera "B", Nyamonye and Bar Kanyango. The maps and issues from the community maps are shown below:

**Kanyamaji village**

The resources found within Kanyamaji village include Lake Kanyaboli, roads, a dispensary, church, shopping centre, Dutch camp, Dominion offices, Sigulu hill, beach, tree nursery, forest and fish ponds.



**Plate 4.1: Kanyamaji village**

**( Source: Author, 2018)**

**Gendro village**

Gendro village, which is adjacent to Kanyamaji, is also endowed with resources such as Yala swamp, road, Lake Kanyaboli, Yala canal, electricity, Dominion rice farm, reserve land, community land, fuel collection zone, church, rice farm, school, shopping centre, market, Dominion bathrooms, rice mill factory and a beach.
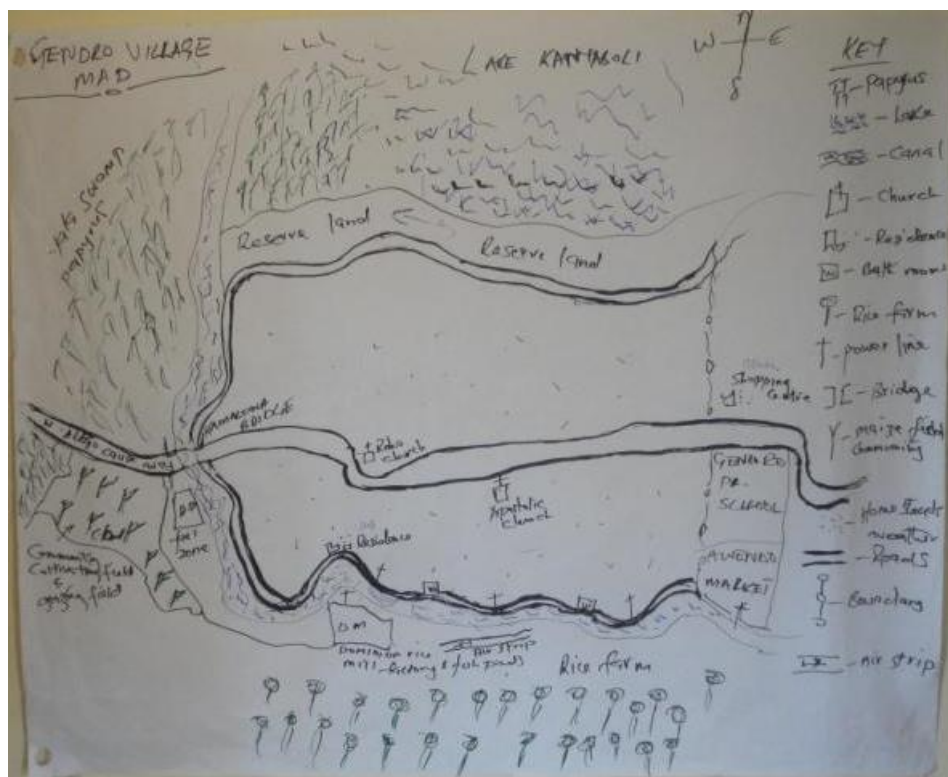


**Plate 4.2: Gendro village**

**( Source: Researcher, 2018)**

Proximity to these resources gives communities from the two villages an opportunity to benefit from them, for example, buying rice at affordable prices from Dominion managed shops. However, it was noted that some of facilities meant to improve their living conditions had been vandalized such as Dominion bathrooms constructed where the community used to bathe in the open next to the water courses.

**Ulutho and Swila villages**

The resources found in the proximity of Ulutho and Swila villages are Lake Kanyaboli, seasonal stream, market, swamp, Kanyaboli beach, water pan, church, murram road. Others

are a cattle dip, church, Swila beach, well, Got Kadando hill, school, Swila resort club, and natural salt lick and papyrus reeds along water courses.



**Plate 4.3: Ulutho village**

**( Source: Author, 2018 )**



**Plate 4.4: Swila Village**

**(Source: Author, 2018)**

**Uyingi and Nyandheho villages**

The main features in Uyingi village were: Hwiro swamp, market centre, all weather road, churches and borehole whereas in Nyandheho village, the resources were a river, school, road, beach, church, posho-mill, Yala swamp, grazing land and farming land.



**Plate 4.5: Uyingi Village**



**Plate 4.6: Nyandheho Village**

 **(Source: Author, 2018)**

**Mudaho village**

In Mudaho village, the community appreciated Dominion Farms Ltd for controlling flood water from the swamp thus allowing them to do farming adjacent to the swamp to improve their livelihood. The resources mapped included the roads, school, church, well, market, electricity and Yala swamp.



**Plate 4.7: Mudaho village**

(Source: Author, 2018)

**Mahuru village**

Mahuru village are endowed with the following resources: Yala wetland, road, borehole, market, posho mill, well, church and Mahuru wetland.

**Plate 4.8: Mahuru village**

 **(Source: Author, 2018)**

**Misori Village and Kombo Beach Resource**

The local communities at the shore of lake Kanyaboli in Misori village near Kombo beach mapped the natural resources and gave their ownership  as follows: Akara Hills, Ndere caves, Kombo beach, Kombo woodland, papyrus, herbs, vegetables and fish in the lake to be owned by community. They recognized that Kanyaboli resort was privately owned while Sitatunga by Kenya Wildlife services. This perception by community is not the true position hence the need to create awareness on land ownership and tenure regimes to guide decisions and discussion on resource ownership and access from an informed social and legal position. The community indicated that they have access to all the places for free even those owned privately but resource access in private areas requires permission from the owner.
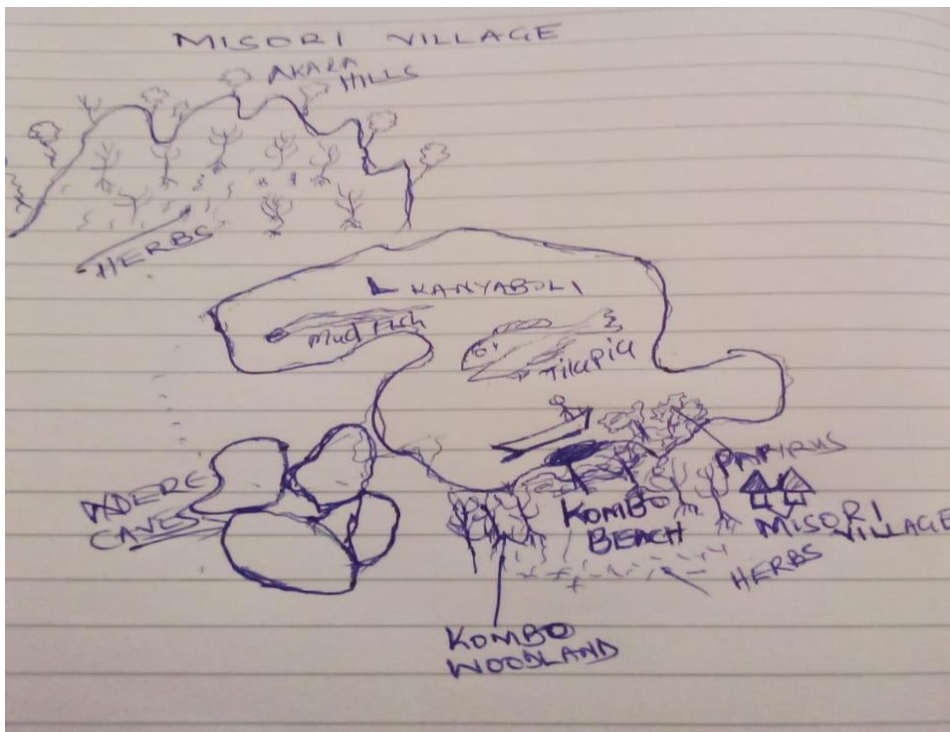
**Plate 4.9: Misori Village and Kombo Beach Resources map**

 **(Source: Author, 2018)**

## 4.3.4 Conflict Prevention, Resolution and Management of Yala Wetland Resources

Conflicts over Yala Wetland resources use was a key issue identified by focus discussing groups, key informants and students' respondents. There were only four types of conflicts. First, human-wildlife mainly between residents and wildlife. Second, human-human conflicts occurring among residents themselves (e.g. over land boundaries). Third, resource use conflict mainly between residents and investors; and finally, conflicts in management frameworks mainly resource governance. Figure 4.8 shows the various types of conflicts mapped by the wetland communities in both FGDs and key informant interviews.
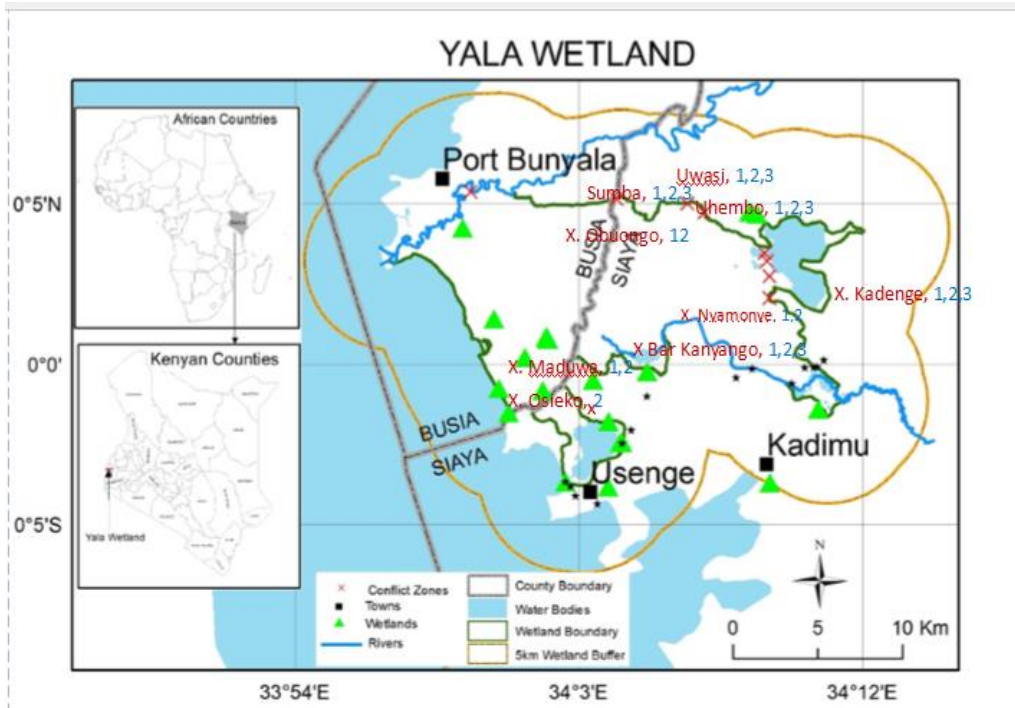
**Figure 4.8: Conflict areas in Yala Wetland**

**(Source: Author, 2018)**

Key**:** 1. Human-wildlife 2. Human-human conflicts occurring among residents themselves 3. Resource use conflict such as between residents and investors 4. Conflicts in management frameworks

**Examples the Conflicts in Yala Wetland**

a. **Conflict between Wetland Communities and the Dominion Farms**

There was apathy by a section of the local community resulting from the way the Dominion Farms investor had handled them. The FGDs consisting religious leaders network narrated how at the beginning the company manager had built a church in the company compound and founded a pastor's network where they would fellowship together. In the process of this fellowship, the manager promised that some company's farm produce would be given to local communities. Later, when things changed and they raised it with the management, they quoted the pastor manager saying "I am a businessman who paid the government to do business, I am not here for religious pursuits". The local community also felt that the

company increased the price of rice without consideration of the local communities' preferential treatment as had been done before. As a result, many local communities could not afford to buy the rice.

b. **Conflicts in Management Frameworks on Resource Governance**

Under the emerging structures for devolved governments at County level, the governance of the Yala Wetland is not clear. Article 63(3) of the Constitution provides that "any unregistered community land shall be held in trust by the County governments on behalf of the communities for which it is held". Section 20 provides that "County Governments shall approve plans for the development, management and use of community land". Yala Wetland straddles across the County Governments of Siaya and Busia. Most of this wetland is unprotected community land which has been held in trust by Siaya and Busia County Governments under the pre-2010 Constitution. However, with the Constitution of 2010 and Community Land Act of 2016 that require all Trust Lands to be registered according to the Act. If communities do not register their lands themselves, the law says the County Government must plan to register community lands but they might not include local people in the registration process and communities might lose some of their lands and might not be able to make their own rules for governing and managing their lands.

The FGD and key informant interview respondents identified laxity in implementing the existing wetland policy and enforcing existing regulations. They noted the effect of the Nile Treaty which limited what could be done in Lake Victoria catchments and River Nile. This raised yet another opportunity on the management of transboundary natural resources where conflicts arise on resource use within and under different management jurisdictions.

Yala Wetland is an example of a resource spanning two counties within Kenya and therefore LUP and SEA processes had deliberately taken the development with dual ownership and leadership of the processes. For example, the national government provided technical support but steering the processes was left to the county governments leadership. This dual ownership also had its challenges including two separate channels of making decisions before joint decisions were made at the intercounty steering committee level.

**c.  Establishment of Lake Kanyaboli National Game Reserve Conflict**

Lake Kanyaboli was gazetted as a National Reserve through Legal Notice No 158 of 2010 (GoK, 2010b). The total area of the reserve is 41.42 km$^2$ and is legally under the management of Siaya County Government with technical and policy support from Kenya Wildlife Service (KWS). In addition, KWS has initiated the process of having the site listed as a Wetland of International Importance under the Ramsar Convention.

 However, some local communities had not welcomed that development. The Usonga communities did not welcome the creation of Lake Kanyaboli  reserve and as a result made it difficult to operationalize it. Their concerns were that the reserve would take away some portion of Yala Wetland from them hence would not available for their use (farming, accessing wetland resources) and they feared that having the KWS staff around would result in controlling their activities in the wetland including hunting. They also felt that the wetland was part of their ancestral land hence could not be taken away. Consequently, the Usonga communities from obtained a court injunction challenging the decision.

Despite these concerns and decision to pull out their representative from Yala Wetland LUP process where communities voices are factored in the plan development; the researcher accessed some insiders among them and got limited entry to get them back in the SEA/LUP processes.

**d.  Wetland Size Discrepancy and Land Tenure**

The Yala community participation framework pointed out the discrepancy on wetland size which the LUP team estimated as 20,276 ha (207.6 Km[2)] by using latest remote sensing and GIS techniques (Odhengo *et al*., 2018b) whereas earlier survey records estimated the wetland at 17,500ha (NEMA, 2016). The later has formed the basis of utilization of the wetland and allocation to users like the Dominion Farms and other land uses over the years. This lends credence to the concerns raised by a panel wetland specialist as the gaps in wetlands being determination of the size of papyrus wetlands (van Dam, *et al*., 2014). The physical survey of the wetland is therefore urgently needed and should  involve both the

County governments of Busia and Siaya and Yala Wetland community representatives to resolve the tension.

e. **Land Disputes and Land Adjudication Conflicts**

Conflicts of land disputes and land adjudication issues were spread throughout the area and highly visible in Kadenge, Bunyala south and around Lake Kanyaboli. For instance, between Alego and Yimbo regions there was conflict due to the claims that only Alego people benefited from Dominion Farms.

**Yala Wetland Conflict Resolution and Management**

The conflicts in Yala Wetland have many faces and complexities. For example, on the conflict over the creation Lake Kanyaboli National reserve, which the Uhembo community objected to and thereafter obtained a court injunction. A community leader, expressing suspicion of ill motive, had this to say to one Research Assistant during the community consultations, "since you came from very far from South Nyanza, you cannot have the intention of taking away our land, we shall give you audience to explain to us the land use issues you want to hear from us. Otherwise, we have sent away the CBOs working on Yala Wetland since we don't trust them".

Later, they requested more time in order to consult one of their own an expert who was a Dean at the Department of Spatial Planning and Natural Resources Management at Jaramogi Oginga Odinga University of Science and Technology (JOOUST) over the land allocation for the game reserve which had a court injunction. Again, the feeling of trust, empathizing with them and mutual respect were key in aiding the local communities to increase their participation.

The FGD and key informant interview respondents identified the main causes of conflicts in the wetland as follows as population increase resulting into inter-community conflicts as they share available resources; land conflicts by different communities on disputed boundaries, disputed ownership among individuals as they subdivide the bigger parcels for inheritance from their parents tenures; perceived ownership of Yala Wetland by the communities as cited by the Usonga communities, insufficient capital to undertake

commercial agriculture and inadequate funds to support commercially viable farming practices by the local communities.

Yala Wetland communities had resolved some of their previous conflicts using varied strategies namely community resource-based management; law enforcement; county land management board and surveys and adjudication. However, those interventions had not been fully utilized nor had they been sufficient thereby calling for other innovative ways of managing emerging and future conflicts.

### 4.3.5 Aspirations and Dreams of a Future Yala Wetland

The FGD respondents were tasked to envision the future they would desire of Yala Wetland as basis for their input into SEA and LUP processes using appreciative enquiry methods. The following are results from wetland communities and students from learning institutions.

### 4.3.5.1 Envisioning a future Yala Wetland by Wetland Communities

The qualitative analysis of the dreams and aspirations from the communities brought out a clear picture of what they would like the wetland to look like in 2063 in line with the African Union's Agenda 2063 timeframe for attaining prosperity for the continent. The highest emerging key themes on their dreams and aspirations were biodiversity conservation (8%); enforceable laws and regulations to protect the wetland (7%); mechanized commercial farming and with robust extension system (7%); unique habitat conserved including the one for varieties butterflies (7%); developed recreational and tourism facilities in harmony with nature (7%). The other desired aspirations occurrences by priority as revealed in the qualitative analysis results are shown in Figure 4.9.
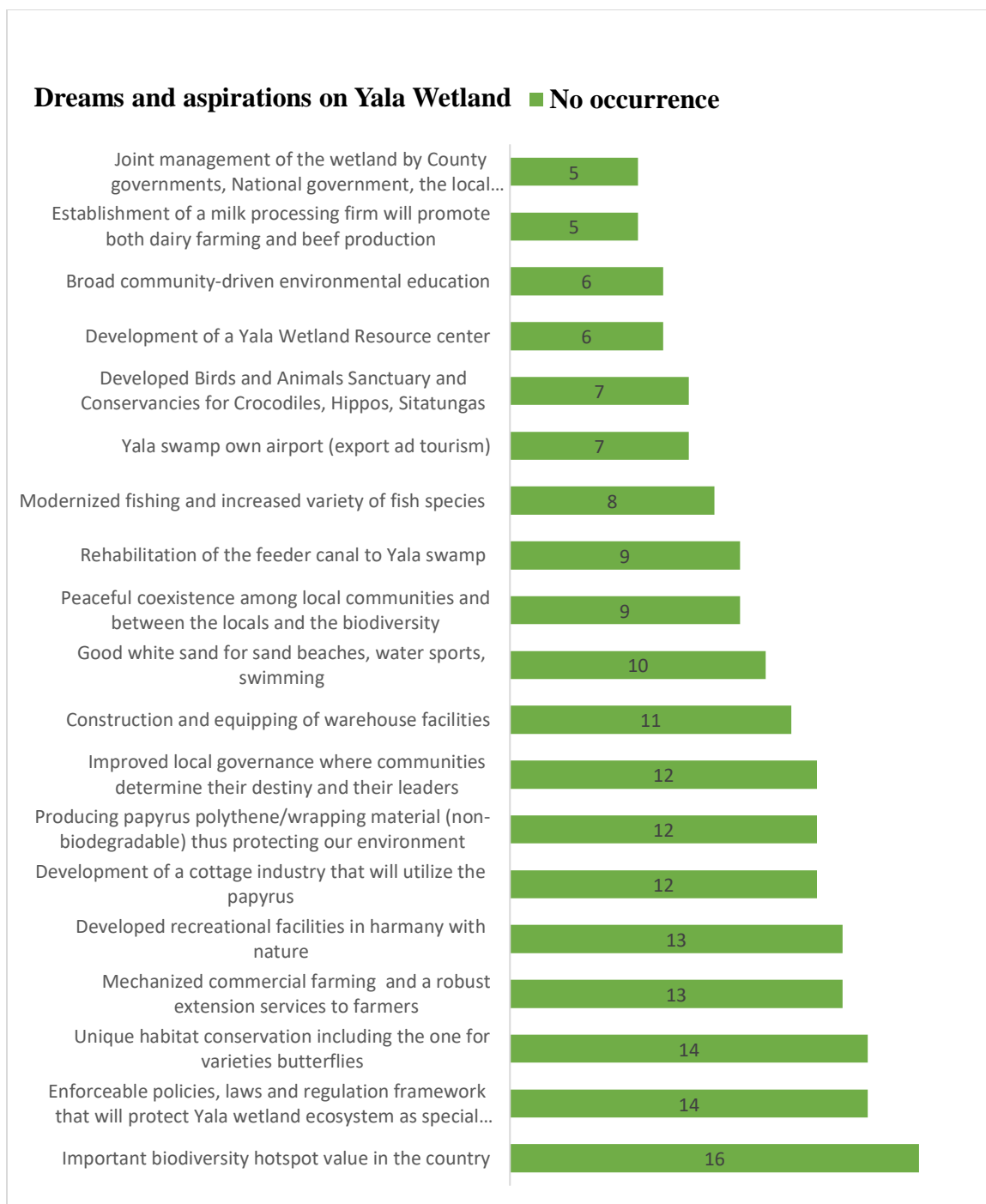
**Figure 4.9: Wetland Communities envisioned future of a perfect Yala Wetland by 2063**

**N=60**

**(Source: Author, 2018)**

Focus group discussions respondents were asked to itemize what needed to be done to actualize their dreams and aspirations starting with actions at community level. The actions they recommended include continuous sensitization and capacity strengthening of local communities on the importance of conserving and protecting the wetland by local communities and the new wetland LUP; embracing continuous dialogue and genuine engagement that balances conservation and livelihoods, implementation of LUP; developing appropriate policies and legislations to guide its implementation; establish a documentation centre for information resources and cultural artifacts; exposure visits by the community leadership and county officials to some of the best practices in wetlands management and managing land based conflicts.

The researcher with the help of local communities identified role models who were recognized by communities as change makers in the community and sought their views about Yala Wetland management. Some feedback was used to create the history of the wetland in objective one. The other aspects of that information sought their views on the envisaged future and what it shall take to deliver those aspirations.

A retired civil servant and once a Councilor of Bunyala ward respondent had this to say;

"I have a compelling desire for change and development and with this I will encourage community leaders and youths to take initiative of sustainable livelihood programmes and stop lamenting for help. During my tenure as the Councilor, I initiated Ndekwe Bridge, which was constructed. I also wrote a letter to the Minister for Lands in the National Government expressing communities' views that Yala Wetland should be converted from trust land to community land" (Interview with former elected leader, 2016).The changemaker advised that Yala Wetland management should be guided by the philosophy that "every step you take towards a goal/ success requires implementation of brilliant ideas and determination to achieve what you believe in."

The chairperson, Kaugagi Hawinga Yala Wetland Farmers Association pointed out the following: "If the community would know the value of wealth, they have in their hands in Yala Wetland, they would neither experience hunger nor poverty. Enhancing equity within the community is important since this will harmonize every community member's potential

in the development of our community". Other change makers including the Luo Council of Elders' leadership, youth and women role models emphasized that Yala Wetland communities must be intentional in mainstreaming gender equity in development issues while the younger generation should be mentored for them to meet their future needs. They agreed on the need to transform Yala Wetland communities' perception on the importance of agriculture as a key driver of the wetland's economy. Finally, they recommended functional cooperatives by farmers to boost their level of production and income.

In addition, Focus Group Discussions and sermon write-ups by religious leaders on what they saw as God's dream of a perfect Yala Wetland identified the following key themes: preservation of sacred sites and shrines; protection of biodiversity in the wetland, good stewards of God's creation on animals and plants; communicating with God through nature in Yala Wetland, the helplessness mentality and the need to change that mindset.

**4.3.5.2 Envisioning a future perfect Yala Wetland in 2063 by Wetland by Students through School Essays, Debates and Artworks**

The study expanded to reach out to primary and secondary schools, and post-secondary institutions through writing essays, artworks; and debating on the topic of Yala Wetland. The results of what they envision as the future of Yala wetland from essays, debates and songs are shown in Figures 4.10, 4.11 and Plate 4.12 their artwork visualizing the same.
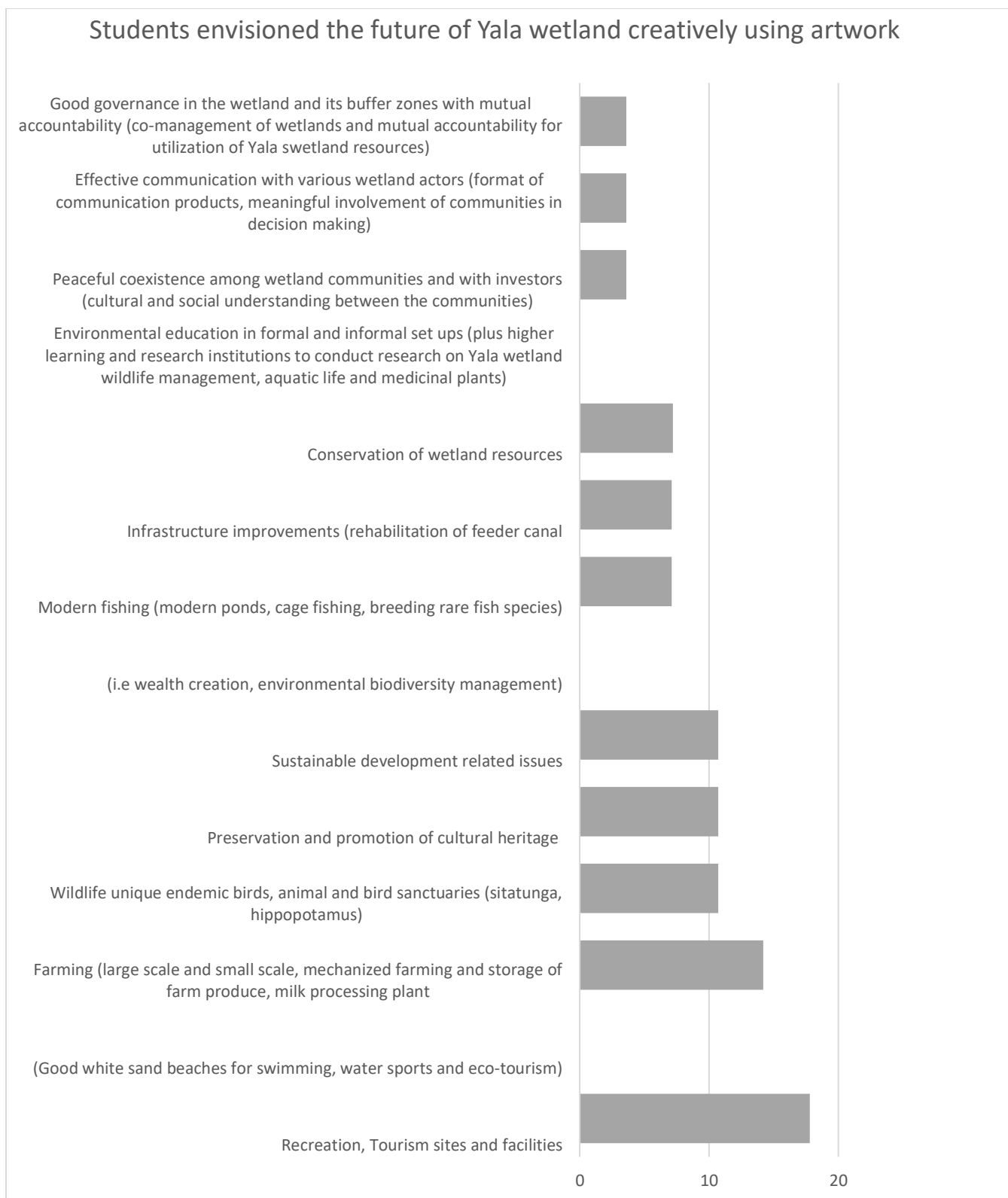
**Figure 4.10: Students aspirations for future Yala Wetland (N=187) (Source: Author, 2018)**

The students envisioned the future of Yala Wetland creatively using artwork as shown in Plate 4.10 below:



**Plate 4.10: Envisioned  future Yala Wetland**

**(Source: Author, 2018)**

From these artworks, some key themes were clean water for domestic use, crops, wildlife and plants; swamp for recreation and leisure; wise of wetland resources and protection of wetland biodiversity such sitatunga, birds, fish; wetland plans; improved livelihoods of wetland communities; renewable energy, use of modern technologies to conserve the wetland such as drones.

These artworks were further analyzed and synchronized in the mosaic with a clear message on the need for conservation of Yala wetland to continue benefiting from it as shown Figure 4.12.

**Figure 4.12: Mosaic about the future Yala Wetland from Learning Institutions Artwork**

( **Source: Naomi Anyango, 2018** )

## 4.3.6 Turning Environment Problems and Challenges into Opportunities- Appreciative Enquiry Lenses (Mindset Shift)

When asked to look at the challenges using appreciative lenses, FGD respondents were able to change their perspectives from a problem lens to a solution lens. The challenges were then framed into opportunities. This took place after the facilitator took them through some mindset change exercise using appreciative inquiry methods that enabled participants to shift their energies to see possibilities. Table 4.6 shows the opportunities identified by the respondents.

**Table 4.6: The Opportunities presented by Environmental Challenges in Yala Wetland**

| | Challenges | Wetland Opportunities | Examples |
|---|---|---|---|
| 1 | a. Conflicts between the local community, the investors, government and the third parties<br>b. The effects of Nile Treaty which limits what can be done in Lake Victoria catchments and River Nile<br>c. Flooding and its negative effects | Establishment of Enterprises/Factories/Industrial Parks and a mutually benefit sharing formula<br>Establish inclusive institutional framework for managing wetland resources<br>River catchment, river and lake basin conservation<br>Job and wealth creation for the youth.<br>Flood based livelihood systems. | - Water bottling factory using water from the wetland<br>-Papyrus products processing factory like handicrafts, paper, artworks<br>-Industrial parks for agricultural produce, wealth creation and employment of large numbers of youth various agricultural values; |
| 2 | -Encroachment on the swamp by the locals.<br>- Food insecurity –as commercial farming took large chunk of land used to supply food all year round.<br>-Hunting /poaching wildlife species. | -Commercial Agriculture<br>-Modern sustainable agronomic practices<br>-Wildlife and birds Conservancies<br>-Development of settlement schemes to cater for communities living in villages. | -Massive investment;<br>-Innovative farming options including condominium and crowd farming. |
| 3 | -Absence of Wetland research institution in the wetland to undertake action research on the wetland challenges to inform its management. | Establishment of new learning and research institutions and partnerships focusing on Yala Wetland ecosystem. | -Center for wetland research, learning and conservation Yala Wetland. |
| 4 | Human and wildlife conflicts | Improved Infrastructures and social amenities<br>Develop and implement participatory integrated management plan of Yala Wetland. | Establish wetland resource centre and cultural centres or Museum.<br>Establish conservancies, bird sanctuaries and community-conserved areas.<br>-Could also encourage wildlife farming and ecotourism enterprises |
| 5 | Burning papyrus to provide land for agriculture leading to habitat and biodiversity loss; | Deployment of drones to monitor wetland degradation and conservation of endangered wildlife species in the swamp.<br>Papyrus rehabilitation. | Explore more possibilities of deploying technologies such as drones to aid in managing Yala Wetland. |

| 6 | Unemployment and limited livelihood options<br>Idle youths and drug abuse and drunkenness from drinking traditional brews like<br>*waragi and changaa and smoking marijuana* | Sustainable livelihoods due to rise in employment and wealth creation opportunities<br>- Financial deepening services to avail credit to local communities and youth to create their enterprise and grow existing ones to scale<br>-Targeted financial models to the youth out of school &out of employment | Local people pooling resources to partner with farmers and improve the farm sizes, intensity of farming and farm mechanization |
|---|---|---|---|
| 7. | Laxity in implementation of wetland policies among national and county governments and wetland communities like fisherforks with BMU regulations; conflicts among the local communities on boundary issues | Peaceful co-existence among wetland communities and with investors<br>Equitable benefit sharing of wetland resources | Voluntary enforcement of beach management regulations<br><br>Yala Wetlands benefit sharing framework |
| 8 | Lake Kanyaboli consistently drying up | Rehabilitation and conservation of River Yala basin | Ensure optimal water levels in lake Kanyaboli all year round by protecting all its water sources and upstream dams and streams |
| 9 | Killing of wild animals like birds using chemicals; and pollutants channeled into the wetland particularly Bunyalla | Raising awareness and strengthening conservation programmes among communities and in schools | Adopt the Whole School Approach (WSA) where pupils/students learn education for sustainable development (WWF, 2013) |

**(Source: Author, 2018)**

## 4.3.7 Communities Environmental Mitigation measures for in Yala Wetland Ecosystem plans

The wetland communities through focus group discussions, key informant interviews, community meetings and students' essays, debates and artwork feedback showed the manifestation of key environmental issues and suggested how they should be mitigated in SEA, LUP and other Yala ecosystems management plans. These are shown in Table 4.6.

**Table 4.7: Key Environmental Issues in Yala Wetland and their Mitigation Measures**

| Key Environmental Issues | Manifestation | Recommended Mitigations measures by Wetland Communities |
|---|---|---|
| Destruction of important biodiversity areas | Growing pressure on papyrus due to land use change, demand for its products; declining fish stocks and species. | -Dedicated Institutions like YSSG and Yala Wetland Management committee to check on wetland changes and promote conservation of important habitats.<br>-Environmental programmes in schools and post-secondary institutions in Lake Victoria Basin (curriculum needed)<br>-Competition to sustain awareness raising on Yala Wetland threats in schools and during environmental events.<br>-Cage Culture Fishing EIA; and support in Lake Victoria<br>-Promote rearing Lake Victoria endangered fish species such as cichlid<br>-Planting papyrus on degraded wetland areas; and strengthening cluster leaders on collaborative problems diagnosis and creative problem-solving skills.<br>-Upgrading the current private museum to a community museum in Kombo beach.<br>-Control invasive species |
| Population growth | Expected rise | -Job and wealth creation opportunities for the youths in different value chains in farming,<br>-Population control programs linked with environmental conservation.<br>-Proper crop and animal husbandry (crop rotation, using the right fishing gears, control of pollution and introduce alternative source of income). |
| Land use changes | Influx of large-scale investors | Undertake EIAs, SEAs and ensure Environmental Assessment compliance.<br>Designated land use zones and adherence their respective planning and management policies/guidelines |
| Weak governance systems | Under the devolved system, the governance of the wetland is unclear. | -LUP specific implementation structure; other institutions like KWS for the game reserve area; KFS for forests, WRA for water resources YSSG etc.<br>-Develop governance structure that recognize local communities' co-ownership of Yala Wetland<br>-Strengthen the capacities of the governance structures to carry out its mandate |

| | | -Create awareness, involve all stakeholders in management and have agreement between government and communities |
|---|---|---|
| Benefit sharing mechanism | -Absence of guidelines for sharing wetlands benefits equitably.<br>-Lack of comprehensive information on costs of ecosystem services to guide stakeholders in its management. | Quotable quotes: *Otoyo adak e samba niang to kia mit niang*" A hyena lives in a sugarcane plantation but has no clue of the sugarcane's sweetness" thus there is a need for proper mechanism for optimizing Yala wetland benefits by wetland communities<br>- Inventory opportunities of Yala Wetland and articulate these in the LUP<br>- Develop mechanisms for equitable benefit sharing of wetland's resources (Investors vs. Communities and Government at 70%:30%. Then Wetland communities' vs/County Governments at 60%:40%. Spending communities shares to be done in line communities 7 identified priorities during SEA/LUP participation. |
| Conflicts | Both human- wildlife and human-human conflicts are experienced in the swamp. Examples of conflicts- Gendro community and Dominions farms; Usonga communities with KWS over the game reserve gazettement in Yala Wetland. | -Conflict management capacity enhancement among the wetland's officials.<br>-Develop an apex governance structure that caters for the interest of all wetland communities.<br>- Intervene and manage Usonga communities' conflict over the establishment of Lake Kanyaboli game reserve. |
| Declining water resources | Diversion of main river course, proposed development of multipurpose dams, expansion of irrigation, water quality is affected by population and siltation | -Identification of Gongo multipurpose use dam for future development strict adherence to EIA/SEA.<br>Catchment protection; Massive tree planting on farms and hills; Promote Rainwater harvesting<br>-Regulate and charge water abstraction from the wetland by large scale and medium scale farming enterprises<br>-Develop a well-established drainage system, building dykes for flood control |
| Climate change | Changes in precipitation affects livelihoods as well as biodiversity | -Ecosystem management plans that are climate change and variability sensitive<br>-Intensify agroforestry practices among the communities in agricultural zone of the final LUP.<br>-Afforestation, plant trees and bamboo on river banks |

### 4.3.8 Information Access and Seeking Behaviours among Yala Wetland Communities

Information generated on access and seeking behaviors of the wetland community leaders was diverse. The common approaches used to get information included peer talks, authoritative policy orders and regulations from administrators. Further, all the leaders had mobile phones and in some groups all the members also had telephone connectivity thereby providing greatest opportunity for telephone communication. The telephone was both a tool for communication and money transaction. Various groups had their different and unique information seeking behaviours and had different interactions among these categories and how they influenced one another.

The student respondents were found to be highly influential on their parents and guardians with conservation messages shared in schools like tree planting and wetland conservation. When students were made to plant trees in schools and given seedlings to plant at home, they reported that their guardians helped them to care for them while they were in school by watering and preventing domestic animals from damaging them.

### 4.4 Yala Wetland Environmental Issues for LUP/SEA using Remote Sensing and GIS Analysis

The environmental issues of Yala Wetland identified using Remote Sensing and GIS analysis presented here include land use/landcover changes and its impact on Yala Wetland ecosystem, wetland reclamation, water use, biodiversity conservation and climate change especially on the environmental issues identified by communities to determine their relative weight in LUP development.

The satellite images provided by Google Earth of various dates in this study provide a valuable record of historic land use changes in Yala Wetland area in the last 40 years although detailed photographic evidence of the condition of the wetland was not available prior to 1984.

**4.4.1The Extent and Impact Yala Wetland Land Use/Land Cover changes between 1960 and 2014**

In 1960 Yala Wetland was largely intact and covered an area of 20,756ha (207.6Km$^2$) thus the spatial extent and condition is assigned at a score of 100. This forms the baseline for measuring and evaluating the subsequent scenarios for future development.

Figure 4.13 shows the wetland in 1960, while Figures 4.14, 4.15, 4.16, 4.17 and Table 4.8 show the  land use in 2014.
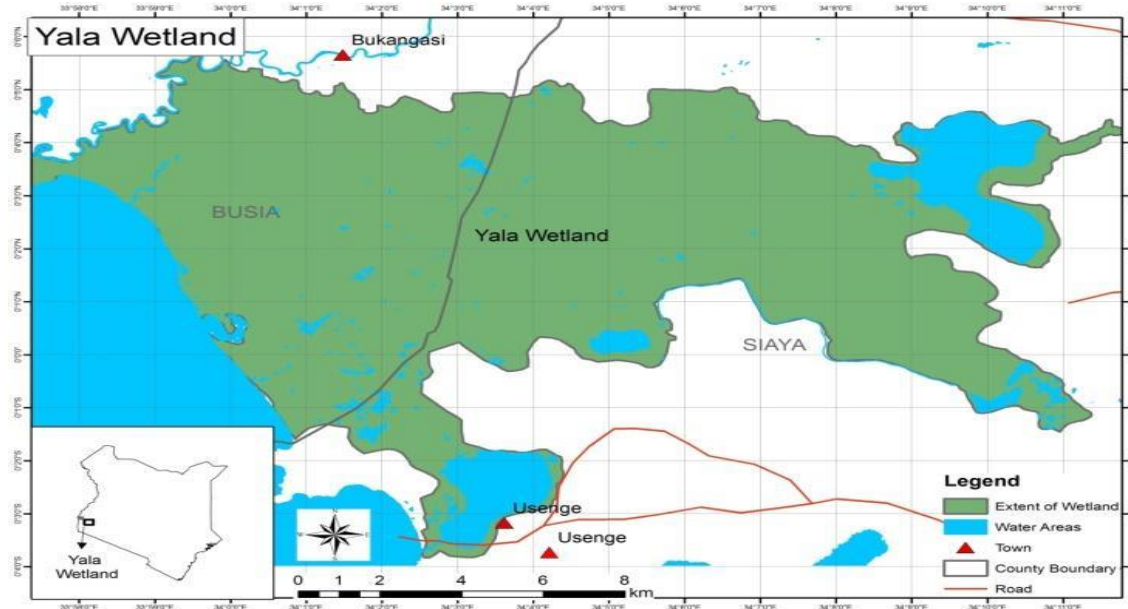


**Figure 4.13: Yala Wetland Condition in 1960**

**( Source: Odhengo, 2018b)**

Landuse/Landcover status of Yala Wetland in 1990,2000,2010 and 2014
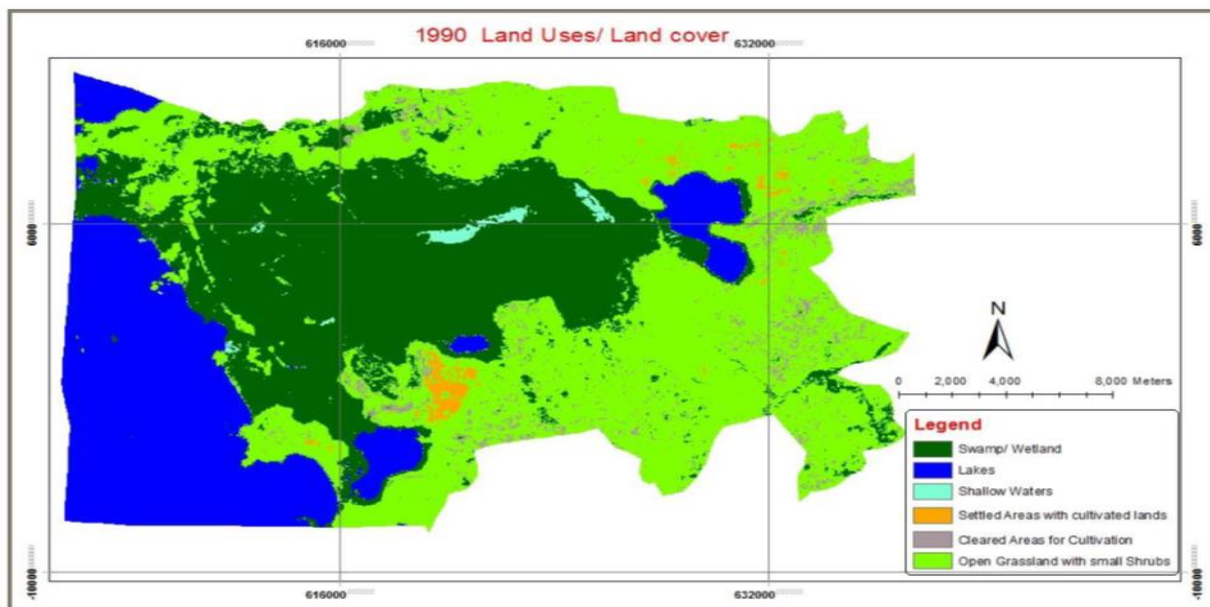
**Figure 4.14: Classification land use land cover image results for the year 1990 in Yala wetland**

**(Source: Ondere, 2016)**
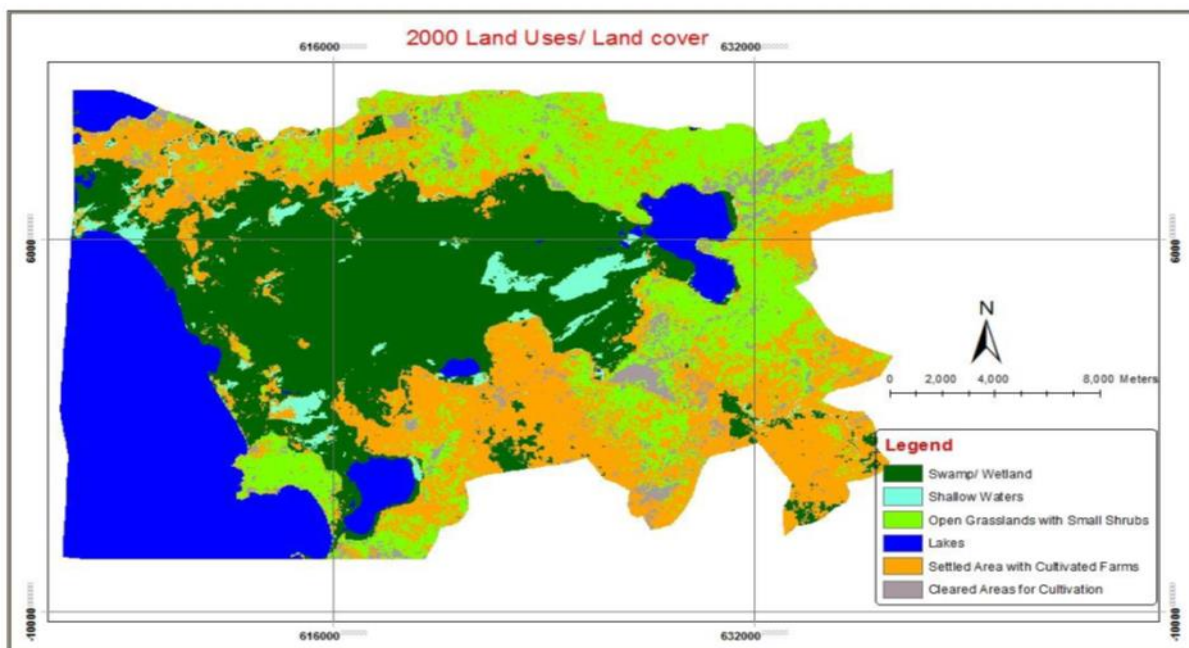


**Figure 4.15: Land use land cover image results for the year 2000 in Yala wetland**

**(  Source: Ondere, 2016)**
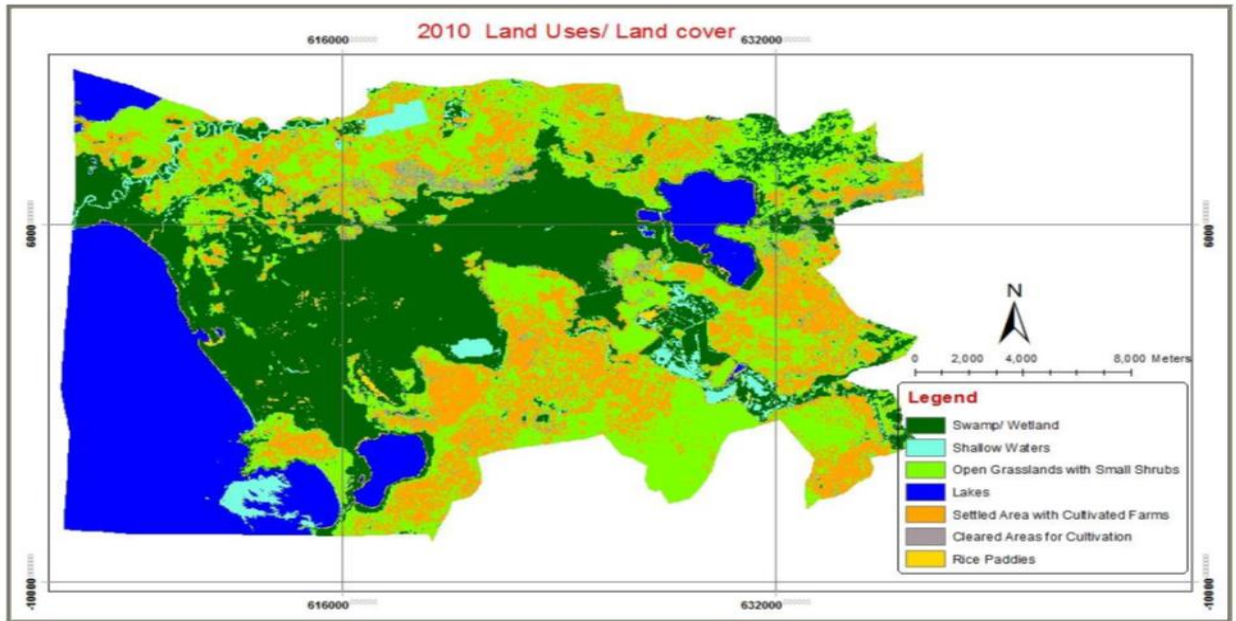
**Figure 4.16: Land use land cover image results for the year 2010 in Yala wetland**

