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COMMUNITY INVOLVEMENT IN RIVER HEALTH MANAGEMENT

Lessons from River Mayanja (Uganda) and River Njoro (Kenya)

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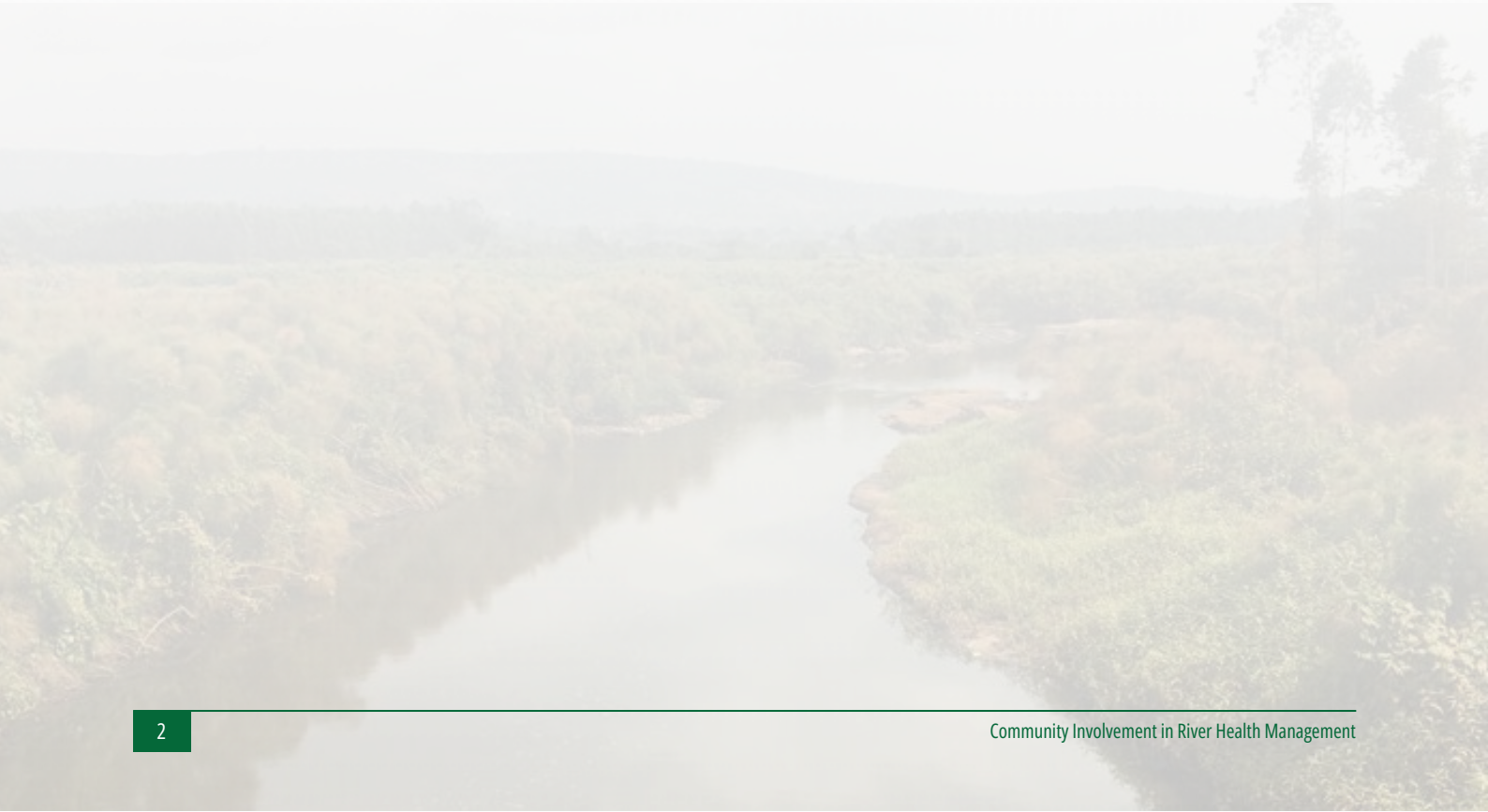
Abbreviations