**( Source: Ondere, 2016)**
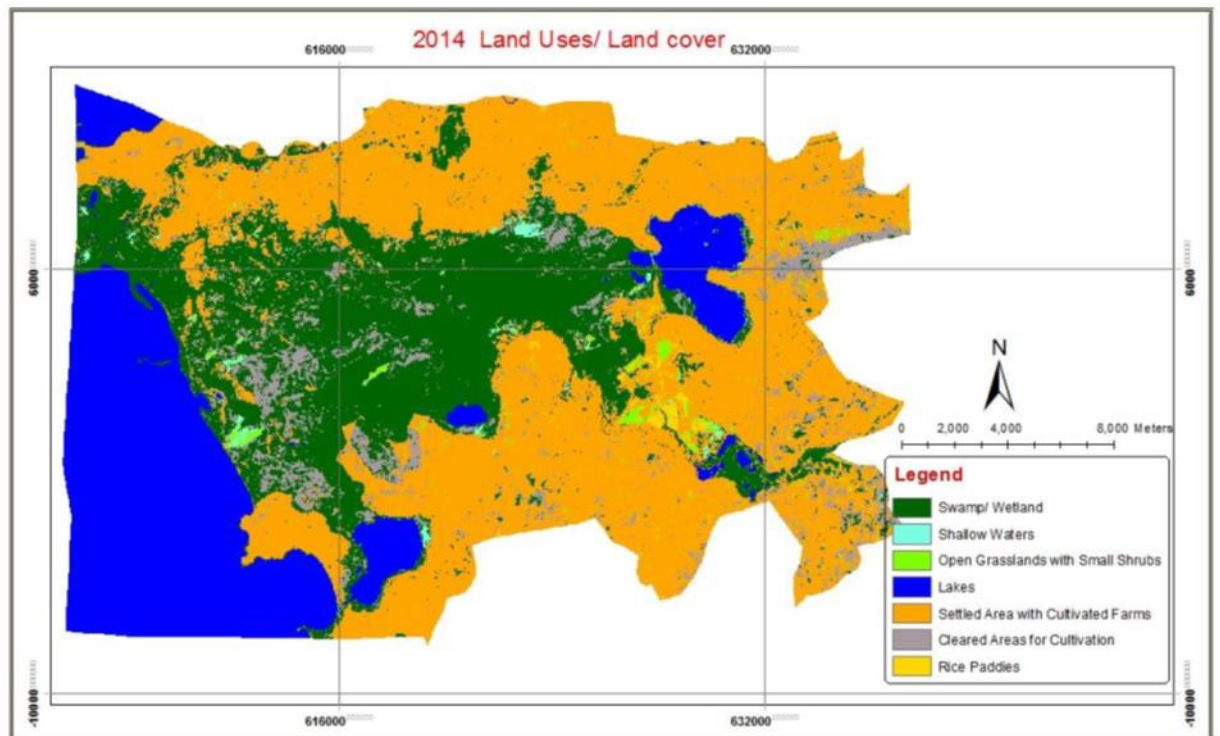


**Figure 4.17: Land use land cover image results for the year 2014 in Yala wetland**

**(Source: Ondere, 2016)**

**Table 4.8: Land Use Land Cover Changes 1990-2014 in Yala wetland and its buffer zones**

|  | Areas in square metres | | | | |
|---|---|---|---|---|---|
| Land Use | 1990 | 2000 | 2010 | 2014 | % Change |
| Wetland/swamp | 188231 | 167251 | 142018 | 125787 | 33.2 |
| Lake | 119788 | 120091 | 113281 | 110875 | 7.5 |
| Shallow water | 14342 | 18291 | 17173 | 13311 | 7.1 |
| Settled Areas with cultivated land | 44943 | 14768 | 18027 | 26040 | 50 |
| Cleared areas for cultivation | 14241 | 23661 | 34662 | 41159 | 65 |
| Grassland/shrub | 252386 | 104174 | 94397 | 42000 | 83 |
| Rice paddy |  |  | 4124 | 5238 | 21.2 |

**(Source: Ondere, 2016)**

The landcover images Yala wetland image from 1990 to 2014 show cumulative changes that the wetland/swamp had decreased in size by 33.2%, settled areas with cultivated land increased by 50%, cleared areas for cultivation increased by 65% and grassland /shrubs decreased by 83% all due to population increase and subsequent turning to wetland resources for sustaining their livelihoods. This population increase has direct effects on the wetland and the land use land cover changes.
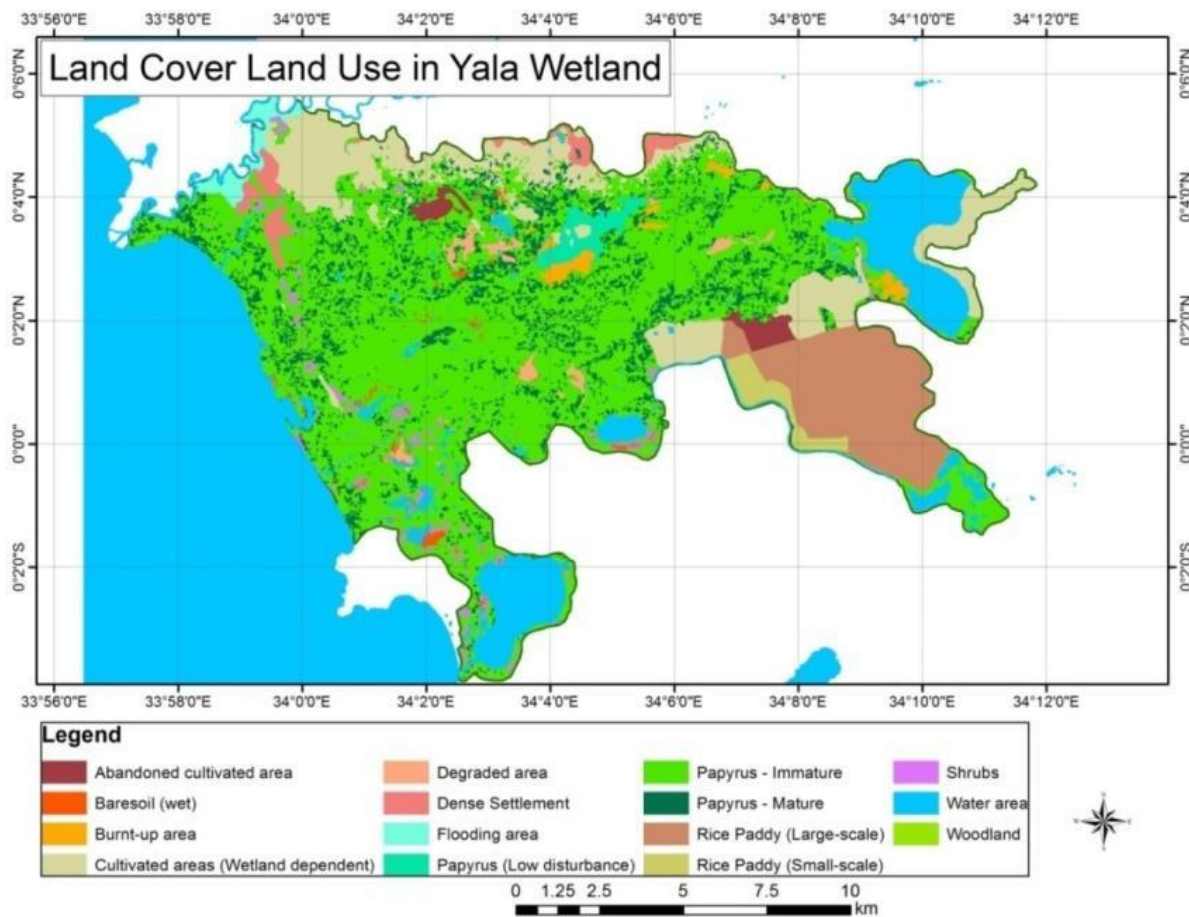
**Figure 4.18: Yala Wetland Condition in 2014**

**(Source: Odhengo, 2018b)**

**Table 4.9: Yala Wetland Land Use/Land Cover Areas in 2014**

| Land use/Land cover category | Area | |
|---|---|---|
| | Hectares | % |
| Papyrus | 12,693.1 | 61.2 |
| Village Cultivated areas | 2,380.8 | 11.5 |
| Open Water | 2,101.0 | 10.1 |
| Rice Cultivated areas | 1,951.0 | 9.4 |
| Degraded Papyrus | 350.4 | 1.7 |
| Scrub/Woodland | 349.5 | 1.7 |
| Settlements | 320.9 | 1.5 |
| Abandoned Land | 220.4 | 1.1 |
| Burnt Papyrus | 204.0 | 1.0 |
| Floodplain | 184.9 | 0.9 |
| **Tota** | **20,755.9** | **100.0** |
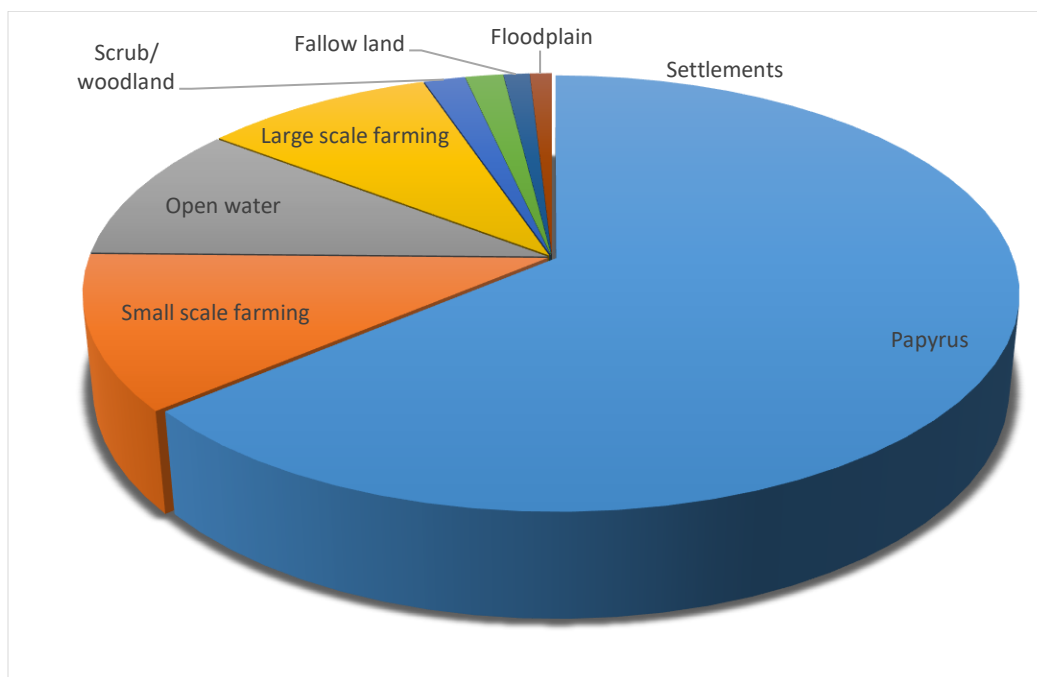
**Figure 4.19: Relative Extent of various Land Uses/Land Cover**

The landcover changes show degraded papyrus (350.4 ha) areas and burnt papyrus (204.0 ha) Table 4.9. These satellite maps (Figure 4.13 to 4.18) were shown to the communities who had drawn community maps on areas close to their villages where they managed to identify and gave their reasons for degradation of the wetland associated with their activities shown in community maps. The respondents' reasons included encroachment in the wetland to get land for farming crops, overharvesting of papyrus and reeds for weaving baskets and to get lungfish during dry seasons which interferes with breeding sites for fish, bush meat hunting hippo, sitatunga, otter, bushbuck, bush duiker, and certain species of birds as a cheap source of proteins and income, overfishing using unauthorised fishing nets in Lake Kanyaboli. The wetland communities were able to engage in wetland restoration like planting papyrus when it was clear the to them of their role in degradation when satellite and GIS analysis information/evidence was shown to be them. Hence, restoration of papyrus requires community participation with a clear demonstration linkage to their

improved livelihoods. During LUP development, this was done by linking to future carbon trade, wildlife habit tourist and visitors to Lake Kanyaboli. The wetland communities including those who developed community maps with the wetland and lake Kanyaboli (Gendro, Kanyamaji, Nyamonye "A", Uriri) were then involved replanting and caring papyrus on these degraded areas and by 2019 they restored about 100 ha through Yala Swamp Site Support Group (YSSEG) and a conservation NGO. Appendix 11 shows the areas community organizations replanted with papyrus.

Figure 4.20 shows the major habitats and land use in Yala wetland in 2014 which form the basis for landuse plan development and associated ecosystem management plans.
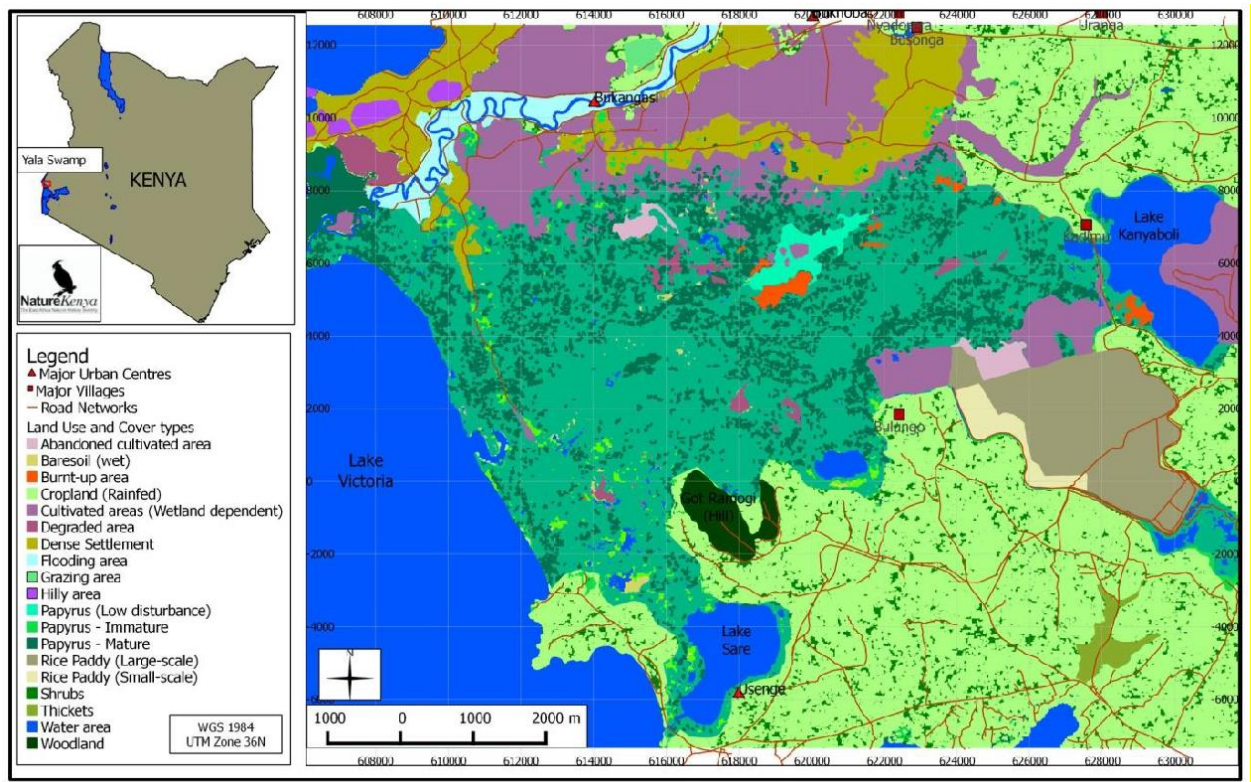


**Figure 4.20: Major Habitat and Land-Uses in Yala Wetland**

**(Source: Odhengo, 2018b)**

## 4.4.2. Impact of   Reclamation on the Yala Wetland

Figure 4.21 is an image of the wetland taken on 31 December 1984. The southeastern plain below Lake Kanyaboli (the area now occupied by Dominion Farms) appears as partially reclaimed and cultivated. However, there is no evidence of the retention dyke which was built during the 1960's separating Lake Kanyaboli and the middle area of wetland and much of the lake itself appears to be covered with either papyrus or floating vegetation.
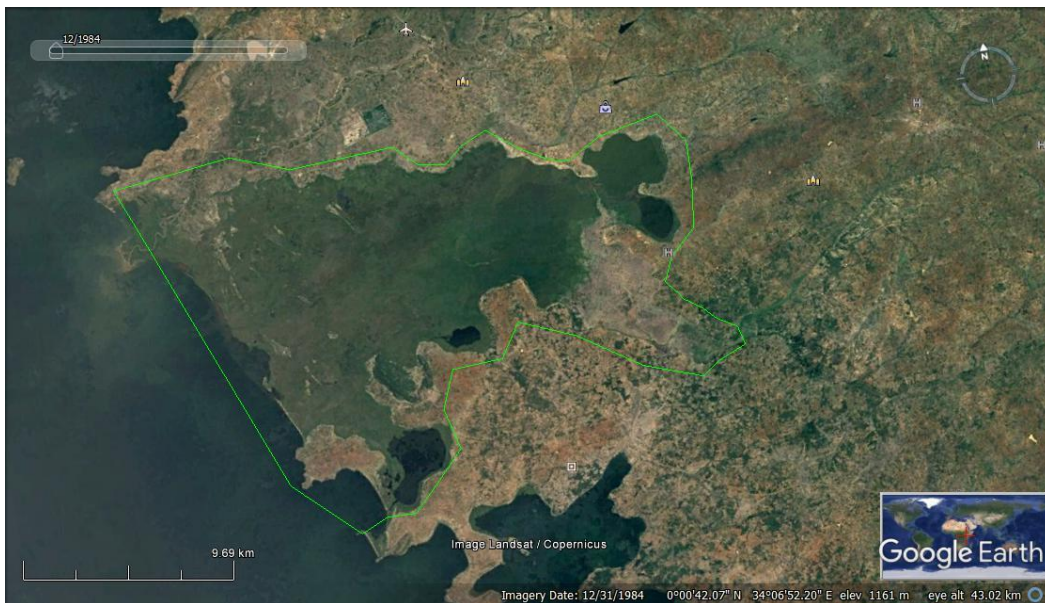


**Figure 4.21: Yala Wetland in 1984**

**( Source: Google Earth, 1984)**

**Figure 4.22: Close up of the reclamation area on 31st December 1984**

**( Source: Google Earth, 1984)**

The enlarged satellite image shown as Figure 4.22 above shows the existence of parts of the retention and cut-off dykes, although these had fallen into disuse by the 1980's. However, Yala River had been partially diverted at this time and floodwater flowed both to Lake Kanyaboli and along the southern canal discharging into the middle swamp at a point close to Bulungo village.



**Figure 4.23: Southern Diversion of River Yala ending in Bulungo Village ( Source: Google Earth, 2001)**

( **Source: Google Earth, 2001)**

Detailed examination of the historic evidence (2001) shows that the southern diversion of the River Yala ended (see red circle in Figure 4.23)  at a point to the north of the Peninsula on which the village of Bulungo is situated.



**Figure 4.24:  River Yala discharge point into the Middle Swamp between the 1960's and 2003**

 **(Source:  Google  Earth, 2001)**

The original course of the southern diversion canal can still be seen in Figure 4.25 (see arrow), with the current canal, realigned and reconstructed after 2003, marking the boundary between traditional farmland around Bulungo village and recent large-scale reclamation.

**Figure 4.25: Bulungo Peninsula showing the old and current alignments of the southern canal.**

( Source:  Google Earth, 2016)
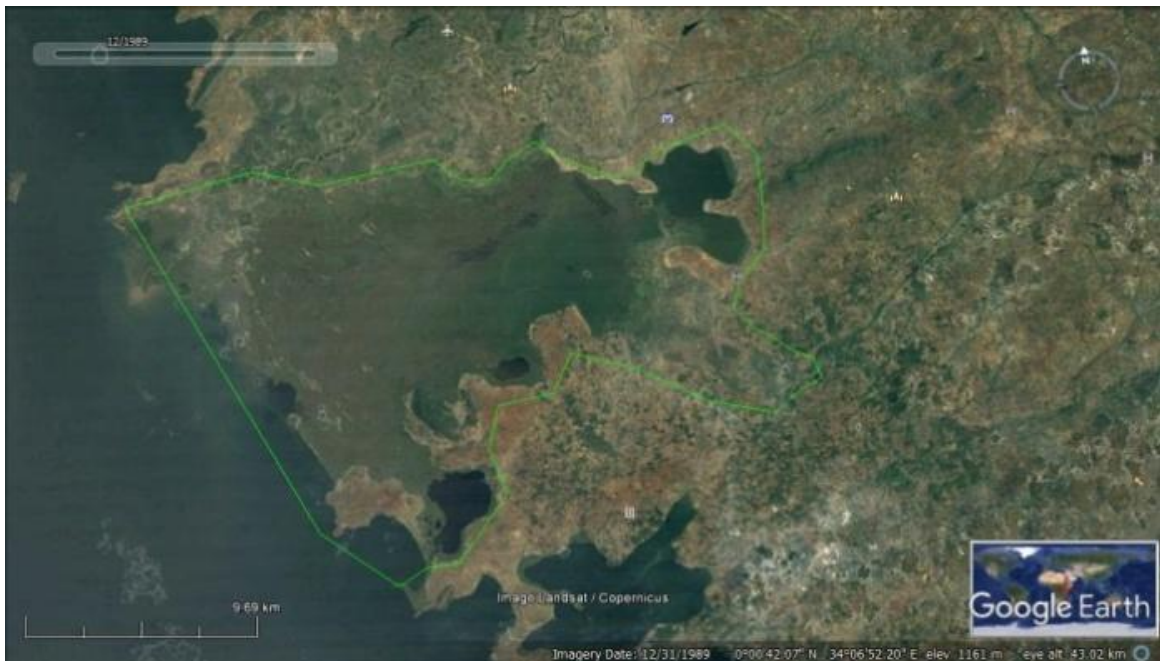


**Figure 4.26: Yala Wetland in 1989**

( Source: Google Earth, 1989)

**Figure 4.27: Yala Wetland in 1994**

**( Source: Google Earth, 1994)**
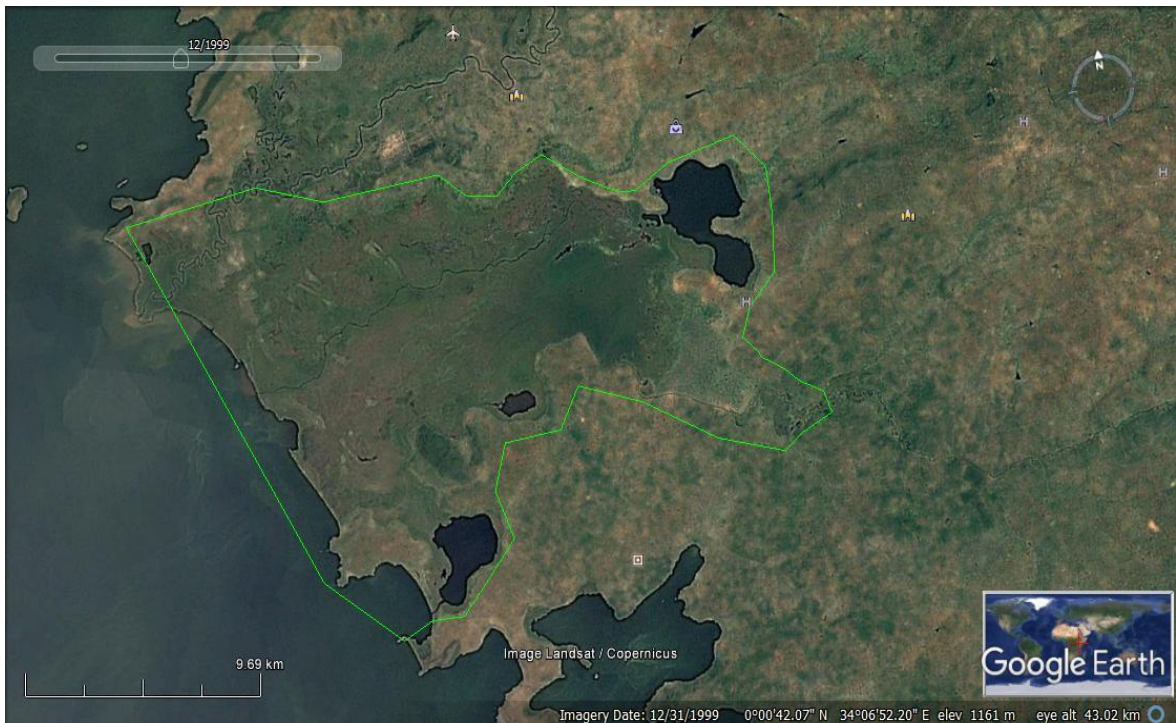


**Figure 4.28: Yala Wetland in 1999**

**( Source: Google Earth, 1999)**

The satellite images show very minimal change in the main characteristics of Yala Wetland between 1984 and 1994, as revealed by a comparison of Figures 4.26 - 4.28. However, towards the end of this period the image suggests that revegetation has occurred across the lower part of the area now leased to Dominion Farms without direct community involvement with that portion of the wetland.

## 4.5 A Framework to Optimize Community Participation in Yala Wetland Planning and Ecosystem Management

The section has three parts: the development of the framework; application of the framework to the remaining SEA and LUP processes and the deployment of the framework in a Siaya County Integrated Development Plan preparation and Yala Wetland Indigenous Community and Conservation Area Management Plan Development.

### 4.5.1 A Framework to Optimize Community Participation

Part one looks at issues from community participation in Yala Wetland's management and identification of environmental issues for inclusion to SEA/LUP to design a modification of the community participation framework.

### 4.5.2 YPAC Limitations and Challenges

Results from two objectives namely objective one on assessment of local communities' participation in Yala Wetland ecosystem management, and objective two on environmental issues to be included in Yala Wetland LUP were used as a basis to design the framework discussed below. The level and effectiveness of community participation in SEA and LUP process revealed strengths and challenges of the existing YPAC framework.

The analysis of SEA and LUP processes itemized the following 12 limitations and challenges with YPAC framework: narrow membership of YPAC against the various interests to be represented; low quality of participation by YPAC members due to inherent weaknesses; inadequate points/places of community participation in the planning processes at six (steps 2, 4, 5, 7, 9 and 10) out of eleven steps in the LUP process; low level of community involvement based on the spectrum levels; unsatisfactory participation based

on the 10 indicators for evaluation of public participation results; the challenge  of communicating scientific and technical information to communities; dominant fixed and negative mindsets about the wetland. Others include lack of methodology for integration of indigenous knowledge with scientific information; absence of an organized Yala Wetland-wide agency with communities' strong representation; disconnect between wetland decision-making and provision of adequate scientific and technical evidence/or information;; lack transformational and value driven leadership at the community level on wetland issues; and absence of comprehensive wetland wide information system since what was available was rather ad hoc and scattered pieces of data and information. These 12 limitations compromised the ability of YPAC to represent wetland communities meaningfully and effectively in SEA/LUP process and therefore provided the justification for designing a modified framework to optimize the existing YPAC framework in SEA/LUP processes and implementation plans.

### 4.5.3 Design of The YALA RAPPEF-CF-IR-Hub Framework-The Yala Hub Framework

This is a framework designed to optimize community participation in Yala Wetland planning and ecosystem management. The framework sought to remedy the weaknesses of the original YPAC mechanism as well as tap opportunities presented as an outcome of the action research. The framework is called Yala RAPPEF-CF-IR Hub Framework based on the various steps on using it and shall be referred to in short form as the Yala Hub Community  Framework.  The five steps are: 1. React/Act. 2. Restructure/Adjust the participation framework based on the reactions. 3. Participation Preparations. 4. Community Participation and 5. Review, Evaluate and Follow-up. These are supported by a base of a Community Facilitator (CF) with a supportive Information Resources Hub (IR-Hub) to support its execution, as presented in Figure 4.29.

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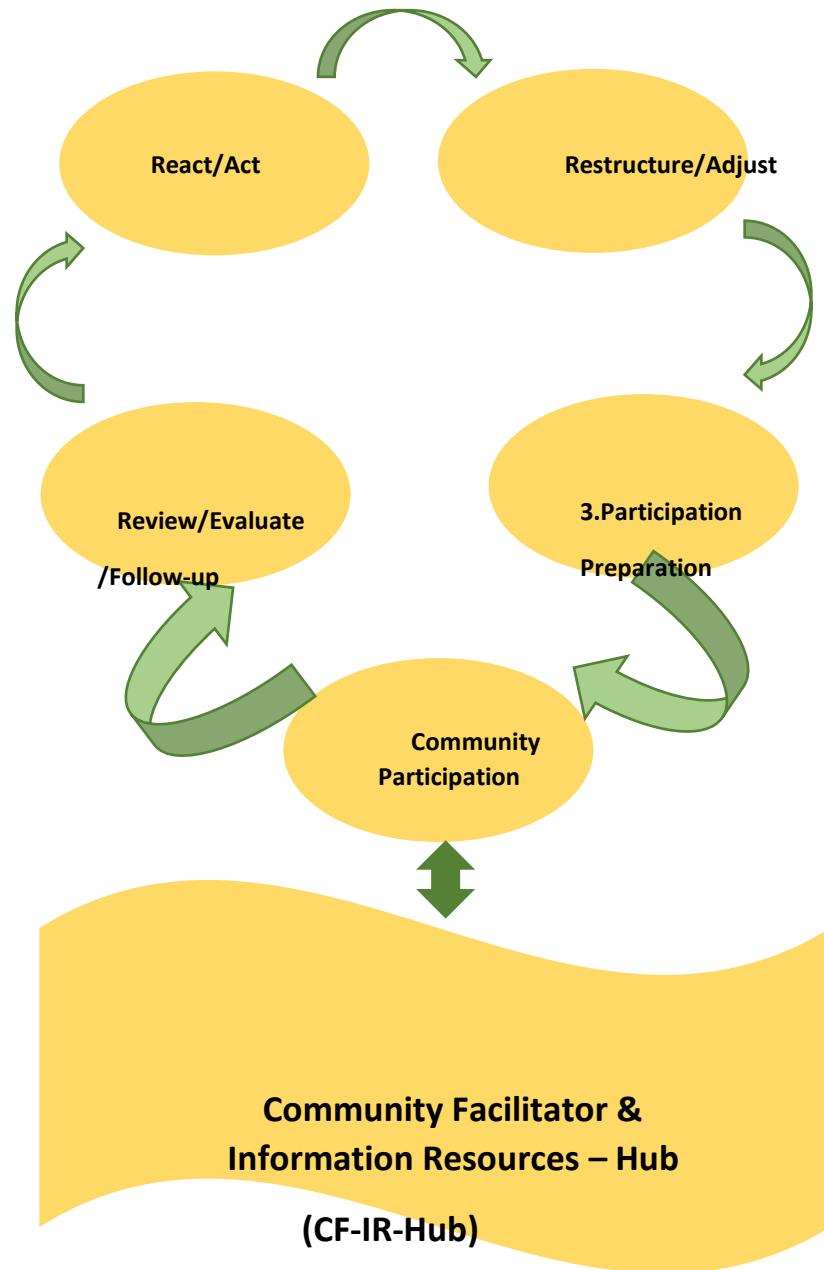
**Figure 4.29: The YALA RAPPEF-CF-IR-Hub Framework to Optimize Community Participation in Yala Land Use Plan Development and Implementation**

( Source: Author, 2019)

It is notable that if the project and program or process is new and therefore starting from scratch, then it moves from step 1 to step 3 and by passes step 2.

**Step 1. React or Act**.

The first thing is to gain entry to participate in the process with a high degree of acceptance if the process is already ongoing. The intervener has to find appropriate entry point which depends on the context and how the facilitator(researcher) positions self. For examples, as a researcher with their interest at heart, their own representative with technical expertise in the process, conservationist of good reputation with community and application of emotional intelligence to penetrate the ongoing process such as understanding their areas of greatest need to participate in the process.

If the process is starting, then conduct a stakeholder analysis to check on representation particularly of the local wetland communities. If it is in progress then conduct a stakeholder analysis tier two, which reviews existing stakeholders and their level of participation, and special preference for local communities. The key guiding question is how effective the processes is in representing the local communities.

The guiding questions for this step include:

1. What does this community regard highly that can lead to high degree of acceptance of an outsider/ a facilitator?

2. Who is participating in this process? Who is missing on the decision-making table? Which other important voices are not being heard on this planning agenda? Are the divergent voices included in this process? Does participation ensure fair geographic representation? The process facilitator should identify these and ensure their inclusion.

3. What are the strengths and challenges of the community participation framework currently being implemented?

4. Using the 10 indicators for public participation effectiveness, what are strengths and weaknesses of the current community participation framework in the SEA and LUP processes? How do you ensure the weaknesses are mitigated going forward?

The 10 indicators are: Objective of participation; Contexts for the participation; Levels of Involvement; Who was involved, how were they chosen and by who? What methods were used (maps, interviews) if they did work? Innovation of the methods used; Commitment to community participation; Inputs (time, money etc. and results in relation to those inputs); Outputs (hard outputs, reports, posters, press, completed survey forms); and Outcome.

**Step 2. Restructure or Adjust the Participation Framework based on the stepwise Feedback and Reactions**

The outcome of step one forms the basis for adjustment and restructuring at this stage. If the project or program is new, then it moves from step 1 to step 3, by passing step 2.

The guiding questions for this step include:

1. Who needs to be added to the participation processes? What uniqueness do they bring on board?

2. How can one ensure meaningful participation from the people joining an ongoing process?

3. How are the elements that were hampering community participation effectiveness being tackled in the adjusted mechanism?

4. How can one use participatory methodologies to improve participation?

5. What should one do to improve the environment for participation and harness creativity?

In the SEA and LUP processes, the researcher adjusted the participation process by bringing to the decision- making table the stakeholders who were not initially on board. This expanded the representation of local communities to include community formations and organizations and learning institutions at their bases in addition to YPAC. Both preparations and actual implementation methodologies were modified and new ones added based on the feedback from step one.

**Step 3.   Participation Preparation**

The third step called for thorough preparation before the actual participation. Consequently, this step evaluated participation readiness and ensured the process was ready.

 The guiding questions for this step include:

1. What is the community participation process in this activity?  Does the process provide local communities with room to articulate their interests and concerns?

2. What are the units of participation? What is the smallest unit for participation in this case?  How are they organized to enable smooth flow of information and receive timely feedback?

3. What type of persons will be required to facilitate this participation process?

4. What type of skills and training are required to equip facilitators of this process?

5. What logistical support and budget will be required to conduct this participation?

6. How does one frame issues for effective discussion with the identified stakeholders in step 1 above?

7. Which participatory methodologies and how will one use these in community participation processes?

8. What creativity and innovations will one bring to this community participation process?

For SEA/LUP process preparations entailed identifying other community co-facilitators and equipping them to manage the process effectively; practical training on facilitation skills including mock training amongst facilitators; enabling logistical support, and framing issues for discussion with the identified stakeholders in step one using appreciative lenses focusing on root causes and suggesting the possibilities of tackling them.

**Step 4. Community Participation**

This step is where the wetland communities interact with the planning processes and relay the feedback to the main LUP technical team.

The guiding questions were:

1. How does one conduct community consultations that will allow participation of the new groups to smoothly integrate with other existing teams?

2. Summarize the key issues about (SEA/LUP) process to date? What are the areas of convergence? What are the areas of disagreement? What other concerns do the wetland communities have about Yala wetland?

3. What participation tools are appropriate for the targeted community and why?

4. How are the processes outcomes documented, validated by the communities and relayed to the LUP technical team for inclusion?

5. What do the wetland communities' value most about the wetland and why? What are the communities' non- negotiables on the wetland ecosystem resources?

6. Identify sites of environmental significance and conduct empathy walks with communities to pool out their issues /feelings on those sites?

7. Immerse oneself in the community to experience their issues and ensure that the participation process brings out what one has experienced even if not comfortable to talk about?

The Community Facilitator manages the community participation processes using various participatory methodologies and resolves any participation challenges to ensure maximum interaction of communities in the planning process and relaying critical feedback to the technical team and other planning organs outside the formal consultation sessions. For example, by empathy walks; consulting in communities' local languages; artistic works where talented community members express themselves; and cultural artifacts to express themselves.

**Step 5.  Review, Evaluate and Follow-up: Participants feedback about participation processes**

At this stage stakeholders evaluate the participation processes and outcomes guided by the following questions:

1. a. What went very well?  b. What could be done even better/improved next time?

2: How does one feel about the final outcome of Yala Wetland Land Use Plan and ecosystem management plan?

3. What follow-up mechanism is in place to ensure community participation issues /outcomes in the plan are later implemented?

4. How does one get the community as a key player in the implementation processes?

5. How does one ensure that the benefits from Yala wetland are shared equitably with the wetland communities and other key wetland actors with a mutual accountability system?

In SEA/LUP process, evaluation was done with the Wetland communities, Researchers, LUP Technical team, County officials from departments of Lands, Professionals, teachers and students in schools

**Community Facilitator (CF)**

At the core of optimizing community participation in SEA/LUP processes is the CF who helps communities navigate those five steps, which is supported by an IR-Hub. The Yala RAPPEF-CF-IR-Hub Framework is a facilitative model with the community facilitator being key to its execution. The CF should have relevant attributes and skills in interpreting scientific and technical information to the community.

For Yala Wetland the following attributes were needed namely: skills and capabilities in planning and management; environmental sciences knowledge; networking and advocacy, proximity and access to decision makers; and, community acceptance to generate a feeling that it was a safe environment of trust and mutual respect. The CF uses these skills and emotional intelligence to help communities see and overcome their barriers to participation.  Finally, the CF provides new feedbacks loops and leverage points for community interventions.

**Information Resources Hub (IR-Hub)**

The IR-Hub was vital in gathering, processing and relaying timely data and information required to inform the processes. The resources gathered included previous related studies on Yala Wetland, feedback from community meetings, validation feedback of various SEA/LUP outputs and draft reports; vital networks or contact persons who were called to inform and input the various parts of the process. In the IR-Hub, facilitators used multifaceted but audience appropriate channels in communicating with them. For example, CF relayed technical process outputs through graphical images, storytelling, folklores, sayings, proverbs and metaphors. Constant feedback by CF using appropriate target audience information and channel was key in applying the framework. The IR- Hub was opportunity for new forms of information to flow into the process and therefore should remain a 'live' entity, constantly growing and replenished with current information.

**4.5.4 Application of Yala RAPPEF- CF-IR Hub Framework in SEA/LUP Process**

The Yala RAPPEF-CF-IR-Hub Framework was applied within an on-going SEA/LUP process after draft one of SEA and LUP report had been generated. The remaining processes were mainly reviewing draft 1, providing feedback, generating contents and review feedback for SEA and LUP drafts 2 and 3.

**4.5.4.1 Outcomes of Application of Yala RAPPEF-CF-IR-Hub in SEA/LUP steps 1 and 2**

The Yala RAPPEF-CF-IR-Hub steps 1 and 2 in SEA/LUP processes entailed:

The Step 1. React or Act focuses on smooth entry into the participation process, checking out its community inclusivity and effectiveness of the process while Step 2. Restructure or Adjust focusing on using the feedback from step one to restructure and adjust the participation processes to accommodate more community's representation, and their contributions and concerns.

YPAC's strength include it demonstrated that community concerns would be addressed and their participation guaranteed in the SEA/LUP processes. However, the following

shortcomings were noted that hindered maximum community participation in the SEA/LUP processes:

1. YPAC members noted that they needed facilitation beyond transport to move around and call for meetings to debrief their communities after meeting technical team.

2. They needed the technical materials printed to be shared with communities but this had been overlooked in planning hence not budgeted for thereby hampering their effective communication role. This challenge hampered their reach to a significant number of their constituents to report back the deliberations from the YPAC meetings and seek inputs which they would relay to YPAC meetings, as a result they presented their views and inputs from those around them into the process, thereby narrowing representation.

3. The people from Usonga ward were not represented in the YPAC committee. Although they were initially in the YPAC they were later replaced when they became a challenge to the process. The initial officials had a challenge of understanding the LUP processes and conveying the correct messages and feedback to the grassroots level to allay fears and reduce political tension from their area of Yala Wetland.

Therefore, the researcher cum community facilitator in this framework purposely reached out to people in their circles including a retired chief and a primary school headmaster who arranged for a meeting where they gave their input. However, the process was very tense as illustrated in some of the exchanges below. While some were direct, other used metaphors to convey the messages leaving the research team to interpret their meanings and take appropriate action. For example, the statements below capture the various feelings from communities about the Yala Wetland conflicts:

"The LUP process must end with immediate effect because people will die and I don't want to die. I am just one person and I can't talk on behalf of my community; they will even kill me if they hear that I attended this meeting" Interview with respondent one. "The Dominion Farm came to Yala Wetland in 2003 and without consulting the community, proceeded to acquire the land. May God punish the initiators of LUP if they

also have ill and demonic idea of taking our land away from us like Dominion Farms did?" Interview with respondent two.

"The camera man, you are still very young and have a bright future ahead of you, I hope you have not come all the way from South Nyanza with ill motive of initiating how the swamp will be grabbed from us." (Interview with respondent two referring to one of the Research Assistants).

**John 1:1-3**, "In the beginning was the word and the word was with God and the word was God. The same Bible states that, there was a time people cried in the wilderness, that a person is coming whose shoes laces we cannot untie, this is how the foreigners came to displace us in our land" respondent three.

"The wetland has plenty of resources both in the dry season and rainy season, we get a lot of income from the swamp, therefore, it is our mother" respondent four

"I don't know who my parents are, neither my mother nor my father, the first person to cloth me and buy me a blanket is the swamp, the swamp is my only parent I have ever known" Interview with respondent five.

"Since we started cultivating in the swamp, we don't beg for food anymore, no more big lorries from Uganda and other provinces come in our mother land bringing us food, we have enough now from our precious swamp" (Interview with respondent six).

"One day it was very cold outside and the elephant was freezing helplessly and he could not survive, it moved to a nearby home seeking for help, it requested the owner of the house to allow only one of its feet into the house which was very warm, the owner showed mercy and agreed, it requested the 2$^{nd}$ foot, the 3$^{rd}$ one and the 4$^{th}$ foot. Finally, the elephant occupied the whole house in the end displacing the owner of the house, ruthlessly. The elephant symbolizes the government" (Interview with respondent seven).

It was clear that the community felt they have been used, cheated on, and lied to by some NGOs working in the area. Some of those organizations had betrayed the community trust and as a result they had developed negative attitude to any kind of development in Yala Wetland. Likewise, the above statements clearly show that because of the conflicts in the swamp, the wetland planning required ability to understand the various conflict

dynamics and participatorily proffer resolution and management strategies that would be delivered as Yala Wetland ecosystem management plans are being implemented.

Further weakness of the YPAC framework was that the process did not deliberately reach out to professionals in the area and other key community voices as schools and religious leaders for their inputs into the process. For example, the YPAC did not map out previous studies that had been done to cross check with what had been gathered by the technical team. As a result, the researcher who was acting as the CF managed to avail study findings where he was a team member of Nile Basin researchers on identification of Multipurpose Water Resources Development Projects in Gucha-Migori and Yala River Basins in Kenya in 2011-2012 period on proposed multipurpose dam at Gongo on River Yala that would affect environmental flows of River Yala when it is finally constructed.

The application of Yala Community Participation Framework led to expanded scope and depth of local community participation in later stages SEA/LUP process phase two and three. Likewise, some of the processes were iterative hence, data and information generated enriched even process that were done before application of this framework. The additional groups brought on board included the following eleven groups/key stakeholders.

1. The researcher reached out to elders' formation in the communities like the **Luo Council of Elders** and respected elders who are viewed as custodians of communities' heritage. They brought on board historical information; land tenure issues; gender issues and societal meaning around them including land ownership.

2. **Schools:** In understanding the communities and how they have changed over time, education and learning institutions have played a significant role. Therefore, where changes were expected  schools played a catalytic role. In this study schools developed environmental ethos for sound management of  wetlands, created awareness about the sensitivity of the Yala Wetland, envisioned the future of Yala Wetland through essays, debates and artwork as seen in Figure 4. 12. These included nursery , primary, secondary and post-secondary schools.

3. **Change Makers in the Community**.  Yala Wetland land use plan is a key driver in bringing change in the area. The researcher reached out to respectable change makers on what it takes to bring change and how their experiences could be harnessed for implementing  Yala Wetland vision. Their inclusion brought new planning issues: herbal trees and how to preserve them, land tenure involving cultural dynamics including engendering landuse planning; traditional weather forecasting and social cultural subtleties that determine how local communities relate with land and thus its subsequent care.

As one female change maker revealed during our data collection meeting in Yimbo with the elders, while narrating why women are prevented from owning land. She stressed that

"We cannot obtain land title deeds without the permission of our husbands or male guardians. Communities fear losing their land to strangers from different clans when their women are inherited upon the death of a husband or if a woman remarries in a different clan".

Consequently,  Yala Wetland change makers helped dig deeper into cultural nuances in land ownership issues especially property owners and tenants' relationship and how it affected their utilization which in turn affects sustainable use.

4. **Professionals** from  Yala Wetland and its surroundings. These included experts on land, water, environmental sciences, academia, scientists and researchers. These brought a deeper analysis of the issues with the entry of commercial farmers, lessons learnt and best practices from elsewhere, interrogated drafts and gave their expert views and recommendations. A key input from them was the need for proper understanding of environmental water flows and soil health in agricultural interventions. The professionals from  Yala Wetland and its buffer zone among them retired and active experts would be key in the implementation of the LUP plan and therefore their ownership at the design stage was core. Similarly, the Yala Wetland residents in the diaspora were critical in identifying overlooked issues like mental health.

5. **Local Administrators** including current and retired chiefs, sub-chiefs, and village elders (*mlangos*) were key entry points into the communities as well as resolving communal

conflicts backed with the powers of the county administration. These administrators provided additional historical and contextual information, conflict information and how they dealt with them, sensitive issues among the various communities living in and around the wetland.

6. In the course of conducting this study, **Wetland International Eastern Africa office (WI)** brought wetland experts in their network from various African countries on a tour of Yala Wetland and experienced the benefits of the swamp especially exceptional resource values like unique biodiversity value under threat and globally threatened species which are endemic to the wetland's ecosystem. They in turn shared their experiences on managing wetlands from across Africa, which was a very useful input in the LUP process. Additionally, they donated 50 binoculars to Yala Site Support Group worth Kenya shillings 500,000 ($5,000).

7. The **Tourist Association of Kenya** brought in the elements of tourism potential of Yala Wetland and how these can be tapped and integrated within the western Kenya tourism circuit.

8. The small and medium scale investors in Yala Wetland brought into the planning process information plans to expand their farm activities and the need to increase water abstracted from Lake Kanyaboli and the other parts of the wetland. This was very useful in modeling future water demand to be abstracted from the wetland.

9. Additional Non-Governmental Organizations (NGOs) working in the wetland were invited during the presentation of drafts SEA/LUP reports and their feedback included.

10. The **Motorcycles Association (*Boda boda*)**. Motorcycles have transformed transportation in Yala Wetland in the counties of Siaya and Busia. However, despite being key players their interests were neglected by other transporters in the YPAC. This pervasive transport system moves Yala Wetland residents and agricultural goods easily and promptly.

11. Later in the SEA/LUP processes, **the Media** was brought on board to participate in feedback meetings with technical teams. The media in turn covered these in their various media channels mainly newspapers, FM radios and documentaries.

**4.5.4.2 Application of steps 3 and 4 of the Yala Community Participation Framework to SEA/LUP processes-Preparation and Community Participation**

**i. Environmental Events as Anchor Points for Multi-stakeholder combined Participation and Feedback**

**a. Annual Wetland Day Events**

Siaya County Wetland Day of 2016 was held at Usenge Primary school where schools took the lead in extolling the benefits of the swamp and the need to preserve it from deterioration due to anthropogenic causes. The event was preceded by a bird watching exercise at Goye causeway where participants identified 60 bird species. Songs, poems and dramas were performed to convey the messages. The YPAC also used the occasion to update the communities on the progress of the SEA and LUP. The school's competition titled envisioning Yala Wetland was officially launched at Usenge Primary school during the Wetlands Day celebration whose theme was Wetlands for our Future: Sustainable Livelihood.



Plate 4.11: Research Team in Wetland Day of 2016 to launch school's LUP competition(**Source:Author, 2016**)

The Wetlands' Day of 2017 was celebrated at Hawinga Primary school and themed on the importance of world migratory birds where the researcher seized the occasion to discuss the progress of SEA and LUP and then sought community contributions on the same. Results of these participation processes included: strengthening environmental awareness programmes in schools through clubs, tree planting and post planting care, promoting hygienic practices and protection of Lake Kanyaboli and water springs; a deeper understanding on the Yala Wetland challenges and the role of the wetland communities in solving them.

This seizing of key environmental events offered wetland communities with an opportunity to reconfirm the challenges, their aspirations and dialogue on preliminary findings of SEA/LUP processes. During these occasions, some of elders gave talks on the values Yala communities attached to various types of birds and how they treated them based on these understanding (indigenous knowledge and passing that to schools during the event). The interaction between pupils, parents and guardians and technical staff from the government continued to offer opportunity for cross learning from all the subsets of communities represented. Plate 4.12 shows the researcher giving a synopsis of draft 2 of SEA and LUP reports to Hawinga communities during the Annual Wetlands Day celebration while Plate 4.13 shows Nyiego Women Group participating in the wetland's day held at Hawinga where they got presentations of the draft SEA and LUP reports and they provided their feedback.

**Plate 4.12: The Researcher during WWD celebration at Hawinga Primary School, February 2017 facilitating Communities to make their contributions count in the SEA/LUP Processes.**

Plate 4.13: Nyiego (jealousy of a co-wife) Women Group extolling the Benefits of Yala Swamp in a song during WWD Celebration at Hawinga Primary School, February 2017

**( Source:Author, 2017)**

Focus group discussions with community groups and different gender broadened inclusivity in SEA/LUP process and involved taking on board their concerns and indigenous knowledge for managing the Yala Wetland.

Plate 4.14 shows Rasugu Primary School pupils participating in a wetland day celebration where they had the opportunity to participate in LUP processes by submitting their essays and artworks on the envisioned Yala Wetland.

**Plate 4.14: Rasugu Primary School Pupils during WWD Celebration 2017:**

**( Source:Author, 2017)**

Rasugu primary school students performing arts and songs during Wetlands Day at Hawinga school.  Seventeen schools and other post-secondary institutions envisioned the future Yala Wetland thereby giving some ownership to the process and therefore would participate in the implementation of the SEA/LUP plans. The continued participation of schools inculcated environmental consciousness and subsequent behavior change among the students at an early age.

**b.      Schools Debates and Artworks**

As part of students' participation, they envisioned the future of Yala Wetland and generated graphic images of a perfect future Yala Wetland by 2063. The artworks were further fused into one mosaic that brought out the key themes on the various artworks including a call for conservation and resultant benefits as shown in Figure 4.12. Information from learning institutions was used to finalize  the final LUP vision and goal, contributed to issues and

mitigation ensure proposed for inclusion in SEA/LUP and other wetland ecosystem management plans and current conservation activities like papyrus planting in degraded areas, tree nurseries, tree planting and growing, visits to the wetland for recreation and learning about endangered species and endemic birds.

Plates 4.15 shows significant environmental areas in the wetland (sandy beaches at Osieko) and plates 4.16 mini- boarding school at Maduwa island where researchers were able to get communities feelings about the wetland and utilization of its resources.



**Plate 4.15: Empathy Walks at sandy beaches of Osieko and meeting Islanders in Wetland Villages (Source: Author, 2017)**

**Plate 4.16: Pupils from Maduwa Island returning to Maduwa Primary School after collecting food for mini-boarding provision (Source: Author, 2018)**

## c. Community Meetings at Village Level in Busia and Siaya Counties

Communities' participation was mostly done through FGDs and community meetings at village levels facilitated by the research team and assisted by YPAC members. Some meetings mainly focus group discussions for smaller groups; community open forums where the research team explained the purpose of the research, briefing on SEA/LUP status and then discussions guided by the facilitator on key themes on SEA/LUP issues (Plate 4.17). To ensure high level of attendance, wetland residents from relatively far off places were facilitated with transport and light refreshments during the meetings.

The YPAC members then got the opportunity to meet communities and discussed YPAC issues during these researcher facilitated sessions. The process was enriched by information gathering from communities on their priority issues using participatory methodology tools such as priority ranking, appreciative inquiry and empathy walk methodologies.

Feedback was captured and processed using content analysis method. The researcher's feedback to the technical team in the form of review of drafts and comments with input from the community. Secondly, during the meeting with YPAC the various members were able to bring key summaries of local communities' concerns on the drafts shared from these meetings to the technical team. Later, the researcher had the opportunity with various subject matter specialists in the technical team and reached out to them for specific inputs for incorporation in the plan drafting process.



**Plate 4.17 Focus Group Discussion with Fishermen and traders at Yimbo guided by the Researcher**

**( Source: Author 2018)**

**Plate 4.18 A Community meeting at Iyanga Island, Bunyala**

**( Source: Author, 2018 )**

### 4.5.4.3  Outcomes of application of the Community Facilitator and Information Resources Hub

The Community Facilitator and Information Resources Hub were designed as the base of the framework to support wetland communities navigate the five steps of the proposed framework.

### a.       Community Facilitators (CF)

The researcher who served as a CF formed a team and networks to help actualize optimizing community participation in SEA/LUP processes. The team consisted of research assistants from SES for technical know-how; some members of YPAC and YSSG for local knowledge, acceptance by community and community level meeting facilitation,

linkage with networks of professionals with interest in Yala Wetland for technical expertise and genuine involvement in determining the development paths of their communities. Additional team members that CF linked up with include development facilitators and partners to allow for navigation into the processes without hindrances mainly Nature Kenya, the IMTC Deltas Secretariat and County Government of Siaya and Busia Leaders at both the Executive and County Assemblies

The Research Assistants were trained on requisite skills for fieldwork tasks including facilitating community level meetings, interviewing respondents, moderating focus group discussions, use of participatory tools for community data capture and data capture through photography and videography of some key issues relevant to the study as well as visioning skills.

The type of stakeholders targeted determined the type of data collection tool used. For example, the youth preferred a mix of media at the same time using audiovisuals, social media like whatsapp, facebook, instagram, group work sent to their phones directly. In schools the team opted for artwork, debates, essays with queries that focused on challenges and what future they envisioned of Yala Wetland, for environmental events days the team choose gallery walks on artistic works display on Yala Wetland, wetland products display, creative performances like poems and dramas with conservation messages, display of ecotourism sites and thematic songs delivered with aid of traditional instruments such *nyatiti, ohangla, orutu, pekee, tung* and talks by both government and community leaders based on the theme of the event. The researcher also seized the occasion to update participants on SEA/LUP progress, key planning issues, and also obtained their feedback.

In addition, the steps intentionally involved the use of local leaders to co-facilitate the meetings with the researchers after being trained on SEA/LUP specific issues to guide focus group discussions and community meetings. This gave them the opportunity to relay SEA/LUP updates from Inter-county steering committee and technical team, which had been a challenge before due logistical reasons. Each team was furnished with the latest copies of SEA and LUP and YPAC meeting minutes during community meetings.

The community facilitator of the process had to be a respected and trusted person, who was influential enough to engage at all stages and structures of SEA/LUP processes involving ICSC, YPAC, Technical Team, Learning and Research Institutions, various organs and players in policy making space. Consequently, the researcher being from the area fitted in well and facilitated the process.

**b.      Information Resources Hub for Accessing Relevant Information to make Informed Decisions that are Evidence and Outcome based**

LUP and SEA processes required a lot of data and information. The data was scattered among various stakeholders that required identification and availing to the team. Some data like for water abstraction by investors was just not available. On the contrary to availability, some collated information was not easily discernable by local communities to support their informed participation, yet information access is   a critical component for increasing the quality of community participation in managing Yala Wetland ecosystem. In increasing access to technical information, the communities required less text and tables but rather more visuals, graphics and intuitive information delivered mostly in consultative and experiential processes with adequate time for questioning, reflection and responding.

On framing issues, the team used appreciative words of being positive, optimistic and desired result focus to guide the information gathering among some respondents. For community organizations to elicit feedback, the researcher framed guiding questions for each category.  For the students, the essay topic was "what is your dream for the future of Yala Wetland in 50 years' time if money is not a problem? The religious leaders were asked to reflect with their leadership teams and thereafter prepare a compelling God inspired sermon on the theme of a better Yala Wetland; while the professionals were asked to give back to their communities their expertise in developing Yala Wetland land use plan, to which some responded by reviewing the SEA/LUP drafts.

The team used empathy walks methodology as they moved into the wetland with inhabitants who narrated their issues. For instance, an elderly woman showing the graveyard of her husband and reasserting her unwillingness to leave the grave in the wetland if the residents were to be relocated; have mini-boarding  schools in the wetland

so that pupils return home over the weekends to replenish food supplies as depicted in Plate 4.16; and in those situations researchers just engaged in deep listening to derive deeper meanings which they reflected in their journals and was key in designing the logical steps of this framework.

The research team also lived with the communities during the study period, which extended for over one year starting from 2016 to2018 since the LUP processes delayed. This gave them the opportunity to immerse themselves into the communities to experience their lives firsthand, obtain people issues very deeply, and to infuse creativity in the participation process based on these experiences.

Some communities were very hostile to the LUP but through participatory processes, the researcher was able to get their inputs and concerns. The Usonga communities' representatives had been edged from the SEA/LUP process and as a result the communities were hostile to the research team. They did not welcome the creation of Lake Kanyaboli National reserve which would take away some portion of Yala Wetland and hence would not be available for their use for farming, or accessing wetland resources. They also had fear of having KWS staff in Lake Kanyaboli post that will control their activities in the wetland including hunting. The researcher had to use some insiders among them to get limited entry and their fears and strong opinions over the wetland management. They also felt that Yala Wetland was part of their ancestral land hence could not be taken away from them.

During the process, the SEA/LUP secretariat and the researcher carried out some of these tasks to fill in the information gap. In the IR-Hub, facilitators used multifaceted but audience appropriate channels in communicating with them. For example, the CF relayed technical process outputs through graphical images, community maps, storytelling, folklores, sayings, proverbs and metaphors. Constant feedback by the CF using appropriate target audience information and channels was key in applying the framework. Thus, the IR-Hub was a support mechanism that enabled communities and their agents to access relevant, timely information and contributed to the SEA/LUP processes. The IR-Hub functions executed included sourcing, processing, repackaging, storing, retrieving, targeted

dissemination, receiving feedback and taking action towards LUP development. It was envisaged that the IR-Hub should be a 'live' entity, constantly growing and replenished with current information.

## 4.5.4.4 Outcome of  Step 5. Review, Evaluate and Follow-up in SEA-LUP Process

The research team engaged in targeted sourcing  of feedback on the application of this RAPPEF-CF-IR Hub framework  from various persons involved in the SEA/LUP process when  using this framework. The communities 'expressed feelings on participation in SEA/LUP based on the modified framework were varied. Majority (85%) applauded the application of the modified Yala community framework to improve their participation in SEA and LUP development in drafts 2 and 3 developments. Some were involved in planning for Yala Wetland issues for the first time. They however, felt that this should have come at the beginning of the LUP process to allow for intense consultations with communities and solicit their critical input to inform the processes. A minority (15%) felt dissatisfied with the processes indicating that they have always been treated like this and then 'dumped' later.

The students on their part while expressing gratitude for their involvement in SEA/LUP; proposed that the competition should be held annually to allow many students to get involved and steer tangible conservation action. Additionally, they suggested that environmental clubs should be actively involved in conservation activities of the wetland and be recognized if they implement their dreams as captured in their submitted artworks of mosaic. Furthermore, environmental conservation and education guidelines for lake and river basins and wetland should be developed to guide implementation of these activities. In the guide development, the pupils and students stressed the use of students and young people oriented  friendly packaged information.

The government officials on their part appreciated the framework for helping in solving their long- standing challenge of the best method of involving the public in their plans and programs. They noted that it requires resources hence must be budgeted and resources availed to the process. They noted that the framework has pointed to structural issues which

they need to take back to their government operations at the county government levels like Directorate of Public Participation that can mainstream the framework in their systems.

The review noted that not many professionals reached took their time to provide feedback. Therefore, indicating more investigation on lack of interest was required as well as how to incentivize participation to increase future participation. Likewise, it took the facilitator's personal intervention to get feedback from some of these professionals. Some viewed it as consultancy work hence needed to be paid to review and when the payment option was clarified as *pro bono* work, they declined.

The Yala RAPPEF-CF-IR Hub Framework brought on board the need for thorough documentation of historical and contextual information after the first draft of SEA and LUP developed. Through the technical expertise of the Yala Hub framework the Community Facilitator, the researcher was tasked by the YPAC to document this information and present it to the technical team for review and incorporation into the LUP processes.

Similarly, the historical and contextual information helped the team to analyze certain elements with deeper appreciation on their genesis. For instance, the conflicts between the residents and the investor, the Dominion Farms, became clearer in-terms of unmet expectations with high national political stakes on Yala Wetland investments and the special relationship between the local communities and the wetland to an extent that some could not leave the graves of the family members in the swamp even when asked to vacate for safety reasons.

The LUP still awaits approval of the two county assemblies. However, programs that are currently being implemented are referring to the Yala SEA/LUP including the County Integrated Development Plan (CIDP) 2018-2022 of Busia and Siaya. The framework was also applied in the preparation of Siaya CIDP 2018-2022 and ICCA management plan 2019-2029.

The Yala Hub framework resulted in a database of community group members and their leaders from both the wetland and buffer zone, which makes it easy to individually reach out to them for follow-up. From the study, there were highly passionate individuals on

environmental conservation who should continue providing leadership during LUP implementation phase besides the Yala SSG officials. The LUP implementation phase requires another level of relationship with various implementing agencies. This shall ensure benefits accruing from the wetland are equitably shared and are perceived to be fair. A governance structure with communities at the core was formed as part of the follow up actions in applying the framework on implementation of the LUP plan. The structure shown in Figure 4.5 has since been validated by Yala Wetland community conservation areas stakeholders in February 2020 (Plates 4.19 and 4.20) to ensure this continuity in managing Yala Wetland ecosystem according to plan.



**Plate 4.19: Second Stakeholders' consultations held in March 2020 in Siaya Town validating the proposed governance framework and ICCA Management plan**

**( Source: Author, 2018)**

**Plate 4.20: Syndicate groups discussion during the second consultative meeting in 2020 in Siaya led by the Luo Council of Elders, deputy vice chair in a coat and ICCA Chairperson.**

 **(Source: Author, 2018)**

**Community Conservation Champions**

During the study, some individuals were found to be active and pursued Yala Wetland conservation matters passionately. Some had been trained by conservation agencies like Nature Kenya on bird watching, KWS on conservation of fragile wetland ecosystems and while some were change makers who in their respective undertakings brought positive changes in their localities and had earned communities' respect. The change makers have been profiled in a database and remain strategic community pointers for LUP implementation and follow-ups.

The Learning Institutions in Yala Wetland who were involved in expanded LUP development consultations were very positive on the essays and artworks competitions, debates about Yala Wetland and proposed that these should be done annually. As such, a mechanism for yearly competition, participation on key environmental events like Wetland days and strengthening environmental groups in school should be prioritized in the implementation phase.

The last phase of the LUP approval by the county executive and then by county assemblies of Siaya and Busia were not done partly due to the August 2017 elections. Unfortunately, there was along electioneering period, followed by nullification of presidential elections by the Supreme Court and the boycott of the second election that changed the political environment, which was not conducive for the required approvals. Similarly, over 70% MCAs in the study area were not re-elected hence the new ones required more time to be inducted into the process to gain confidence to perform their approval duties. It therefore follows that in both the executive and the county assemblies required champions within to push for these approvals. Unfortunately, the earlier champions failed in the elections thus leaving the closure of LUP in a very fluid state then. The local communities felt valued because they were consulted in designing the wetland SEA/LUP and would implement their recommendations.

Therefore, the application of the Yala RAPPEF-CF-IR Hub framework in the remainder of SEA/LUP processes was subsequently guided by the framework steps and respective guiding questions. The technical team embraced the application of Yala RAPPEF-CF-IR-Hub in thinking through methodically and identifying weak points in community participation (systems thinking) and took on board some of the practical ways of improving community participation in the remaining LUP steps. The technical team and the secretariat were also flexible to take in inputs from these communities' consultations thus underscoring the transformative learning application in the framework which improved the level and quality participation of wetland communities in SEA/LUP processes. This improved participation resulted in the final LUP with significant community input discussed below.

### 4.5.5 Yala Wetland Land Use Plan Developed through a Participatory Process

The final Yala Wetland LUP which benefited from the application of the improved Yala Community Participation Framework, the Yala Hub Framework, recommended three land uses which included conservation, settlement and farming zones as shown by various maps and discussed below. The plan notes that the development of the various sectors could seriously compromise the ability of the wetland to deliver its important ecological functions of climate regulation, water flow regulation and biodiversity conservation. The

plan recognizes that reclamation of parts of the remaining wetland could affect the ecological sustainability of Lake Victoria which is the source of River Nile. This LUP with legal requirement for public participation was developed with the benefit of optimized community participation using the Yala RAPPEF-CF-IR Hub Framework aims to balance development goals with environmental conservation in order to ensure sustainable development that preserves key qualities for the benefit of the present and future generation.

Figure 4.30 gives a visual presentation of the proposed Yala Wetland LUP which the wetland communities participated aided by YPAC and its improved framework Yala RAPPEF-CF-IR Hub community participation framework. The researcher, as the CF was integrated in into the planning secretariat and YPAC and ICSC which provided multiple avenues for community participation in the LUP process. This CF intervention led to incorporating local community knowledge on the formation and management of the wetland into the process and recognition that communities' ownership needed to be restored and was best placed to the conservation area of the land use plan leading to the pursuit for ICCA for the implementation of the LUP plans. The details of LUP are in the Yala Wetland Land Use plan and how community participation through improved framework influenced the outcome.
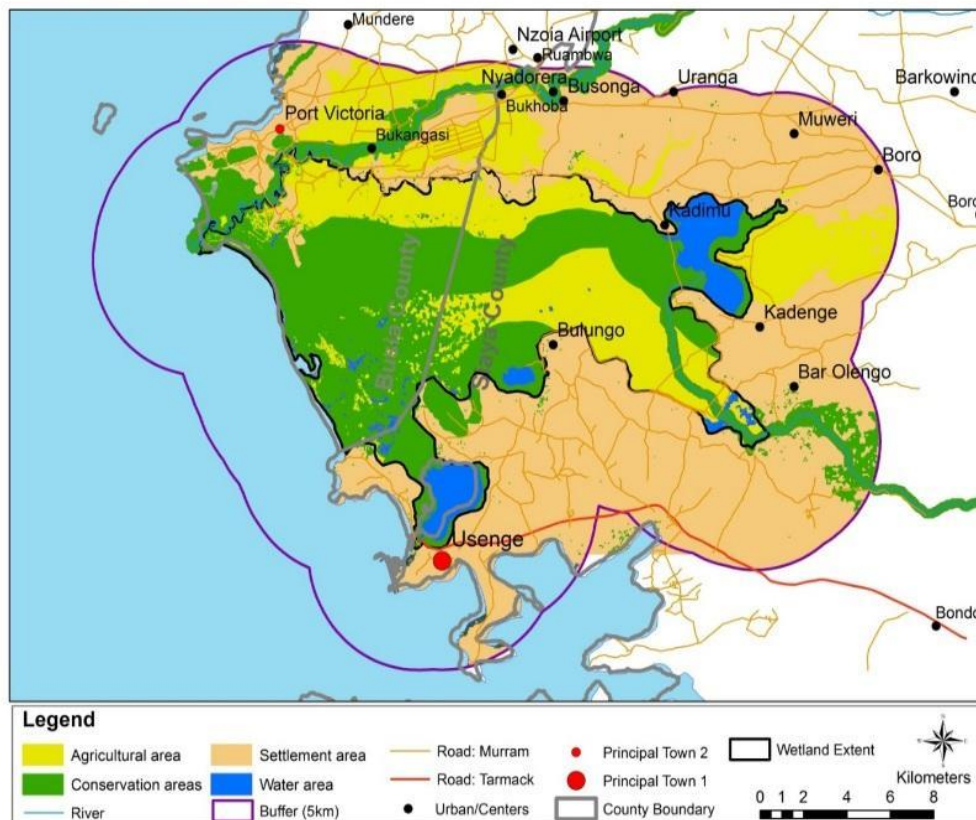
**Figure 4.30: Yala Wetland Yala Land Use Plan – Recommended Land Uses**

 **(Source : Odhengo *et al*., 2018b)**

The main planning areas including the buffer and core were divided into the following subzones:

i. Core zone (Wetland) includes Agricultural production areas, both subsistence and commercial farming, Conservation areas (The river channels (corridors); riparian area, Papyrus zones, Open water); scrub/woodland and human settlement

ii. Buffer zone includes the following subzones (Agriculture (commercial and subsistence); Settlement (towns and villages); Industrial development; River corridors and channels, and Public utilities.

The core planning area of Yala Wetland is about 20,756 ha (about 207 Km$^2$). About 64% of the wetland area is occupied by papyrus dominated vegetation while 11.5% and 9.4 %

of the wetland is under subsistence agricultural and large scale commercial agricultural production respectively as shown in Figures 4.31 and 4.32. About 10% of Yala wetland is covered by open water comprising of lakes Kanyaboli, Sare and Namboyo. Settlements only occupy about 2% of the wetland.
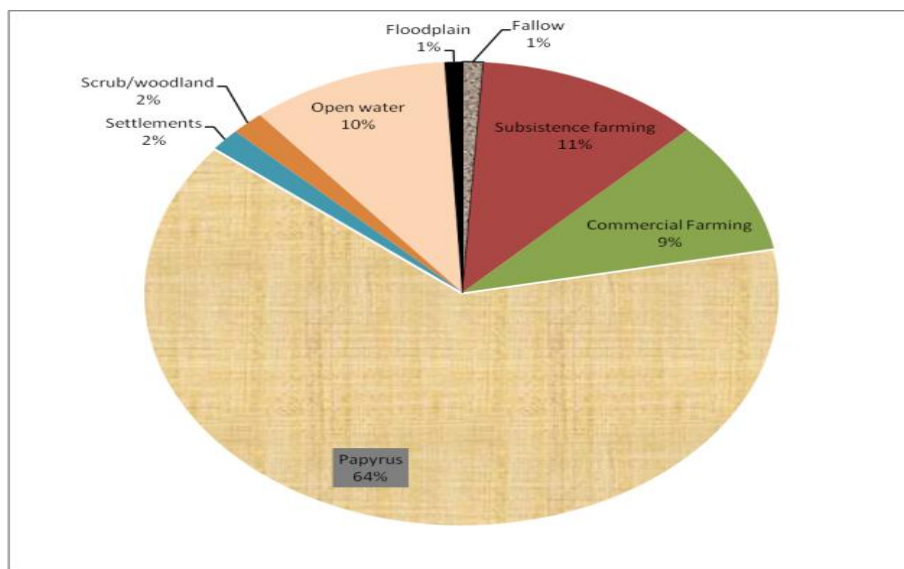


**Figure 4.31: Proportion of various Land Uses and Habitat Types within Yala Wetland Area**

The following planning zones can be recognized in the wetland (the core planning area): Settlements, Agricultural production land, Conservation areas (water corridors and riparian zones, Permanently flooded area–papyrus areas, and Open waters) with their issues for planning considerations.

**4.5.5.1 Settlements Zone**

A few human settlements are found within the wetland. However, it is expected that these settlements will continue increasing as human population increase. These settlements lack basic social infrastructure including access to schools and health facilities. Transport is also a major challenge. Other issues include high incidences of diseases including malaria and water borne diseases because of poor sanitation.

**4.5.5.2 Agricultural Production Area Zone**

These are areas of high and moderate agricultural potential excluding water channels and riparian areas around open waters (Figure 4.32). The key planning issues in this area include high demand for agricultural land, flooding, pollution due to use of agrochemicals, high water demand, and human wildlife conflicts due to crop destruction by birds, monkeys and wild pigs .

**4.5.5.3 Conservation Areas Zone**

**Water Corridors and Riparian Zone**

Community Conserved Areas (CCAs) will include the riparian areas around open water and the land buffering key water channels that allow connectivity of Yala River and Lake Kanyaboli and also Lake Kanyaboli and Lake Victoria. The key planning issues in this area will include biodiversity loss, destruction of riparian vegetation, and lack of data on biodiversity and climate change

**Open Waters**

This area mainly comprises three Lakes, Kanyaboli, Sare and Namboyo. Key planning issues in this area include reduction in water quality due to pollution particularly from agrochemicals, reduction in water quantity due to diversion for irrigation and other uses, biodiversity loss due to poaching and overfishing, destruction of riparian vegetation, lack of data on biodiversity and impacts of climate change.

**Permanently Flooded Areas**

Here the land is permanently under water because it lies below the normal water level of Lake Victoria. The area would be difficult to reclaim with the current technology, but in environmental terms it is vitally important to the maintenance of the overall wetland ecosystem.

**4.5.5.4 Threats in Land Use /Land Cover Areas in the Yala Wetland Planning Areas**

The key threats in Yala planning areas include overharvesting and burning of papyrus, overharvesting of fish, high levels of poverty and land degradation. Other threats are shown in Figure 4.32 below.
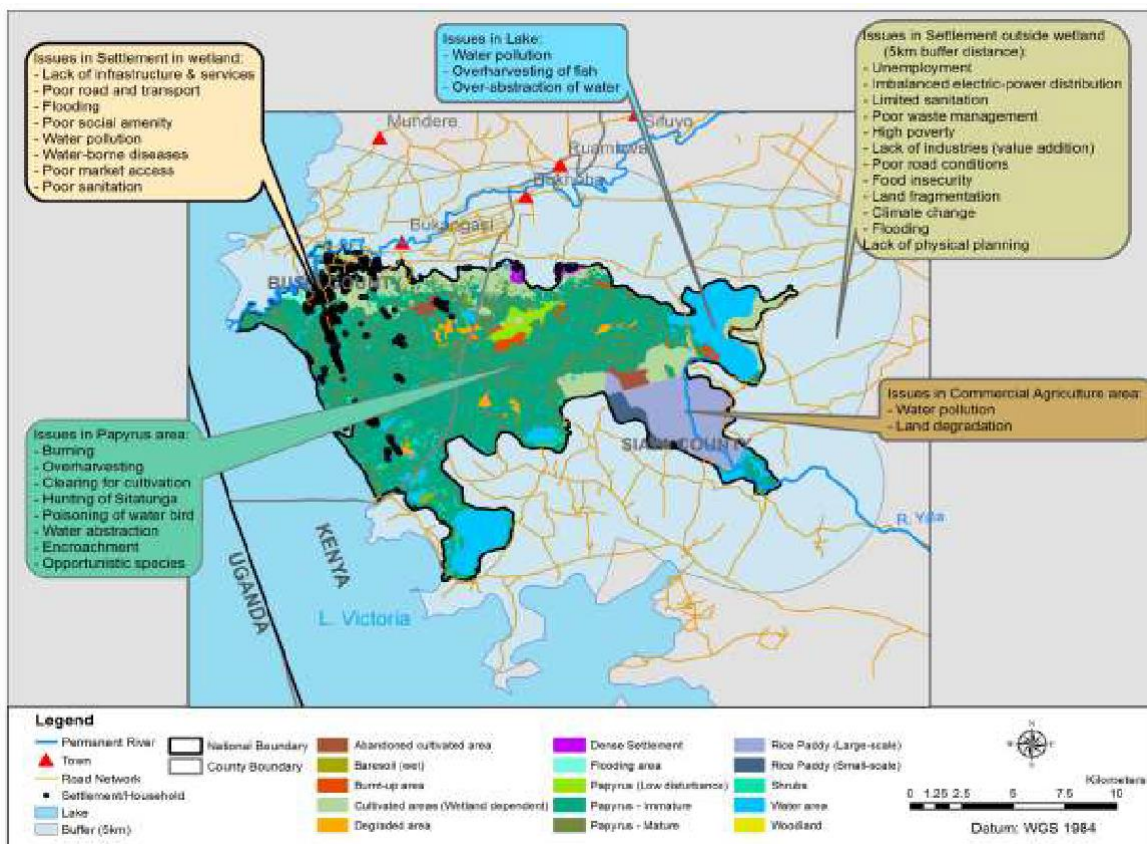


**Figure 4.32: Threats in different land Use /land cover areas in the Yala Wetland Conservation Areas zone**

**(Source: Odhengo, 2018a)**

**4.5.5.5 Potential Land Uses in the Core Planning Area**

The potential land uses in conservation areas, open waters and agricultural zones include subsistence food production, commercial farming, sustainable fishing and biodiversity conservation. The opportunities reflect communities and students' aspirations and the rest of wetland land use opportunities are shown in Figure 4.33.
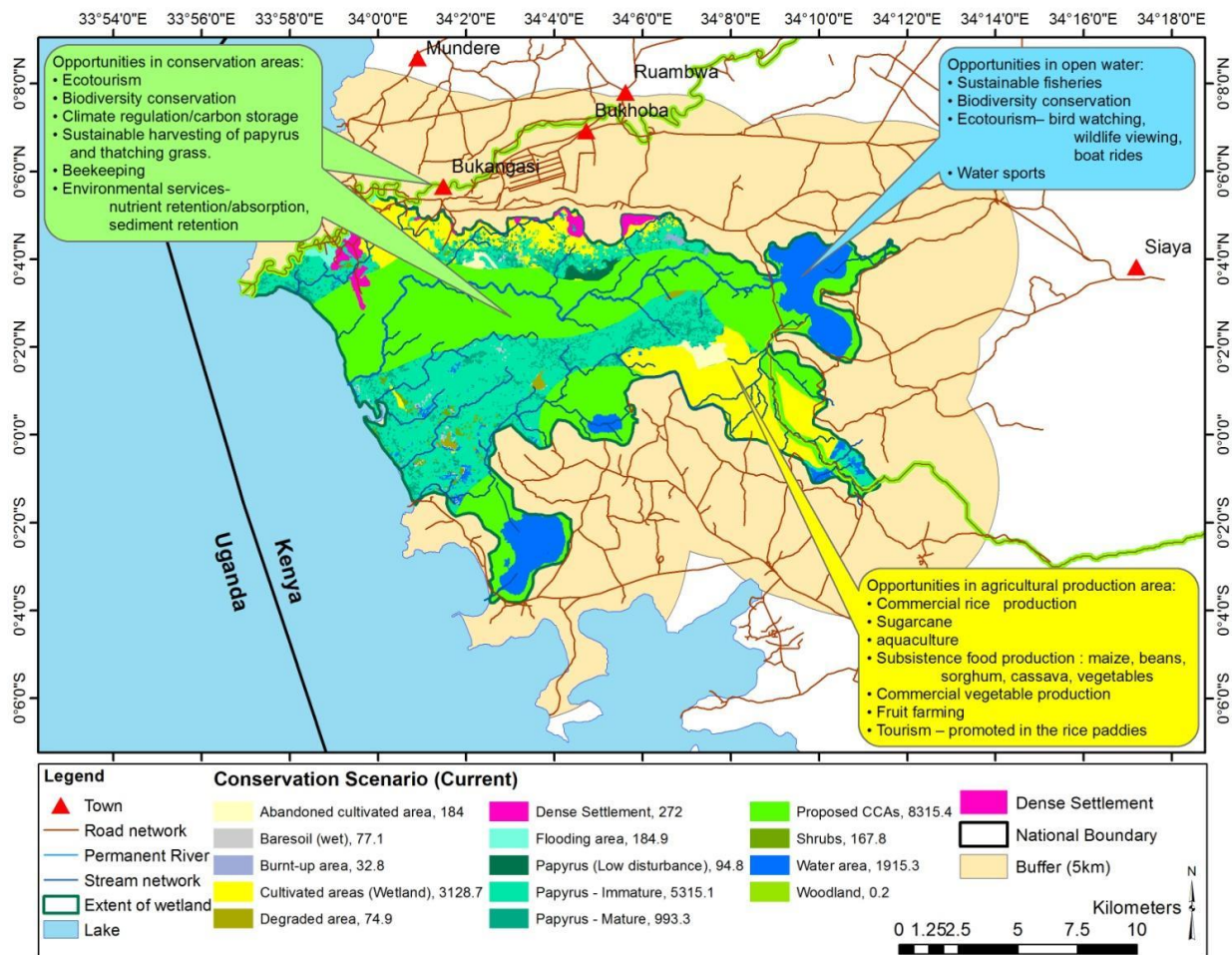
**Figure 4.33: Potential Land Uses in Yala Wetland Planning Zones**

**( Source: Odhengo, 2018a)**

**DEPLOYMENT OF THE FRAMEWORK**

**4.5.6 Deployment of the Yala RAPPEF–CF-IR Hub Framework to Siaya County Integrated Development Plan (CIDP) 2018-2022**

**4.5.6.1 Application of the Yala RAPPEF–CF-IR Hub Framework to Siaya CIDP**

The County Government Act (2012) provides for development of a County Integrated Development Planning (CIDP) in a participatory manner. Whereas this is a constitutional requirement, Siaya County government had been grappling with how best to conduct this besides including it in the budgeting process where the County staff faced many challenges including being chased away by citizens. During the development of the CIDP 2018-2022

from September 2017 to April 2018, the Yala RAPPEF-CF-IR Hub framework for optimizing community participation was however, applied in CIDP development process starting with step 1.

**Step 1.  React/Act**

The researcher joined the process as the lead mentor to the County government to provide technical skills and build their capacity for County Integrated Development Planning as component of Public Expenditure Management (PEM) Cycle. This process had  started earlier and even generated draft one of CIDP 2018-2022 by November 2017. In providing technical assistance, the researcher as the Process Facilitator reviewed the processes that had taken place up until then. It was found that the process had a technically skewed membership of CIDP secretariat and departmental technical specialists. They had reviewed previous plans, generated sector plans like Environment, Agriculture, Health, Lands, Education, Trade and Industries which touched on conservation and utilization of Yala Wetland resources.

The researcher applied the **stakeholder analysis tier two** of  Yala Hub Framework which identified the following as missing or underrepresented: students, professionals both from within and outside the county, and members of the county who were in the diaspora. The later eventually organized themselves and their submissions were considered as inputs from the diaspora ward number 31 given that the county has only 30 wards.

The team conducted public participation for the County Fiscal Strategy Paper (CFSP) and Budgeting process only to meet legal compliance as per the Public Finance Management Act (PFM) (2016) section 52. In the first generation of CIDP 2013-2017 the team did not conduct public participation citing time pressure to deliver the plan to enable the national government to release funds to counties to start operationalizing devolved governance units. Thus, the CIDP secretariat, where the researcher mentored the team, agreed to conduct public participation by applying Yala Community Participation Framework to improve the quality of the participation in the remainder of the CIDP process.

Thus, from the analysis of how the county had done public participation for CFSP and Budgeting processes; it was determined that improving community participation would require broadening representation at the planning secretariat, the departments, wards and village levels, and the non-governmental agencies working within the county. It further needed good linkage with the national government to ensure compliance and to benefit from lessons learnt from the first generation of CIDP planning cycle.

**Step 2. Restructure/Adjust the Participation Framework based on the feedback from reaction step 1 on improved framework**

Informed by the above analysis, the CIDP secretariat improved the consultation framework. The stakeholder's analysis tier two was done at the public participation training of trainers targeting ward administrators, technical staff, sub-county administrators and representatives of civil society to prepare them for the task. Each ward mapped out their own stakeholders with respect to the planning functions expected for generating an integrated county plan, required resources and their sources.

Among the stakeholders left out initially but second level of identification brought on the fore included: Motor cycle operators of *boda boda*; supporters of leaders who lost in the general election of August 2017; people who were not in groups such as older persons in the society; students in schools; and county residents who were out of the county and country.

**Step 3. Participation Preparations**

This entailed preparing draft document arising from plans from various county sector and departmental plans; previous CIDP reviews and peer reviews inputs. The CIDP development facilitators at the ward level were trained on CIDP planning process; facilitation skills, data collection and processing, documentation.

The team identified facilitators from county government departments, CIDP secretariat and non-state actors. The ward administrators with the help of the CIDP secretariat, subject matter specialists and non-state actors managed the participation processes at each ward

level. The facilitators received a two-day training of training of facilitators (TOF) to familiarize them with the new approach to county planning as reflected in Plate 4.21.

The content of the training included: Understanding the County Integrated Planning Processes; Review of 2013-2017 CIDP at ward levels; Why Public Participation? Public Participation Data Collection Tools involving Stakeholder mapping and analysis, Problem Analysis using the problem tree tool, Appreciative Inquiry, the Opportunity Tree; Group work and simulation; Facilitation skills for public fora; Ward based Action planning and development of a road map for public participation.

The County Secretary (CS) challenged the TOF trainees about the lack of money mindset, stating that it was a hindrance to creativity in planning and implementation, "It is a good thing to plan when you are broke" while the County Executive Committee Member (CECM) of finance spelt out his expectation as "Siaya County needs to come up with a bankable CIDP".



**Plate 4.21: Stakeholder mapping and analysis tool simulation session by trainees during TOF on public participation for CIDP development**

**( Source: Author, 2018)**

The trainees conducted mock public participation where they applied the pair-wise ranking and recorded the feedback from the communities. This activity identified areas where they had difficulties, and had these clarified by trainers and members of CIDP secretariat deployed as back up to the teams during public participation.

The team also mapped out potential challenging stations based on previous experience, incitement by local leadership; territorial control base of some leaders and back-up team assigned appropriately with those concerns in mind. Likewise, teams in those potential challenging areas were psychologically prepared and the respective ward administrators coordinated the pre-event activities. The ward administrators developed a plan and a checklist preparation of CIDP public participation at the training to ensure sound preparations.

**Step 4. Community Participation**

The notice for the meeting was sent out in the local daily newspaper and on local radio station. The ward administrators thereafter mobilized the teams while ensuring representation reflected the agreed upon list of stakeholders identified during the TOF training stakeholder analysis tier two. The public participation forums were held between 10 a.m. and 5.00 p.m. from February 5$^{th}$ to 9$^{th}$, 2018 in all the county 30 wards. The following week of February 12$^{th}$ to 15$^{th}$, 2018 the team conducted a separate public participation for CFSP which focused on policy guidance on budget ceilings. The teams met every day to prepare at the county headquarter, then departed to their respective wards, then reconvened at the end of the day to debrief with the County Director of Planning. The ward administrators provided leadership in their respective wards. The new concept planning the CIDP way, integrated development planning, was explained and given local metaphors for the communities to comprehend the dreams and aspiration of the county "*Lek mar county mag ndalo mabiro*" interpreted to mean desired county vision.

Due to resource challenges over time, communities found it difficult to believe that they could envision a world where there would be no constraints indicating a shift from resource

constraint mindset to resource abundance mindset. Interestingly, some community meetings within the wetland were able to present issues they presented during SEA/LUP meetings like expanding the fishing industry, protection of Yala Wetland while deriving benefits from the swamp, co-management of wetland resources with government agencies, fear of the wetland being taken by the government as a protected area thereby allowing only limited community access to its benefits.

In one ward, the local communities and their MCA warned the CIDP public participation team by stating their pre-conditions for participation. Firstly, that they would participate only if the facilitators guaranteed that discussion from the communities will be taken seriously. Secondly, that they would not be rushed but rather take the meeting to its logical conclusion. When the meeting started, they stated that they had been mobilized for budget presentation and not CIDP hence they will have to go back and prepare for the CIDP meeting on a later date. With a bit of persuasion and through the intervention of local communities who understood and thus explained new form planning; and with the respect they had for the local chief, the communities agreed to proceed with the meeting.

The communities engaged in prioritisation of their issues using pair wise ranking tool (Figure 4.34) and appreciated how different choices coalesce to give priority having taken everybody's opinion on board without conflicts. They also identified transformative projects in the County's 10 departments as per the Executive Order No 1 of 2017(County Government of Siaya, 2017).

**Figure 4.34: Sample of Pairwise Ranking for problems facing Fishing Communities in the Fisheries Department**

**( Source:Author, 2018)**

The research used the following participatory tools to increase community participation in county CIDP planning processes: stakeholder analysis tier two, priority ranking, focus group discussions and community meetings at ward levels, requested for submission of memorandum, advertisement of the meetings through national newspapers, radio announcement on local FM radio stations and finally mounted participation dates on County headquarter, sub-county and ward offices announcement boards.

The administrator in each ward became community facilitator who mobilized their respective communities. The various groups that came to ward level meetings included: CBOs, NGOs, religious leaders, youth groups, and County Technical officers. The NGOs like World Vision organized their community teams to review the draft CIDP and prepare their issues before the actual day. Then on the material day, they participated in the sector's groups raising issues in their respective memos.

The additional planning issues arising from applying the Yala Community Participation Framework were transformational livestock policy and strategy, mechanized agriculture in the wetland buffer zones; smart warehousing system and modern aquaculture including smart cage fish farming and mental health.

The final outcome was that the application of the Yala RAPPEF-CF-IR-Hub Framework contributed to the creation of a directorate of public participation which elevated the public participation function and profile in the county. The structure of this directorate is shown in Figure 4.35.
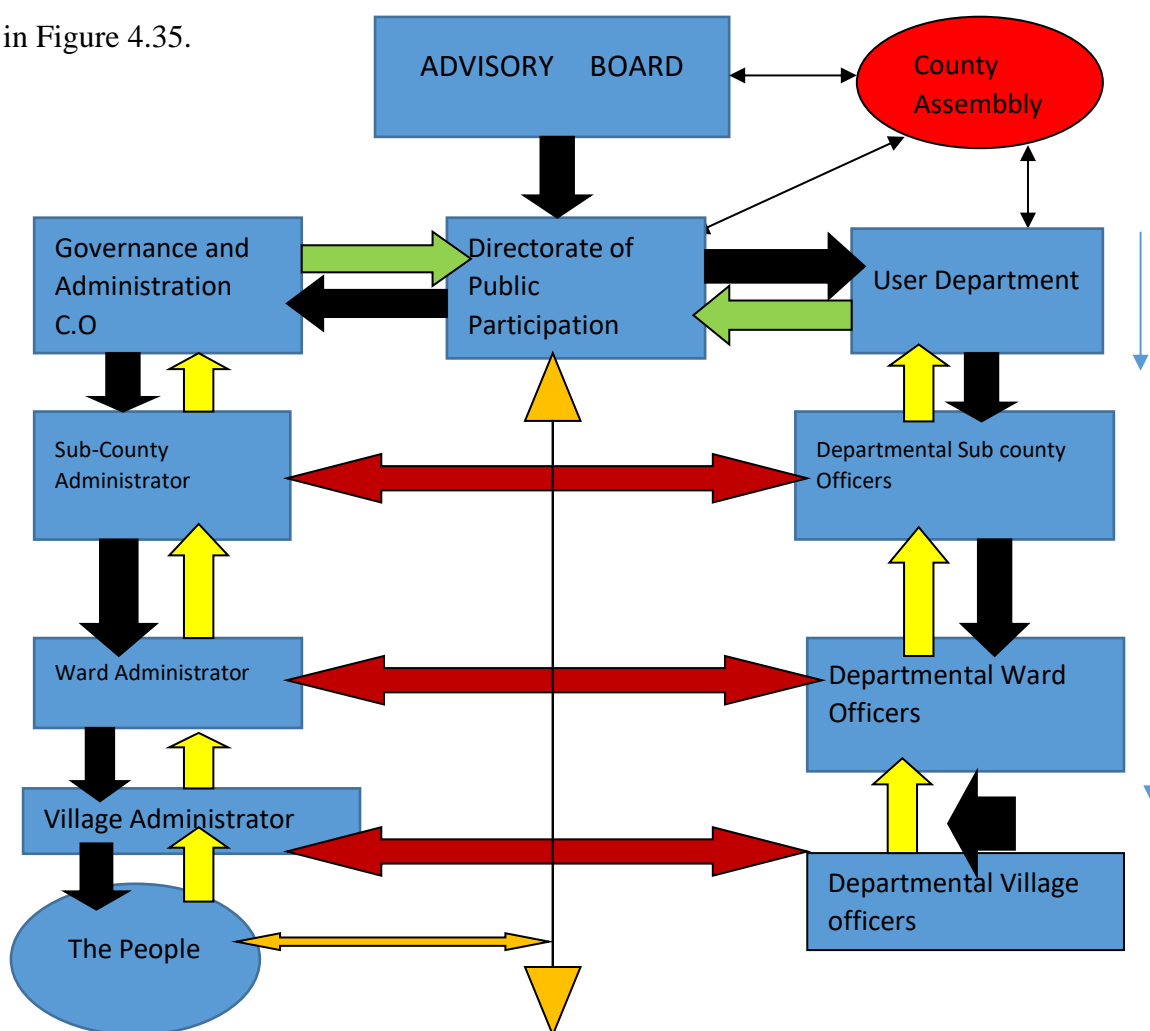


It was agreed that the directorate be anchored at the department of Governance and

**Figure 4.35: Public Participation Structure for Siaya County adopted at the Consultative meeting at the Vic Hotel in Kisumu** (Source: Researcher, 2018)

Secondly, the framework provided for consultation at village level with village administrators to deepen the level of consultation. Thirdly, the structure comprises of county employees and non-government employees to ensure diversity in membership as well as provide mechanism for mutual accountability among the citizens and the county government.

### Community Facilitator Support

A key element of Yala RAPPEF-CF-IR HUB framework was to have **a dedicated community facilitator who** seizes the concerns of local communities in planning processes. The CF provides a safe environment of trust and mutual respect for participation. In the CIDP this function was done by the lead mentor for CIDP process who was also researcher in SEA/LUP and his assistants. As discussed earlier, the researcher was native of Siaya County, Planner and Environmentalist and had access to decision makers on short notice such as some the CECs and CCOs, Directors and development partners based on the rapport built while undertaking Yala Wetland research. The American Government through USAID/AHADI gave some leverage in accessing top leadership. The CF as the lead mentor was key in finalizing the CIDP with views from the expanded stakeholders brought on the planning process.

### The Information Resources Hub (IR- Hub)

The researcher used information resources from the mentoring toolkit available for mentors who were supporting Kenya Devolution Support Programme and personal information resources relevant for mentoring demands of the county. Mentoring toolkit and information resources held on the cloud (dropbox for easy access at all times: [https://www.dropbox.com/sh/4ji6ldfqsvuchhz/AAAS-P4t71rl-Q0vWju3Zanxa?dl=0](https://www.dropbox.com/sh/4ji6ldfqsvuchhz/AAAS-P4t71rl-Q0vWju3Zanxa?dl=0)).
The information and tools contained in the mentoring toolkit were mainly: The Constitution of Kenya 2010; Devolution policy, CIDP guidelines, CIDP review, Planning tools, Sector Planning Process, Sector working groups, Public participation toolkit, Sector Tool for Climate change and Disaster Risk Screening, Gender and Climate Change, Rapid Results Initiative. This IR- HUB was very useful during the plan development and

implementation phase of the plan. The facilitating team updated this with new resources and lessons learnt in the process of executing the task.

**Step 5.  Review and Evaluation: Participants feedback about participation**

The preparation TOF for Public participation was evaluated and feedback used to finetune planning processes by the ward administrators. Some of the feedback about the training include: "Complaints might not be the issue but how to turn them into something positive" a member of CIDP secretariat and subcounty administrator.

The ward level consultations were done for five days. They involved mobilization of communities by announcements through vernacular FM radios on *Mayienga* and *Ramogi FM* Radio stations; word of mouth by the ward administrators; chiefs and their assistants at local community meetings (*barazas*). Participants said the consultations made them feel like co-owners of the CIDP plan hence would actively participate in plans' implementation. The following quotations capture their feedback on application of the framework from all the 30 wards based on draft CIDP:

"There is need to establish the County Budget and Economic Forum to facilitate public participation, have a comprehensive civic education in relation to key policy documents and the departments should take the process very seriously to facilitate early release of the technical staff".

"There should be adequate funds which should be set aside for the public participation process while public participation forms and language should be simplified".

"The county should use the bottom-up approach that is from the village-Ward, Sub-County then finish at the County level for the PP process with more time allocated to the PP process not just one day".

"Comprehensive M&E should be done and given a true picture on the ground while there should be a feedback mechanism back to the public and periodic oversight on the implementation of CIDP".

"Commercialization of agriculture has not been factored in and internal issues within Agriculture should be addressed urgently"

"What lessons have been learnt from the current irrigation systems".

"Some major flagship projects may have been left out yet they are very political and they include Fish Processing factory in Ratiya, Dominion Farms after the Mzungu left and the cold storage structures in Usenge and Wichlum being underutilized".

"The cover page should have a collage of more transformative pictures that will show what Siaya would look like in 2022".

"Public Service was not subjected to Public Participation".

"Public and Community land missing in the CIDP and the theme of Research and Development that would transform the County through Research Development".

Despite some of these positive feedbacks, some citizens did not trust that the county government was genuine in seeking their views as expressed by some community members. While conducting CFSP public participation in West Ugenya a ward administrator was insulted by a member of the public who said "*Tunajua unatafuta per diem, ndara ma ugero no, iko kwa tumbo yako*" meaning "we know you are looking for per diem and allowances, the road you purport you want to build is in your stomach". This clearly underscores the mistrust the communities had on the ward administrator and the county government officials conducting community consultations on government plans and budgeting process.

Some feedback from professionals and county citizens from the diaspora are captured in the quotation below.

"The CIDP is well written and provides sufficient information which if implemented can give the County a proper take-off. However, a document of this nature is worthless unless the Siaya executive and legislature can internalize and implement it. So far, the executive in Siaya has been relatively inert, now six years down the road. One key observation is the lack of recognition of possible roles of Professionals from the County who are both retired

and active in backing up the implementation of the plan, be it formally or informally. Similarly, the County people in the Diaspora and their possible involvement is lacking in the proposal. You need to look at other County's CIDPs and see how they have addressed these resources. Finally, there is need to link the CIDP with Agenda four of the current government. Development is politically driven and Siaya county must see itself as a microcosm of the Kenya nation in development" a professor of agriculture and rural development at a Kenyan public university.

Further challenges identified while using Yala Community Participation Framework include:

The members of county assembly requested for documentation of public participation feedback from their respective wards as evidence to countercheck the final CIDP during the second County Assembly training on CIDP Scrutiny, Budget and Approvals held in Kisumu. The mentor availed the excel sheets where the feedback was captured as well as gave them an overview of the CIDP process and content as part of the training delivered by AHADI and Centre for Parliamentary Studies and Training (CPST).

The public consultation mechanism was designed to serve the CIDP development but was not institutionalized for other development interventions since there was no directorate with staff to continue public participation processes.

The two-day TOF training for public participation was inadequate for course content and practicum required for facilitators.

There were logistical challenges particularly limited and late release of vehicles to take the secretariat teams to public participation sites, inadequate stationary for facilitators, inadequate funding to facilitate the processes such as staff allowances, mobilization of residents to attend, and refreshments while in attendance as some sessions started at 10.00 a.m. up to 4.00p.m.

The forms provided for use were not simple for public use especially on prioritization on issues.

There was a superiority complex associated with power conflicts between the Executive and the County Assembly played out in the field and thereby derailed the process in some areas as the citizens demanded that their MCAs must be present for the process to continue.

The absence of Project Management Committees (PMCs) finance made this structure nonfunctional resulting into lack of community participation in project implementation and subsequently high rate on uncompleted projects.

Finally, there was outright hostility towards some county staff based on previous unfilled promises by the same staff thereby delaying the process which called for use of conflict resolution skills and mindsets among the facilitation team.

### 4.5.6.2 Outcomes of deploying the Yala RAPPEF-CF-IR Hub Framework on CIDP Development

The application of the Yala RAPPEF-CF-IR Hub Framework on CIDP development brought out the following lessons to improve this process in future. First, the local communities appreciated their involvement in the developmental processes of their county and asked that similar intense and facilitative consultations should continue going forward.

Second, on language used in the public participation, the data collection forms were not user friendly to communities, therefore required simplification and use of multiple communication channels for mobilization including "pavement" radios for older generation and social media platform for the younger generation.

Third, the community had very high expectations of devolution outcomes and had unrealistic timelines for achieving these.

Fourth, given the various conflicts the team had to deal with, it would have been appropriate for the training contents to include conflict resolution and risk management and mindsets. Meaningful public participation per se is a way of resolving conflicts on projects, programs and policies as concerns raised are addressed.

The outcomes showed ways of improving public participation for CIDP development using RAPPEF-CF-IR Hub Framework needs to consider and frame the 5-steps guiding or

coaching questions; adapt the Community Facilitator and Information Resource Hub to reflect these:

First, provision of continuous comprehensive civic education in relation to key government policy documents; technical staff availability as part of public participation support team, language simplification in data capture and use of participatory tools, availing resources for undertaking public participation, allocating adequate time for the process rather than being a one-day affair, growth mindsets, embedding consultation in day-to-day development activities of the communities at village levels.

Second, using the inverted pyramid model for participation. This entails using the bottom-up approach that is from the village with more consultation from projects or services innovation conceptualization, prioritisation and implementation. Then proceed to ward, sub-county then finish at the county level with public participation process with a clear feedback and accountability mechanism to the public. This has been embedded in the directorate of public participation structure.

Third, the lower level consultations at village level with community organizations require support of a community facilitator who would take lead to relate with various stakeholders taking part in the development consultations.

Fourth, the community facilitator has to meet some predetermined criteria and for Siaya County this included: must be someone the community respects, trust and has the power to engage with at all stages and structures of CIDP development, mainly heads of two arms of county government. In addition, good networking and advocacy capabilities with development partners, national government and the business community. For example, it took the facilitator's professional reputation to negotiate with the hotel to avail the facility for the team for one more day at no cost to the county government nor the development partner.

Fifth, Information Resources Hub to aid CIDP preparation process entailed availing the previous CIDP 2013-2017 documents and related implementation reports, guidelines from national government, some case studies of what worked well with devolution; challenges,

lessons and access to technical resources for CIDP secretariat, and updated county data. The researcher had a mentoring toolkit developed by AHADI to support devolution and mentors' own network in 22 counties in Kenya who provided additional resources.

Sixth, use appropriate participatory methodologies including the ones that are emotionally intelligent. These included trainings and guidance for various stages of CIDP development that were packed with materials, coaching with emotional intelligence, empathy walks with communities, living with the people in total immersion, previous experience, and societal structures to get people-issues very deeply and infuse creativity in the process.

### 4.5.7 Application of the Yala RAPPEF–CF-IR Hub Framework to Indigenous Community Conservation Area Management Plan Development and Implementation

### 4.5.7.1 Introduction and Overview

The LUP recommended land use on Conservation areas zone A requires a management plan. The wetland communities through the leadership of Yala Swamp ICCA Management Committee developed a 10-year management plan. This ICCA plan seeks to ensure a balance between socio-economic development and environmental conservation in order to secure the livelihoods of the residents of Yala Wetland ICCA members, other people and entities that directly and indirectly benefit from the wetland.

### 4.5.7.2 ICCA Development and Use of Yala Hub Framework

ICCA management plan development process begin in February 2018 with review of all available literature on the conservancy, gathering spatial data/Remote sensing and Geographical Information System (GIS), community spatial information (community maps, artworks), historical and contextual information, indigenous knowledge on conservation of Yala Wetland.

The next steps that followed were  first stakeholder meeting held in February 2018, a second stakeholder meeting in March 2020 (Plate 4.22); community level meetings 2018-2019, Community validation meeting in November 2020  and technical team (government technical officers from Siaya and Busia consultations in November 2020 (Plate 4.23 ).

There were follow up/clarification meetings on the draft documents with county technical staff during the process of development and validation. Deliberate efforts were made to ensure a large proportion of conservancy members were present. During the stakeholders meeting and community level meetings, the team agreed on the following: the plan vision, mission, goals, core values and principles; baseline data including exceptional resource values such as ecological and biodiversity, scenic sites, culture and cultural sites; identified management issues, constraints and challenges; agreed on a zonation plan for the conservancy; identified management programmes and activities to be included in the plan; and developed and agreed on governance structure for implementing ICCA plan called Yala Swamp ICCA Management Committee; and nominated officials to the ICCA management committee in December 2020 during the committee inaugural meeting.



**Plate 4.22: Syndicate group validating various programmatic areas in the ICCA plan with the researcher interrogating with them through salient issues. ICCA validation done under strict observance of Covid-19 health protocols.**

**Plate 4.23: ICCA Validation meeting taking held 12 November, 2020 at Villa Hotel, Siaya**

**(Source:Author, 2020)**

### 4.5.7.3 Issues for ICCA Management Plan Development

Yala Wetland Conservation zone faces with multiple land-use related threats which affect water quantity and quality, biodiversity and the ecosystem's integrity. The main threats include; drainage for commercial irrigation at the Conservation area, intensified use of agrochemicals; unsustainable harvesting of papyrus among others. These pressures are aggravated by demands from the ever-increasing human population and other compounding factors such as climate change.

The analysis which had substantial input from wetland communities through the use of Yala hub framework identified key environmental, social and ecological issues that need to be addressed in the Yala Swamp ICCA including:

1. **High human population density** exerts much pressure, leading to over exploitation of various wetland resources and conversion of parts of the wetlands into agricultural land including sugarcane, rice, and maize cropland.

2. **Poverty and associated inequalities:** According to the Welfare Monitoring Survey of 1994 and the National Poverty Eradication Plan 1999 – 2015), by 1994, Siaya and Bondo were ranked among the 10 poorest districts (based on total expenditure on food and non-food requirements). Yala Wetland area is further aggravated by having only major source of income as subsistence farming despite the abundant irrigation potential in the area. Besides, the existing schools in wetland area lack educational facilities and has a high dropout rate among primary school students, particularly among the girls; health centres lack basic facilities such as water, drugs, diagnostic equipment and trained staff; Yala and Nzoia rivers heavy silt loads contaminate water resulting in high incidences of water borne diseases (Heukelom, 2011). Yet the poverty-environment nexus is well documented (e.g. UNEP, 2005; SOE, 2010) and has resulted it in conflicts over wetland resources and use that local communities over depend on.

3. **Alien invasive Species:** The Water Hyacinth *Eichhornia crassipes* continue to cover the open waters in Lake Victoria (Johnston and Githongo, 1997) and also Yala Wetland. The introduction of the non-native predatory fish, Nile perch *(Lates niloticus)* in Lake Victoria has led to decline of several native Cichlid fishes.

4. **Biodiversity Loss:** The major threats to Yala Wetland that affect biodiversity include: pressure caused by high population densities on its edges, over-harvesting of papyrus for thatching and making products such as mats and baskets, clearing of papyrus beds for agriculture by the local people rendering them less suitable for birds, grazing ground for cattle at times of drought. Illegal fishing methods poses a danger of extinction especially to the two endemic species *Oreochromis variabilis* and *O. esculentus* found only in Lake Kanyaboli.

5. **Water pollution** through run-off from the upper catchment of the basin with fertilizer, agro-chemicals and industrial waste (from factories that discharge directly into the river) lead to eutrophication and affects fish, amphibians, birds etc. at the swamp.

6. **Air Pollution** through aerial chemical spraying at rice farms

7. **Soil erosion and siltation** caused by flooding: Poor farming practices and deforestation on the upper Yala River catchment area has led to heavy siltation in the rivers and the silt is eventually deposited in the wetland.

8. **High incidence of poverty**: most residents of Yala Wetland rely entirely on the wetland and papyrus in particular for their livelihoods.

9. **Flooding** leads to excessive siltation which causes loss of wetland area and is a major cause of food insecurity and poverty as it destroys crops, washes away houses and shrinks grazing and farming areas

10. **Burning of Papyrus**: During the dry season, much of the papyrus are destroyed by burning. In the burnt and grazed areas, dry papyrus rhizomes and culms are collected as fuelwood. The burning causes degradation of wetland vegetation, resulting in the loss of biodiversity, fish breeding grounds, bird habitats and livelihoods.

11. **Persistent and prolonged drought**: leads to food and water shortages (GoK, 2002a) forcing people to invade the wetlands for farming and grazing.

12. **Wetland reclamation and encroachment:** Increased human population has led to intensified agricultural activities leading to reclamation of papyrus wetland hence land cover change. The growing interests for Yala resources particularly land from large scale investors threaten its sustainability. Often decisions on land allocations are taken without good knowledge of the capacity of the wetland to accommodate new developments and on the potential impacts on the environment and society. Weak frameworks for stakeholder participation like the local communities have created suspicion and tension among various interest groups. Other challenges include the impacts of the proposed dams upstream, declining water levels, soil erosion and silting of the dams and water pans, as well as low agricultural productivity.

13. Lack of sound documentation and uptake of indigenous knowledge in biodiversity conservation.

14. Inadequate harmonization between policies across sectors on environmental conservation and management in the Yala wetland ecosystem

**4.5.7.4 The Core of ICCA Management Plan**

The 14 issues identified above through SEA/LUP processes, community consultations, community maps, community meetings, schools, key informant interviews, consultation with government agencies and validation of 3 drafts with communities and technical validation by government technical team formed the basis for the following five programmes:

**Programme one**: Governance and Conservancy operations which includes Environmental governance and Environmental conservation education.

**Programme two**: Food and Nutritional Security which entails Fisheries, Limited Crop production in the islands and Controlled Livestock Access through access to grazing lands during drought and controlled livestock keeping and grazing.

**Programme three**: Wildlife, Water and habitat conservation and management. This includes Wild animals, Water, Papyrus and Waste management.

**Programme four**: Socio–Economic Development including Tourism and recreation, Beekeeping/aquaculture, Carbon trading, Wildlife utilization and other Conservation enterprises

**Programme five**: Resource Mobilization Programme from various sources including National and County Government Resources; Payment for Ecosystem Services, Yala Swamp Community Conservation Fund, Private sector partnerships, Development partners, High networth individuals/Conservation Friends of Yala ICCA, Equitable benefit sharing mechanism from investments on Yala Wetland.

The issues from community maps and other community level consultations have been factored in the five programmes such as access to shrines and cultural places within the wetland, access to grazing designated zones during dry seasons, equitable benefit sharing of wetland natural resources and controlled farming for the island communities. Contributions from learning institutions such schools' artwork, essays, songs and debate themes on what they envision for Yala wetland in 2063 in line with Africa Union's Vision for the Africa we want.

**4.5.7.5 The Governance ICCA**

The ICCA management committee presented in section 4.28 and illustrated in Figure 4.5 has an implementation secretariat heading with Community Facilitator and Information Resources Hub. The hub will seek to document indigenous knowledge of Yala wetland and community spatial information generated during this study and seek to integrate with other planning and management information for sensitive ecosystem like Yala Wetland.

# CHAPTER FIVE

# DISCUSSIONS

## 5.1 Introduction

The chapter discusses the results of the study in relation to both the theoretical fundamentals of the profession and the specific objectives one, two and three. It further explains the weaknesses of the YPAC community participation mechanism and discusses that the modified framework designed to address community participation challenges.

## 5.2 State of Community Participation in Yala Wetland Ecosystem Management

The first objective of this study was to assess the state of community participation in Yala Wetland Ecosystem management. A discussion of the objective is given below.

### 5.2.1 How History of Yala Wetland has informed current Utilization of its Resources

From data provided by local communities' respondents, it can be stated that the utilization of Yala Wetland resources has been partly informed by how the local communities perceive its formation. For those who perceived it as God's gift to them, they utilize wetland resources as their own and as such take genuine care of the resources therein. For example, they view Lake Kanyaboli and the Yala Wetland as a rare fish gene bank. Additionally, it has religious and cultural values for them. The Yala Wetland is a historical site that comprises of important components of the Luo and Luhyia cultural heritage (Got Ramogi where the Luos first settled in Kenya having come from Uganda before dispersing to other parts of Kenya; Gunda Adimo (historical sites). For the Bunyala communities including 36 villages in the wetland, the wetland is their home from where they derive their entire livelihoods. Besides, their ancestors and recent family members who died have been buried there, thus bestowing special recognition of the spirits of their family members whom they insist they have obligation to care for. Other communities' wetland formation postulations do not support sustainable utilization of Yala wetland resources because they consider it a menace which causes floods and a government resource which it decides on how to use

without regard to the local communities; and thus, requires mindset change if they have to change to support sustainable interventions for the wetland. These findings are consistent with the challenges of managing common pool resources as elucidated by the three models of The tragedy of the commons, the prisoner's dilemma game and the logic of collective action (Ostrom, 1990; Hardin, 1968). Further, the findings are in line with increasing global attention being given to formal recognition of indigenous and community conserved areas as part of national and/or global protected area systems. These systems are generating novel encounters between the customary institutions through which indigenous peoples and local communities manage these traditional estates and the bureaucratic institutions of protected area management planning (Davis *et al.,* 2012; Wood *et al*., 2002) These ought to reflect the distinctive socio-cultural and political characteristics of community conservation areas and support indigenous people as the primary decision makers and drivers of knowledge integration in indigenous protected areas with a focus on customary institutions in governance and strategic planning approaches that respond to interlinkages of stewardship between people, place, plants, and animals.

Therefore, improvements to sustainably manage the wetland ecosystem ought to factor the historical and contextual information and mindset change among wetland communities towards the wetland. In the final SEA and LUP reports, this historical and contextual information was included as chapter 4 in the SEA report, titled understanding the Yala Wetland, a recent History of the Yala Wetland that shaped the final LUP plan and its implementation plan and other related ecosystem management plans like the Yala Wetland Indigenous Conservation Area Management (ICCA) for 2019-2029.

### 5.2.2 Yala Wetland Ecosystem Benefits derived by local communities and their influence on Wetland Management

It begs the questions; Who benefits? Does participation equate with benefit sharing?

"*Otoyo adak e samba niang to okia mit niang*" A hyena lives in a sugarcane plantation but has no clue of the sweetness of the sugarcane. This quote a from Yala Wetland community youth leader captures the communities' perception of their relationship with the wetland's resources, thus underscoring that they do not derive optimal benefits from the wetland.

As communities participated in wetland protection and conservation activities, they had not received commensurate benefits. As a result, conflicts over wetland resources had risen as demonstrated by cases witnessed during the study. At the core of these conflicts was the skewed access and utilization of the wetland resources by the wetland communities. Furthermore, equitable utilization of the wetland benefits had been constrained by lack of an equitable benefit sharing guideline (Reconcile n.d).

Equitable benefit sharing of Yala wetland's resources would help resolve some of the current conflicts while making anticipated future ones manageable. The modified Yala community participation framework sought deeper understanding of the wetland resources and its actors, roles and responsibilities of the actors and their stakes in the resources and thereafter proposed how to apportion fair share of the wetland resources to benefit the wetland communities, governments and investors. From the findings, it was clear that wetland communities considered elements of equitable benefit sharing to include clear identification of **who benefits** from the resources and what portion of the resource pool would be assigned to them. Further, they considered community participation to be effective only if it entailed an honest discussion and agreement of benefit sharing where local communities **felt needs, fears and concerns were addressed in the agreed mechanism.** The equitable benefit sharing demands certain fundamentals such as inventorying the benefits found in the entire wetland and its buffer zones including Yala, Nzoia and Hwiro river basins taking into account its sensitivity based on ecological and anthropogenic factors and a trusted organization to oversee it. For Yala Wetland it is the Yala Swamp Management Committee that communities gave the mandate to oversee its implementation.

Thus, Yala Wetland communities proposed  benefit sharing of formula of 70%:30% between investors and government and wetland communities and further sharing between government and community at 60%:40% with clear 7 priorities of utilizing the benefits is a clear attempt to resolve the long-standing conflict in Yala Wetland with investors, government agencies and the wetland communities. However, this requires piloting and nurturing to see its full potential. These findings are consistent with European Union Life Environment Wise Use of Flood Plan project lessons that recognises that participation

requires time investment (nurturing he proposed benefit sharing) and partnership working especially local host organization to help build up trust and ongoing relationship especially for crossborder situations (transboubdary wetland resources for Yala wetland) (Harrison *et al.,* 2001).

## 5.2.3 Preservation of Indigenous Knowledge System and its use in Managing Yala Wetland

During the study, two relatively older members of the community (aged 89 and another 78 years old) narrated the historical events that have occurred but very few young people like one aged 27 years could. Furthermore, there was no documentation of these historical information of how the wetland communities used to manage the wetland and yet this information was needed to inform SEA/LUP plans and subsequent implementation and in other Yala wetland ecosystem management plans. The indigenous information for conserving birds, wild animals and medicinal trees provided some elders who are custodians of wetland information helped the technical team in generating management options for the wetland. However, there were not readily available and, in some cases, they had to be commissioned for SEA/LUP process. These valuable indigenous ecological knowledge were shared during Wetlands and Environment days to raise the consciousness of the rest of wetland communities so as to uphold positive attitude towards the birds, other wild animals, plant species and conserve them for their utility to the communities.

Therefore, there is urgent need to document and preserve this information and disseminate it for planning and management purposes of the wetland ecosystem and other land uses in the area. In addition, the Kenya Constitution 2010 article 69(1) and part VIII section 87-92 and 115 of The County Government Act, 2012 on devolution provisions provided for participation of local communities in the development of the five-year County Integrated Development Plan (CIDP) and other county plans such as Land Use Plans, 10 -years Spatial Plans and Cities and Urban Centres Plans.

The CIDP espouses the principle of integration by linking various sectors such as Health, Agriculture, Environment and Trade; various levels of governance such as National, County and Regional economic entities and demands public participation in planning and

management of the county affairs. These findings further give a framework on how to integrate in the county planning and management processes with local community knowledge and scientific information for sustainable management of the Yala Wetland ecosystem.

These indigenous knowledge systems have since been recognized and used in the implementation of LUP and other ecosystem management plans. The key environmental events such as Wetland days and Environmental days are currently being used to disseminate information and LUP plans have been allocating sessions where elders share this knowledge. Likewise, in school's environmental awareness and education sessions in the wetland region are also starting to incorporate these but still targeted research and documentation is needed to preserve these.

These findings are consistent with Berkes (2007) who point that scientific input is important to ensure that community conservation management plans support conservation given new threats from globalization and habitat loss to biodiversity values that may have formerly been conserved as an indirect consequence of indigenous or local people's management for tangible and intangible livelihood needs. Berkes further suggest that cross-sectoral and cross-scale partnerships are important because local management alone cannot address new and pervasive threats to biodiversity and cultural heritage that emanate from deeper level institutions and larger scale systems. However, if they are to be the primary decision makers, indigenous people need to be the prime drivers of knowledge integration, as is also increasingly acknowledged in other contexts (Bohensky and Maru, 2011).

## 5.2.4 YPAC as a primary Community Participation Structure in SEA/LUP Processes

YPAC was formed at the onset of SEA/LUP as the main mechanism for representing the communities of Yala Wetland in the SEA/LUP processes whose role was to discuss the findings of the SEA/LUP and obtain views from the wetland communities. The YPAC members were tasked to guide and instruct their own communities on the role and purpose of the LUP and SEA; to provide effective communication vertically and horizontally; to minimize misinformation and were collectively responsible for common good. Of the

various structure as created to facilitate the SEA/LUP processes, YPAC was the weakest link. They were not sufficiently capacitated to perform these functions. For instance, they could not even organize community level meetings to disseminate LUP information nor receive community feedback to relay to LUP structures.

The main challenge YPAC's members faced was how to report back the deliberations and seek inputs from a large number of their constituencies (e.g. some over 200 persons). Owing to logistical constraints, they presented their own views and received inputs from only those around them. This offered limited local community participation. Similarly, they were unable to seek broader views of their representation to enrich YPAC meetings and feedback to draft SEA and LUP reports thereby limiting the quality of community participation in SEA and LUP development. Thus, YPAC framework membership was narrow with respect to representation and quality of participation.

The foregoing created a serious weakness in the process of public participation as required by the Kenya Constitution 2010 article 69 (1) and part VIII section 87-92 and 115 of County Government Act, 2012, EMCA 2015 and Public Participation Bill, 2020. Further analysis revealed that most YPAC leaders were mainly teachers in secondary and primary schools, entrepreneurs, fisher folks, conservationists, current and retired civil servants, respected elders, and farmers. These varied backgrounds and experiences helped in bringing different perspectives to the issues in SEA/LUP processes. For instance, an elder who worked with surveyors was able to share some old maps he had before the diversion of river Yala. The youth raised concerns of unemployment while some recalled days when they were food secure while they cultivated the wetland in the 1970s and 1980s.

However, the technical aspects of the SEA and LUP information required repackaging in a simple language that could be easily communicated to the rest of the wetland communities after their consultative meetings with planning technical team. This repackaging to suite the target audience context and the appropriate channel reveal the content was lacking. As a result, the process up to draft 1 of SEA and LUP documents received inadequate feedback attributed to lack of strong grassroot mobilization and leadership. Not all YPAC leaders were specially equipped with requisite leadership and

technical skills to provide this extra responsibility needed to make community participation effective.

The technical reports in draft SEA, draft LUP, baseline data and studies were sent by email to the YPAC members and most of them cited financial and technical constraints hence they did not download them. In addition, the representatives hardly printed those documents for sharing with communities. They relied on brief presentations done by technical staff and their quick input during the meeting. Thus, the technical information did not benefit from deep reflection, as well as critical and analytical review of the drafts expected from the community's representatives.

YPAC consisted of 46 members drawn from local communities and reported to the Inter-County Technical Committee (ICTC). The YPAC organ represented various interests namely ecotourism, cultural groupings/heritage; conservation; religion; islanders; fisherman; hunters; persons with disability, transporters; handicraft; farmers; investors; wildlife (honorary warden); county technical officers (lands, livestock, water, fisheries, crops, forests); sand harvesters; the youth; administration (ward, sub-county); and voluntary scout.The National Government and the County Government officers participated in YPAC meetings as observers and adjudicated on any internal disagreements. However, at YPAC the interests of some stakeholders were still not represented and there were doubts on the capacity of some persons nominated in YPAC to adequately articulate issues on their behalf.

The researcher thus conducted further stakeholder analysis, tier two, with a view to identify and seek to fill in the gaps so that their voices could not miss out completely. Tier two analysis obtained some key voices for substantial involvement in the Yala Wetland planning namely schools and colleges, religious leaders, professionals, other conservation groups, communities organized in villages in the islands, change makers, motorcycle operators and elders and some community organizations that had been left out of the process.

Community members required transportation facilitation and lunches to enable them participate in the meeting, which was provided by the researcher especially for those who

had travelled from far off distances to get to the meeting venues. The team also visited villages in the wetland and experienced their unique challenges like flooding and destruction of their cultural artifacts and heritage.

The above weaknesses of YPAC provided room for improvements within the life of LUP development which the modified framework (Yala Hub Framework) sought to cater for and used to improve the final SEA and LUP outcomes, their implementation and implementation of other Yala wetland ecosystem management plans.

## 5.2.5 Level of Community Participation in LUP/SEA Process using the Spectrum of Public Participation

The level of participation by local communities was analyzed using the spectrum of public participation model. Whereas the level of participation started at "informing" level, with the application of a modified Yala community participation framework (Yala Hub), it progressively moved to both "Consult" and "Involve" levels by the time the second draft of SEA and LUP reports were released.

Further application of the modified Yala framework on SEA/LUP draft three development, the community participation substantially moved to "Involve" level and slightly to "Collaboration" level. This confirms that using the modified Yala community participation framework in the LUP/SEA processes was both a diagnostic tool and an optimizer to YPAC in the LUP development that understood the Yala Wetland context to enhance wetland communities' participation. The wetland communities' groups had group level discussion in their local language about SEA/LUP information and had these relayed to the LUP technical team through their representatives and community facilitators. The communities had opportunities to contribute through environmental events' days as well as through their children in schools. Their religious leaders also had sermons based on the wetland hence multiple points about the importance of conserving the wetland as they get livelihood benefits from it. The communities felt that the modified process ensured their concerns and aspirations were directly reflected in SEA and LUP and that together with the Governments they would implement the resultant LUP recommendations and other associated management plans.

These findings are supported by best practices in public participation as identified by World Bank Public Participation lessons and in compliance with the requirements of the Kenya Public Participation Bill 2020 that recognize the need to overcome personal and institutional barriers to public participation, understanding the participation context like political contexts, employment contexts, issues contexts such as flooding and cultural contexts relating to a history of co-operation and participation (World Bank, 1998:2002; Harrison *et al.,* 2001;, GoK, 2020). The wetland communities were able to participate in the process directly through FGDs in their villages, key informant interviews, community meetings, empathy walks with community facilitators, participation in environmental events, students in school debates, essays, songs and artworks to express their future desires (vision) for wetland using appreciative enquiry methods unlike before the framework when it was through YPAC representatives and LUP researchers obtaining data from them (by asking them questions). This time they drew maps, composed songs about the wetland and drew their vision maps. They also participated in planting papyrus in degraded areas with some incentives of labour compensation that was sensitive to high poverty levels that pressure then to over exploit wetland resources.

## 5.2.6 Effectiveness of Community Participation in Yala SEA/LUP Processes

The overall score of YPAC framework on effectiveness of community participation was unsatisfactory (41%) but this moved to good (68%) with the application of the modified framework. The Yala Hub framework moved communities' participation effectiveness from poor (2 indicators) and unsatisfactory (8 indicators) to satisfactory (3 indicators) and good (7 indicators) in SEA/LUP processes. The modified framework moved virtually all the 10 indicators by three scores out of 10 therefore enhanced the Yala Wetland community participation in SEA/LUP processes. Further, it revealed very specific interventions that should improve the ongoing LUP processes especially early involvement, determining with local communities the level of participation expected (how much power is handed over and when) which then influence the methods of participation, level of commitment to participation processes by all concerned parties; and measures to overcoming barriers to participation including incentivizing participation, and clear identification of participation benefits and how to share equitably.

The use of two models as a standard of analysis on effectiveness of YPAC brings some innovation of internal quality control into Yala Hub framework. It gives independent but related feedback on the framework being assessed. The two validate and augment each other especially on reinforcing their strengths and making up for potential weaknesses of either model. The effectiveness of YPAC framework based on 10 indicators on SEA and LUP preparation were consistent with the results of spectrum of participation model which was at Inform and Consult levels of participation on the draft 1 SEA/LUP reports. The indicators model provided specific areas that require attention to improve overall effectiveness of the model being assessed.

For YPAC, early wetland communities' involvement and commitment were key to the desired outcome of the participation process in SEA/LUP. As a result, these had then to be rectified very urgently if the process was to achieve the desired outcome with the communities' meaningful participation hence consequent design of Yala Hub framework. This result shows that community participation in LUP and SEA processes is a living ('alive') process that requires constant checking and modification to respond to the emerging issues on the content of the plan and community involvement processes in the plan's development.

Previously, there were ownership issues dealing with the history of conflict with communities and Dominion Farms. Intrinsically, this Yala Hub framework in the SEA and LUP processes gave a second chance to Yala Wetland communities to seek the way of resolving those outstanding conflicts. Since, Dominions Farms has since left, new investors should seek to remedy this by engaging with the Yala Swamp Management Committee directly and ensure the equitable benefit sharing mechanism proposed in this study is agreed by all the parties (wetland communities, governments and their agencies with mandate on Yala wetland and the investors). Some restitution of the previous misdoings should be considered.

Further, the foregoing evaluation shows that community participation in planning takes place in a continuum and therefore multiple participation avenues should be provided such as Wetlands' Day, Environmental Day and Migratory Birds Day as well as incentivized

like happened during the study through facilitation of community meetings, schools' participation prizes and conservation publications. The process is iterative and therefore must be properly managed by the Community Facilitator with Information resources in facilitating the 5-steps of the framework. Thus, the application of the Yala Hub framework enhanced community participation effectiveness in the final LUP.

The application of Yala Hub framework to improve original YPAC framework resulted in some immediate benefits such as induced sustainability through ownership of Yala LUP and ICCA plans; empowered the stakeholders to take responsibility for sustainable management of Yala Wetland ecosystem; created institutional structure to help overcome some institutional barriers of community participation; minimized conflicts during plans preparation; increased transparency, inclusivity of various interests and accountability in Yala Wetland land use plan and Yala Wetland ecosystem management decision making process. The emerging good practices in public participation show that early involvement of communities in decision making and partnership working using local host organisations to build trust and ongoing relationships to improve participation (Harrison *et al.*, 2001) which are in line with the findings of the modified Yala community participation framework.

**5.2.7 Governance Framework for Yala Wetland Ecosystems Management**

In order to remedy weak framework for community participation in Yala Wetland, this study therefore designed a governance structure named Yala Swamp Management Committee with a wide membership representation and has put wetland communities at the core of the managing Community Conservation Areas in Yala Wetland Ecosystem. The governance structure provides for co-option where umbrella bodies of Nzoia and Yala river catchment organizations will be represented to provide the linkage for the whole Yala wetland and its catchment. It also has fluidity to bring very passionate members on board who can provide linkages for resources, thoughts leadership and innovations.

The analysis identified that governance gap extends to quality of leadership to lead the conservation efforts at community level when wetland ownership is substantially transferred to them. Thus, the qualities required here are strong, passionate and

transformational leadership at the community level on wetland issues with a philosophy and  vision to rally other group members around that vision. This corroborates with George's (2003) five characteristics of authentic leadership especially on the need for a clear purpose, strong ethical values, establishing trusting relationships, demonstrating self-discipline and action and  having passion. Thus, while identifying the leaders to operationalize Yala Wetland governance structure, this quality of leadership criteria will be a practical indicator for nominating, electing and even capacitating committee leaders.

The membership is to be drawn from the conservation area zone of the Yala LUP initially, but other zones such as Settlement and Agricultural would join too. The 11-point management committee's roles and responsibilities spelt out are adequate to deliver their Yala Swamp ICCA Management Plan 2019-2029. This governance structure has put wetland communities at the core for managing conservation areas of Yala Wetland Ecosystem which has been their ultimate desire; being co-owners and co-creators of the sustainable Yala Wetland ecosystem. This governance structure fills in the existing gap for managing Yala Wetland Ecosystem identified by previous studies and fits into the proposed governance framework for implementing the Yala Wetland LUP namely Yala Wetland Land and Water Management Committee (YSLWMC) (Odhengo *et al*., 2018b), NEMA's proposed governance framework for implementing the Yala Wetland Integrated Management Plan 2016-2026 (NEMA, 2016) and is also compliant with provisions of the Kenya Government Wildlife Conservation and Management Act of 2013  on community conservancies.

## 5.3 Yala Wetland Environmental Issues using Remote Sensing and Community GIS to be considered in LUP by Communities

The second objective was to identify environmental issues for inclusion in Yala Wetland Land Use Planning and Management both by the local communities and by Remote sensing and GIS methods. A discussion on this is given in subsequent sections.

**5.3.1 Environmental Issues cited by Local Communities**

Findings indicated that Yala wetland communities' main environmental issues were encroachment and reclamation of the wetland this being the highest ranked, burning of papyrus (second highest ranked), resource use conflicts (third highest ranked), weak framework of their participation in wetland management was the eighth highest ranked while poverty effects and invasion of alien species was the least ranked. It is interesting to note that communities confirmed their weak participation in LUP and wetland management due to a weak framework.

Respondents were able to identify the root causes of these environmental issues which formed the basis for designing the desired future using the appreciative learning methodology which turned challenges into opportunities. The root causes were used with the help of appreciative enquiry to change the world view and look at the opportunities in the challenges which became the basis for their contributions on what LUP and the future Yala Wetland should look like. As Dweck (2008) notes mindset change is key in how one views the desirable future for them to create it. These results pointed to priority issues that LUP processes had to incorporate like improving the participation structures and processes as well as issues that should be included in the final LUP plan. Thus, the framework to optimize community participation became an urgent matter in the Yala SEA/LUP processes.

**5.3.2 Conflict Prevention, Resolution and Management over Yala Wetland Resources**

Results showed four types of conflicts and their locations within the wetland. Efforts for managing the conflicts and resolving them have however been dismal particularly resolving some of the outstanding conflicts which have trigged other conflicts. Thus, an equitable benefit sharing mechanism developed with local communities' meaningful participation would be key in resolving these outstanding conflicts and potential future ones. As communities were designing the formula for benefit sharing at 70%:30% between investor and community and government, and 60%:40% for community and government, they prioritized areas for using the benefits (see section 4.1.2), it became apparent that

they would need to be part of the institution that ensures implementation of the mechanism with an effective monitoring and evaluation of conflicts and the wetland benefits being derived and shared accordingly.

The study identified various conflicts and only highlighted some of the key conflicts. The main conflicts related to Yala Wetland study on ecosystems management included: conflicts between the local community and investors, with the government and other third parties; size of Yala Wetland, ownership/land tenure of Yala Wetland, lack of participation in planning and management of the wetland; creation of Lake Kanyaboli game reserve, boundary issues conflicts among the local communities, inequitable benefit sharing accruing from wetland resources; over-abstraction of water from the wetland including Lake Kanyaboli (Lake Kanyaboli inlet),which will eventually dry up if the status quo remained, the effects of the Nile Treaty particularly with constraints of water use/water conflicts either in the wetland or on the wetland as communities go for encroachment on rich fertile alluvial soils.

From the analysis of results, it was clear that there was weak governance system in Yala Wetland that was neither acceptable to all stakeholders nor meaningfully represented local communities in wetland decision making and management processes. This study came up with Yala Swamp Management Committee with resource based guidelines/code of conduct that would give institutional mechanism for resolving and managing the wetland's resource use conflicts. This governance would oversee the implementation of the proposed equitable benefit sharing mechanism. Secondly, communities' representation and meaningful participation on the management of those wetland-based conflicts also required special attention and a link person in those processes. The framework provides for community facilitator that would provide that linkage. Thirdly, lack of access to wetland resources and equitable benefit sharing guidelines/mechanism has also exacerbated the conflicts. With those glaring gaps, the modified Yala Community Participation framework applied in Yala SEA and LUP became a mechanism for Yala Wetland conflict resolution and management. Likewise, its resultant Yala Wetland Management Committee governance structure is also compliant with provisions of the Kenya Government Wildlife Conservation and

Management Act of 2013 for community conservation areas as a mechanism to help manage their human wildlife conflicts.

### 5.3.3 Designing the future Yala Wetland by Communities using a Mindset Shift Methodology

The Yala Wetland communities in using transformational learning methodologies such as appreciative enquiry methodologies were able to reflect and act upon their world (problem-based view) to transform it to future aspiration (opportunity- based view). The wetland communities with students were able to use opportunities as the basis of the priorities identified for inclusion in LUP. When the respondents shifted their lenses and energies because of applying appreciative enquiry methods, they were able to identify possibilities for sustainable wetland ecosystems management. This changed world- view (mindset) became the basis for their inputs in the Yala Wetland LUP. This points to the fact that in planning and management of the wetland, it is important to set the frame that derive the possibilities rather than lack from the communities. This empowerment will be taken to the implementation which will require their highest level of involvement at collaboration and empowerment levels of public participation levels.

The communities and students were able to envision the Yala Wetland they would like LUP to help in designing and eventual attainment. Whereas FGD respondents  were able to identify their top 3 priorities as biodiversity conservation, enforcement of policies, laws and regulations and agriculture; these were different from students' top priorities on the envisioned future which were recreation and tourist facilities, agriculture and then biodiversity conservation in that order. This shows how different actors within the wetland experience the services it offers and aligns these with their life needs. Therefore, designing actions for implementation will have to factor in the various stakeholders' priorities, perspectives and sensitivities and purpose to develop targeted and aligned interventions to those needs. For example, schools' interventions for managing the same will include recreational elements while local communities target biodiversity conservation actions that also provide food to the increasing wetland population.

The Community Facilitator inducted the wetland communities on the application of opportunity-based view/lenses through appreciative inquiry methodology, empathy walk and community maps which they quickly adopted and used to generate their inputs into the plan. The broader wetland community representation through CF intervention using framework for bringing fundamental changes as provided in Theory U (Scharmer, 2009) and Post-Modernism Theory (Beck and Wynne (1992) enabled local communities to envision, dream, and articulate their aspirations of the future Yala Wetland using possibility-based mindset and eventually provided for wider co-ownership which is a prerequisite for the sustainable management of Yala Wetland ecosystem. Significant wetland communities' perspectives were incorporated in the final SEA and LUP reports and depicted in the final Yala Land Use Plan and Indigenous Community Conservation Areas Management Plan (2019-2029).

### 5.3.4 Access to Information and Utilization in SEA/LUP Processes by different Community Organizations

There were interactions among various community members and some had influenced each other as they sought and accessed SEA/LUP information. For example, the students were found to have substantial influence on their parents and guardians with conservation messages and actions from schools such as tree planting and preserving Lake Kanyaboli biodiversity. When students were requested to plant their tree seedlings in schools and given some to plant at home, they reported that their guardians helped them in taking care of the ones at home when they were in school or away, for example with watering and preventing any damages from domestic animals.

For the community leaders, when they needed information on the wetland especially documented findings of previous studies on Yala Wetland, they resorted to multiple sources with different levels of access. They consulted amongst themselves especially their acquaintances, then moved to school teachers and then government officers closer to them. They also looked at publications within their reach such as newspaper features and pull outs, listened to vernacular FM radios and subsequent talks about what was aired with colleagues in *pavement radio* and from meetings they had been invited to attend by virtue

of the position as group leaders. Thus, user convenience was a major factor in what data and information these leaders accessed and used to contribute to SEA/LUP processes. Okello *et al.,* (2009) noted that the reason for unsatisfactory accessibility of information to the public to participate in EIA/SEAs were inadequate availability and low access to information dissemination media. The study suggests translations into indigenous languages with simple explanations and illustrations and meeting them in churches and markets where they carry their livelihoods.

The different information seeking behaviours and outcomes of interactions among wetland communities offer opportunity on what factors and nuances are key in ensuring effective community participation in management of Yala wetland ecosystem.

## 5.4 Yala Wetland Environmental issues for LUP/SEA by Remote Sensing and GIS analysis

### 5.4.1 Impact of Land Use/Land Cover on the Extent of Yala Ecosystem

The wetland which covered an area of 20,756 ha in 1960 had reduced by 4,652.7 ha to 16,103.3 ha in 2014, a decline of 22.4%. Therefore, the wetland's ecological value had fallen from 100 to 77.6**.** The condition of the wetland had also declined in absolute terms as a result of this loss to the same score but unfortunately an estimated 20% of the remaining papyrus swamp is now in very poor condition due to desiccation and the spread of both wild fires and deliberate burning. This was been confirmed by the wetland communities FGDs as the second highest ranked environmental issue. Consequently, at the time of this study  Yala Wetland  had a cumulative value of only **57.6**. leaving it with a moderate status which formed the basis for LUP development and other Yala Wetland ecosystem management plans like ICCA 2019-2029.

Evidently areas of prime habitat occupied by papyrus wetland still remain and support critically endangered species like the Sitatunga antelopes, and these areas can still be regarded as having a value of 100 but they are coming under increasing threat due overharvesting of papyrus, opening grounds for fishing and farming during dry seasons

and it takes increasingly smaller increments of development to have a disproportionate effect on these sanctuaries.

Sustained use of the wetland for agricultural production has negative impacts on biodiversity. These include habitat loss for the wetland dependent species like the Sitatunga and papyrus endemic birds; the use of artificial fertilizers leading to nutrient loading in the wetland's aquatic systems with undesirable consequences on the chemistry of the wetland's satellite lakes including Lake Kanyaboli currently a habitat for many endangered fish species that have been exterminated in Lake Victoria. This wetland reclamation for agriculture was the highest ranked environmental issue while drying and alteration of water chemistry in Lake Kanyaboli were seventh and eight ranked by wetland communities. The satellite images analysis information corroborated some of the findings from communities on FGDs, key informant interviews, student essays and artworks and community maps.

The community participatory GIS was used to come up with the status and changes of the wetland as indicated by the community maps and artworks from students. These enriched the vision of the desired Yala wetland finally stated as "Yala Swamp is supporting sustainable livelihoods of the residents of Siaya and Busia counties while its ecological integrity and that of its associated ecosystems is protected" and goal captured as "Yala Swamp resources are allocated and used in a manner that improves the livelihoods of the residents of Siaya and Busia Counties while promoting ecological sustainability and equity in order to strengthen local and national economy". They also provided a basis for involvement of communities that rehabilitated 340.71ha along River Yala through planting and caring for indigenous trees and 100ha of papyrus planted to rehabilitate degraded areas within Yala Wetland and  plant 100 ha restoration of degraded papyrus and commitment to provide post planting care by end of 2019 (Odero, 2020). They kept the satellite images and  alongside their own maps which they will use for training,  keep track of changes in Yala Wetland and manage the resources going forward. To ensure that there is continuity of this interface of communities in implementation of LUP and other ecosystem plans, there is need for respective County Governments of Siaya and Busia to have their GIS departments incorporate Participatory GIS in their development planning including CIDP and monitoring evaluation and learning systems. Likewise, the Yala Swamp Management

Committee secretariat should also continue generating, keep the community spatial data and continue strengthening wetland communities' application of spatial data in their day-to-day management of the wetland and its catchment areas.

Increase in small scale farming in the wetland has also led to increased human -wildlife conflicts due to increased incidences of crop raiding by wild animals especially wild pigs, hippos and monkeys. This has led to negative attitudes towards wildlife. Other issues cited include increased hunting while increased use of agrochemicals can affect biodiversity negatively. The communities also identified human-wildlife conflicts among top the 10 priority issue for consideration in LUP development shown in Table 4.6. Similarly, the communities identified and ranked as number one increasing human population as the leading cause of environmental challenges of Yala Wetland which puts pressure on utilization of its resources and the need to reclaim more land for food production.

## 5.4.2 Impacts of Land Use Change on Global Warming and Climate Regulation Potential

The reduction of the wetland by 4,652.7 ha which translates to a decline of 22.4%, has had a significant effect on the amount of carbon released back to the atmosphere from the wetland thus contributing to global warming.  The mean amount of carbon locked up in the wetland soils and papyrus vegetation in 1960 was estimated at 23.2 million tonnes (Muoria *et al*., 2015).  This declined to around 11.8 million tonnes in 2014, representing a release of 11.4 million tonnes to the atmosphere, or almost 50 % of the original amount.  At the time of this study, the prices for sequestering carbon (i.e. introducing schemes for paying investors to leave carbon in the ground) this represents a loss of 59.8 million dollars (Carbon futures market 1 tonne = $5.247 as of  13th April, 2015 (Muoria *et al*., 2015).

Ninety two percent (92%) of the remaining carbon is stored in the Papyrus vegetation mainly as part of  soil carbon. Areas of degraded and burnt papyrus contain roughly 2.3% of the carbon stocks while the rest of the carbon stocks are in land converted to agricultural use. It is important to note that increased drainage of the swamp leads to release of the stored carbon through oxidation. In addition, other greenhouse gases particularly nitrogen oxides and methane, particularly from rice paddies and livestock are released to the

atmosphere reducing the climate regulation potential of the wetland. Further expansion of agricultural activities in the wetland would lead to reduced climate regulation potential.

While harvesting of fish and other animals will have very little impacts on climate regulation potential, harvesting of papyrus, firewood and thatching material can have a big impact on climate change regulation potential through reduction of above ground carbon stocks and reduction of the carbon sequestration potential thereby reducing the climate cooling potential of the wetland hence community based conservation activities should be intensified and urgently develop a greater appreciation of the wetland value by the wetland communities. There ought to be strong environmental education in schools to instill environmental ethos required for caring for the wetland and using its resources wisely by the students.

This implies that for the Yala wetland to continue performing its climate regulation function, then degraded papyrus vegetation should be rehabilitated and local communities made to see carbon potential and benefits. Whereas, local communities were involved in rehabilitation through facilitation from a conservation organization, further carbon benefits should come from selling carbon in the International Carbon market. Further, the income to be used to further implementation of ICCA management plan and utilized based on the equitable benefit sharing mechanism proposed in this study.

### 5.4.3 Impact of Land Use Change on Water Use and Water Quality

The primary use of water from River Yala is for rice production and other agricultural crops. The allowable rate of abstraction is 5cum/sec under the agreement for the 25-year lease of the upper wetland. However, no payment is made for water abstraction. As an increasingly scarce resource, water has a real monetary value and around the world charges are increasingly being made for abstraction for irrigation. The Water Resources Authority (WRA) has power for water abstraction and licensing as per Water Act (2016) Article 72 and should enforce the regulation. WRA should introduce water charging for agricultural use and in line with payment for ecosystem services to ensure the resources from the Yala wetland are used to conserve it while improving residents' livelihoods. The wetland degradation is deeply rooted in high poverty levels of the wetland resident hence the uses

ecosystem services such as water abstraction by commercial investors should be paid for and used  to conserve the same where communities engaging in such also get livelihood improvements.

The use of water for irrigation results in the return of around 20% of the water from drainage ditches. This water contains nutrients leached from the soil, including residual fertiliser and pesticides.  By comparison, small scale agricultural production in the wetland does not rely on irrigation so it is not expected to increase water demand to any significant extent.

The continued expansion of agricultural activities is a threat to fish breeding areas and to fishing both in Yala Wetland and in Lake Victoria. Similarly, harvesting of papyrus, thatch grass and firewood can lead to reduced water quality regulation resulting lower water quality. This will impact negatively on fish and other biodiversity. This corroborates with communities' findings identify water declining water levels of Lake Kanyaboli and pollution arising from large scale farming activities from Dominion Farms and other farmers around Lake Kanyaboli. Therefore, designated land uses in the wetland with clear guidelines is key to ensuring that the quantity and quality of water in the wetland remains at optimal levels. Likewise, communities living in Yala and Nzoia reiver catchment areas should be actively involved on protection and rehabilitation activities particularly agroforestry, rain water harvesting, planting and nurturing trees and ensuring that 30% of tree cover regulation is implemented; protection of water pans and streams. The community resources maps would help local communities identify areas to increase their conservation actions such agroforestry practices and evaluate their performance to report on their community scorecard for conservation of Yala wetland to Yala Swamp management committee.

**5.4.4 Impacts of Harvesting Natural Products on Biodiversity Conservation**

Natural products being harvested from the wetland are part of biodiversity and this  reduces their abundance. This is particularly important when globally threatened species are involved. For example, indiscriminate fishing is a danger to the Critically Endangered Haplochromine fish (*Lipochromis maxilaris* and *Xystichromis phytophagus*) of Lake

Kanyaboli and the Vulnerable Oreocromis esculentus. Hunting of the nationally Endangered Sitatunga is also a major issue in the wetland. This study found indiscriminate fishing and hunting to be driven by pressures for livelihoods and family legacies (hunting families) therefore supporting alternative livelihood options such as Cage fish farming, pond fish farming and strengthening BMUs to enforce their code of conduct would release the pressure from unstainable harvesting of wetland natural products. For hunters who consider it as part of their family heritage, they will need to be converted (total conversion using transformation learning and empowerment models) to be the champions for anti-hunting after giving them alternative livelihood options agreeable to them to forgo their hunting trade. They can provide known wildlife routes and habitats to be mapped to help with conservation activities of the endangered species in Yala Wetland.

Apart from the direct threat of harvesting, the plant or animal, biodiversity is also affected by habitat loss associated with harvesting of some of the wetland's products. For example, unsustainable harvesting of papyrus for the mat making industry destroys habitats for the wetland dependent species. Local communities also highly ranked papyrus harvesting as a root cause of the environmental challenges of the wetland. Therefore, wetland communities will need high level of awareness of impacts of harvesting wetland natural resources and their impacts on biodiversity and then develop their action plans to mitigate identified habitat losses. Part of payments for ecosystem services should then be channeled to support those community action plans. This wetland ecosystem restoration approach is consistent with empowerment and transformational learning theories (Taylor, 2007; Sen, 1997; Mezirow, 1991).

### 5.4.5 Impact of Reclamation on the Wetland

The satellite images analyzed showed very minimal change in the main characteristics of Yala Wetland between 1984 and 1994, as revealed by a comparison of figures 4.17-4.23. However, towards the end of this period, the image suggests that revegetation had occurred across the lower part of the area leased to Dominion Farms. The remote sensing data confirm that the most significant changes to the Upper Yala Wetland were made in the latter half of the 20th Century because of engineering works carried out by the Government

of Kenya assisted by international agencies. However, Dominion Farms, the immediate former investor, had either rebuilt or substantially extended that earlier infrastructure much more effectively with the result that the environmental, social and economic consequences of the original plans have become more apparent.

On the converse, the foregone benefits expected from the large-scale investor has caused a lot of conflicts between the wetland communities, the elected leaders and the investor. This was discussed exhaustively under conflict prevention and resolution. The conflicts contributed significantly to the departure of Dominions Farms. The investor also felt the benefit sharing did not favour their investment interests since they were many unofficial demands placed on the investor by the political class on one hand while on the other hand community hostilities continued. The communities felt very unhappy with the benefit sharing arising from the investment into the wetland and suggested developing an equitable benefit sharing formula of 70:30% and 60:40% as discussed in section 4.12. Going forward, any investor should seek agreement on benefit sharing before committing their investments in the wetland which conforms with Yala Wetland Land Use Plan and ICCA management plan.

## 5.5. Data Integration and Yala Wetland Information System

To a large extent the local communities' environmental issues and their causes from FGDs, key informant interviews, community meetings and students' essays, debates, songs and artwork corroborates with those of remote sensing and GIS information used for developing Yala LUP. Local communities' knowledge and satellite data have been integrated to support wetland ecosystem planning. The key environmental issues depicted by wetland communities using community participatory approaches like appreciative enquiry methods, community maps and priority ranking such as trends of changes in the wetland ecosystem over time have augmented what remote sensing data such as the extent of wetland degradation and ecosystem value by 2014 as the basis for LUP and other ecosystem plans. Further, the envisioned future of Yala Wetland in 2063 captured in a mosaic (Figure 4.12) from different artworks submitted by students crystalized the issues from the perspective of learners thereby providing another crucial data set for integration

of wetland issues. Likewise, the presentation of wetland information spatially helped the wetland communities to visualize the magnitude of the environmental challenges and opportunities, specific spatial locations the challenges, variety of planning data and information required to plan Yala LUP and ecosystem management plans. The process of integration was evident when the planning processes provided many nodes of obtaining their inputs into the planning processes both official and informal channels. The formal channels included stakeholders' meetings, community meetings, FGDs, key informant interviews while informal channels used were participation in environmental days, wetland days, schools' competitions through essays, artwork, debates and songs. Additionally, the process provided for various feedback loops which expanded wetlands communities space for participating into the planning and management of Yala ecosystem. These feedback loops accorded wetland communities opportunities to correct (data) anomalies as seen in satellite images and GIS analysis data which amplified what communities had and then used as the basis for corrective measures like participating in restoration of degraded papyrus by planting more papyrus upto 100 ha out of 410 ha targeted area. This confirms the benefit of data integration between community held data and spatial information provided by remote sensing and GIS analysis for use in wetland ecosystem planning and management.

The analysis also pointed out to an existing gap in Yala Wetland Information System, for collating existing relevant information, information generated by SEA and LUP studies and processes information; and others for LUP finalization and implementation. Similarly, community spatial information needs to be strengthened for managing the wetland ecosystem and therefore should be integrated in Siaya and Busia County GIS departments and ICCA Yala wetland information system.

## 5.6. The modified Yala Community Participation Framework

### 5.6.1 Designing the modified framework-The Yala Hub framework

This section looks at how 11 shortcomings and challenges identified in YPAC framework were improved and potential weaknesses mitigated in a design of a modified Yala Community Participation Framework called RAPPEF-CF-IR Hub (shortened as Yala Hub

Framework) to optimize community participation in Yala Wetland Ecosystem management. The Yala Hub framework design was done through a rigorous analysis of context of participation and review of the quality of YPAC representation of wetland communities (Spectrum of participation model and World Bank 10 indicators of public participation effectiveness). This knowledge plus the application of the foundations of the following theories Ecosystems approach theory (complex systems and holistic decision making); post modernism (current environmental problems require postmodern solutions//pacesetter thinking); Green Social theory (concern for environment and sustainable development principles in modernization) during implementation of Yala wetland plans; theory of change (ability of the framework to mobilize wetland communities to envision the future and preconditions to overcome to realise the vision guided by Africa Unions Agenda 2063 and SDGs hence CF and IR Hub to help manage those personal and institutional barriers to participation; Theory U (where wetland communities enabled to go through a profound change including mindset from a wasteland mindset to a rich ecological feature mindset to be managed to get benefits for now and future generation and connecting to more authentic higher aspects of self/consciousness) and transformative learning theory (frame of reference which limits and shapes individual's perception and cultural values that determine how they relate with their environment and appreciative enquiry thinking of giving and adding value).

Action research methodology of action, reflection, learning and refining/improving was very key in design of the framework, testing it real life in generation of drafts 2 and 3 of SEA/LUP and making modifications until the current Yala Hub framework. It has been validated and refined by application in developing CIDP and ICCA management plans. The Yala Hub framework therefore is both diagnostic and optimizing tool that requires capacity strengthening support to implement. These include resources (Human (CF) and assistants),Technical (computer, internet connectivity, cellphone, airtime, GPS, Financial,) Leadership, Time).

**5.6.2 Integration of Local Communities' Knowledge and Scientific Knowledge Systems through a Framework**

In objective one the issue of community participation in Yala Wetland management the analysis demonstrated the importance of historical and context information and local communities' knowledge on Yala Wetland planning. Further, the analysis showed the need for integrating local communities' knowledge and scientific knowledge in the planning and management of the ecosystem.

The modified framework has provided for this integration through inclusivity using stakeholder's analysis tier two, documentation of indigenous knowledge systems, Community Facilitator and Information Resources Hub for processing wetland community contributions and application of remotely sensed data and GIS analysis on Yala Wetland on environmental issues for planning the Yala Wetland Land use plan and other ecosystem management plans. However, this integration demands among others; communicating scientific information and knowledge to some local communities, and it requires repackaging in a way they understand particularly in their own language and contexts. The language goes further in the way certain concepts are expressed such as the use of metaphors, proverbs, wise sayings, songs and artifacts. The Yala Hub Participation Framework caters for this through its CF and IR- Hub components that eventually account for 35% of the framework's total effectiveness.

The CF-IR-Hub was able to provide feedback in ways that communities could understand the information easily. The community focused facilitation helped with simplifying the SEA/LUP processes, languages, and simulations of the issues at community meeting. Likewise, local communities were able to draw simple maps to give their inputs, used their proverbs and sayings to pass their concerns on the LUP which were then repackaged by the researcher and relayed to the technical team. Thus, repackaging SEA/LUP information this way for communities  helped to educate them and  sharpened their contribution in LUP remaining phases using different channels namely: community channels, radio, music, religious leader sermon, local administration *barazas*, funerals, special community events, special events such as World Wetlands Days, Environment Days,  Partners' Field days,

and competition in learning institutions through essays, debates, performances such dramas, songs, and artwork among others

This framework hence responded to "the how to" of the study call on public participation during EIA in Kenya that recommended that EIA study reports should not only be widely available but also translated into indigenous languages with simple explanations and illustrations (Okello *et al.*, 2009).

The final SEA /LUP added historical and contextual information in its chapter one thereby providing necessary planning context for Yala Wetland and local community knowledge integration in the wetland ecosystem management (Odhengo, 2018b).

**5.6.3 Governance Framework for Yala Wetland Ecosystem**

There has been no organized agency in the study area, Yala Wetland wide institutional framework, where communities' wetland ecosystem issues are discussed and channeled for decision making in its management. Rather, small group community formations such as CBOs, sector specific groups that lack the larger wetland clout to influence key environmental decisions. This weak framework for community participation in the management of the ecosystem has continued over time despite significant increases in Yala Wetland development interventions.

Community participation in the original SEA/LUP framework through YPAC took place at 6 out of 11 steps, specifically at steps 2, 4, 5, 7, 9 and 10. Each step required different sets of information for appropriate input and feedback to the draft information shared but this was found to be inadequate. Similarly, at YPAC the interests of some stakeholders were not represented while some YPAC members could not comprehensively articulate issues on behalf of their represented wetland communities.

Thus, a framework for governing wetland ecosystem resources with wetland communities being at the core has been proposed by this study called Yala Wetland Conservation Areas Management Committee (YSCAMC) will fill this gap. The committee shall comprise of 47 members initially drawn from the conservation area zone of the Yala LUP, but other zones Settlement and Agricultural, would join too. The governance structure has been

validated by stakeholders in Siaya Town and agreed that it included the concerns raised in objectives 1 and 2. The 11-point committee's roles and responsibilities are adequate to deliver their Yala Wetland Conservation Management Plan. This structure is designed to put the wetland communities at the core of conservation area zone management of the Yala Wetland is within the purview of Wildlife Conservation and Management Act, 2013; NEMA, 2016 and in line with proactive management of common pool resources challenge of "free riders" (Ostrom,1990; Hardin,1968).

**5.6.4 Using Participatory Methodologies to design the future Yala Wetland Ecosystem Plan**

In objective two the Yala Wetland communities used transformational learning methodologies to reflect and act upon their world in order to change it to future aspiration. The process incorporated deeper interaction participatory community participatory tools like empathy walks, community maps, pair-wise ranking and appreciative enquiry methodologies to gather expanded stakeholders' inputs from different shades of local communities: young and the old, males and females; persons living with disabilities, and the poorest of the poor into planning process. The empathy walks underscored identifying with respondents by going through their experiences with them such as walks into the wetland island villages with the affected residents. For example, as indicated elsewhere in this thesis during one of the empathy walks session with an old lady in Buhuma Village Island, she said. "I cannot leave the body of my husband buried in the island here just because of the fear of being submerged by floods".

This changed worldview arising from the use of these participatory methodologies became the basis for their inputs in the Yala Wetland LUP. In the modified framework, the CF inducted the wetland communities on the application of opportunity-based view through appreciative inquiry methodology and empathy walks which was quickly adopted and used to generate their inputs into the plan. The broader wetland community representation through this modified Yala community participation framework enabled local communities to envision, dream, and articulate their aspirations of the future Yala Wetland from the opportunities presented by the root causes of the environmental challenges they identified.

It eventually provided for wider ownership for the sustainable Yala Wetland as most of their recommendations are reflected in the recommended land uses (Odhengo *et al*., 2018b) and proposed institution for implementing the ICCA plan (Odero, 2020). These findings corroborate with previous studies on techniques of public participation which noted the need for different techniques while specifically calling for the use of emerging technologies such as open space technology, future search conferences, e-participation, appreciative enquiry and study circles to capture diversity and complexity of issues and dynamics of local community (Odero, 2015; Smith, 2002, 2006; Ferraz de Abreu, 2002,World Bank, 1998).

The study also identified other participatory methodologies and situations where they are best applicable that would be useful in optimizing communities' participation in various development interventions. These include  watering plants and circles and stars tools for financial data and services; the extension river tool for community advisory services; the food diary tool for dietary diversity; the ideal job tool for youth job opportunities; the land access and control matrix tool for women empowerment; and the social protection traffic light tool for community social protection.

### 5.6.5 Drivers of Participation in the Yala Community Participation Framework

### 5.6.5.1 Stakeholder Analysis Tier Two

The second stakeholder analysis substantially brought important but initially left out actors in the SEA/LUP process to the decision table. Consideration for this stakeholder tier two analysis was given to subject matter representation, meaningful geographic representation; the first stakeholder analysis assumptions which did not hold that YPAC would represent the communities and have seamless flow of SEA/LUP information to the local communities; and empathy walks to have a feeling for the community on the Wetland.

These eleven additional actors and the value they added to the framework and processes were: the **Luo Council of Elders** (custodians of communities' heritage); **Schools (**nursery schools, primary, secondary and post-secondary) played catalytic role of learning and implementing ethos and plans for sound management of the wetlands, awareness raising

about the Yala Wetland sensitivity, envisioning Yala Wetland future through essays, debates and artwork. **Change makers who** brought new planning issues such preservation of herbal trees, land tenure socio-cultural dynamics and how it determines its subsequent care. **The professionals** (experts on land, water, environmental conservation, scientists and researchers) who brought a deeper analysis of the planning issues, lessons learnt and best practices from elsewhere, interrogated drafts and gave their expert views and recommendations; The **local administrators** (chiefs, sub-chiefs, village elders (*mlangos)-* (current and retired) were key entry points into the communities as well as resolving communal conflicts besides providing additional historical and contextual information; The **Wetland International Eastern Africa office (WI)** visiting wetland expert guests from various African countries who added unique biodiversity value on threatened species which are endemic to the delta ecosystem; The **Tourist Association of Kenya** tourism potential of the Yala Wetland and its integration with western Kenya tourism circuit; the small and medium scale investors on their plans to expand their farm activities and the need to increase water abstracted from the wetland. Additional NGOs giving valuable feedback to draft plans; The **Motorcycles Association (*Boda boda*)**; and **the media** who covered subsequent process outcomes in their various media channels mainly newspapers, FM radios and documentaries.

The stakeholder analysis tier two further revealed primary **influencers of decision makers** as an avenue of participation which is central to information transmission continuum at both community and county leadership levels and should be utilized as participation entry points appropriately. This avenue is very important based in different information seeking behaviours of decision makers involved in Yala Wetland. However, since these are not official channels, they must be used very carefully without jeorpadising the intended outcome of using them because such a channel utilizes and maximizes power relations based on prevailing goodwill.

Thus, stakeholder's analysis tier two tool increased wetland communities' participation into the SEA/LUP process by broadening the scope representation (11 additional categories and 60 focus group discussions and community meetings; and the quality of participation based on the various unique contributions these 11 stakeholders brought on board and the

community level feedback as demonstrated by the shift in spectrum levels of participation from information (17%) and consultation (83%) in draft 1 SEA/LUP report to involvement (80%) and collaboration (20%) in SEA/LUP draft 3 and the 10 indicators of effective public participation from poor and unsatisfactory to satisfactory and good.

These findings are consistent with Theory U, which is a methodology for leading profound change and away connecting to a more authentic aspects our self (Scharmer, 2016). Theory U calls for an in-depth understanding of problems, going beyond the surface which only depicts symptoms, to underneath them where deeper root issues and sources that give rise to them. This requires shifting one's awareness that one is operating from by improving his/her quality of attention or consciousness and these tools helped to identify stakeholder tier two level analysis and brought to public participation space the primary influencers of decision makers (invisible stakeholders) as part of public participation continuum that has to be utilized sufficiently but cautiously since they lie outside decision makers legitimate accountability mechanism. The invisible stakeholders could be compromising the overall effectiveness of community participation when activities are implemented but do not translate to expected community outcomes. This would be interesting area to follow through especially as public participation practice evolve with deepening of devolution in Kenya's governance space.

## 5.6.5.2 Levers for Increasing Community Participation Rates

The Yala Hub framework provided avenues for participation in multi-stakeholder events which included Annual Wetland Day Events, World Migratory Birds' Day and Environment Days. Additionally, schools became another key participation avenue that enabled students to participate through essay writing, debates and artworks which gave them fun and incentives from the competition. Further avenues were the organized community meetings at village levels that required its own facilitation that is sensitive to the community dynamics. These avenues of participation were revealed by stakeholder analysis tier two feedback and the community facilitator joining the SEA/LUP process. The researcher used them and subsequently widened the participation avenues, added

intergenerational perspectives and  new feedback loops, blended learning, iterations and actioning from participation on SEA/LUP processes.

This finding is consistent with Lewin's action research in organizational development assertion that motivation to change is strongly related to action hence when they are active in decision that affect them, they are more likely to adopt new ways (Lwein,1958). Thus, increasing participation avenue that Yala Hub framework added to the LUP and Ecosystem management planning expanded their involvement in the planning as various segments of the wetland community who will be called upon to implement the plans. And since implementation of plans has been a challenge in Yala Wetland, involvement at conceptualization and design with many feedback loops in readiness for joint implementation of ecosystem management plans broadened their ownership for wetland communities through groups, schools, religious networks, professionals, traditional institutions and investors.

### 5.6.5.3 Learning Institutions' Active Involvement, Changing Mindsets and updating Environmental Education Curriculum

The Learning Institutions who were involved in expanded LUP development consultations were very positive on the essays and artworks competitions, debates about Yala Wetland and proposed that these should be done annually. As such, a mechanism for yearly competitions, participation on key environmental events like Wetland days and strengthening environmental groups in school should be prioritized in the implementation phase. This will require wetland customized environmental education guide.

The substantial involvement of learning institutions in SEA/LUP processes revealed weakness in the existing Education for Sustainable Development for Schools in Lake Victoria Basin region given to participating schools as incentive for participation. The submissions, their analysis of  the current wetland challenges and their propositions for a sustainable wetland would call for expanding the curriculum to incorporate the following aspects: mindset change and mindsets for planning conservation and integration of local

communities' knowledge with sustainability ethos and values for managing the wetland ecosystem that provide for required deep changes. Others include transformative leadership for Yala Wetland conservation, transformational learning methodologies (appreciative inquiry and applying Theory U for leading deep changes); incentivizing participation in wetlands conservation, the student, the teacher and parent nexus for sound conservation; innovative avenues mobilizing local communities to participate in wetland's management such as the Wetlands Day Celebrations, Environment day and World Migratory Birds. The upgraded curriculum should aim at instilling higher level environmental consciousness and stewardship among the learners in Yala Wetland. This is in line with recommendations of learning and equipping students for 21$^{st}$ century by embracing innovative pedagogies, tailored to particular education settings; hybrid learning environments, which blend formal and nonformal schooling, and; promoting the pivotal role of the "missing middle," or "meso," layer of education—consisting of networks, chains of schools, and communities of practice—to scale deep change (Istance and Paniagua, 2019).

### 5.6.5.4 Incentivizing Participation

Students looked forward to giving their best with a view to winning the prizes announced on the competition advertisement. The prizes were Polo T-shirts and certificates of recognition. Therefore, incentivizing the participation contributed to enabling them to focus and give their best during the exercise.

As a reward for participation, schools received booklets for Environmental Studies Curriculum for upper primary and secondary schools developed by Retouch Africa Consulting (RAI) done for WWF for their Lake Victoria Basin Environmental Programme (WWF, 2012). The schools were also given Model Schools Best Practices on Education for Sustainable Development, Income Generating Activities (IGA) and Education for Sustainable Development (ESD) village concept in project areas. The students were awarded certificates of participation while the winners got Polo T-shirts with wetland conservation messages. This recognition triggered further demand for the annual

competition to give others a chance to participate and hence the need for annual competition to showcase the learners' conservation activities.

The YPAC officials were also able to conduct community meetings when the researcher facilitated them by paying associated meeting costs of refreshments and transport reimbursements. These confirmed that effective participation requires resources and should therefore be budgeted for upfront in SEA/LUP and other community development planning processes. Consequently, lack of resources for participation despite existence guidelines will not translate into meaningful community participation. In addition, support should be designed that are cost effective to ensure their sustainability.

These findings are consistent with Harrison's emerging lessons and good practices of public participation that identify a need for understanding the context of participation (YPAC members issues) and participation resources which if not availed in sufficient quantities would compromise its outcome (Harrison, *et al.,* 2001).

### 5.6.5.5 Technical and Institutional support provided by -the Community Facilitator

The creation of a **Community Facilitator** in the Yala Community Participation Framework served many practical concerns of the wetland communities. The CF, who was the researcher formed a team and networks to enhance community participation in SEA/LUP processes. The team consisted of Research Assistants from SES, University of Eldoret (for technical know-how); some members of YPAC and YSSG (for local knowledge, acceptance by community and community level meeting facilitation) and linkage with networks of professionals from and/ or with interest in Yala Wetland (for technical expertise and genuine involvement in determining the development paths of their communities); development facilitators and partners to allow for navigation into the processes without hindrances (Nature Kenya, The IMTC and County Government Leadership).

A key feature CF also provided was a **safe environment of trust, inspired confidence and mutual respect for participation**. This is confirmed by top-level leadership respondents' remarks "you are our son please tell us, will our ideas be taken seriously or they will do like what Dominion Farms did" at Siaya MCA leaders meeting on consultations on CIDP 2018-2022 preparation. This further confirms the need for inspired confidence to participate in Yala Wetland LUP and CIDP in which the researcher and mentor played the role of the Community Facilitator and Process Facilitator respectively. The researcher had conducted end term evaluation of Tana River Basin SEA/LUP hence brought in some experience and emerging good practices from that premier SEA/LUP process in Kenya. Thus, relationship building was vital aspect of increasing community participation and the CF brought this aspect to SEA/LUP process. The CF component of this framework has to deal with relationship building and nurturing trust required in optimizing community participation processes. The CF will have to apply emotional intelligence skills to hasten this process.

The type of stakeholders targeted determined the type data collection tool adopted**.** For example, the youth preferred a mix of media at the same time (audiovisuals, social media whatsapp, facebook, instagram, group work sent to their phones directly), while in schools the team opted for artwork, debates, essays with queries that focused on challenges and what future they envisioned of the future Yala Wetland, for environmental events days the team choose gallery walks on artistic works display of Yala Wetland, wetland products display, live performances like poems and dramas with conservation messages, display of ecotourism sites and thematic songs delivered with aid of traditional instruments (such *nyatiti, ohangla, orutu, pekee, tung*) and talks by both government and community leaders based on the theme of the event. The CF also seized these occasions to update on SEA/LUP progress, key planning issues and obtained their feedback on the same (leveraged participation points and new feedback loops).

In addition, the steps intentionally involved the use of local leaders to co-facilitate the meetings with the researchers after being trained on SEA/LUP specific issues to guide focus group discussions and community meetings. This gave them the opportunity to relay SEA/LUP updates from Inter-county steering committee and technical team, which had

been a challenge before. Each team was also provided with the latest copies of SEA and LUP and YPAC meeting minutes to equip them while conducting community meetings.

The CF of the process therefore needed to be somebody whom they respected, trusted and had the power to engage at main stages and structures of SEA/LUP processes (ICSC, YPAC, Technical team, Learning and Research institutions, various players of policymakers) leverage points for community interventions and creates new feedbacks loops. The CF brought certain attributes to the process that were harmonious with Yala Wetland context. The skills and capabilities in planning and management; environmental sciences knowledge; networking and advocacy, proximity and access to decision makers and community acceptance. Thus, CF-IR-Hub component of the framework helped reduce the disconnect between decision makers and provision of scientific and technical information for Yala Wetland.

In addition, the CF also helped with collating historical and contextual information, and indigenous  knowledge which were used in planning as well as in implementation of LUP recommendations. The CF became a very important empowerment enabler for local communities to participate in wetland's issues at multiple levels. This happened within themselves in FGDs, personal interviews, environmental events, schools and outside with other  agencies  (technical teams,  county  executives  and  elected  leaders MCAs, development partners). The CF has to marshal some power that would be needed to penetrate other powers within planning and management processes as transformative learning theory pointed that empowerment is changing power relations in favour of those who previously exercised little power. The CF needed to be creative on how to gain and remobilize this power and then use it to empower wetland communities in decision making about the wetland. For instance, CF became part of the technical team and had access to the decision makers hence would weigh in to provide this nexus.

### 5.6.6 Information Resources Hub for Accessing Relevant Information to make Informed Decisions that are Evidence and Outcome Based

The Yala Wetland Information System gap to help with the implementation was filled by the SEA/LUP secretariat and the researcher who carried out some of required functions.

The information resources gathered related studies on Yala Wetland, feedback from community meetings, validation feedback of various SEA/LUP outputs and draft reports; vital networks or contact to review the various parts of the process.

The IR-Hub also provided feedback in ways that communities could understand the information easily. The community focused facilitation helped with simplifying the SEA/LUP processes, languages and simulations of the issues at community meeting. Likewise, local communities were able to draw simple maps to give their inputs, used their proverbs and sayings to pass their concerns on the LUP were then repackaged and relayed to the technical team. Thus, repackaging SEA/LUP information this way for communities helped to educate them and then sharpened their contribution in the LUP remaining phases using different channels namely: community channels, radio, music, religious leaders sermons, local administration meetings (*barazas)*, funerals, special community events, special events such as World Wetlands Days, Environment Days, and Partners Field days, and competition in learning institutions through essays, debates, performances such dramas, songs, and artwork among others.

Overall, the IR-Hub sub-component of the Yala Hub framework provided timely access to relevant, repackaged information and kept new forms of information flowing into the process and thus evidence and outcome-based decision making.

## 5.6.7 Information Access, Information Seeking Behavior and Opportunities to Optimize Participation

The information access and seeking behaviors of the wetland community leaders showed diversity. However, common approaches they use to get information include peer talks, authoritative policy orders and regulations from administrators. Moreover, all the leaders had cellphones and, in some groups, all the members had telephone connectivity thereby providing greatest opportunity for telephone communication. The telephone was both a tool for communication and money transaction. The analysis revealed that various groups had their different and unique information seeking behaviours, and had different interactions among themselves and how they influenced one another. Thus, the different information seeking behaviours and outcomes of interactions among wetland communities

offer opportunity on what factors and nuances are key in ensuring effective community participation.

## 5.6.8 Unique Wetland Issues brought out by the Improved Community Participation Framework

The Yala RAPPEF-CF-IR Hub framework identified the following new issues: enactment and enforcement of livestock policy and regulation, establishment of irrigation schemes alongside the wetland, multipurpose feed processing plant for both dairy and poultry; and development of cereal stores in the wards; installation and equipping of fish cages. It also revealed the relative importance of the issues which the LUP plan ought to give weight to in terms of implementation priorities when sharing wetland benefits including safe and portable water for communities, modern farming methods, health care support, education fund for vulnerable children, action research that address key challenges of the local people; and community projects of the investor's choice but which address the local communities felt needs.

The Yala Hub Framework pointed out the discrepancy on wetland size which the LUP team estimated as 20,276 ha (207.6 km[2)] using latest remote sensing and GIS techniques (Odhengo *et al.*, 2018b) whereas earlier survey records estimated the wetland at 17,500ha (NEMA, 2016). The later has formed the basis of utilization of the wetland and allocation to users like the Dominion Farms and other land uses over the years. This lends credence to the concerns on wetlands raised by a panel wetland specialist as the gaps in wetlands being determination of the size of papyrus wetlands (van Dam *et al*., 2014). The Physical survey of the wetland is urgently needed and should involve both the county governments of Busia and Siaya and Yala Wetland community representatives.

## 5.6.9 The Application of Yala RAPPEF -CF-IR-Hub Framework as a System and the Relative Weight of its Subsystems

The Yala RAPPEF-CF-IR Hub Framework operates as a complete system that has relative weights for each sub-component that cumulatively determine the overall effectiveness of

community participation based level of effort that was put in the various stages and recorded in researchers journal compared across the action research outcomes in SEA/LUP drafts 2 and 3 processes, Siaya CIDP 2018-2022 development and Yala ICCA management plan 2019-2029. The relative weights were Step 1. React/Act; (10%) step 2. Restructure/Adjust the participation framework based on the reactions of step 1 (7%); step 3. Participation Preparations (20%), step 4. Community Participation (16%) step 5: Review, evaluation and follow-up (12%) and the base CF-IR-HUB (35%). Whereas the processes are sequential, the application could be iterative as feedback from preceding steps provides insights and revelations that may take the user back to mine more data and information before proceeding to the next step.

This proposition is supported by the works of Dr. Brent Peterson of Columbia University (2004) who found that learning effectiveness is a product of three subsystems namely pre-work (26%); learning event (24%) and follow-up/post learning event (50%), thus pre-course work and post-event follow-up contributes a combined total of 86% of learning effectiveness.

## CHAPTER SIX

## CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Introduction

This chapter starts with a general summary of the research findings based on the three research objectives followed by conclusions, recommendations and suggestions for further research in Yala Wetland and in the public participation domain.

### Summary of the research findings

### 6.2 The Problem

A synthesis of research and policy priorities for papyrus wetlands presented at the Wetlands Conference in 2012 documented by van Dam *et al*, (2014) concluded that (1) there is a need for better estimates of the area covered by papyrus wetlands. Limited evidence however, suggests that the loss of papyrus wetlands is rapid in some areas; (3) research on papyrus wetlands should include assessment of all ecosystem services so that trade-offs can be determined as the basis for sustainable management strategies ('wise use'); and (4) more research on the governance, institutional and socio-economic aspects of papyrus wetlands is needed to assist African governments in dealing with the challenges of conserving wetlands in the face of growing food security needs and climate change.

Nearly 65% of Yala wetland is occupied by papyrus dominated vegetation (Odhengo *et al*., 2018a). Yala wetland and the livelihoods it sustains have become more threatened and their ecological integrity endangered by various anthropogenic and hydrodynamic causes during the last half of the century. The anthropogenic causes include land use, increased human population and the relations between lake/water level dynamics, weak wetland management and coordination frameworks, underrepresentation of local communities in wetland decisions making processes. Cumulatively, these have created the enabling environment  that is accelerating degradation and loss of these ecosystems, loss of livelihoods and increased poverty among the wetland resource dependent communities

(Odhengo *et al*., 2018a; Davis, 2010). Further, there has been a weak framework of coordination among the Yala Wetland stakeholders to ensure effective wetland communities' participation in wetland ecosystems management processes.

Studies on Yala Wetland by KEFRI (2015) has pointed the reasons for under representation of local communities in Yala Wetland management to include dispossession of community lands by a Dutch company and LVBDA without compensation and wetland residents' denied access to their ancestral lands. Other reasons include incidences of water pollution causing sickness to community members; death of livestock and poultry as result of contact with agro-chemicals; lack of awareness / baseline information on Yala wetland inventories and variable climatic conditions and destructive practices by community like perennial flooding; and overharvesting wetland plants. As result locals have no interest in Yala wetland management.

Evidence from literature reviewed shows that in Yala Wetland the population of wetland residents are increasing constantly as they carry out their livelihoods activities that are dependent on natural resources from the wetland. The County Governments of Siaya and Busia and the National Government are interested in uplifting the wetland communities' livelihood and have planning and inventory techniques for valuing wetland resources that local people do not know. The riparian communities also have vast local knowledge which can be of benefit to government planning. The challenge therefore is how to combine all these to uplift their livelihoods and not degrade resources in Yala Wetland Ecosystem of Lake Victoria, Kenya.

Further, the dynamics of community participation that would make their participation effective and meaningful in Yala ecosystem management as their population increase and many stakeholders increasingly get involved in the wetland are yet to be clearly understood. If they are not well understood, then design for sustainable management actions will not be attainable thereby posing a major threat to the existence of the Lake Victoria Wetland ecosystem.

This brings into sharp focus the role riparian communities in the continued wetland degradation as well as the change needed to reverse this trend. However, the dynamics of

communities' participation and their activities on the wetland are not clearly understood despite wetland's continued degradation in size and value (Dobiesz *et al.,* 2009; Dugan 1993). This study therefore sought to bring clear understanding on and how to enhance community participation in the planning and management of Yala Wetland ecosystem.

The action research sought to enhance and strengthen the participation of the local communities so that they would co-own the outcomes of the LUP/SEA process and ensure their stake in future implementation of the results in the management of the wetland. The study sought to achieve this by analyzing the current status of community participation in the management of Yala Wetland Ecosystem that is provided for in the YPAC framework, identifying environmental issues to inform LUP/SEA development, and subsequently developing a framework to optimize their participation in Yala Wetland Ecosystem Management.

## 6.3 Research Conclusions by Objectives

### Objective 1: Status of Community Participation in Yala Wetland Management

Communities' participation in Yala Wetland ecosystem management was determined by their interactions with the wetland resources and agencies therein as they seek for support their livelihoods and this affected the wetland either positively or negatively. It is the negative impact of their interactions which exacerbates wetland degradation necessitating development and execution of management plans seek to remedy this.

The local communities had participated in the management of the Yala wetland in various ways alongside other actors. They had done this through their community-based organizations, through chiefs' meetings/open public gatherings, religious groups/networks, schools and cooperative societies and by carrying subsistence farming, fishing, harvesting papyrus and making crafts for use and sale, hunting wild animals and birds in the wetland, sand harvesting, harvesting herbs, working for investors in the wetland and other agencies doing various development projects in the wetland among others.

There has not been a Yala wetland wide institutional framework where communities' wetland ecosystem issues were discussed and channeled for decision making in the

management of the wetland ecosystem. Rather, small group community formations such as CBOs, sector specific groups that lacked the larger wetland clout to influence key environmental decisions had been the norm. Further, political players had dominated key decision making on the wetland ecosystem issues and decision done solely by the political class. This gap for community participation in the management of Yala Wetland ecosystem affairs had continued over time despite significant increase in wetland challenges. The study has proposed, validated and now operational a governance structure called Yala Swamp Management Committee, defined its membership (47 members), identified its roles and responsibilities that puts communities at the centre of conservation alongside other agencies. It has a secretariat led by a Community Facilitator to undertake day-to-day activities of implementing the indigenous community conservation area management plan.

The study found that conflicts over Yala wetland resources had risen partly due to the skewed access and utilization by the wetland communities. It recommended an equitable benefit sharing of the wetland's resources based on the formula of 70%:30% Investor and Community and Government and 60%:40% local communities and county governments respectively developed in participatory manner would help resolve some of the conflicts and requires wetland communities be represented in the governance system.

Findings further revealed that utilization of Yala Wetland resources has been partly informed by how the local communities perceive its formation based on the four postulations advanced by the communities. These were: existence of the wetland was from a water body that disappeared miraculously; from flooding experienced in the 1960s and believed as a curse from the gods; the construction of Owen Falls Dam in Uganda in 1954 resulting in backflow water challenge; and flooding to River Nzoia channel expansion for construction of Webuye Paper Factory resulting in floods around Musoma thus submerging the island villages. For those who perceived it as God's gift for them, they utilize wetland resources as their own and as such take genuine care of the resources therein. Other community postulations do not support sustainable utilization of the wetland resources because it is menace and a government resource that uses it without consulting the local communities and this requires a mindset change if they have to change to support sustainable interventions for the wetland. Thus, improvements to sustainably manage the

wetland ecosystem ought to factor in the historical and contextual information. In the final SEA and LUP reports, this historical and contextual information was included as chapter 4 in the SEA report, titled understanding the Yala Wetland, recent History of Yala Wetland that shaped the final LUP plan and its implementation plan and other related ecosystem management plans like the Yala Wetland ICCA 2019-2029.

The study revealed that local communities had developed positive conservation practices by attaching defined significance to the various wildlife species. For example, some birds are totems and therefore cannot be eaten by those communities. However, there was no documentation of these local knowledge for managing the wetland. Yet, this was needed to integrate local communities' conservation knowledge and SEA/LUP planning information used by technical team.

The level of wetland communities' participation in SEA/LUP processes based on the Spectrum of Public Participation Model revealed that community participation in SEA/LUP was at Inform (17%) and Consult (83%) levels, and the 10 indicators of effectiveness revealed that YPAC framework was poor (20%) and unsatisfactory (80%) and thus not meaningful and effective. But, with design and application of Yala Community Participation Framework (Yala Hub) to remedy this occasioning a significant improvements of community participation in LUP (Consult 80% and Collaborate 20%); while effectiveness moved to satisfactory (3 indicators) and good (7 indicators).

In drawing a conclusion for objective one component of study, the analysis thus demonstrated the complementary role of community indigenous knowledge and planning science in management of wetland ecosystems. Yala Wetland ecosystem planning requires a thorough understanding of the area particularly history and context of the area, political economy, past planning and management initiatives and future aspirations of the local communities. Additionally, practical experience showed a disconnect between decision making and adequate scientific evidence as a guide in the two counties of Siaya and Busia, but broader stakeholder education, involvement and participation was core for making wetland management decisions. The study succeeded in integrating various sets of information on local communities' knowledge for conserving the wetland, its formation

and their aspirations for the future toward providing complementary information to the SEA/LUP.

## Objective 2: Environmental Issues using Remote Sensing and Community GIS for Inclusion in Yala Wetland Land Use Plan

The local communities' main environmental issues were prioritized as encroachment and reclamation of the wetland, burning of papyrus, resource use conflicts, weak framework for their participation in wetland management, poverty effects and invasion of alien species. The Yala Wetland communities while applying transformational learning methodologies managed to reflect and act upon their world from problem-based view dimension and transformed it to future aspiration an opportunity- based view. This changed world- view of mindset became the basis for their inputs in the Yala Wetland LUP.

The efforts for managing and resolving the identified four types of conflicts have been dismal even triggering further conflicts. Thus, an equitable benefit sharing mechanism developed with local communities in participatory manner is key to resolving these outstanding conflicts and potential future ones. As communities were designing the formula for benefit sharing at 70%:30% and 60%:40% and priority areas for using the benefits, it became evident that they would need to be part of the institution that ensures implementation of the mechanism with an effective monitoring and evaluation of conflicts and the wetland benefits being derived and shared accordingly.

On application of remotely sensed data and GIS analysis, the wetland land cover reduced by 4,652.7 ha occasioning a fall in its ecological value by 22.4%. Further, an estimated 20% of the remaining papyrus swamp was in very poor condition due to desiccation and the spread of both wildfires and deliberate burning thus leaving Yala Wetland ecological value at **57.6% of** moderate status.

The harvesting of the wetland's natural products had led to  loss of biodiversity of such critically endangered Haplochromine fish (*Lipochromis maxilaris* and *Xystichromis phytophagus*) of Lake Kanyaboli and the vulnerable *Oreocromis esculentus* and poaching of the nationally endangered Sitatunga.

The satellite data showed that reclamation engineering works had environmental, social and economic impacts of the original plans, with some adverse than anticipated. The foregone benefits expected from the large-scale investor the Dominion Farms has caused a lot of conflicts between the wetland communities, the elected leaders and the investor.

To a large extent the local communities' environmental issues and their causes corroborated with remote sensing and GIS information used for developing Yala LUP. Local communities' knowledge, community resources maps, students' artworks on the vision of Yala Wetland and satellite data had been integrated to support wetland ecosystem planning. The key environmental issues depicted by the community using community participatory approaches like appreciative enquiry methods, community maps, and priority ranking had augmented what remote sensing data made available to the planning team.

Further, the envisioned future of Yala Wetland in 2063 captured in a mosaic from different artworks submitted by students crystalized the issues from the perspective of learners thereby providing another crucial set of data  for integration of wetland issues. Likewise, the presentation of wetland information spatially helped the wetland communities to visualize location specific planning information, their inputs into the processes as well as opportunity to correct data anomalies. This confirms the benefit of data integration between community held data and information with and remote sensing and GIS information for use in wetland ecosystem planning and management.

## Objective 3: Development of a Framework to Optimize Community Participation in Yala Wetland Ecosystems Management

The initial community participation framework, YPAC, was found to be narrow in its membership not representing all key community actors in Yala wetland, low quality of participation by  YPAC members due to inherent weaknesses ; inadequate points/places of community participation in the planning processes at six (steps 2, 4, 5, 7, 9 and 10) out of eleven steps in the LUP process;  low level of community involvement based on the spectrum levels; unsatisfactory participation based on the 10 indicators for evaluation of public participation results; the challenge  of communicating scientific and technical information to communities; dominant fixed and negative mindsets about the wetland;.

Others include lack of methodology for integration of indigenous knowledge with scientific information; absence of an organized Yala Wetland-wide agency with communities' strong representation; disconnect between  wetland decision-making and provision of adequate scientific and technical evidence/or information; absence of a governance framework for effective community  representation; lack transformational and value driven leadership at the community level on wetland issues; and absence of comprehensive wetland wide information system since what is available is rather ad hoc and scattered pieces of data and information.

Those limitations compromised the ability of YPAC to meaningfully and effectively represent wetland communities in the SEA/LUP process, thus providing the basis for developing a framework to optimize wetland communities' participation in the ongoing Yala SEA/LUP processes.

The designed Yala RAPPEF-CF-IR-Hub Framework (Yala Hub Framework) has 5- steps with a Community Facilitator and an Information Resources Hub at its base.  Further, it has guiding questions for every step that help analyze the public participation framework being evaluated for optimization. This was subsequently applied to improve the remaining SEA/LUP processes and generated the final Yala Wetland LUP. The application  brought in more inclusivity of wetland communities in the process and ensured their high level of participation that is Involvement (80%) and Collaboration (20%) from the lowest level that is Inform level based on the spectrum of public participation model; and an overall assessment on 10 indicators of effectiveness at good (68%) from unsatisfactory (41%) on Yala  LUP preparation; designed for the first-time a wetland wide governance framework for managing Yala Wetland Ecosystems called Yala Swamp Management Committee for conservation zone, developed an equitable benefit sharing mechanism of 70%:30% (Investor/Community  and  Government)  and  60%:40%  (local  community/county government) in a participatory manner.

The Framework's Community Facilitator opened other avenues that increased participation rates and added new feedback loops, blended learning, iterations and actioning from

participation; and, provided a safe environment of trust, inspired confidence and mutual respect for participation which was highly valued by the Yala Wetland communities.

Similarly, Information Resources Hub sub-component provided timely access to relevant information, repackaged technical information to the level of communities, kept new forms information flowing in the process thereby allowing evidence and outcome-based participation in the process and subsequent decision making.

The Yala RAPPEF -CF-IR-Hub Framework is a system that optimizes public participation in environmental planning and management therefore the relative weight of its subsystems are: step 1. React/Act; (10%) step 2. Restructure/Adjust the participation framework based on the reactions of step 1 (7%); step 3. Participation Preparations (20%), step 4. Community Participation (16%) step 5: Review, evaluation and follow-up (12%) and the base CF-IR-HUB (35%).

The application of Yala RAPPEF-CF-IR Hub Framework in Yala LUP therefore induced sustainability in Yala Wetland ecosystem through ownership of the land use and ecosystem management plans; empowered the stakeholders to take responsibility for sustainable management of Yala Wetland ecosystem; minimized conflicts during plan preparations; increased transparency, inclusivity and accountability in Yala Wetland ecosystem management decision making process. The Framework was further deployed in Siaya County CIDP 2018-2022, where it also occasioned a significant improvement in public participation processes through a creation of a public participation directorate. The framework was applied in the development of ICCA management plan 2019-2029 leading to the creation of Yala Swamp Management Committee and a secretariat lead by community facilitator to spearhead its implementation. The implementation of ICCA plan will ensure these pathways to sustainability are maintained and remain responsive to the changing dynamics in Yala Wetland ecosystem.

However, the application of the framework requires a mindset shift among the local communities, technical teams and county government staff; and requisite resources like human, finances, time and leadership to be operationalized optimally.

**6.4 Conclusions**

Community participation in Yala Wetland ecosystem management study was conceived and designed to ensure a collaborative solution generation to Yala wetland degradation challenges. The over-exploitation of natural resources by competing local communities and the establishment of large-scale agricultural operations has not only destroyed natural habitats but caused detrimental hydrological changes. Further, it was recognized that Yala wetland communities' participation was underrepresented in its management and therefore required methodical attention and proposed intervention to ensure they become core solution to the wetland present and future challenges. This necessitated action research conducted alongside the SEA and LUP process to assess community participation in the management of Yala Wetland ecosystem using spectrum of public participation and the 10 indicators for evaluating public participation effectiveness, identified key environmental issues for inclusion in final SEA/LUP by the communities and remote sensing, subsequently designed a framework to optimize community participation named the Yala RAPPEF-CF-IR-Hub (a Yala Hub Framework) aimed at remedying the challenges in the YPAC communities participation framework in SEA/LUP processes. The framework was further deployed in Yala ecosystem management plan and Siaya county integrated development plan development.

From the foregoing, it is evident that action research design made it possible to collaboratively generate and refine solutions leading modification of YPAC participation framework through Yala Hub framework which was applied in the remaining steps of LUP development with improved community participation in the final LUP outcome. It also led to establishment of a wetland wide governance framework- Yala Swamp Management Committee with a plan a 10- year Yala Wetland ICCA management plan 2019-2029 to implement LUP recommendations in the conversation areas of the wetland.

This study has therefore demonstrated that effective community participation substantially determines and influences development of ecosystems management plans and the subsequent effective implementation of decisions made therein; and that increased participation through deliberate intervention, in the case of Yala Wetland the Yala RAPPEF-CF-IR Hub (Yala Hub) Framework as an optimizer and a diagnostic tool, will

eventually increase the effectiveness of community development. However, the application of Yala Hub framework requires a mindset shift among the local communities, technical teams and county government staff; and requisite resources to be operationalized optimally.

## 6.5 Recommendations

Based on the findings, the study recommends the following:

First, strengthen the capacities of Yala Swamp Management Committee to deliver Yala Wetland Ecosystem management plans to restore Yala wetland ecological health and ensure sustainable management thereafter.

Second, a timely tracking of land use/landcover changes should be instituted every three years to monitor the changes in Yala Wetland ecosystem and subsequently inform the implementation of the Yala Wetland ecosystem management plans. Additionally, systematically document and preserve Yala Wetland local communities' knowledge systems and integrate with other management data during the implementation of LUP and other Yala Wetland ecosystem management plans.

Third, since the Yala RAPPEF-CF-IR Hub (Yala Hub) Framework has different sub-components with the Community Facilitator and Information Resources Hub as its base accounting for 35% overall effectiveness, there is need for and valuing of a Community Facilitator (CF) and an Information Resources Hub (IR-Hub) in Yala Wetland ecosystem management.

Fourth, there is need to strengthen Yala Wetland Information System that collates, stores and disseminates existing relevant wetland information, research studies and processes generated information; and others to help with the implementation of Yala Wetland Management plans. The Yala Community Participation Framework's IR-Hub sub-component developed during this study therefore becomes part of this Yala Wetland Information system.

Fifth, County Governments of Siaya and Busia to incorporate Participatory GIS from this study in their GIS departments and help wetland communities with more GIS training and subsequent use of participatory community GIS with County GIS and other emerging technologies. Consequently, the wetland communities should track wetland land cover/ land use changes and conservation activities such as mapping wetlands exceptional resources and conserving them, papyrus restoration and surveillance, wildlife census and surveillance, protection water catchments, protection of fisheries breeding sites among others and to mainstream these in their county development planning in CIDPs and other relevant sector plans to guide the sustainable use and management of wetland resources.

Sixth, deploy Yala Community Participation Framework in future LUP processes to wetlands with "similar challenges" as Yala (such Omo, Malewa, Nyando, Sondu-Miriu and Nzoia) and to continue validating the framework.

Seventh, widely disseminate, validate and adopt the proposed equitable benefit sharing mechanisms of wetland resources accruing from investment in the Yala Wetland to be shared at the proportion of 70%:30% Investor and the Community and County Government. The Community and County Government should in turn share be at the proportion of 60%:40%, for Communities and County Government. This will help manage the various outstanding resource use conflicts in Yala Wetland.

## 6.6 Suggestions for Future Research

Since this study focused on optimizing community participation in the Yala Wetland ecosystem management, it did not focus on community organizing *per se* but rather how their participation effectively informed the SEA/LUP planning processes and ecosystem management. However, future work needs to be directed at community organizing for effective participation of wetland ecosystems management, sensitive spaces, and other development interventions.

There is need to develop and test ICT based application for the Yala RAPPEF-CF-IR-Hub (*I-Yala Hub)* to be used in future development planning of wetland ecosystems and other community development interventions including design, implementation and evaluation

for optimization of community participation. This should be then linked to the newly developed and currently being tested E-Riparian application for providing information about the wetlands in Kenya.

 Further studies that need to be conducted in Yala wetland should include mapping, documenting and repackaging indigenous knowledge and innovations systems  for managing  Yala wetland systems; and, integrating it with planning knowledge systems; Ornithological investigation targeting both migratory and resident bird species; models for sustainable conservation enterprises identified in Yala wetland; Conflict resolution and management options for human wildlife conflicts; capacity assessment and targeted strengthening of  community governance community Conservation Areas   and codifying the emerging Yala wetland lessons, and resource use efficiency modelling for Yala wetland natural resources.

## 6.7 Contribution to Knowledge

This study has contributed to providing a greater understanding on community participation in wetlands planning and management processes using Yala Wetland Ecosystem case study. The study developed the Yala Community Participation Framework, The Yala RAPPEF-CF-IR-Hub (Yala Hub) Framework, to optimize community participation in planning and management of natural resources starting with the wetland's resources thereby stimulating knowledge production as a driver of socio-economic and ecological development. It showed how equitable benefit sharing of the wetland's resources is a key outcome of a meaningful community participation in Yala LUP processes. The Yala Hub framework is both a diagnostic and optimizing tool for public participation processes that requires learning environment to maximize it benefits.

The Yala RAPPEF-CF-IR-Hub framework was also applied in the development of Siaya CIDP 2018-2022 resulting in increased participation rates of the public and brought out critical issues for the decision-making using the structured mechanism thereby making special contribution to formative stages of Kenya devolved governance system. The Public Participation Bill 2020 (Part 2 section 6.1a-e; 6.2(1) requires that a responsible authority

(national and county governments) aid interested persons in accessing and giving their views on proposals and therefore modified Yala Community Participation Framework provides a mechanism to aid the various governments meet this requirement.

In addition, the Yala Hub framework was used in the development of a 10- year Yala Wetland ICCA Management Plan as part of Yala LUP implementation which led to formation of Yala Swamp Management Committee governance structure and defined the kind of transformative and authentic leadership ethos required to implement it. This governance framework will ensure that wetland communities are part and parcel of Yala wetland resource decision making processes, on ground actions and eventual custodians of its sustainability.

This study has increased understanding on community participation as one category of the "publics" in shared natural resources planning and management of Yala Wetland, which spans two counties of Siaya and Busia. The resultant database of Community Knowledge in-house experts and networks with crucial contacts and biographies are vital for future planning and management of Yala Wetland Ecosystem. Doing this research alongside the researcher's work practice provided him with rare opportunities along the way to improve actions and development practice based on information and lessons gained from Yala Wetland SEA/LUP, actual public participation as per the devolved governance systems and application of the modified framework in the development of ICCA as part of implementation of Yala LUP.

# REFERENCES

Abila, R. (1998). Utilization and economic valuation of the Yala Wetland, Kenya. In. Gawler, M. ed. Best practices in participatory management; *Proceedings of a workshop held at the 2nd International Conference on Wetlands and Development*, November 1998, Dakar, Senegal. Wetlands International, IUCN, WWF Publications No. 56, Wageningen, The Netherlands.

Abila, R.O. (2003). A Socio-Economic Study of the Yala Wetland Fisheries. Paper presented at ECOTOOLS Scientific Workshop on Yala Wetland. Switel Hotel, Bondo, Kenya. 9th–10th December, 2003.

Abila, R. (2005). Biodiversity and Sustainable Management of a Tropical Wetland Lake Ecosystem: A case study of Lake Kanyaboli, Yala Wetland, Kenya. *FWU Water Resource Publication* 200:3.

Abila, R. and Othina, A. (2006). What is the socio-economic value of the wetland's fisheries? The case of Yala Wetland in Kenya. *11TH World Lakes Conference*, Nairobi, Kenya, 31 October to 4th November 2005. Proceedings Volume I, Edited By: Eric O https://sustainabledevelopment.un.org/?menu=1300

Ampofo, S., Ampadu, B., & Abanyie, S.K. (2015). Landcover Change Patterns in the Volta Gorge Area, Ghana: Interpretations from Satellite Imagery. *Journal of Natural Sciences Research,* Vol.5 (4), 2224-3186 (Paper), 2225-0921.

Aloo, P. A (2003). Biological Diversity of the Yala Wetland Lakes, with special emphasis on fish species composition in relation to change in L. Victoria Basin: Threats and conservation measures. *Biodiversity and Conservation* 12: 905-920.

Allmendinger, P. (2001). *Planning in postmodern times*. London: Routledge.

Alsop, R., & Heinsohn, N. (2005). *Measuring empowerment in practice: structuring analysis and framing indicators.* Washington DC: The World Bank.

Agrawal, A. & Gupta, K. (2005). Decentralization and participation: The governance of common pool resources in Nepal's Terai. *World Development* 33: 1011-1114.

Agrawal, A. (2002). Common resources and institutional sustainability. In: Ostrom E, Dietz, T, Dolsak, N, Stern PC, Stonich, S, Weber, EU, (Eds). Drama of the Commons. Washington DC: National Academy Press; P. 271-98

African Union (2013). Agenda 2063: The Africa we want. AU. Retrieved March 31,2016, from https://au.int/en/agenda2063/overview.

Arnstein, A. (1969). A ladder of citizen participation, *Journal of the American Planning Association*, 35(4), 216-224.

Association for Supervision and Curriculum Development & Sagor, R. (2000). *Guiding school improvement with* action research. *6th ed*. Alexandria: ASCD.

Awange, J. L., Aluoch, J., Ogallo, L. A., Omulo, M., & Omondi, P. (2007). Frequency and severity of drought in the Lake Victoria region (Kenya) and its effects on food security. *Climate Research*, *33*(2), 135-142.

Awange J.L. & Obiero-Ong'ang'a (2001). Lake Victoria: Ecology, Resources, Environment. ISBN: 978-3-540-32574-1 (Print) 978-3-540-32575-8 (Online), John Reader (2001). Africa. Washington, D.C. *National Geographic Society*. pp. 227–228. ISBN 0-7922-7681-7.

Babbie, E. R. (2015). *The practice of social research*. 14th Edition. Boston, Massachusetts: Wadsworth Publishing.

Barry, J. (1999). *Rethinking green politics: Nature, virtue and progress*. London: Sage.

Bartlett, A. (2005). No more adoption rates! Looking for empowerment in agricultural programmes. *CIMMYT Impact Assessment Workshop*, Mexico. 19-21 October, 2005.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544-559.

Beck, U., Lash, S., & Wynne, B. (1992). *Risk society: Towards a new modernity.* Sage Publications: London.

Best, J.W & Khan, J.V. 8th ed. (1998). *Research in education*. Allyn and Bacon: Boston

Beuel, S., Alvarez, M., Amler, E., Behn, K., Kotze, D., Kreye, C., ... & Becker, M. (2016). A rapid assessment of anthropogenic disturbances in East African wetlands. *Ecological Indicators*, *67*, 684-692.

Berkes, F. (2007). Community-based conservation in a globalized world. *PNAS* 104(39): 15188-15193. Retrieved September 11, 2018, from http://www.pnas.org/cgi/doi/10.1073/pnas.0702098104

Berkes, F., & C. Folke, (eds.) (1998). *Linking social and ecological systems: management practices and social mechanisms for building resilience*. Cambridge: Cambridge University Press, United Kingdom.

Berkes, F., George, P.J., & Preston, R.J., (1991). The evolution of theory and practice of the joint administration of living resources. *Alternatives* 18(2), 12–18.

Binswanger, H. P., & McIntire, J. (1987). Behavioral and material determinants of production relations in land-abundant tropical agriculture. *Economic Development and Cultural Change*, *36*(1),73-99.

BirdLife International (2018). Important Bird Areas Factsheet. Yala Wetland complex. Retrieved January 22, 2018, from http://www.birdlife.org

Boye, A., Verchot, L. & Zomer, R. (2008). Baseline Report Yala and Nzoia River Basins Western Kenya Integrated Ecosystem Management Project Findings from the Baseline Surveys. International Centre for Research in Agroforestry Nairobi, Kenya 5 March 2008.

Brett, Jeanne M. "Culture and negotiation." *International journal of psychology* 35.2 (2000): 97-104.

Browne, W.B. Imagine Chicago. Retrieved May 10, 2015, from http://www.imaginechicago.org/inquiry.html

Bushe, G.R (1998). Five theories of change embedded in appreciative inquiry. Presentation at *18th Annual World Congress of Organization Development*, Dublin, Ireland, July 14-18, 1998.

Castells, M. (1983). *The city and the grassroots: A cross-cultural theory of urban social movements.* Los Angeles: University of California Press.

Chambers, R. (1983*). Rural development: Putting the last first*. London: Longman House.

Chambers, R. (1997). *Whose reality counts? Putting the last first.* London: Intermediate Technology Publications.

Chambers, R. (1994). The poor and the environment: Whose reality counts? Working Paper 3. Institute of Development Studies, Brighton, UK

Chambers, R. (2006). Participatory Mapping and Geographic Information Systems: Whose Map? Who is Empowered and Who Disempowered? Who Gains and Who Loses? *Electronic Journal of Information Systems in Developing Countries* 25 (2): 1-11. Retrieved May 20, 2018, from http://www.ejisdc.org/ojs/include/getdoc.php?id=247&article=264&mode=pdf

Chappell, B. (2016). Community engagement handbook: A model framework for leading practice in local government in South Australia. Adelaide: Local Government Association of South Australia. Retrieved May 10, 2018, from https://www.lga.sa.gov.au/webdata/resources/project/2016_LGA%20Community%20Engagement%20Handbook%20Revised%204th%20Edition%20June%202016_Final.pdf

Claridge, G. & O'Callaghan. B. (1997). Making co-management of wetland resources work. In: Claridge, G.F & B. O'Callaghan (eds.) Community Involvement in Wetland Management: Lessons from the Field. Kuala Lumpur. *Wetlands International*, 8 (25-66).

Cleaver, F. (2001). Institutions, Agency, and the Limitations of Participation Approach to Development. In B. Cooke and U. Kothari (Eds). *Participation: The New Tyranny*? London: Zed Books.

Cleaver, F. (1999). Paradoxies of Participation: Questioning Participatory Approaches to Development. *Journal of International Development* (11), 597-612.

Cohen, J.M. & Uphoff, N.T. (1980). Participation's place in rural development: seeking clarity through specificity. *World Development* 8(3), 213-235.

Convention on Biological Diversity (CBD) (2006). Guidelines for the rapid ecological assessment of biodiversity in inland water, coastal and marine areas. CBD Technical Series No. 22 / Ramsar Technical Report No. 1. Joint publication of the Secretariat of the Convention on Biological Diversity, Montreal, Canada, and the Secretariat of the Ramsar Convention, Gland, Switzerland, from www.cbd.int/doc/publications/cbd-ts-22.pdf

Convention on Wetlands. (2020). *A New Toolkit for National Wetlands Inventories*. Gland, Switzerland: Convention on Wetlands Secretariat.

Cooke, B. & Kothari, U. (Eds.) (2001). *The Case for Participation as Tyranny*. London: Zed Books.

County Government of Siaya (2017). Executive Order 1, 2017.

County Government of Siaya (2014). County Integrated Development Plan 2013-2017.

County Government of Siaya (2015). Annual Development Plan 2015-2016.

County Government of Siaya (2019). County Integrated Development Plan 2018-2022.

County Government of Busia (2013). Busia County Integrated Development Plan (2013-2017). https:// roggkenya.org/wp-content/uploads/docs/CIDPs/ Busia-County-Integrated Development-Plan- CIDP_2013-2017.pdf

County Government of Busia (2014). County Integrated Development Plan 2013-2017

County Government of Busia (2015). Annual Development Plan 2015-2016

County Government of Busia (2019). County Integrated Development Plan 2018-2022.

Cooperrider, D. L. and Whitney, D. (2000).  A positive revolution in change: Appreciative inquiry. In Golembiewski, R.T, *Handbook in organizational behaviour. 2nd ed*. New York: Routledge.

Cooperrider, D. L., Whitney, D., & Stavros, J. (2008).  *Appreciative inquiry handbook: For leaders of change.(2nd ed.)*. Ohio: Crown Custom Publishing and Berrett-Koehler Publishers

Crafter, S.A., S.G. Njuguna & G.W. Howard (eds) (1992). Wetlands of Kenya*:* Proceedings of the KWWG Seminar on Wetlands of Kenya. National Museums of Kenya. Nairobi, Kenya, 3 5 July, 1991. Pp. 8- 183.

Cranton, (1996). *Professional Development as Transformative Learning: New Perspectives for Teachers of Adults*. San Francisco: Jossey-Bass Publication.

Creswell, J. W. (2009). *Research design*. Sage. Retrieved March 4, 2015, from http://rub.ruc.dk/_rub/summa/save_mendeley.php?id=9781412965569

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.)*. Boston, MA: Pearson.

Davidson, S. (1998) `Spinning the wheel of empowerment', *Planning*, vol 1262, 3 April, pp14–15.

Davies, J., Hill, R., Walsh, F. J.,  Sandford, M.,  Smyth, D. & Holmes, M. C.

(2012). Innovation in management plans for community conserved areas: experiences from Australian indigenous protected areas. *Ecology and Society* 18(2): 14. http://dx.doi.org/10.5751/ES-05404-180214

Dawson, S., Manderson, L., & Tallo, V. L. (1993). *A manual for the use of focus groups*. Boston: International Nutrition Foundation for Developing Countries.

DBRM (n.d). Directory of Business Research Methods.

Deshler, D. & Sock, D. (1985). Community Development Participation: A concept review of the international literature. Paper prepared for the International League for Social Commitment in Adult Education.

De la Reyn, C. (2018): Reshaping African PhDs for development. Retrieved December 5, 2018 from, http://www.scidev.net/global/article-series.africas-phd- renaissance.html

DETR, Department of the Environment, Transport and Regions (2000). Public Participation in making local environmental decisions. *The Aarhus Convention Newcastle Workshop Good Practice Handbook*, London. Retrieved May 3, 2018, from www.unece.org/env/pp/enaces/handbook.pdf>.

Dietz, T., & Stern, P. (1998). Science, Values, and Biodiversity. *BioScience, 48*(6), 441-444. doi:10.2307/1313241

Doelle, M and Sinclair , J. (2005). Time for a new approach to public participation in EA: Promoting cooperation and consensus for sustainability. *Environmental Impact Assessment Review,* **26**, 185-205.

Dominion Farms (2003). The EIA Report. Dominion Farms Limited.

Dominion Farms (2015). Proposed sugarcane plantation and processing mill for Dominion Farms Limited in Siaya County location, from http://www.nema. go.ke

Duveskog, D. (2012). *Farmer Field Schools as transformative learning space in the rural African setting.* Doctoral thesis, Department of Urban and Rural Development, Swedish University of Agricultural Sciences, Uppsala.

Dweck, C.S. (2008). *Mindset: the new psychology of success*. New York: Ballantine Books.

East Africa Natural History Society (EANHS) (2018). Balancing Conservation and Development in Yala Wetland. Posted on January 30, 2018.

Envertek Africa Consult Limited (2015). Proposed sugarcane plantation and processing mill for Dominion Farms Limited in Siaya county location: reclaimed section of Yala Wetland on longitude 34.171380 east and latitude 0.022992 north in the flood plain of river Yala in Siaya and Bondo sub counties in Siaya county, Kenya. Environmental and Social Impact Assessment Report. Dominion Farms Limited.

Environmental Protection Agency (EPA) (1990). *Sites for Our Solid Waste - A Guidebook for Effective Public Involvement*. Environmental Protection Agency, USA. March 1990.

Ekirapa A. E & Kinyanjui, H. C. K. (1987). The Kenya Soil Survey. Ministry of Agriculture, National Soil Laboratories.

Fals- Borda, O. & Rahman, M. A. (1991). *Action and knowledge: Breaking the monopoly with Participatory Action-Research.* New York: The Apex Press.

Food Agriculture Organization of the United Nations (FAO) (1993). *Guidelines for Land Use Planning*. Rome, Italy

Food Agriculture Organization of the United Nations (FAO) (1997). *A Digital Soil Map of the World*. CDROM. Rome, Italy

Ferraz de Abreu, P.M.B. (2002). *New Information Technologies in Public Participation: A Challenge to Old Decision-Making Institutional Frameworks*. Doctoral dissertation, Massachusetts Institute of Technology.

Frankena, F. (1988). "The Emergent Social Role and Political Impact of the Voluntary Expert". *Environmental Impact Assessment* Rev. 1988; 8, pg. 73-82.

Freire Souto-Manning, M. (2010). *Freire, teaching, and learning: Culture circles across*

    *Contexts*. New York. Peter Lang.

French, W.L. & Bell, C.H. (1973). *Organization development: Behavioral Science Interventions for Organization Improvement*. Prentice-Hall, Englewood Cliffs.

Finlayson, C.M., Davidson, N.C., Spiers, A.G. & Stevenson, N. J. (1999). Global wetland inventory– status and priorities. *Marine and Freshwater Research* 50: 717-727.

Finlayson, C.M. & D'Cruz, R. (2005). Inland water systems. In: *Ecosystems and human well-being: Current state and trends*, eds., Hassan, R.; Scholes, R.; Ash, N. Findings of the Condition and Trends Working Group. Washington, DC, USA: Island Press. Pp. 551-584.

Friis-Hansen, E. & Duveskog. D. (2012). The Empowerment Route to Well-being: An Analysis of Farmer Field Schools in East Africa, *World Development*. 40(2): 414-427.

Gichuki J., Maithya, J., & Masai, D. M. (2005). Recent ecological changes in  Lake Sare, Western Kenya. *In:* (eds). Odada, E.O., Olago, D.O., Ochola, W., Ntiba, M., Wandiga, S., Gichuki, N., & Oyieke, H. *Proceedings of the 11$^{th}$ World Lakes Conference, Nairobi, Kenya.* **Vol II.** Ministry of Water and Irrigation; International Lake Environment Committee (ILEC).

Githui, F. W. (2009). *Assessing the impacts of environmental change on the hydrology of the Nzoia catchment, in the Lake Victoria Basin*. Doctoral dissertation. Vrije Universiteit, Brussels.

George, B. (2003). *Authentic leadership: Rediscovering the secrets to creating lasting value*. San Francisco, CA: Jossey-Bass.

Gordon, L.J., Finlayson, C.M., & Falkenmark, M. (2009). Managing water in agriculture for food production and other ecosystem services. *Agricultural Water Management*, doi: 10.1016/j.agwat.2009.03.017.

Government of Kenya (1987). Yala Wetland Reclamation and Development Project: Inception Report. The Government of Kenya and the Government of Netherlands. Lake Basin Development Authority.

Government of Kenya (1999). The Environment Management and Coordination Act (EMCA). Nairobi: Government Printer.

Government of Kenya (2007). Kenya Vision 2030 popular version. Retrieved on April 20,2016 from http://www.vision2030.go.ke/cms/ vds/Popular_Version.pdf

Government of Kenya (2009a). Sessional Paper on National Land Policy, Nairobi. Government Printer.

Government of Kenya (2009b). Kenya Population and Housing Census Vol 1A. Kenya National Bureau of Statistics, Nairobi.

Government of Kenya (2010a). Constitution of Kenya, 2010. Retrieved May 10, 2015, from http:// www.kenyalaw.org:8181/exist/kenyalex/actview. xql?actid=const2010

Government of Kenya (2010b). Schedule-Lake Kanyaboli National Reserve, Nairobi: Government Printer.

Government of Kenya (2011). The Urban Areas and Cities Act, No. 13 of 2011. Nairobi. Government Printer.

Government of Kenya (2012a). The National Land Commission Act, 2012. Nairobi. Government  Printer.

Government of Kenya (2012b). The County Governments (Amendment) Act, 2012. Nairobi. Government Printer.

Government of Kenya (2012c). The Intergovernmental Relations Act, 2012. Retrieved May 20,2015, from http://www.cickenya.org/index.php/ legislation/acts/item/227-the-intergovernmental-relations-act-2012

Government of Kenya (2012d). Physical Planning Act, 2012. www. kenyalaw.org.

Government of Kenya (2013a). National Environment Policy, 2013. Retrieved February 20, 2016, from http://faolex.fao.org/docs/pdf/ken147906.pdf

Government of Kenya (2013b). Wildlife Conservation and Management Act, 2013. Retrieved June 7, 2016 http://www.cickenya. org/index.php/legislation/acts/item/364-the-wildlife conservation-and-management-act-2013#. V4NVzvl97IU

Government of Kenya (2013c). The Agriculture, Fisheries and Food Authority Act, 2013. Nairobi. Government Printer.

Government of Kenya (2015a). The Environmental Management and Co-ordination (Amendment) Act, EMCA (2015). Retrieved May 10, 2015, from http://extwprlegs1.fao.org/docs/pdf/ken41653.pdf

Government of Kenya (2016a). Forest Conservation and Management Act 2016. Nairobi. Government Printer.

Government of Kenya (2016b). Community Lands Act 2016. Nairobi. Government Printer.

Government of Kenya (2016c). The  Climate Act 2016. Nairobi. Government Printer.

Government of Kenya (2016d). The Water Act 2016. Nairobi. Government Printer.

Government of Kenya (2019). Physical Planning Act, 2019. Nairobi. Government Printer.

Government of Kenya (2020). The Public Participation Bill 2020. Nairobi. Government Printer.

Government of Kenya -Japan International Cooperation Agency (2013). The Development of the National Water Master Plan 2030. Final Report Executive Summary. Government Printer.

Glass, J.J. (1979). "Citizen Participation in Planning: The Relationship Between Objectives and Techniques". *Journal of American Planning Association*, Vol. 45 No. 2, April 1979.

Greene, M. (1995). *Releasing the imagination: Essays on education, the arts, and social change*.  San Francisco: Jossey-Bass Publishers.

Graham, M. (1929). *The Victoria Nyanza and its Fisheries. A report on the fishing surveys of Lake Victoria (1927-28).*  London: Crown Agents Colonies.

Hahn, B. A. & Silverman, E. D. (2007). "Managing breeding forest songbirds with conspecific song playbacks." *Animal Conservation* 10.4: 436-441

Hardin, G. (1968). The tragedy of the commons. *Science* 162, 1243 – 1248.

Harrison, A., Schmidt, G., & Hauser, R. (2001). WWF's preliminary comments on Public Participation in the context of the Water Framework Directive and Integrated River Basin Management. WWF.

Hayombe, P.O. (2010). *Environmental planning and management implications of urban development within a city-lake interface: A case study of Kisumu municipality Kenya*. Doctoral dissertation, Moi University, Eldoret, Kenya.

Harmsen, H. (2018). Kenyan wetlands: going, going, gone. Technical Report February 2018. Wangari Maathai Institute for Peace and Environmental Studies| University of Nairobi.           Retrieved           July           1,           2019,           from https://www.researchgate.net/publication/323906128

Hartley, N &Wood, C. (2005). Public participation in environmental impact assessment: implementing the Aarhus Convention. *Environmental Impact Assessment Review,* 25, 319-340.

Heukelom, T. S (2011): "Dominion Farms: The intricacies of foreign agricultural investment in the Yala Wetland" *in The Link,* June 2011.

IAP2 (2008). International Association of Public Participation; Public Participation Spectrum. Retrieved March 6, 2018 from, http://www.iap2.org/associations/4748/files/spectrum.pdf.

ILACO (1983). Yala Integrated Development Plan: Design Report – Pilot Irrigation Project.

Innes, J.E. (1992). Group Processes and the Social Construction of Growth Management. Department of City and Regional Planning, University of California, Berkeley. *Journal of the American Planning Association*, Autumn 1992.

International Water Management Institute (IWMI) (2014). *Wetlands and people*. Colombo: IWMI.

International Union for Conservation of Nature (IUCN) SSC Antelope Specialist Group. (2016) Tragelaphus spekii. The IUCN Red List of Threatened Species 2016: e.T22050A50195827. Retrieved April 8,2017, from http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS. T22050A50195827.en.

IUCN (2009). Indigenous and community conserved areas: a bold new frontier for conservation. IUCN, Geneva, Switzerland.\ Retrieved July 7, 2019, from www.iucn.org/about/union/commissions/ceesp/topics/governance/icca/

IUCN (2018). Protected planet report. IUCN, Geneva, Switzerland. IUCN (2009). Indigenous and community conserved areas: a bold new frontier for conservation. IUCN, Geneva, Switzerland. Retrieved September 1, 2018, from www.iucn.org/about/union/commissions/ceesp/topics/governance/icca/

IUCN, UNEP. "WWF (International Union for the Conservation of Nature, United Nations Environment Programme and World Wide Fund for Nature) (1991)." *Caring for the earth: a strategy for sustainable living*.

Involve (2005). *People and Participation: How to Put Citizens at the heart of Decision-Making*. London: Involve. Retrieved April 3, 2015, from http://www.involving.org/

IYSLP (2017). *International Yearbook of Soil Law and Policy 2016*. Springer Science and Business Media LLC.

Jacobs, J. (1961). *The Death and Life of Great American Cities.* New York: Vintage Books.

Jacobson, N. (2006). Tenure, diversity and commitment: Community participation for urban service provision, *Journal of Development Studies*, 40(3), 1-26.

JICA (1987). The Study of Integrated Regional Development Master Plan for the Lake Basin Development Area. Japan International Cooperation Agency.

JICA (2013). Development of the National Water Master Plan 2030. Workshop on Report. JICA, Nairobi, Kenya.

Joanaz de Melo, J. (1993). "Metodologia de decisão, informação e consulta publica para ainstalação do sistema de gestão de residuos perigosos em Portugal". João Joanaz de Melo, Conceição Martins, Marlene Marques. GEOTA - Grupo de Estudos de Ordenamento do Territorioe Ambiente, para o Ministerio de Ambiente e Recursos Naturais, Portugal, Dezembro 1993.

Johnson, R.A (1976). *Management, systems, and society: An introduction.* California: Goodyear Publication Company.

Kansiime, F., Saunders, M. J., & Loiselle, S. A. (2007). Functioning and dynamics of wetland vegetation of Lake Victoria: an overview. *Wetlands Ecology and Management*, *15*(6), 443-451.

Kareri, R.W. (1992). The sociological and economic values of Kenya's wetlands. In Crafter, S.A., Njuguna, S. G and Howard, G. W. eds., 1992. Wetlands of Kenya. *Proceedings of the Kenya Wetlands Working Group Seminar on Wetlands of Kenya*, National Museums of Kenya, Nairobi, Kenya 3-5 July 1991.

Kenya Wildlife Service (2010). Resource Mapping Lake Kanyaboli Ecosystem. Nairobi: KWS.

Kenya National Bureau of Statistics (KNBS) (2010). 2009 Population and Housing Census. Nairobi: Government Printer.

Kenya National Bureau of Statistics (KNBS) (2020). 2019 Population and Housing Census. Nairobi: Government Printer.

Kenya Wetland Forum (2006). Rapid assessment of the Yala Wetland. East African Wildlife Society, Nairobi, Kenya.

Kenya Forestry Research Institute (KEFRI) (2015). Participatory Rapid Appraisal Learning of Yala Wetland Siaya County, January 2015, Kakamega, KEFRI.

Khan, S. M. & Hannan, M. (2011). *Participatory wetland resource governance in Bangladesh: an analysis of community-based experiments in Hakaluki Haor*. AGRIS. FAO.

Kiluva, V., Mutua, F., Makhanu, S. & Ong'or, B., (2011). Rainfall runoff modeling in Yala River Basin of Western Kenya. *Journal of Meteorology and Related Sciences*. Special Issue Volume 5(1).

Kinaro, Z. (2008). *Wetland Conversion to large-scale agricultural production; implications on the livelihoods of rural communities, Yala Wetland, Lake Victoria Basin, Kenya*. Unpublished MSc. Thesis; Linköping University, Sweden.

Kitchin, R. (1998). 'Towards Geographies of Cyberspace' *Progress in Human Geography 22(3):385-406.*

Kituyi, E., & Wakhungu, J. W. (2004). Harnessing life cycle approaches for Africa's development: institutional and policy challenges (No. 12). *ACTS Press*.

Krhoda, G.O. (1992). The Hydrological functions of wetlands: in crafter, S.A, Njuguna S.G. and Howard, G.W (Eds 1992), Wetlands of Kenya. *Proceedings of the Kenya Wetlands Working Group Seminar on Wetlands of Kenya*, National Museums of Kenya, Nairobi, Kenya 3-5 July 1991, pp 183.

Krueger R.A., Casey M.A. (2008). *Focus Groups*: *A Practical Guide for Applied Research* (4th ed.). Los Angeles: Sage Publications.

Kumar, R. (2011). *Research Methodology*: *A step-by-Step Guide for Beginners* (3rd ed.). London: Sage Publications.

Lake Basin Development Authority (LBDA) (1989). Reclaiming the Yala Wetland. *Resources* 1(1):9-11.

Lee, N. (2000). Reviewing the quality of environmental impact assessment in Africa. In Environmental Assessment in Developing and Transitional Countries, eds. Lee, N. and George, C. Chichester: John Wiley and Sons.

Leggo, C. (2008). Astonishing silence. Handbook of the arts in qualitative research. *Canadian Journal of Education.* (41)1: 165-174.

Lehner, B., & Döll, P. (2004). Development and validation of a global database of lakes, reservoirs and wetlands. *Journal of Hydrology* 296(1-4):1-22.

Lewin, K. (1946).  Action Research and Minority Problems. *Journal of Social Issues* 2(4): 34-46.

Lewin, K. (1958). *Group Decision and Social Change*. New York: Holt, Rinehart and Winston.

Lightfoot, C. (2002). Catalytic action for the emergence of farmer empowerment for 'Demand driven' extension: experiences from East Africa. Volume 3, Demand-Driven Approaches to Agricultural Extension. In: W.M. Rivera & G. Alex (eds.), *Extension Reform for Rural Development 3:16-22.* Washington DC: The World Bank.

Lihanda M., Aseto O., & Atera, F.  (2003). Environmental Assessment Study Report of the Proposed Rice Irrigation Scheme at Yala Wetland – Socio-cultural and Economics Survey, Vol. III.

Lillesand, T. M., & Kiefer, R. W. (1987). *Remote sensing image interpretation* (2nd ed.). Chichester and New York: John Wiley.

Lincoln, Y., & Guba, E. (1985). *Naturalistic Inquiry*. New York: Sage Publications.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology* 140:1-55.

Liverman, D.; Moran, E.F.; Rindfuss, R.R; & Stern, P.C (Eds.*) (*1998*).* People and Pixels: Linking Remote Sensing and Social Science**.** Committee on the Human Dimensions of Global Change, National Research Council. Washington DC. National Academy of Sciences

Lockie, S. & Sonnenfeld, D. A (2008). Communities, natural resources, and environments: African and Asian experiences. *Local Environment*. 13(5):385-391.

Luedeling, E., (2011). Climate Change Impacts on Crop Production in Busia and Homa Bay. Kenya World Agroforestry Centre.

Macharia, J. M, Thenya, T. & Ndiritu, G.G. (2010). "Management of highland wetlands in central Kenya: the importance of community education, awareness and eco-tourism in biodiversity conservation", *Biodiversity*, 2010.

MacOpiyo, L.A (2005). *Spatially explicit, individual-based modelling of pastoralists' mobility in the Rangelands of East Africa*. Doctoral dissertation, Texas A&M University.

McCay, B.J. & Acheson, J. (1987). (Eds). *The Question of the Commons: The Culture and Ecology of Communal Resources*. Tucson: University of Arizona Press.

Melton, J. R., Wania, R., Hodson, E.L., Poulter, B. (2013). Present state of global wetland extent and wetland methane modelling: conclusions from a model inter-comparison project (WETCHIMP). *Biogeosciences*, 10, 753–788.

Mertz, N.T., & Anfara, Jr., V.A. (2006). Conclusion: Coming in full circle. In: V.A. Anfara, Jr. & Mertz, N.T. (Eds.). *Theoretical frameworks in qualitative research*, Thousand Oaks, CA: Sage, p189-196.

Mezirow, J. (1991). *Transformative dimensions of adult learning and fostering critical Reflection in adulthood: a guide to transformative and emancipatory learning.* San Francisco: Jossey Bass Publication.

Mezirow, J. (1995). Transformative Theory of Adult Learning. In: Welton, M. (Ed.). *Defense of the Lifeworld*. Albany: State University of New York Press.

Mezirow, J. (1996). Contemporary Paradigms of Learning. *Adult Education Quarterly* 46:158-172.

Mezirow, J. (1997). Transformative Learning: Theory to Practice. *New Directions for Adult and Continuing Education 74*:5–12.

Michener, V. (1998). The Participatory Approach: Contradictions and co-option in Burkina Faso. *World Development* 26 (12): 2105-2118.

Millennium Ecosystem Assessment (MEA) (2005). *Ecosystems and human well-being: wetlands and water*. World Resources Institute.

Mitsch, W.J. and Gossellink, J.G. (2009). The value of wetlands: Importance of scale and landscape setting. *Ecological Economics*, 35 (1): 25-33.

Mitsch, W. J., and Gosselink, J.G (2015). *Wetlands*. John Wiley & Sons.

Miriti, E.M. (2016). *Assessment of effectiveness of community participation in the management of Ondiri Swamp, Kiambu county*. Unpublished Master's Thesis, University of Nairobi.

Monkelbaan, J. (2019). *Governance for the Sustainable Development Goals*. Springer Science and Business Media LLC, 2019.

Muoria, P., Field R., Matiku, P., Munguti, S., Mateche, E., Shati, S. (2015). Yala Wetland Ecosystem Service Assessment. Siaya and Busia County Governments.

Mulwa, R. K. (2012). *Spatial and temporal fluctuations in bird communities along a forest-farmland gradient in western Kenya.* Doctoral dissertation Johann Wolfgang Goethe University Frankfurt, Germany.

Mulwa, R. K., Njagi, E., Adhola, T., Kosgei, G., Chesire, D., Mateche, E. (2014). Baseline biodiversity survey at the Yala Wetland complex. Technical Report. Nature Kenya.

Mulwa, R., Opaa, B., Mnyamwezi, E., Nyangena, J., Malombe, I., Malonza, P. (2015). Baseline information report towards developing a strategic environment assessment and land use plan for the Yala Wetland ecosystem. Nature Kenya.

Murgor, K. D. (2015). *Farmers access to climate and weather information and its impact on maize and wheat production in Uasin Gishu County, Kenya*. Doctoral dissertation, University of Eldoret, Kenya.

Nasongo, A. A. S., Zaal, F., Dietz, T., & Okeyo-Owuor, J. B. (2015). Institutional Pluralism, access and use of wetland resources in Nyando papyrus, Kenya. *Journal of Ecology and the Natural Environment*. Vol 7(3), 56-71.

Narayan, D. (2002). Empowerment and Poverty Reduction: A Sourcebook. Washington DC: The World Bank.

Nature Kenya (2009). Yala Wetland Important Bird Area Conservation. Nature Kenya.

NEMA (2016). Yala Wetland Integrated Management Plan (2016-2026): Enhancing Environmental Management through Devolved Governance. Nairobi: NEMA

Neuman, W. L. (1997). *Social Research Methods: Quantitative and Qualitative Approaches* (3rd ed.) Boston. MA: Allyn and Bacon.

Newaz, M.W & Rahman, S. (2019). Wetland resource governance in Bangladesh: An analysis of community-based co-management approach. *Environmental Development,* 32, (1-12).

Niskanen, A., & Väyrynen, J. (1999). *Regional forest programmes*. European Forest Institute.

Nissan, M. (1997). Ten cheers for interdisciplinarity: The case for interdisciplinary knowledge and     research. *The Social Science Journal*, *34* (2), 201-216.

Njiru, M., Waithaka, E., Muchiri, M., van Knaap, M., & Cowx, I. G. (2005). Management of Lake Victoria fisheries. Exotic introductions to the fishery of Lake Victoria: What

are the management options for lakes and reservoirs: *Research and Management, 10*, 147-155.

Obiero K. O., Philip O. Raburu., J. B. Okeyo-Owuor. and Raburu, E (2012). Community Perceptions on the Impact of the Recession of Lake Victoria Waters on Nyando Wetland. *Scientific Research and Essays* Vol. 7(16), pp. 1647-1661.

Odero, D.O. (2015a). *Promoting Community Participation in Transboundary Natural Resource Management in Mt Elgon Ecosystem using Geographic Information Systems: Case study of Mount Elgon Regional Ecosystem Conservation Programme*. Graduate Seminar Paper, University of Eldoret.

Odero, D.O. (2015b). *The Application of Remote Sensing in Community Participation for Managing Mt Elgon Transboundary Natural Resources: Case study of Mount Elgon Regional Ecosystem Conservation Programme*. Graduate Seminar Paper, University of Eldoret.

Odero, D.O. (2020). Yala Swamp Indigenous and Community Conservation Area Management Plan 2019-2029. Yala ICCA.

Odhengo, P., Matiku, P., Waweru, P., Guda, D., Kinara, T., Kathike, S., (2014). Tana River Delta land Use Plan. The Tana River and Lamu County Governments

Odhengo, P., Matiku, P., Muoria, J, K., Nyangena, J., Waweru, P., Munguti, S. (2015). Yala Wetland Strategic Environmental Assessment, Version (7).

Odhengo, P., Matiku, P., Muoria, J, K., Nyangena, J., Wawereu, P., Mnyamwezi, E. (2018a). Yala Delta Strategic Environmental Assessment. Siaya and Busia County Governments, Siaya and Busia.

Odhengo, P., Matiku, P., Muoria, J, K., Nyangena, J., Wawereu, P., Mnyamwezi, E. (2018b). Yala Delta Land use Plan. Siaya and Busia County Governments, Siaya and Busia.

OECD (2001). Citizens as Partners: Information, Consultation and Public Participation in Policymaking. Paris, France.

OECD (1996). Guidelines for aid agencies for improved conservation and sustainable use of tropical and sub-tropical wetlands. Technical Report. Organization for Economic Co-operation and Development, Paris, France.

ODPM (2004). *Models of Participation-the spectrum.*

Ogello, E. O., Obiero, K., & Munguti, J. M. (2013). Lake Victoria and the Common Property Debate: Is the Tragedy of the Commons a Threat to its Future? *Lakes, Reservoirs and Ponds*, Vol. 7(2), 101-126.

Ogutu M. A. (1987a). Fisheries and fishing. Siaya District Socio-Cultural Profile. Ministry of Planning and National Development and Institute of Agricultural Studies, University of Nairobi, Republic of Kenya, Kenya, pp. 86-105.

Ogutu, M.A. (1987b). Fisheries and fishing. Pages 86-105. In: *Republic of Kenya (1987) Siaya District Socio-cultural Profile*. Ministry of Planning and National Development and Institute of Agricultural Studies, University of Nairobi, Kenya.

Ondere, L. A. (2016). *Spatial-temporal changes of landcover types in response to anthropogenic dynamics in Yala Wetland, Siaya County, Kenya*. Master's dissertation, Kenyatta University, Kenya.

Onywere, S.M., Getenga, Z.M., Mwakalila, S.S., Twesigy, C.K., & Nakiranda, J.K (2011). Assessing the Challenge of Settlement in Budalangi and Yala Wetland Area in Western Kenya Using Landsat Satellite Imagery. *The Open Environmental Engineering Journal,* 4, 97-104.

Okello, N., Beevers, L. Douven, W. & Leentvaar, J. (2009). The doing and un-doing of public participation during environmental impact assessments in Kenya. *Impact Assessment and Project Appraisal Journal*, 27 (3)217-226.

Okungu, J., & Sangale, F., (2003). Water quality and hydrology of Yala Wetlands. ECOTOOLS Scientific Workshop on Yala Wetland. Switel Hotel, Bondo, Kenya. 9th–10th December.

Okondo, P. (1989). The Yala Wetland is Useless. *Resources* 1:16-19.

Olsen, B. (2008). Introducing teacher identity and this volume. *Teacher Education Quarterly*, 3-6.

Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups.* Havard Economic Studies 124. Cambridge, M.A. Havard University Press.

Osumo, W. (2006). "Effects of physical mixing on the environment of satellite lakes and dams of Lake Victoria, Kenya." *Proceedings* volume II: 183.

Organizational Research Services (ORS) (2004). Theory of Change: A Practical Tool For Action, Results and Learning prepared for Annie E. Casey Foundation (*www.aecf.org and www.organizationalresearch.com).*

O'riordan, T., & Jordan, A. (1995). The precautionary principle in contemporary environmental politics. *Environmental Values*, *4*(3), 191-212.

Otieno, M. N., Odenyo, V. O. A., & Okeyo, J. B. (2001). The capabilities of multispectral Landsat TM for mapping spatial landscape characteristics of a tropical wetland. The case of Yala Wetland, Kenya. *In Proceedings of LVEMP, First Regional Scientific Conference 3rd-7th December 2001*, Kisumu, Kenya.

Otieno, M.N (2004). *Mapping Landscape Characteristics of Yala Wetland, Kenya*. Unpublished master's dissertation, Moi University.

Owiyo, P., Bor, E. K., & Sutter, P. (2014). The Effect of Dominion Irrigation Project on Environmental Conservation in Yala Swamp, Siaya District, Kenya. *International Journal of Science and Research*, *3*(10), 83-86.

Owuor, J. B., Raburu, P. O., & Kwena, F. (2012). Community based approach to the management of Nyando wetland, Lake Victoria Basin, Kenya.

OSIENALA, (1998). Lake Kanyaboli Conservation and Rehabilitation Program. Draft Report, October 1998. Kisumu.

Osumba, J., Okeyo-Owuor, J. and Raburu, P., (2010). Effect of harvesting on temporal papyrus (Cyperus papyrus) biomass regeneration potential among swamps in Winam Gulf wetlands of Lake Victoria Basin, Kenya. *Wetlands Ecology and Management,* 18(3): 333-341.

Ostrom, E. (1990). *Governing the commons: The Evolution of Institutions for collective action.* New York: Cambridge University Press.

Patton, M. (1990). *Qualitative evaluation and research methods*. Beverly Hills: Sage.

Piaget, J. (1950). *The Psychology of Intelligence. London*: Routledge and Kegan Paul.

Pretty, J. (1995). *Regenerating Agriculture*. London: Earthscan Publications Ltd.

Raburu, P.O. (2012). Conservation and rehabilitation of Kanyaboli wetland, Kenya. In Streever W.J (EDs). An International Perspective on Wetland Rehabilitation. Springer Science & Business Media, 6 December 2012 - *Technology &Engineering*. 167-172.

Raburu, P.O. Okeyo-Owuor, J.B. and Kwena, F. (2012). *Community Based Approach to the Management of Nyando Wetland, Lake Victoria Basin, Kenya.* Nairobi: First Edition Printers.

Ramsar Convention on Wetlands (1996). Resolution VI.1: Working definitions of ecological character, guidelines for describing and maintaining the ecological character of listed sites, and guidelines for operation of the Montreux Record. 6th Meeting of the Conference of the Contracting Parties, Brisbane, Australia, March 19-27, 1996. Retrieved May 30, 2017, from www.ramsar.org/cda/en/ramsar-documents-resol-resolution-vi-1-working/main/ramsar/1-31-107%5E20929_4000_0

Ramsar (1971a). The Ramsar Convention Definition of Wetland and Classification System for Wetland Type. Rue Mauverney 28, CH 1196 Gland, Switzerland. Retrieved May 30, 2015, from http://www.ramsar.org

Ramsar (1971b). What are Wetlands? Ramsar Information paper no.1. accessed on June , 2017 from https://www.ramsar.org/sites/default/files/documents/library/info2007-01-e.pdf

Ramsar Convention Secretariat (2016). *An overview of the Ramsar Convention*. Gland, Switzerland.

Reason, P. (Ed). (1994). *Participation in human inquiry*. London: SAGE.

Reconcile (n.d). *How to invest on a Multi-User Natural Resources without Conflicts: A case study of Yala Wetland*. Nakuru : Reconcile.

Rhydderch. M.G., Elwyn, M.& Marshall, R. G. (2004). Organisational change theory and the use of indicators in general practice. *Quality and Safety in Healt*h 13;213-217, from http://www.bmjjournals.com/subscriptions

RIVM/UNEP (1997). The Future of the Global Environment: A model-based Analysis Supporting UNEP's First Global Environmental Outlook.

Ruthenberg, H. (1976). *Farming systems in the tropics* (2nd ed.). Oxford, England: Oxford University Press.

Sandelowski, M. (1995). Sample size in qualitative research. *Journal of Research in Nursing and Health,*18(2):179-183.

Sangale, F., Okungu, J., & Opango, P. (2012). Variation of flow of water from Rivers Nzoia, Yala and Sio into Lake Victoria. Ministry of Environment and Natural Resources (LVEMP).

Scharmer, C. O. (2016). *Theory U: Leading from the Future as It Emerges*. Oakland, CA: Berrett-Koehler Publishers

Scharmer, C. O. (2009). *Theory U: Learning from the Future as it Emerges*. Berrett-Koehler: San Francisco.

Schmidt, H. & Jaetzold, R. (1982). Farm management handbook of Kenya (No. 630.96762 JAE v. 2. CIMMYT).

Seegers, L.; De Vos, L. & Okeyo, D.O. (2003). Annotated checklist of the freshwater fishes of Kenya (excluding the lacustrine haplochromines from L. Victoria). *East African Natural History Society*, 92, pp.11–47.

Semenov, M.A., (2008). Simulation of extreme weather events by a stochastic weather generator. *Climate Resources,* 35(3): 203-212.

Sen, A. (1999). *Development as Freedom*. Oxford: Oxford University Press.

Senge, P. (1990). *The fifth discipline: The art and practice of organizational learning.* New York

Shamir, B., & Eilam, G. (2005). "What's your story?" A life-stories approach to authentic leadership development. *Leadership Quarterly*, 16, 395–417

Simonit, S., and Perrings, C. (2011). Sustainability and the value of the 'regulating' services: Wetlands and water quality in Lake Victoria. *Ecological Economics* **70:** 1189–1199.

Smith, S. (2002). Participatory Approaches Using Geographic Information (PAUGI): Towards a Trans-Atlantic Research Agenda. *5th AGILE Conference on Geographic Information Science*, Palma (Balearic Islands, Spain) April 25th-26th, 2002.

Smith, S. (2006). Theories of Digital Participation (Ch. 3). In Campagna M. (Ed.). *GIS for Sustainable Development*. London; CRC/Taylor & Francis.

Stec, S., Casey-Lefkowitz, S. & Jendroska, J. (2000). The Aarhus Convention: An implementation guide. Geneva: United Nations Economic Commission for Europe. Retrieved April 20, 2018, from http://www.unece.org/env/pp/acig.pdf>

Stuart, G. (2017). What is the Spectrum of Public Participation? Retrieved June 30,2020, from https://sustainingcommunity.wordpress.com/2017/02/14/spectrum-of-public participation

Stringer, E. T. (1999). *Action research.* United States of America, SAGE Publications.

Schuyt, K. & Brander, L. (2004). *The economic values of the world's wetlands*. Gland Switzerland: WWF.

Sen, G. (1997). *Empowerment as an approach to poverty*. Bangalore: Indian Institute of Management.

Shadrack K.R., (2013). Factors involving level of community participation on restoration of Kenyan wetlands: a case study on Yala Wetland.

Shepherd, G. (2004). *The ecosystem approach: five steps to implementation*. Gland : IUCN.

Sonja, B., Miguel, A., Esther, A., Kai, B., Donovan, K., Christine, K, Constanze, L. (2016). A rapid assessment of anthropogenic disturbances in East African wetlands. *Ecological Indicators*, 67:684–692, 2016. ISSN 1470160X. doi: 10.1016/j.ecolind.2016.03.034.

Spiers, A. G. (1999) "Review of international/continental wetland resources." Global review of wetland resources and priorities for wetland inventory (1999): 63-104.

Springate-Baginski, O., Allen, D. and Darwall, W.R.T. (eds.) (2009). *An Integrated Wetland Assessment Toolkit: A guide to good practice*. Gland, Switzerland: IUCN and Cambridge, UK: IUCN Species Programme xv.

Strauss, A. & Corbin, J. (1990). *Basics of qualitative research: grounded theory procedures and techniques.* Newbury Park, CA: Sage.

Taylor, E. W. (2007). An update of transformative learning theory: a critical review of the empirical research (1999-2005). *International Journal of Lifelong Education* 26: 173-191.

Thenya, T. (2006), Analysis of Mycrophyte Biomass Productivity, utilization and impacts of various ecotypes of Yala Wetland, Lake Victoria basin, Kenya. *Ecology and Development Series* No.45, Cuvillier Verlag Gottingen.

Thenya, T., Wassmann, R., Verchot, L. & Mungai, D. (2001). Degradation of the riparian wetlands in the Lake Victoria basin - Yala Wetland case study. Retrieved  March 28, 2016,                                                                                    from http://www.indiaenvironmentportal.org.in/files/file/riparian%20wetlands%20in%20the%20Lake%20Victoria%20basin.pdf

Thenya, T., & Ngecu, W.M. (2017). Dynamics of resource utilisation in a tropical wetland, Yala Wetland, Lake Victoria Basin: Statistical analysis of land use change. *International Journal of Science Arts and Commerce Vol.2 No.3, May-2017:12-38.*

Thomas, D., Kariuki, M., Magero, C. & Schenk, A. (2016). Local people and Tool For Action, Results and Learning prepared for Annie E. Casey Foundation (*www.aecf.org and  www.organizationalresearch.com)*

Turkheimer, E., Haley, A., Waldron, M., D'Onofrio, B & Gottesman, I. (2003). Socioeconomic Status Modifies Heritability of IQ in Young Children. https://doi.org/10.1046/j.0956-7976.2003.psci_1475.x

Turner, B. L. II. (1998). *Frontiers of Exploration: Remote Sensing and Social Science Research.*, Pecora 13 Symposium, Human interaction with the Environment: Perspectives from Space (August 20-22, 1996, Souix Falls, SD), pp. 15-19.

UN (2015). The Sendai Framework for Disaster Risk Reduction 2015–2030, Adopted at the *Third United Nations World Conference on Disaster Risk Reduction*, held from 14 to 18 March2015 in Sendai, Miyagi, Japan.

UNEP (2020). Wetlands and biodiversity is the theme for Wetland 2020. Retrieved April 4, 2020, from  https://www.unep.org/news-and-stories/story/wetlands-and-biodiversity-theme-world-wetlands-day-2020

UNEP (2016). Online Learning Opportunity Ecosystems Approach. Retrieved August 4, 2016,from http://web.unep.org/ecosystems/news/events/online-learning-opportunity-ecosystems-approach

UNEP 2020. Wetlands and biodiversity is the theme for Wetland 2020. https://www.unep.org/news-and-stories/story/wetlands-and-biodiversity-theme-world-wetlands-day-2020

UNESCO (2011). Sacred Mijikenda Kaya Forests. Retrieved July 14, 2018, from http://whc.unesco.org/en/list/1231

United Nations (2015). Sustainable Development Goals. UN. Retrieved May 5,2016, from https://www.un.org/development/desa/disabilities/envision2030.html

University World News (UWN) (2014). New Partnership to support 10,000 new PhDs in Africa. July 11, 2014 Issue No: 328.

Van Dam, A. A., Kipkemboi, J., Mazvimavi, D., & Irvine, K. (2014). A synthesis of past, current and future research for protection and management of papyrus (Cyperus papyrus L.) wetlands in Africa. *Wetlands Ecology and Management*, *22*(2), 99-114.

Van Heukelom, S. T. (2013). Security: *The controversy of foreign agricultural investment in the Yala Wetland, Kenya*. Doctoral Thesis. Centre for International Security Studies, Business School University of Sydney.

Vasconcelos, L.T. (1993). *Difficulties in Integrating 'Hostile' Data in Environmental Decisions: the case of the new bridge over the Tagus river*. ACSP.

Vlachos, E. (1993). *"North American Experiences with Public Participation"*. Colorado State.

Von Bertalanffy, L. (1968). General system theory. *New York*, *41973* (1968), 40.

Waweru, P. and Muoria, P. (2015). Yala Wetland Land Use Planning Framework. Nairobi. Nature Kenya.

Wehling, P. (2020). Nile Water Rights. Springer Science and Business Media LLC,

White, S. (1996). Levels of Participation. Retrieved June 30, 2020, from **https://www.participatorymethods.org/method/levels-participation**

Wilson, D.C. (2003). Community Development Tradition and Fisheries Co-management: In Wilson, D.C., Nielsen J.R., Degnbol, P. 2003 *The Fisheries Co-management Experience, Challenges and Prospects.* Kluwer Academic Publishers.

Witte, F., & Van Densen, W. L. (1995). Fish stock and fisheries of Lake Victoria: a handbook for field observations.

Wood, A., Hailu, A., Abbot, P., Dixon, A., (2002). Sustainable management of wetlands in Ethiopia: Local knowledge versus government policy. In: Gawler, M. (ed.), Strategies for wise use of wetlands: best practices in participatory management. *Proceedings of 2nd International Conference on Wetlands and Development*, Dakar, Senegal. Wetlands International IUCN, WWF Publications No. 56, Wageningen, The Netherlands.

World Bank (1998). Participation and civil engagement group. Retrieved November 1, 2016, from http/www.worldbank.org/participation/

World Bank (1999). Report from the International Workshop on Community-Based natural Resource Management (CBNRM), Washington, DC, 10–14 May 1998. Retrieved June 6, 2015, from http://www.worldbank.org/wbi/conatrem/

World Bank (2002). Indicators of Public Participation Effectiveness. Washington DC. The World Bank.

WWF (2006). Community-based Natural Resource Management Manual. Nairobi: WWF.

WWF (2012). Thematic Education for Sustainable Development Resource Booklet For Schools in the Lake Victoria Basin. Nairobi: WWF.

WWF (2013). Education for Sustainable Development. ESD Model Schools Report. Nairobi: WWF.

Yin, R. K. (2009). *Qualitative research from start to finish*. Guilford Publications.

Zsuffa, I., Van Dam, A. A., Kaggwa, R. C., Namaalwa, S., Mahieu, M., Cools, J., & Johnston, R. (2014). Towards decision support-based integrated management planning of papyrus wetlands: a case study from Uganda. *Wetlands Ecology and Management*, 22(2), 199-213.

**APPENDICES**

**APPENDIX I: PHOTO GALLERY OF RESEARCH PROCESS AND OUTCOMES IN YALA**

**All Photos in appendix 1 were taken by the Researcher.**



Plate 7.1: Public participation training workshop group photo at Distinction Gardens Siaya January 25-26, 2018. The County Secretary and the CEC Finance officially opened the training.
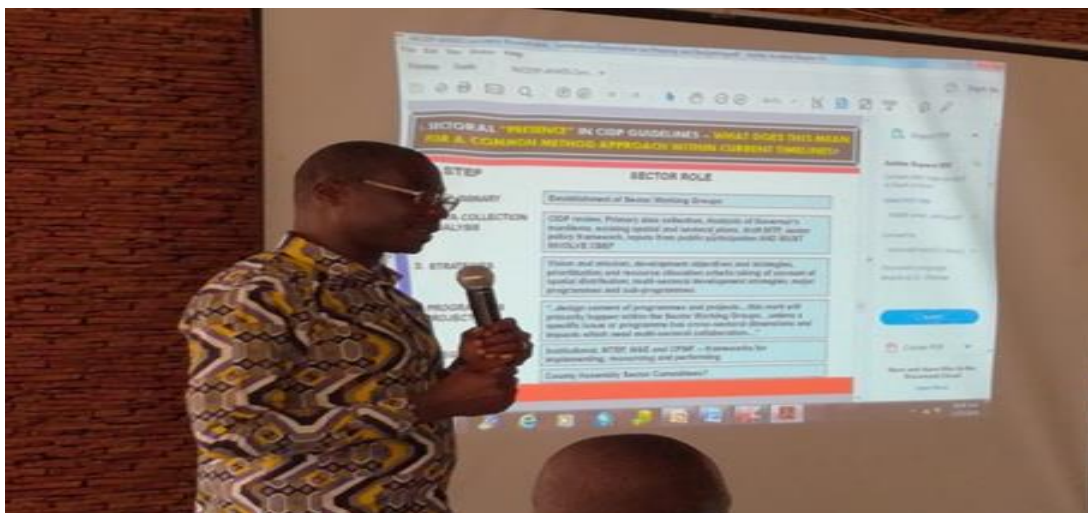


**Plate 7.2 Lead Consultant and Researcher taking participants through CIDP development Process.**

**Figure 7.3: CIDP public Participation conducted in 30 wards**



**Plate 7.4: Sample pairwise raking for problems facing the fishing communities**

**Plate 7.5 Presentation of sector working group feedback to the CIDP public consultation in Boro, West Alego sub-county.**



**Plate 7.6: Siaya CECM Education public participation feedback session**

(Source Author)

**Plate 7.7  Stakeholder who attended the public consultation included politicians, leaders of women groups and retired professionals from Sigomore the ward**



**Plate 7.8 Member of County Assembly of East Asembo addressing participants after submission of their aspirations to CIDP secretariat.**

**APPENDIX II. DATA COLLECTION TOOLS**

**A FRAMEWORK TO OPTIMIZE COMMUNITY PARTICIPATION IN THE MANAGEMENT OF YALA WETLAND ECOSYSTEM, IN LAKE VICTORIA BASIN, KENYA**

**1.0 PREAMBLE**

Enabling local communities living around natural resources to contribute ideas, knowledge, skills, labour and to participate in managing these resources is key to attaining sustainable development. Public participation that targets local communities provides a mechanism for such involvement.

**2.0 TOOL 1: FOCUS GROUP DISCUSSION GUIDE FOR COMMUNITY ORGANISATIONS**

**THEME: BUILDING A BETTER YALA WETLAND VISIONING BY COMMUNITY ORGANISATIONS**

**1.0 INTRODUCTION**

Dear Sir/Madam

The County Governments of Siaya and Busia in collaboration with the National Government and key stakeholders are in the process of facilitating development of a comprehensive **Yale Swamp Land Use Plan** and thereafter oversee its implementation. This will ensure sustainable livelihoods for local communities and ensure the environment is taken for care for posterity. As a result, the **planning team research wing** is inviting your participation in the process. We have identified your organization as a critical group to help with analysing the management of and envisioning the future of Yala Wetland and its immediate environs and how to implement it successfully.

**PART 1: Historical and Contextual Information**

Identify community members who can provide information about the history of the swamp. This will be reviewed and triangulated with other submissions.

**A: Identification of respondents**

i.      Name of the Group------------------------------------
ii.     ii. Location -------------------------------------------------
iii.    iii. Village name------------------------------------------
iv.     Distance from the Wetland-----------------------------

**B: Demographic and Socio-Economic Information of respondents**

i.      (a)Name of the Leader of the group---------------------(b)-Gender (M /F) ------
ii.     (a) Age ------------ ------------------------(b) Highest education level attained ---
iii.    What do you do for a living---- -------------------------------------------------------?
iv.     What is your average total income per year (in Kshs) -----------------------------------
v.      For farming what type of farming do you practice (subsistence or commercial, semi-commercial);
vi.     What is the size of your farm in acres---------------------------------? vii. How are the various activities of the farm distributed (land use types and areas allocated for each)

### C: WETLAND MANAGEMENT

i.  How satisfied are you with the current management of Yala Wetland?

        Very satisfied   --- --Satisfied          ---Somewhat satisfied   Not satisfied -Very dissatisfied

Explain your response above-------------------------------------------------------------------------
How satisfied are you with your current use of the land in Yala Wetland?

Very satisfied   --- --Satisfied        ---Somewhat satisfied   Not satisfied ---Very dissatisfied

Explain your response above-------------------------------------------------------------------------

iii. What could be done to create your ideal land use for Yala Wetland? ---------------------

### D: COMMUNITY LEADERS GIVING HISTORICAL INFORMATION

i. Who owns Yala Wetland?  (legal and legitimate) ---------------------------------------------

ii. What are the significant events/milestones of the community that have happened in relation to Yala Wetland?

e.g.  How did the swamp come about? What changes you have witnessed over time?

-------------------------------------------------------------------------------------------------

iii. What are the key challenges of Yala Wetland with respect to use of wetland resources, conservation and management?

a. How would you as a community member quantify population increase in the last 30 years? Do community members see this as a challenge? How has it manifested itself? Are there any conflicts?

b. Has the swamp shrank in extent in the recent years?------------------------------------------

c. Have the outer boundaries changed (apart from the reclaimed sections)? Quantifiable? Sketch the map ----------------------------------------------------------------------------------------

d. What are some of the Indigenous knowledge tools that have been used to maintain the swamp healthy so that it continues to provide its services for all that depend of the swamp?

--------------------------------------------------------------------------------------------------

## C: STORY TELLING SESSION ON YALA WETLAND

A. Storytelling: Thinking back on your years, please share a high point when you were very happy with Yala Wetland

B. What do you love most about this Yala Wetland community?

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C. What first drew you here and what has most encouraged you to be here?

--------------------------------------------------------------------------------------------------

D. What do you consider some of the most significant trends, events, and developments shaping the future of this Yala Wetland community?

i. Trends----------------------------------------------------------------------------------------

ii. Events---------------------------------------------------------------------------------------

iii. Developments--------------------------------------------------------------------------------

E. Who are the local communities of Yala Wetland as far back as you can remember? State where they used to reside? Explain their migration patterns ------------------------------------

F. What do local communities **value most** about Yala Wetland as a resource?

--------------------------------------------------------------------------------------------------

G. Who are the key influencers (those who determine how things are done and may not be in the position of authority e.g. housemaid, watchman, spouse of an elder) and key power holders (those with authority to do certain things on behalf of the group (e.g. a chief, head teacher, MCAs, Governor) in the Yala Wetland community issues.

ii. Where are their present/available (location, village, contact details e.g. phone/e-mail/nearest phone access to leave them a message). --------------------------------------------

**G. What is the extent of communities' participation in Strategic Environmental Assessment (SEA) and Land Use Plan(LUP) processes? ----------------------------------**

i. Explain your level of involvement and your recommendations for improving your participation in the SEA/LUP process? **-----------------------------------------------------------**

**PART 2:  WHO ARE THE STAKEHOLDERS AND THE EXTENT OF COMMUNITY PARTICIPATION IN SEA-_LUP PROCESSES?**

**Stakeholder defined as "**One who directly or indirectly uses any form of resources associated with the swamp. Key stakeholders are those whose actions can affect the swamp in a big way like swamp drying up completely by using the water for commercial farming and stop access to the swamp"

**Q1: Who are the stakeholders of Yala Wetland SEA-Land use Plan?**

How do they benefit from Yala Wetland?

What is their orientation to SEA_LUP processes?

What is their degree of influence and importance on Yala Wetland?

(Capture the responses in the table below)

| Stakeholders Name | Type/Category 1-Government 2-Non-Governmental Organizations 3-Private | Type of benefits received from Yala Wetland | Effect on Yala Wetland 1-Positively 2-Negatively 3-None | Orientation to Yala Land Use Plan Process 1-Support 2-Oppose 3-None | Degree of influence/importance to Yala Wetland 1-High level 2.Medium 2-Low level | Remarks |
|---|---|---|---|---|---|---|

| | 4. **Forums & Networks**  5.**Others** | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

2. List the members who constitute the local communities of Yala Wetland.

b. Why do you think they are?

c. Where are they found now? Where are their original homes?

3. How are they organized to ensure representation in development activities?

-----------------------------------------------------------------------------------------------------------

4. a. Who are the **influencers** (those who determine how things are done and may not be in the position of authority e.g. housemaid, watchman, spouse of an elder) and power holders (those with authority to do something on behalf of the group (e.g a chief, head teacher, MCAs, Governor) in the Yala Wetland community issues?

4b Where are they presently/availability (location, village, contact details e.g. phone/e-mail/nearest phone access to leave them a message

-------------------------------------------------------------------------------------------

5.a What key management plans of Yala Wetland do you recall?

5b. Indicate how the identified the local communities have been involved in the development and implementation of Yala Wetland plans ----------------------------------------

5c. From the previous Yala Wetland management plans, discuss   their successes, challenges and lessons learnt?  ------------------------------------------------------------------

## 6.  COMMUNITY PARTICIPATION IN THE CURRENT YALA WETLAND STRATEGIC ENVIRONMENTAL ASSESSEMENT (SEA) AND LAND USE PLAN (LUP) PROCESSES

### 1.  Community Participation in Strategic Environmental Assessment (SEA) and Land Use Plan(LUP) ?

a. How are local communities organized to participate in the SEA_ YLUP processes?

------------------------------------------------------------------------------------------------------------

b. Does this structure facilitate or hinder the participation process?  Explain

------------------------------------------------------------------------------------------------------------

e. Overall, what was the extent of community participation in SEA-LUP processes in phase 1? (using the spectrum of public participation)

Levels in the spectrum model of participation are shown below



INF          CONS          INV          COL LAB-          EMPO

| Provide stakeholder s with information to assist them in understanding the issues and options **INFORM** | Obtain feedback on analysis, options and decisions **CONSULT** | Work directly with stakeholders throughout the processes to ensure their issues and concerns are consistently understood and considered **INVOLVE** | Partner with stakeholders in each aspect of the decision including the development of options **COLLABORATE** | Final decision lies with the stakeholders **EMPOWER** |
|---|---|---|---|---|

What was the level of communities' participation in the following SEA LUP Processes based on the 5 levels of participation?

| YLUP activities (Phase 1) | Level of participation based on Spectrum of public participation model | Process |
|---|---|---|
| 1.Baseline Studies | | |
| 2.Strategic Environment Assessment | | |
| 3.Participatory rural learning appraisal report on Yala Wetland | | |
| 4. Ecosystem services assessment study | | |
| 5. Stakeholders initial consultative meeting on Yala Wetland land use planning | | |
| 6. Draft one of SEA-LUP presented in Busia in April 2016 | | |
| 7. Draft 2 of SEA-LUP presented in September 2016 | | |
| 8. Draft 3 of SEA and LUP December 2017 | | |

f. How effective was the level of participation based the following 10 indicators?

| Parameter | Questions | Score 1-10<br><br>1-lowest and 10 highest level of effectiveness | Findings |
|---|---|---|---|
| 1.Objective of participation | Why participate?<br><br>What was the context for this community participation? | | |
| 2. **Contexts** for the participation | Was participation, for example, part of a larger strategy?<br><br>What is the practice of community participation in the area?<br><br>What is the perception of community participation? | | |
| 3 Levels of Involvement | How early do you involve people? | | |

| | How much power is handed over and when? | | |
|---|---|---|---|
| 4.People involved- **who was involved?** | How are they chosen?<br><br>What mistakes were made (by who?) | | |
| 5. **Method**s used | Were maps, interviews used? Did they work?<br><br>Was there Innovations in the method or just participation itself for the area | | |
| **6.Commitment** | Was there commitment to use or not use community participation in the program/intervention? | | |
| **7. Inputs** | What inputs time, money etc. were brought in for participation?<br><br>What were the results in relation to those inputs? | | |
| 8.**Innovation** | Is the method of participation innovative or just participation itself for the area? | | |
| 9. **Outputs** | | | |
| 10.**Outcome** | | | |

b) Give 3 dreams you have for the future of Yala Wetland?

---------------------------------------------------------------------------------------------------------

## PART 3: MAPPING ENVIRONMENTAL ISSUES

a. What key changes have taken place in Yala Wetland from 1910 to date? Indicate when those changes occurred

e.g Landuse (Government, Locals, Private) ----------------------------------------------------------

b. What are some of the key environmental issues and resources that Yala Wetland communities value?

(Can draw these on Yala Wetland map)

c. What are some of Yala Wetland ecosystem's services/benefits? (list these here)

---------------------------------------------------------------------------------------------------

D. Please draw and map the following environmental issues as they relate to Yala Wetland

i. Conflict areas and the nature of conflict

ii. Cultural values/sites

iii. Wildlife habitat conservation (on endangered species *sitatunga* antelope, papyrus birds)

 iv. Biodiversity hotspots

*v.* Other environmental issues identified in b (community resources)

h. What are future developmental preferences of local communities' choice that balance development and conservation

---------------------------------------------------------------------------------------------------

## PART 4: ENVISIONING YALA WETLAND/DREAMING FOR A FUTURE BETTER YALA WETLAND

4.1What is your dream of Yala Wetland in the next 50(2063) years? (draw the maps, can get person who know how to draw and they give their ideas then the person captures their aspirations)

i. Community organizations participating in YLUP process; YPAC and sample Community Organisations (CO).

ii. Non participating Community Organisations but identified as key in the process

iii. Self-appointed Groups/Community Organisations

iv. Nominated Groups/Community Organisations

4.2 Describe your feelings about that vision ------------------------------------------------------

4.3 What can you do to achieve the dream above? What can you do immediately/now?

--------------------------------------------------------------------------------------------------------------

4.4 How would you actively participate in the creation and realization of this Yala Wetland's future/dream? -------------------------------------------------------------------------------
-

## PART 6: COMMUNITY INFORMATION SYSTEM

a. What is the current state of Yala Wetland /Wetland Community Information System?

--------------------------------------------------------------------------------------------------------------

b. What are your current and anticipated Yala Wetland information needs? (list as many as possible)

| Current Yala Wetland information needs | Anticipated Yala Wetland information needs |
|---|---|
|  |  |

c. What are some of the Information seeking behaviors of community organization leaders that you are aware of (e.g. when I need (state type) information I go to the teacher, clan elder, newspaper, women group)

d. What type of resources do  community organizations need to engage in YLUP processes?

e. What limits local communities' full participation in YLUP process?

f. What should be done to overcome these challenges?

--------------------------------------------------------------------------------------------------------------

## TOOL 2: KEY INFORMANT INTERVIEW SCHEDULE (FOR OBJECTIVE 1)

1. What is the history of and how would you explain the formation of Yala Wetlands?

2. How has Yala Wetland's history informed/influenced current use/activities by local communities of/around Yala Wetland?

3.What local knowledge has been used by local communities to manage Yala Wetlands?

4.What local knowledge is still useful to be used with modern knowledge in planning and managing the wetlands?

5. What are the challenges of Yala Wetland and their causes, and what can be done to turn them into opportunities for sound management of the wetlands?

6. What is the vision/desired future for Yala Wetlands?

7. What is the role of community science in sustainable management of Yala Wetlands?

**TOOL 3: FOR COMMUNITY CHANGE AGENTS envisioning the future Yala Wetland**

For leaders involved in facilitating change in the communities e.g. Chair for Technical community, other change agents in the area (religious leaders), Community activists, Elders who are change agents.

A. Imagine a time in the future when people look to your community as an exceptional example of a thriving, attractive community where citizens of all ages engage as leaders and see themselves as owners of the community's future.

i. In this exciting future, how would citizens/communities be engaged in community life?
-----------------------------------------------------------------------------------------------------

ii. What is sustaining community leaders' dedication in terms of service to the Yala Wetland society?"

(Starting with you) -----------------------------------------------------------------------------------

iii.What kinds of systems and structures are most encouraging to communities/citizen engagement in Yala Wetland management (planning and implementation)?

-----------------------------------------------------------------------------------------------------

iv. What are you most proud of having helped the community accomplish?

----------------------------------------------------------------------------------------------------

v. How can local communities be meaningfully represented in future development activities in Yala Wetland and its surroundings? **-------------------------------------------------**

B. What has inspired you to get engaged as a civic leader?  What do you most hope you can contribute? -------------------------------------------------------------------------------------

C. As an engaged citizen, there are inevitably high points and low points, successes and frustrations.  What stands out for you as a high point when you were part of an outstanding community effort here? --------------------------------------------------------------------------

i. Please describe what happened and who was involved. --------------------------------------

ii. What difference were you able to make working together?  ---------------------------------

iii. Which of your strengths and talents were called upon? ------------------------------------

iv. What contributed most to the success of the effort? -----------------------------------------

v. What did you learn about community change? -------------------------------------------------

D. What are the areas where you feel more community engagement could have the most impact on improving the quality life in Yala Wetland community?

-----------------------------------------------------------------------------------------------------

E. As you reflect on successful ways the community are currently engaged in improving their community, what initiatives stand out as being exceptionally promising in expanding local citizen leadership and why? ---------------------------------------------------------------------

F. What small changes could we make right now that would really encourage more families to get engaged with improving our community? --------------------------------------------------

 G. How would you personally like to be involved in expanding citizen leadership here?

-----------------------------------------------------------------------------------------------------

H. What has inspired you to get engaged in Yala Land Use Planning (LUP)? What do you most hope to contribute to Yala LUP process? ------------------------------------------------------------

*Storytelling: Thinking back on your year, please share a high point when you were very happy with Yala Wetland?*

*e.g Obaro time*

## **A Reflection Worksheet 1: Connecting a Whole Yala Wetland (Imagine Yala Wetland)**

What if your job was…

 1. To create a Yala Wetland economy in which nothing and no one is wasted by:

- helping people develop their imagination and skills as wetland creators.

- creating meaningful opportunities for everyone, especially groups on the margin and young people, to invest themselves in the Swamp's future.

2.To help your Yala Wetland learn to think of itself as a whole rather than in divided terms?

-----------------------------------------------------------------------------------------------

3. Reflecting on the above design some key elements of the process you would create to make this happen: --------------------------------------------------------------------------------

i.What would you do first?--------------------------------------------------------------------------

ii. Whom would you invite to participate? *(Think especially of people who would find this exciting and worthwhile, and with whom you would really like to work)*

---------------------------------------------------------------------------------------------------------

iii. What organizations would you try to get involved? *(e.g. schools, businesses, community groups, government, etc.)*

iv.What would motivate *you* to want to do this work? ------------------------------------------

**Worksheet #2: Connections that Matter**

**A. Connections that Matter**

*Working with a partner, spend 30 minutes (15 minutes each person) addressing the following questions:*

As you reflect on connecting your work to the work of a broader community, think back to an experience in a community project that was a personal highpoint for you, a time where you said to yourself that people really can connect, really **can** make a difference.

i.What happened?---------------------------------------------------------------------------------

ii.What were the vital connections that got made? ----------------------------------------------

iii.Why did they matter? -------------------------------------------------------------------------

iv.Where did they lead? --------------------------------------------------------------------------

v.What do you now see as possible as a result of those connections? ------------------------

vi.What connections are you most interested in developing to move forward on the work in your community you would most like to see happen? ----------------------------------------

vii.What connections do you already have that could lead you to the new connections you seek?

**B. Innovations**

Think of a project you have been involved in that has been a personal highpoint…when you were part of creating something new.

i.What got created? ------------------------------------------------------------------------------

ii. What contributed to making the innovation possible? ----------------------------------------

iii.What vital connections got made? ----------------------------------------------------------------

iv.Why did they matter? --------------------------------------------------------------------------

iv.Where did they lead? --------------------------------------------------------------------------

v.What do you now see as possible as a result of those new connections?---------------------

vi.What is an innovation that you think holds particular promise for transcending traditional divides in Yala Wetland community? ----------------------------------------------------------

vii.What current practices in Yala Wetland community now stand in most need of innovation? -------------------------------------------------------------------------------------------

viii.How might Yala Wetland Land use plan and Indigenous Conservation management plan processes help unlock the local community's potential for innovation?

*An Appreciative Inquiry for Imagining Community Futures…*

*High Point Story*

*What stands out for you at a time you felt you were involved in a really "good"community team effort-- something significant, empowering, and effective—which gave everyone involved a way to contribute their talent and make a difference?*

----------------------------------------------------------------------------------------------------------

i. How and why did you get involved?--------------------------------------------------------------

ii.Who else was involved?---------------------------------------------------------------------------
iii. How did you work together?--------------------------------------------------------------------

iv.What made it a powerful experience?------------------------------------------------------------

v.What were some challenges you had to deal with and did you deal with those

challenges?----------------------------------------------------------------------------------------------

vi.What did you accomplish and how did it feel?----------------------------------------------

vii.What was especially meaningful to you about the process and result?--------------------

viii.What did you learn about how positive community change happens?---------------------

**Best qualities and skills**

**Yourself:** Without being too humble, what is it that you value most about yourself as an

active community builder? What are your best qualities, skills, values, etc.?

-----------------------------------------------------------------------------------------------------------

**Others:** Why does working together make sense? What are the benefits and outcomes of forming strong community partnerships across generations?

-----------------------------------------------------------------------------------------------------

**Core "life-giving" factors**

As you think about what it takes to build great partnerships, (especially across cultures or generations), what is *the* "life-giving" factor in such partnerships (without this, good community partnerships would not be possible)? **-------------------------------------------------**

**Dreams for the Future**

What three dreams do you have for the future of Yala Wetland and its community?

-----------------------------------------------------------------------------------------------------

**Design**: What do you think are some of the essential conditions to enable Yala Wetland community as a whole to prosper? --------------------------------------------------------------------

**Destiny:**

a.What do you consider important next steps that should be taken in Yala Wetland?

i. How do you  get more people involved in making a positive difference in Yala Wetland?- ---------------------------------------------------------------------------------------------------

ii.How do you get develop more productive, inspiring community partnerships?------------

iii.To improve communication?---------------------------------------------------------------------

iv.What support do you most need to plant your highest dream for the future of Yala wetland?------------------------------------------------------------

 v.Who do you most want/need as your dream team/ dream keepers?-------------------------

b. What do you want to do more of towards achieving your dream for Yala wetland?------

**TOOL 4: BUILDING A BETTER YALA WETLAND COMPETITION FOR SCHOOLS**

**1.0 INTRODUCTION**

Dear Sir/ madam

The County governments of Siaya and Busia in collaboration with the National government and key stakeholders are in the process of facilitating the development of a comprehensive **Yala Wetland Land Use Plan** and thereafter ensure its studious implementation. This will ensure sustainable livelihoods for the local communities and the environment is taken of care for posterity. As a result, the **planning team research wing** is inviting your participation in the process. We have identified a critical group to help with envisioning the future of Yala Wetland by schools and institutions around the Yala Wetland. Kindly allow your students to take part in these competitions whose **theme is a better Yala Wetland a**s per the details given below. There will be prizes for the top three (3) students and the top three (3) schools with highest number of student responses and producing the winning essay/composition, drawings/artwork and debates. Schools (primary and secondary, vocational, tertiary) with environmental clubs, wildlife clubs, and 4k clubs are encouraged to have the debates in their respective clubs.

**Eligibility: Eligible Primary, Secondary and Post- Secondary Institutions located in Yala Wetland and its surroundings**

Prize categories;

A. Best essay, First runners up and second runner up

b. Schools with highest entries; First runners up and second runner up

c. Best Artwork/Drawing:First runners up and second runners up, Schools with highest entries in artwork/drawings

Best debating schools and best debating students; first and second runners up

**2.0 CATEGORY ONE: ESSAYS AND COMPOSITIONS**

a. What should Yala Wetland look like in 50 years' time (if money   is not a problem)?

-What is your dream for the future of Yala Wetland?

b. *What can be done to achieve the above dream?*

**3.0 CATEGORY TWO: CREATIVE WORKS AND ARTWORKS, DREAM DRAWINGS**

a. What three dreams do you have for the future of Yala Wetland? Draw these on   a large sheet of paper.

*b*. What can be done to achieve these dreams?

**4.0 CATEGORY THREE: DEBATES** *(Eligible upper primary, Secondary and tertiary)*

**TOPIC: Creating a perfect Yala Wetland**

The debates were moderated by senior teachers after briefing by the researcher and given guidelines to use for the sessions to ensure validity and relevance to the Yala wetland.

Top three students in this debate will be invited for County level debate in Siaya.

**Deadline for Submission: May 6, 2016**

Submission to be endorsed by your respective school (stamp and signed by club patrons).

Submit to Cluster leaders who will submit to Nature Kenya Office in Siaya.

1. Upper Yala Cluster, Gem Subcounty-David Marenya 0724297256
2. Lake Kanyaboli Cluster, Alego-Usonga Subcounty-Ibrahim Onyango 0716423651
3. Yimbo Cluster-Bondo Subcounty-Samson Okuku 0726226286/Ayiro Lwala 0722522192
4. Bunyala Cluster-Bunyala South Subcounty-Edwin Ochieng' 0707839287

For further enquires: Call George Onyango Tel. 0725471402

Committee Leader, Environmental Education and Awareness Creation, for Yala Ecosystem Site Support Group.

**FOR RELIGIOUS COMMUNITY**

**TOOL 5: BUILDING BETTER YALA WETLAND VISIONING BY RELIGIOUS COMMUNITIES**

**1.0 INTRODUCTION**

Dear Sir/ madam

The County governments of Siaya and Busia in collaboration with the National government and key stakeholders are in the process of facilitating the development of a comprehensive **Yala Wetland Land Use Plan** and thereafter ensure its studious implementation. This will ensure sustainable livelihoods for the local communities and the environment is taken of care for posterity. As a result, the **planning team research wing** is inviting your participation in the process. We have identified a critical group to help with envisioning the future of Yala Wetland by religious leaders and institutions around the swamp. Kindly reflect with your religious team and congregations and prepare *a compelling God inspired sermon* on the **theme of a better Yala Wetland.** There will be round table talks and focus group discussions about your submissions at the County after you have submitted and the adjudicating team to review your write-up and prequalify it**. There will be rewards/ prizes for the top 3 sermons**. We appreciate your taking time to be in this rare God given opportunity to shape the future of Yala Wetland.

*SERMON GUIDE (8-15 pages)*

a. What is God's dream for Yala Wetland?

b. What can be done to achieve this God's dream?

**Deadline for Submission: May 6, 2016**

Submit to Cluster leaders who will submit to Nature Kenya Office in Siaya.

For further enquires: Call George Onyango tel 0725471402/Stephen Okumu 0721989229/Emily Mateche 0724550006

**APPENDIX III: LIST OF COMMUNITY BASED ORGANIZATIONS INTERVIEWED AND LEARNING INSTITUTIONS AND THEIR GPS COORDINATE LOCATIONS**

| No | Ward | Subward/Location | CBO Name | GPS Location | GPS Coordinates | Elevation |
|---|---|---|---|---|---|---|
| 1 | Central Alego | Kadenge | Komol for Change | Kadenge | N $00^0$ 01.524' E$034^0$ 10.965' | 3767m |
| 2 | Central Alego | Kadenge | Denge Moyie Youth Group | Kadenge | N $00^0$ 01.743' E$034^0$ 09.973' | 3794m |
| 3 | Central Alego | Kadenge | Kahepro | Kadenge | N $00^0$ 01.972' E$034^0$ 09.673' | 3790m |
| 4 | Central Alego | Kadenge | Kanyimaji Widows Self Help Group | Kadenge | S $00^0$ 02.874' E $034^0$ 05.906' | 1097m |
| 5 | Central Alego | Kadenge | Yar-Leso Self Help Group | Kadenge | S $00^0$ 00.581' E $034^0$ 02.759' | 1143m |
| 6 | Central Alego | Kadenge | Kadenge BMU | Kadenge | N $00^0$ 01.595' E$034^0$ 10.509' | 3787m |
| 7 | Central Alego | Kadenge | Kadenge Elders Group | Kadenge | N $00^0$ 01.815' E$034^0$ 09.806' | 3799m |
| 8 | Bunyala Central | Magombe East | BUNYALA ANTI-POISONING TEAM | Magombe | N $00^0$ 05.994' E$034^0$ 03.590' | 3643m |
| 9 | Bunyala South Ward | Bulwani | BULUANI ELDERS | Buluani | N $00^0$ 03.753' E $033^0$ 59.638' | 1081m |
| 10 | Bunyala South Ward | Bulwani | Buluani Community Group | Buluani | N $00^0$ 03.753' E $033^0$ 59.638' | 1081m |
| 11 | Bunyala South Ward | Bulwani | Iyanga Community Group | Iyanga | N $00^0$ 03.753' E $033^0$ 59.638' | 1081m |
| 12 | Bunyala South Ward | Bulwani | Budici Biodiversity | Bulwani | S $00^0$ 00.225' E $034^0$ 05.178' | 063m |
| 13 | Bunyala South Ward | Bulwani | Nahahira Beach Group | Bulwani | S $00^0$ 00.423' E $034^0$ 00.183' | 1133m |
| 14 | Bunyala South Ward | Bulwani | GIVE CBO | Bulwani | N $00^0$ 00.775' E$034^0$ 00.448' | 3718m |
| 15 | Bunyala South Ward | Obaro | Maduwa Community Group | Obaro | S $00^0$ 00.125' E $039^0$ 01.129' | 1131m |
| 16 | Bunyala South Ward | Obaro | Buhuma Community Group | Buhuma | N $00^0$ 00.813' E $034^0$ 02.018' | 1143m |

| 17 | Bunyala South Ward | Obaro | Obaro Fishing Group | Buhuma | N $00^0$ 01.397' E $038^0$ 59.868' | 1092m |
|---|---|---|---|---|---|---|
| 18 | Bunyala South Ward | Obaro | Misoma Beach Group | Misoma | N $00^0$ 00.813' E $034^0$ 02.018' | 1140m |
| 19 | | Lugale | Wesandye Women Support Group | Lugale | S $00^0$ 00.225' E $034^0$ 05.178' | 063m |
| 20 | | Khajula location | Bukarua | Khajula | N $00^0$ 05.201' E $034^0$ 00.718' | 3737m |
| 21 | | Khajula location | Buhawe | Khajula | N $00^0$ 05.202' E $034^0$ 01.401' | 3737m |
| | | | **Sub locations In the Buffer Zone (within 5 kms)** | | | |
| 22 | West Alego | Kaugagi Hawinga | Nyamiwa Women group | 8 | N $00^0$ 04.512' E $034^0$ 08.390' | 3797m |
| 23 | West Alego | Kaugagi Hawinga | Nyamonye Women Group | 6 | N $00^0$ 04.686' E $034^0$ 08.656' | 1161m |
| 24 | West Alego | Kaugagi Hawinga | YEBICOM | 26 | N $00^0$ 03.865' E$034^0$ 08.980' | 3750m |
| 25 | West Alego | Kaugagi Hawinga | YASCCO | Misori | N $00^0$ 04.358' E$034^0$ 09.023' | 3560m |
| 26 | West Alego | Kaugagi Hawinga | Denge Women Group | Uhuwa | N $00^0$ 03.648' E$034^0$ 08.996' | 3757m |
| 27 | West Alego | Kaugagi Hawinga | Great Lakes (GLICC) | Hawinga A | N $00^0$ 04.839' E $034^0$ 13.818' | 3695m |
| 28 | West Alego | Kaugagi Hawinga | Kosiedo Self Help Group | Nyamonye | N $00^0$ 04.739' E $034^0$ 08.408' | 1095m |
| 29 | West Alego | Kaugagi Hawinga | TELTEL | Hawinga B | N $00^0$ 04.839' E $034^0$ 13.818' | 3695m |
| 30 | West Alego | Kaugagi Hawinga | Kombo BMU | Kombo Beach | N $00^0$ 03.685' E $034^0$ 09.070' | 1145m |
| 31 | West Alego | Kaugagi Hawinga | Hawinga Water & Sanitation | Hawiga water intake | N $00^0$ 04.412' E $034^0$ 14.005' | 1175m |
| 32 | West Alego | Kaugagi Hawinga | NYAMONYE GROUP | Nyamonye | N $00^0$ 04.686' E $034^0$ 08.656' | 1161m |
| 33 | West Alego | Kaugagi Hawinga | Hawinga Bodaboda Youth Group | Hawinga centre | N $00^0$ 04.412' E $034^0$ 14.005' | 1175m |
| 34 | West Alego | Kaugagi Hawinga | Kombo Beach Fishing Group CBO | Kombo beach | S $00^0$ 03.685$^0$ E $034^0$ 09.070$^0$ | 1145m |
| 35 | West Alego | Kaugagi Hawinga | Yala Weavers Umbrella | Nina | N $00^0$ 03.734' E$034^0$ 09.054' | 3754m |
| 36 | West Alego | Kaugagi Hawinga | Nyamiwa Self Help Group | Nina | N $00^0$ 04.686' E $034^0$ 08.656' | 1161m |

| 37 | West Alego | Kaugagi Hawinga | Yala Farmers Group | Uwihwa | N 00$^0$ 03.865' E034$^0$ 08.980' | 3750m |
|---|---|---|---|---|---|---|
| 38 | West Alego | Kaugagi Hawinga | Hawinga Fishermen | Hawinga B | N 00$^0$ 04.325' E034$^0$ 09.023' | 3582m |
| 39 | West Alego | Kaugagi Hawinga | Yafungu Self Help Group | Hawinga B | N 00$^0$ 04.779' E 034$^0$ 09.135' | 3889m |
| 40 | West Alego | Kaugagi Hawinga | Kasichong' | Hawinga B | N 00$^0$ 04.710' E 034$^0$ 09.102' | 3867m |
| 41 | West Alego | Gangu | Gangu BMU | Gangu Beach | N 00$^0$ 04.363' E 034$^0$ 01.409' | 1079m |
| 42 | West Alego | Gangu | Friends of Yala Biodiversity | Gangu | N 00$^0$ 04.363' E 034$^0$ 01.409' | 1079m |
| 43 | West Alego | Kabura Uhuyi | Kabura Uhuyi Group | Kabura | N 00$^0$ 07.281' E 034$^0$ 08.827' | 4015m |
| 44 | Central Alego | Ojwando A | Rapudo Fish Farmers | Rapudo | N 00. 03 601' E 034 11.165 | 3791m |
| 45 | Central Alego | Ojwando B | Nyiego Women Group | Boro | N 00$^0$ 04.441' E 034$^0$ 14.005' | 1193m |
| 46 | Usonga | Nyadorera A | Usonga Elders Group | Sumba | N 00$^0$ 04.537' E 034$^0$ 09.105' | 1076m |
| 47 | Usonga | Nyadorera A, B, | Lower Nyadorera Water Users Association | Sumba | N 00$^0$ 05.053' E 034$^0$ 04.940' | 3753m |
| 48 | Usonga | Nyadorera A | Yawev youth group | Sumba | N 00$^0$ 07.188' E 034$^0$ 05.415' | 3759m |
| 49 | Usonga | Nyadorera B | Blue Star Young Ladies | Nyadorera | N 00$^0$ 06.970' E 034$^0$ 05.525' | 3791m |
| 50 | Usonga | Sumba | Baada Ya Kazi | Rwambwa | N 00$^0$ 05.053' E 034$^0$ 04.940' | 3753m |
| 51 | Central Alego | Bar Olengo | SEJE Safe Water | Bar Olengo | N 00$^0$ 04.418' E034$^0$ 09.034' | 3941m |
| 52 | Central Alego | Bar Olengo | KASTEP | Bar Olengo | N 00$^0$ 01.641' E034$^0$ 10.330' | 3781m |
| 53 | Yimbo West | Usenge | Kanyibok Village Youth Group | Kanyibok | S 00$^0$ 03.656' E 034$^0$ 05.601' | 1157m |
| 54 | Yimbo West | Usenge | Yimbo Ber | Kanyibok | S 00$^0$ 03.377' E 034$^0$ 02.500' | 3694m |
| 55 | Yimbo West | Usenge | Yimbo Youth Group | Usenge | N 00$^0$ 04.627' E 034$^0$ 07.059' | 1084m |
| 56 | Yimbo West | Usenge | Yimbo Elders | Usenge | N 00$^0$ 04.627' E 034$^0$ 07.059' | 1084m |
| 57 | East Yimbo | Got Ramogi | Uchulu Community Dam S.H. G | Got Ramogi | S 000 04.852' E 034 04.689' | 3793m |

| 58 | East Yimbo | Got Ramogi | Lake Sare Green Belt CBO | Got Ramogi | S $00^0$ 01.788' E $034^0$ 03.952' | 1142m |
|----|-----------|-----------|------------------------|-----------|-----------------------------------|-------|
| 60 | East Yimbo | Got Ramogi 010232185 | Umba Ramogi Women Group | Ramogi hills | S $00^0$ 00.491' E $034^0$ 03.461' | 1142m |
| 61 | East Yimbo | Bar Kanyango | Barkanyango Horticulture Farmers CBO | Ramogi | S $00^0$ 01.817' E $034^0$ 03.952' | 3728m |

**APPENDIX IV: LIST OF KEY INFORMANTS**

| Name of Elder/key Informant | Location | Contact/Remarks |
|---|---|---|
| 1. Mzee Samson Okuku | Usenge | Elder and Conservationist |
| 2.Richard Ogangra Onjula | Kombo Misori | Retired teacher and administrator |
| 3.Ker Thomas Ochando | Yimbo | Vice chair of Luo council of Elders |
| 4. Boss Wanyama | Island | Retired Councillor |
| 5. Mzee Paul Onyango Mugenda | Misori Kaugagi | Custodian of traditional birds' knowledge |
| 6. Alex Odinga | Misori Kaugagi | Former chairperson of Kaugagi Hawinga farmers Association |
| 7.Joan Nekesa | Got Ramogi | Chair Umba women group and designed her own upesi Jiko |
| 8. Aloyce Owino | Nyamonye | Retired civil servant and model farmer |
| 9. Charles Okola | Bar Kanyango | Conservationist |
| 10. Mary Hayongo | Umina | Conservationist |
| 11.Jane Ochieng | Usenge | Conservationist |
| 12.George Otieno | Nyangera Daho | Conservationist |
| 13. Richard Juma | Nyamonye A | Conservationist and honorary game warden |
| 14. Cleophas Otieno Bernad | Uwihwa | Retired teacher and chief |
| 15.Jared Oketch | Usonga Elder | Conservationist |
| 16. Dismas Ouma Omoro | Usonga Elder | Conservationist |
| 17. Ibrahim Onyango | Hawinga | Trained Birder and conservationist |
| 18.Pascal Wanyama | Bulwani Island | Conservationist |
| 19. Isaac Buluma | Bunyalla Central | Conservationist |
| 20. Mary Oduor | Nyiego Women Group-Ndai | Conservationist |
| 21.Ruth Anyango | Ochumu Community Dam | Conservationist |
| 22.Serfina Midiwo | Kadenge Elder | Conservationist |
| 23 Lilian Onyango | Bulwani Island | Conservationist |
| 24.Gladys Wanyama | Buhuma Island | Conservationist |
| 25.Joachim Ayimba Ochieng | | Conservationist |
| 26.Paul Ooko Ogutu | Gangu Beach | Conservationist |
| 27.Michael Okoth Osodo | Gangu | Conservationist |

| 28. Desta Namrembo | Maduwa Island | Conservationist |
|---|---|---|
| 29 Gladys Akinyi | Iyanga Island Village | Conservationist |
| 30.Fredrick O Osielo | Hawinga boda boda group | Conservationist |
| 31. Jared Oketch | Uhombe | Conservationist |
| 32.Cosmas Oloo | Kadenge elder | Conservationist |
| 33. Charles Onyango Ombiyo | Got Ramogi | Conservationist |
| 34.Edwin Ochieng | Buhuma Island | Conservationist |
| 35. Stephen Okumu | Misori | Y/Chair SSG |
| 36 George Wambiya | Muweri WRUA | Conservationist |
| 37 Grace Akinyi | | Lake Care Reeds |
| 38.Kesa Bwire | Buhawe | Conservationist |
| 39 John Onyango Madara | Got Ramogi | Got Ramogi CFA chair |
| 40. Peter Oyora | Iyanga | Conservationist |

**APPENDIX V: PERMISSION TO CONDUCT RESEARCH**
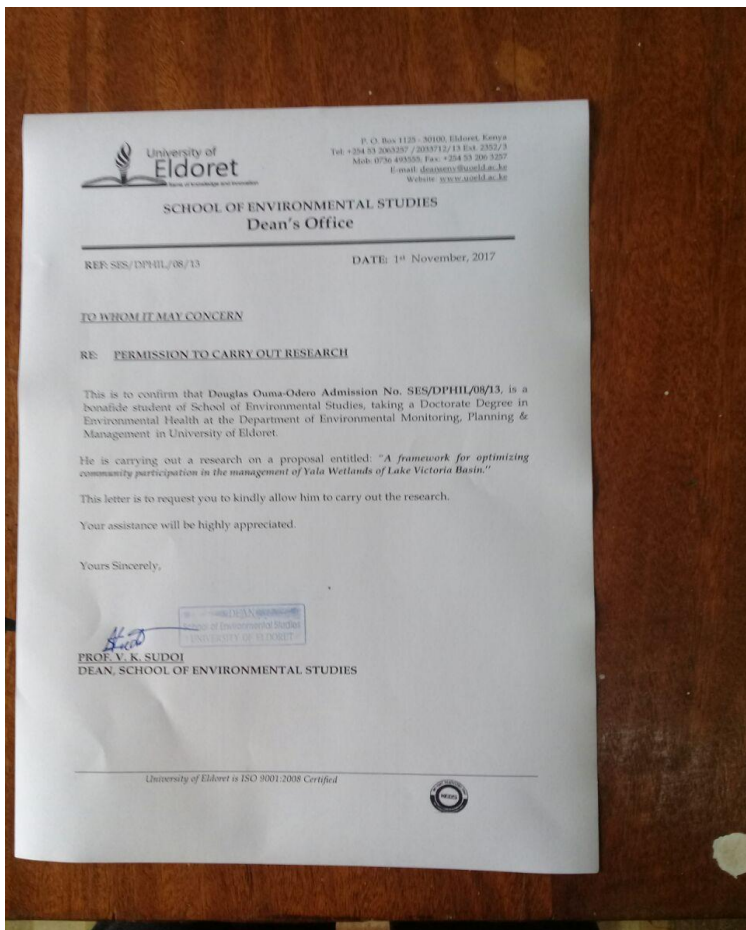


**Plate 7.9: Permission to conduct research**

## APPENDIX VI: PLANT SPECIES RECORDED IN YALA WETLAND

|    | Family | Genus | species | Author | LF |
|----|--------|-------|---------|--------|-----|
| 1 | Acanthaceae | *Dyschoriste* | *nagchana* | | H |
| 2 | Acanthaceae | *Hygrophila* | *auriculata* | (Schumach.) Heine | S |
| 3 | Acanthaceae | *Justicia* | *calyculata* | Deflers | H |
| 4 | Acanthaceae | *Thunbergia* | *alata* | Bojer ex Sims | H |
| 5 | Aloaceae | *Aloe* | *secundiflora* | Engl. | S |
| 6 | Amaranthaceae | *Alternanthera* | *pungens* | Kunth | H |
| 7 | Amaranthaceae | *Amaranthus* | *hybridus* | L. | H |
| 8 | Amaranthaceae | *Gomphrena* | *celosioides* | Mart. | H |
| 9 | Amaranthaceae | *Guilleminea* | *densa* | (Roem. & Schult.) Moq. | H |
| 10 | Araceae | *Pistia* | *strutiotes* | L. | H |
| 11 | Azollaceae | *Azolla* | | | H |
| 12 | Bignoniaceae | *Kigelia* | *africana* | (Lam.) Benth. | T |
| 13 | Celastraceae | *Maytenus* | *senegalensis* | (Lam.) Exell | S |
| 14 | Ceratophyllacea | *Ceratophyllum* | | | H |
| 15 | Commelinaceae | *Commelina* | | | H |
| 16 | Compositae | *Acanthospermum* | *hispidum* | DC. | S |
| 17 | Compositae | *Aspilia* | *mossambicensis* | (Oliv.) Wild | H |
| 18 | Compositae | *Cirsium* | | | H |
| 19 | Compositae | *Conyza* | *aegyptiaca* | Dryand. | H |
| 20 | Compositae | *Crassocephalum* | | | H |
| 21 | Compositae | *Flaveria* | *trinervia* | (Spreng.) C.Mohr | H |
| 22 | Compositae | *Pluchea* | *ovalis* | (Pers.) DC. | H |
| 23 | Compositae | *Schkuhria* | *pinnata* | | H |
| 24 | Compositae | *Sigesbeckia* | *abyssinica* | (Sch.Bip.) Oliv. & Hiern | H |
| 25 | Compositae | *Sonchus* | *oleraceus* | L. | H |
| 26 | Compositae | *Sphaeranthus* | *cyathuloides* | O.Hoffm. | H |
| 27 | Compositae | *Tagetes* | *minuta* | L. | H |
| 28 | Compositae | *Tithonia* | *diversifolia* | (Hemsl.) A.Gray | S |
| 29 | Compositae | *Xanthium* | *pungens* | Wallr. | H |
| 30 | Convolvulaceae | *Astripomoea* | *hyoscyamoides* | (Vatke) Verdc. | H |
| 31 | Convolvulaceae | *Cuscuta* | | | H |

| 32 | Convolvulaceae | *Ipomoea* | *aquatica* | Forssk. | H |
|---|---|---|---|---|---|
| 33 | Convolvulaceae | *Ipomoea* | *cairica* | (L.) Sweet | H |
| 34 | Convolvulaceae | *Ipomoea* | *rubens* | Choisy | H |
| 35 | Cyperaceae | *Cyperus* | *digitatus* | Roxb. | H |
| 36 | Cyperaceae | *Cyperus* | *exaltatus* | Retz. | H |
| 37 | Cyperaceae | *Cyperus* | *papyrus* | L. | H |
| 38 | Cyperaceae | *Kyllinga* | *sp.* | | H |
| 39 | Cyperaceae | *Pycreus* | | | H |
| 40 | Cyperaceae | *Scleria* | | | H |
| 41 | Euphorbiaceae | *Acalypha* | *volkensii* | Pax | H |
| 42 | Euphorbiaceae | *Euphorbia* | *tirucalli* | L. | S |
| 43 | Euphorbiaceae | *Ricinus* | *communis* | L. | S |
| 44 | Gramineae | *Bothriochloa* | | | H |
| 45 | Gramineae | *Brachiaria* | | | H |
| 46 | Gramineae | *Chloris* | *gayana* | Kunth | H |
| 47 | Gramineae | *Cynodon* | *dactylon* | (L.) Pers. | H |
| 48 | Gramineae | *Echinochloa* | *haploclada* | (Stapf) Stapf | H |
| 49 | Gramineae | *Eleusine* | *indica* | (Kenn.-O'Byrne) S.M.Phillips | H |
| 50 | Gramineae | *Eragrostis* | | | H |
| 51 | Gramineae | *Leersia* | *hexandra* | Sw. | H |
| 52 | Gramineae | *Paspalum* | | | H |
| 53 | Gramineae | *Phragmites* | *australis* | (Cav.) Steud. | H |
| 54 | Gramineae | *Rhynchelytrum* | *repens* | (Willd.) C.E.Hubb. | H |
| 55 | Gramineae | *Setaria* | | | H |
| 56 | Gramineae | *Sporobolus* | | | H |
| 57 | Haloragaceae | *Myriophyllum* | | | H |
| 58 | Labiatae | *Becium* | | | S |
| 59 | Labiatae | *Leonotis* | *nepetifolia* | (L.) R.Br. | H |
| 60 | Labiatae | *Ocimum* | *basilicum* | L. | H |
| 61 | Labiatae | *Ocimum* | *suave* | Willd. | H |
| 62 | Leguminosae | *Aeschynomene* | *elaphroxylon* | (Guill. & Perr.) Taub. | T |
| 63 | Leguminosae | *Aeschynomene* | *schimperi* | A.Rich. | S |
| 64 | Leguminosae | *Aeschynomene* | *uniflora* | E.Mey. | H |
| 65 | Leguminosae | *Albizia* | *coriaria* | Welw. ex Oliv. | S |
| 66 | Leguminosae | *Alysicarpus* | | | H |
| 67 | Leguminosae | *Crotalaria* | *spinosa* | Benth. | S |

| | | | | |
|---|---|---|---|---|
| 68 | Leguminosae | *Crotalaria* | | | H |
| 69 | Leguminosae | *Desmodium* | | | H |
| 70 | Leguminosae | *Glycine* | | | H |
| 71 | Leguminosae | *Indigofera* | | | S |
| 72 | Leguminosae | *Mimosa* | *pudica* | L. | H |
| 73 | Leguminosae | *Rhynchosia* | *minima* | (L.) DC. | H |
| 74 | Leguminosae | *Senna* | *didymobotrya* | (Fresen.) Irwin & Barneby | T |
| 75 | Leguminosae | *Sesbania* | | | T |
| 76 | Leguminosae | *Trifolium* | *rueppellianum* | Fresen. | H |
| 77 | Lemnaceae | *Lemna* | | | H |
| 78 | Malvaceae | *Abutilon* | *guineense* | (Schumach.) Baker f. & Exell | S |
| 79 | Malvaceae | *Abutilon* | | | S |
| 80 | Malvaceae | *Hibiscus* | *vitifolius* | L. | S |
| 81 | Malvaceae | *Pavonia* | *urens* | Cav. | H |
| 82 | Malvaceae | *Sida* | *acuta* | Burm.f. | H |
| 83 | Melianthaceae | *Bersama* | | | S |
| 84 | Moraceae | *Ficus* | | | T |
| 85 | Nymphaeaceae | *Nymphaea* | *nouchali* | Burm.f. | H |
| 86 | Onagraceae | *Ludwigia* | *stolonifera* | (Guill. & Perr.) P.H.Raven | H |
| 87 | Palmae | *Phoenix* | *reclinata* | Jacq. | T |
| 88 | Polygonaceae | *Harpagocarpus* | *snowdedenii* | Hutch. & Dandy | H |
| 89 | Polygonaceae | *Polygonum* | *salicifolium* | Willd. | H |
| 90 | Pontederiaceae | *Eichhornia* | *crassipes* | (Mart.) Solms | H |
| 91 | Salvadoraceae | *Azima* | *tetracantha* | Lam. | H |
| 92 | Scrophulariacea | *Cycnium* | *tubulosum* | (L.f.) Engl. | H |
| 93 | Simaroubaceae | *Harrisonia* | *abyssinica* | Oliv. | T |
| 94 | Solanaceae | *Datura* | *stramonium* | L. | H |
| 95 | Solanaceae | *Solanum* | *camphylacanthum* | L. | S |
| 96 | Sterculiaceae | *Melhania* | *sp.* | | H |
| 97 | Tiliaceae | *Grewia* | | | S |
| 98 | Tiliaceae | *Triumfetta* | *brachycerus* | K.Schum. | H |
| 99 | Typhaceae | *Typha* | *latifolia* | L. | H |
| 100 | Umbelliferae | *Centella* | *asiatica* | (L.) Urb. | H |
| 101 | Urticaceae | *Urera* | | | H |
| 102 | Verbenaceae | *Lantana* | *camara* | L. | S |

| 103 | Verbenaceae | *Phyla* | *nodiflora* | (L.) Greene | H |
| 104 | Verbenaceae | *Stachytarpheta* | *jamaicensis* | (L.) Vahl | H |
| 105 | Vitaceae | *Cayratia* | *gracilis* | (Guill. & Perr.) Suess. | H |
| 106 | Vitaceae | *Cissus* | *cactiformis* | Gilg | H |
| 107 | Vitaceae | *Cyphostemma* | *odontadenium* | (Gilg) Desc. | H |
| 108 | Zygophyllaceae | *Tribulus* | *terrestris* | L. | H |

## APPENDIX VII: SOME BIRD SPECIES COMMONLY RECORDED IN YALA WETLAND

NB: NT- near threatened, VU – Vulnerable, PM – Parlaeractic, AM – Afro-tropical migrants, MM - Malagasy migrant, am, pm, mm lower case imply that some population stay around

| | Species | *Scientific Name* | Status |
|---|---|---|---|
| | **Anatidae: ducks and geese** | | |
| 1 | White-faced Whistling Duck | *Dendrocygna viduata* | am |
| 2 | Egyptian Goose | *Alopochen aegyptiaca* | am |
| | **Ciconiidae: storks** | | |
| 3 | Yellow-billed Stork | *Mycteria ibis* | am |
| 4 | Abdim's Stork | *Ciconia abdimii* | AM |
| | **Threskiornithidae: ibises and spoonbills** | | |
| 5 | Sacred Ibis | *Threskiornis aethiopicus* | am |
| 6 | Glossy Ibis | *Plegadis falcinellus* | am |
| 7 | African Spoonbill | *Platalea alba* | am |
| | **Ardeidae: herons, egrets and bitterns** | | |
| 8 | Squacco Heron | *Ardeola ralloides* | AM/pm |
| 9 | Cattle Egret | *Bubulcus ibis* | am |

| 10 | Grey Heron | *Ardea cinerea* | am/pm |
|----|------------|-----------------|-------|
| 11 | Black-headed Heron | *Ardea melanocephala* | am/pm |
| 12 | Purple Heron | *Ardea purpurea* | pm |
| 13 | Little Egret | *Egretta garzetta* | am |
| | **Scopidae: Hamerkop** | | |
| 14 | Hamerkop | *Scopus umbretta* | am |
| | **Phalacrocoracidae: cormorants** | | |
| 15 | Reed Cormorant | *Phalacrocorax africanus* | am |
| | **Accipitridae: diurnal birds of prey other than falcons** | | |
| 16 | Osprey | *Pandion haliaetus* | PM |
| 17 | African Black-shouldered Kite | *Elanus caeruleus* | am |
| 18 | African Fish Eagle | *Haliaeetus vocifer* | am |
| 19 | Western Marsh Harrier | *Circus aeruginosus* | PM |
| 20 | Long-crested Eagle | *Lophaetus occipitalis* | am |
| | **Rallidae: rails and allies** | | |
| 21 | Black Crake | *Amaurornis flavirostra* | am |
| | **Charadriidae: plovers** | | |

| 22 | Spur-winged Plover | *Vanellus spinosus* | |
| | **Jacanidae: jacanas** | | |
| 23 | African Jacana | *Actophilornis africanus* | |
| | **Scolopacidae: sandpipers and relatives** | | |
| 24 | Marsh Sandpiper | *Tringa stagnatilis* | PM |
| 25 | Common Sandpiper | *Actitis hypoleucos* | PM |
| | **Laridae: gulls, terns and skimmers** | | |
| 26 | Whiskered Tern | *Chlidonias hybrida* | pm |
| | **Columbidae: pigeons and doves** | | |
| 27 | Speckled Pigeon | *Columba guinea* | |
| 28 | African Mourning Dove | *Streptopelia decipiens* | |
| 29 | Red-eyed Dove | *Streptopelia semitorquata* | |
| 30 | Ring-necked Dove | *Streptopelia capicola* | |
| 31 | Laughing Dove | *Streptopelia senegalensis* | |
| 32 | Blue-spotted Wood Dove | *Turtur afer* | |
| | **Musophagidae: turacos** | | |
| 33 | Eastern Grey Plantain-eater | *Crinifer zonurus* | |

| | **Cuculidae: cuckoos and coucals** | | |
|---|---|---|---|
| 34 | Diederik Cuckoo | *Chrysococcyx caprius* | am |
| 35 | Blue-headed Coucal | *Centropus monachus* | |
| 36 | Senegal Coucal | *Centropus senegalensis* | |
| | **Coliidae: mousebirds** | | |
| 37 | Speckled Mousebird | *Colius striatus* | |
| 38 | Blue-naped Mousebird | *Urocolius macrourus* | |
| | **Coraciidae: rollers** | | |
| 39 | Broad-billed Roller | *Eurystomus glaucurus* | am/mm |
| | **Alcedinidae: kingfishers** | | |
| 40 | Grey-headed Kingfisher | *Halcyon leucocephala* | |
| 41 | Malachite Kingfisher | *Alcedo cristata* | |
| 42 | Pied Kingfisher | *Ceryle rudis* | |
| | **Meropidae: bee-eaters** | | |
| 43 | Little Bee-eater | *Merops pusillus* | |
| 44 | White-throated Bee-eater | *Merops albicollis* | AM |
| 45 | Eurasian Bee-eater | *Merops apiaster* | PM |

| | | |
|---|---|---|
| | **Picidae: wrynecks and woodpeckers** | |
| 46 | Nubian Woodpecker | *Campethera nubica* | |
| | **Malaconotidae: helmetshrikes, bushshrikes, tchagras and puffbacks** | |
| 47 | Black-headed Gonolek | *Laniarius erythrogaster* | |
| 48 | Papyrus Gonolek | *Laniarius mufumbiri* | NT |
| | **Laniidae: shrikes** | |
| 49 | Long-tailed Fiscal | *Lanius cabanisi* | |
| | **Dicruridae: drongos** | |
| 50 | Common Drongo | *Dicrurus adsimilis* | |
| | **Hirundinidae: saw-wings, swallows and martins** | |
| 51 | White-headed Saw-wing | *Psalidoprocne albiceps* | |
| 52 | Black Saw-wing | *Psalidoprocne pristoptera* | |
| 53 | Barn Swallow | *Hirundo rustica* | PM |
| 54 | Lesser Striped Swallow | *Cecropis abyssinica* | |
| | **Cisticolidae: cisticolas and allies** | |
| 55 | Singing Cisticola | *Cisticola cantans* | |
| 56 | Winding Cisticola | *Cisticola galactotes* | |

| 57 | Carruthers's Cisticola | *Cisticola carruthersi* | |
| | **Pycnonotidae: bulbuls** | | |
| 58 | Common Bulbul | *Pycnonotus barbatus* | |
| | **Sylviidae: Old World warblers** | | |
| 59 | Greater Swamp Warbler | *Acrocephalus rufescens* | |
| 60 | White-winged Swamp Warbler | *Bradypterus carpalis* | |
| 61 | Papyrus Yellow Warbler | *Chloropeta gracilirostris* | VU |
| | **Timaliidae: illadopses, babblers and chatterers** | | |
| 62 | Black-lored Babbler | *Turdoides sharpei* | |
| | **Zosteropidae: white-eyes** | | |
| 63 | African Yellow White-eye | *Zosterops senegalensis* | |
| | **Sturnidae: starlings and oxpeckers** | | |
| 64 | Rüppell's Starling | *Lamprotornis purpuroptera* | |
| | **Turdidae: thrushes** | | |
| 65 | African Thrush | *Turdus pelios* | |
| | **Muscicapidae: chats, wheatears and Old World flycatchers** | | |
| 66 | White-browed Scrub Robin | *Cercotrichas leucophrys* | |

| 67 | Swamp Flycatcher | *Muscicapa aquatica* | |
|----|------------------|----------------------|---|
| | **Nectariniidae: sunbirds** | | |
| 68 | Green-headed Sunbird | *Cyanomitra verticalis* | |
| 69 | Red-chested Sunbird | *Cinnyris erythrocercus* | |
| | **Ploceidae: weavers, bishops and widowbirds** | | |
| 70 | Slender-billed Weaver | *Ploceus pelzelni* | |
| 71 | Village Weaver | *Ploceus cucullatus* | |
| 72 | Yellow-backed Weaver | *Ploceus melanocephalus* | |
| 73 | Fan-tailed Widowbird | *Euplectes axillaris* | |
| | **Estrildidae: waxbills** | | |
| 74 | Black-rumped Waxbill | *Estrilda troglodytes* | |
| 75 | Common Waxbill | *Estrilda astrild* | |
| 76 | Red-cheeked Cordon-bleu | *Uraeginthus bengalus* | |
| 77 | Orange-breasted Waxbill | *Amandava subflava* | |
| 78 | Bronze Mannikin | *Spermestes cucculatus* | |
| 79 | Black-and-white Mannikin | *Spermestes bicolor* | |
| | **Motacillidae: wagtails, longclaws and pipits** | | |

| 80 | Yellow Wagtail | *Motacilla flava* | PM |
|---|---|---|---|
| | **Fringillidae: canaries, citrils,  seedeaters and allies** | | |
| 81 | Papyrus Canary | *Crithagra koliensis* | |
| 82 | Yellow-fronted Canary | *Crithagra mozambica* | |
| | | | |

NB: Some data could not be accertained within the study period

**APPENDIX VIII: FISH SPECIES RECORDED IN YALA WETLAND**

| | *Species* | Family | Common Name | Conservation Status |
|---|---|---|---|---|
| 1 | *Barbus neumayeri* | Cyprinidae | Neumayer's Barb | Least Concern |
| 2 | *Clarias gariepinus* | Clariidae | African Catfish | Least Concern |
| 3 | *Barbus paludinosus* | Cyprinidae | Straightfin Barb | Least Concern |
| 4 | *Protopterus aethiopicus* | Protopteridae | | Not Assessed |
| 5 | *Ctenopoma muriei* | Anabantidae | Ocellated  Labyrinth Fish | Least Concern |
| 6 | *Schilbe intermedius* | Schilbeidae | Butter Catfish | Least Concern |
| 7 | *Haplochromis sp. 1* | Cichlidae | | |
| 8 | *Mormyrus kannume* | Mormyridae | Bottlenose | Least Concern |

| 9 | *Haplochromis sp. 2* | Cichlidae | | |
| 10 | *Bagrus docmack* | Bagridae | | Not Assessed |
| 11 | *Haplochromis sp. 3* | Cichlidae | | |
| 12 | *Clarias liocephalus* | Clariidae | Smooth-head Catfish | Least Concern |
| 13 | *Oreochromis esculentus* | Cichlidae | Singidia Tilapia | Critically Endangered |
| 14 | *Lates niloticus* | Latidae | Nile Perch | Least Concern |
| 15 | *Oreochromis leucostictus* | Cichlidae | | Least Concern |
| 16 | *Oreochromis niloticus* | Cichlidae | | Not Assessed |
| 17 | *Oreochromis sp. 1* | Cichlidae | | |
| 18 | *Oreochromis sp. 2* | Cichlidae | | |
| 19 | *Oreochromis variabilis* | Cichlidae | | Critically Endangered |

NB: Some information could not be obtained during the study period.

**APPENDIX IX: REPTILE AND AMPHIBIAN SPECIES RECORDED IN YALA BASIN**

| Species: Scientific Name | Common Name | Conservation Status (e.g. IUCN) | Lower Basin | Middle Basin | Upper Basin |
|---|---|---|---|---|---|
| *Bitis gabonica* | Gaboon Viper | Not evaluated (NE) | - | - | X Kakamega Forest |
| *Bitis nasicornis* | Rhinoceros viper | NE | x | X | X |
| *Atheris hispida* | Rough-scaled bush viper | NE | - | - | X Kakamega Forest |
| *Atheris squamiger* | Green Bush viper | NE | X Yala Wetland | X | X Kakamega Forest |
| *Causus lichtensteini* | Forest Night Adder | NE | X Yala Wetland | - | X Kakamega Forest, North Nandi Forest |
| *Rhamnophis aethiopisa elgonensis* | Large-eyed Green tree snake | NE | - | - | X Kakamega Forest |
| *Hapsidophrys lineata* | Black-lined Green Snake | NE | - | - | X Kakamega Forest |
| *Philothamnus nitidus loveridgei* | Loveridge's Green-Snake | NE | - | X | Kakamega Forest |

| | | | | | |
|---|---|---|---|---|---|
| *Boiga blandingii* | Blanding's Tree Snake | NE | - | X<br><br>Serem | X<br><br>Kakamega Forest, South Nandi<br><br>Forest |
| *Boiga pulverulenta* | Powdered Tree snake | NE | - | X<br><br>Serem | X<br><br>Kakamega Forest, South Nandi<br><br>Forest |
| *Polemon christyi* | Christy's Snake-eater | NE | - | - | X<br><br>Kakamega<br><br>Forest |
| *Pseudohaje goldii* | Gold's Tree Cobra | NE | - | - | X<br><br>Kakamega<br><br>Forest |
| *Philothamnus carinatus* | Thirteen-scaled Green-snake | NE | X<br><br>Yala Wetland | - | X<br><br>Kakamega<br><br>Forest |
| *Hormonotus modestus* | Yellow Forest snake | NE | - | - | X<br><br>Kakamega<br><br>Forest |
| ***Cnemaspis elgonensis*** | **Mt. Elgon Forest Gecko** | **VU** | | **-** | **X Kakamega**<br><br>Forest |
| *Lygodactylus gutturalis* | Chevron-throated Dwarf Gecko | NE | - | - | X<br><br>Kakamega |

| | | | | | Forest |
|---|---|---|---|---|---|
| *Lepidothyris hinkeli* | Eastern Red-flanked Skink | NE | - | - | X Kakamega Forest |
| *Adolfus africanus* | Multi-scaled Forest Lizard | NE | - | - | - Kakamega Forest |
| *Feylinia currori* | Western Forest Limbless skink | NE | - | - | X Kakamega Forest |
| *Rhampholeon boulengeri* | Boulenger's chameleon | LC | **-** | **-** | X Kakamega Forest, North Nandi |
| *Dendroaspis jamesoni* | Jameson's Mamba | NE | - | X Kaimosi, Khayega | X Kakamega Forest |
| *Leptopelis mackayi* | Mackay Forest tree frog | NE | - | - | X Kakamega Forest, North Nandi |
| *Hyperolius lateralis* | Side-striped Reed frog | LC | - | - | X Kakamega Forest, North Nandi Forest, Cherangani Forest |
| *Hyperolius cinnamomeoventris* | Cinnamon Reed Frog | LC | - | - | X Kakamega |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | Forest, North Nandi Forest |
| *Afrixalus osorioi* | Congo forest spiny reed frog | LC | - | - | X Kakamega Forest |
| *Afrixalus fulvovittatus* | Four-lined Spiny reed frog | LC | - | - | X Kakamega, Forest South & North Nandi Forests |
| *Hydrophylax albolabris* | Forest white-lipped frog | LC | - | X | X Kakamega Forest |
| *Phrynobatrachus graueri* | Grauer's Puddle frog | LC | - | - | X Kakamega, North Nandi Forests |

**APPENDIX X: SOME MAMMAL SPECIES FOUND IN YALA WETLAND**

| # | **Common Name** | *Scientific name* | **IUCN status** |
|---|---|---|---|
| 1 | Hippopotamus | *Hippopotamus amphibius* | Vulnerable |
| 2 | Bushbuck | *Tragelaphus scriptus* | Least Concern |
| 3 | Sitatunga | *Tragelaphus spekii* | Least Concern |
| 4 | Bush pig | *Potamochoerus larvatus* | Least Concern |

| 5 | Bush (common) duiker | *Sylvicarpa grimmia* | Least Concern |
|---|---|---|---|
| 6 | Spot-necked otter | *Lutra maculicollis* | Least Concern |
| 7 | Leopard | *Panthera pardus* | Near Threatened |
| 8 | Wild cat | *Felis silvestris* | Least Concern |
| 9 | Serval cat | *Leptailurus serval* | Least Concern |
| 10 | Spotted hyaena | *Crocuta crocuta* | Least Concern |
| 11 | Black-backed jackal | *Canis mesomelus* | Least Concern |
| 12 | Genet | *Genetta spp.* | Least Concern |
| 13 | African civet | *Civettictis civetta* | Least Concern |
| 14 | Ratel (Honey badger) | *Mellivora capensis* | Least Concern |
| 15 | Marsh mongoose | *Atilax paludinosus* | Least Concern |
| 16 | Slender mongoose | *Herpestes sanguinea* | Least Concern |
| 17 | White-tailed mongoose | *Ichneumia albicauda* | Least Concern |
| 18 | Vervet monkey | *Cercopithecus pygerythrus* | Least Concern |
| 19 | Wrinkle-lipped bat | *Chaerophon spp.* | Least Concern |
| 20 | African Sheath-tailed bat | *Coleura afra* | Least Concern |
| 21 | Yellow-winged bat | *Lavia frons* | Least Concern |

| 22 | Aardvark | *Orycteropus afer* | Least Concern |
|----|----------|---------------------|---------------|
| 23 | African Savanna Hare | *Lepus microtis* | Least Concern |
| 24 | East African Spring-hare | *Pedetes surdaster* | Least Concern |
| 25 | Crested porcupine | *Hystrix cristata* | Least Concern |
| 26 | Unstripped ground squirrel | *Xerus rutilus* | Least Concern |
| 27 | Four-toed Hedgehog | *Atelerix albiventris* | Least Concern |
| 28 | Wrinkle-lipped Bat | *Chaerophon sp.* | Least Concern |
| 29 | African Sheath-tailed Bat | *Coleura afra* | Least Concern |
| 30 | Yellow-winged Bat | *Lavia frons* | Least Concern |

**APPENDIX XI: DESCRIPTION OF SOME OF THE SMALL WATER BODIES IN LOWER YALA**

| Water body | Latitude | Longitude | Maximum depth, m | Average depth, m | Approximate surface area ( ha and or x 1000m$^2$ | Approximate water volume X 1000 m$^3$ |
|---|---|---|---|---|---|---|
| L. Sare | 00$^0$01'45"S | 034$^0$03 01"E | 5.5 | 3.5 | 500 h | |
| L. Kanyaboli | 00$^0$04'30"N | 034$^0$09 36"E | 6 | 4 | 1050 ha | |
| L. Namboyo | 00$^0$00'25"N | 034$^0$05 32"E | 11 | 7 | 200 ha | |
| **Ochot dam** | | | 2.9 | 1.9 | 47.780 m$^2$ | 90.145 |
| Maranda dam | 00$^0$05'42"S | 034o13 35"E | 1.7 | 1.05 | 16.674 m$^2$ | 17.507 |
| Ochilo dam | 00$^0$00'30"S | 034$^0$16 06"E | 1.9 | 1.2 | 17.732 m$^2$ | 21.279 |
| Uranga dam | 00$^0$05'19"N | 034$^0$16 22"E | 2.5 | 0.6 | 3.653 m$^2$ | 2.192 |
| Masawa dam | 00$^0$04'54"N | 034$^0$14 00E | 1.5 | 1.1 | 4.764 m$^2$ | 50.446 |
| Futro dam | 00$^0$04'07"N | 034$^0$16 03"E | 1.2 | 0.7 | 23.919 m$^2$ | 16.673 |
| Kalenyjoouk dam | 00$^0$04'31"N | 034$^0$13 05"E | | | | |
| Mwer dam | 00$^0$07'11"N | 034$^0$10 15"E | 5 | 1.5 | 122.051 m$^2$ | 186.564 |
| Mauna dam | 00$^0$12'31"N | 034$^0$09 21"E | 4 | 2.3 | 46.685 m$^2$ | 110.693 |
| Yenga dam | 00$^0$13'00"N | 034$^0$12 36"E | 4.5 | 2.1 | 18.732 m$^2$ | 39.337 |

*Characteristics of various water bodies within and around Yala Wetland*

**(Source Osumo (2006)**

**APPENDIX XII: PAPYRUS PLANTING IN YALA SWAMP**

| No | CBO | Area Rehabilated | No. of Ha planted |
|---|---|---|---|
| 1 | Children Life In Future SHG | Bunyala-Sitome | 2.4 |
| 2 | Siginga Women Lobby | Bunyala-Sitome | 4 |
| 3 | Khukhoyane SHG | Bunyala-Sitome | 2 |
| 4 | Eifuni Women Group | Bunyala-Sitome, Khulukhongo | 0.5 |
| 5 | Twaweza SHG | Bunyala-Rukala, Kaya | 1.5 |
| 6 | Rukala Women Lobby | Bunyala-Rukala, Kaya | 2 |
| 7 | Riziki Women Group | Bunyala-Rukala, Kaya | 1.5 |
| 8 | Busia Biodiversity & Conservation Initiative (BUDICI) | Bunyala-Khulukhongo, Ndekwe | 5 |
| 9 | GODAC Youth Group | Bunyala-Khulukhongo, Ndekwe | 5 |
| 10 | Khajula Water Users CBO | Bunyala-Khulukhongo | 2 |
| 11 | Usife Moyo Women Group | Bunyala-Khulukhongo, Ndekwe | 5 |
| 12 | Bulwani Transporters SHG | Bunyala-Bulwani island | 0 |
| 13 | Kanyibok Village Youth Group | L. Sare, Dhogoye | 2 |
| 14 | Yimbo Ber | L. Sare, Dhogoye | 2 |
| 15 | Ochulu Fish Farmers | L. Sare, Goma, Kanyagol | 1 |
| 16 | Lake Sare Greenbelt | L. Sare, Kakumu, Ureje | 4 |
| 17 | Luhya Women Group | L. Sare, Ururi | 1 |
| 18 | Jora Fish Farmers Group | L. Namboyo, Ndiwo | 4.5 |
| 19 | Barkanyango Horticultural group | L. Namboyo, Barkanyango | 4.5 |
| 20 | Nyiego Women Group | Ndai, L Kanyaboli | 2 |
| 21 | Yala Swamp Community Environmental Protection Programme (YSCEPP) | Along river Yala, Bar Olengo | 5 |
| 22 | Yala Ecosystem & Biodiversity Conservation Network (YEBICON), Kabura-Uhuyi Farmers | Ndai, L Kanyaboli | 6 |
| 23 | Kadenge BMU | Along river Yala, Bar Olengo | 0 |
| 24 | Lake Kanyaboli Environmental Conservation Network | Along river Yala, Bar Olengo | 5 |
| 25 | Rapudo Fish Farmers Group | Ndai, L Kanyaboli | 2 |
|  | Totals (In Ha) |  | 69.9 |

**NB: As at December at December 2019**

**APPENDIX XIII: SIMILARITY REPORT**



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