STREM	Strengthening Community-based Research for River Health and Climate Change Mitigation in Eastern Africa
DPSIR	Drivers, Pressure, State, Impact and Responses
KII	Key Informant Interviews
WRUA	Water Resources Users Association



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Abstract

Management of Rivers requires a holistic approach for better framing, understanding, and development of solutions for improved river health. The different players within these ecosystems are independently important but stronger together. Activities that promote River health including research, monitoring and evaluation, policy formulation, and regulations implementations play an important role in ensuring that the ecosystem services are utilized sustainably while ensuring co-development and co-implementation of solutions which are key to achieving conservation objectives.

Globally, co-management (a system in which user groups and other stakeholders share management responsibilities for resources) has gained traction as a response to the concept that centralized river management is ineffective in stopping the depletion of related resources and that there are insufficient government resources for river management. Therefore, this study demystifies these factors from the viewpoints of important players in Uganda and Kenya who stand to gain either directly or indirectly from R. Mayanja and R. Njoro, respectively.

Understanding the river health social indicators and governance aspects in the management and conservation of river ecosystems is key for recommendations of solutions to the pressing challenges. To give an outlook of these aspects a study was done by the Strengthening Community-based Research for River Health and Climate Change Mitigation in Eastern Africa (STREM) focusing on River Njoro and River Mayanja in Kenya and Uganda respectively, through literature review, key informant interviews (KII), and stakeholder engagement workshops.

The community-based action employed by the STREM sought to empower communities to reflect upon the status of their rivers, identify issues and causes, and lobby for evidence-based solutions them, and duty bearers including Local and national government officials, policy makers, and researchers for the holistic conservation of river resources.

Holistic River Management **Co-Management Strategies** **Collaborative Governance**

Social Indicators and Governance **Community Empowerment**

Context

Rivers are complex systems characterized by physical, social, biological, and governance dynamics among others. Their form and behavior reflect interacting geomorphological, hydrological, and ecological processes. Although this is a well-understood fact, finding solutions to the existing and ever-evolving river challenges tends to combine unconnected input from the different interacting disciplines. Understanding the complexities within river ecosystems requires holistic interdisciplinary approaches (Phillips, 1995). Presently most of the dynamics in rivers have been orchestrated by humans as they have had a huge role to play in the deterioration of the rivers and the possibility of them having the key solutions for this and many other challenges from river ecosystems. Despite the numerous challenges, there are also benefits that these ecosystems avail to the environment, society, and the economy and there is a need for a more multi-disciplinary approach as evidenced in recent studies to incorporate the most appropriate framework to balance the use and management of rivers (Dollar et al., 2007).

Globally, regionally, and locally water is a huge topic of economic, political, social, and human debate. This is attributed to the fact that water is a critical element in the development of human societies, affecting aspects such as livelihoods since ancient times (Antunes et al., 2009). The World Water Council highlights the biophysical aspects detailing: "Water is life. All living organisms are predominantly made of water: human beings about 60%, fish about 80%, plants between 80% and 90%. Water is necessary for all chemical reactions that occur in living cells and is also the medium through which information is exchanged between cells. The sustainability of human development depends on the hydrological cycle since water is essential for food production and all living ecosystems".

Although a small fraction of the world's water is freshwater, they support 6% of all species (100,000 out of 1.8 million) found in both aquatic and terrestrial ecosystems. This makes both inland water and its biodiversity essential resources for society, the economy, and the environment (Sanon et al., 2020). Water availability contributes to sustainable development goals through socioeconomic development and poverty reduction. Multiple pressures such as demographic changes, climate change, urbanization, widespread poverty, ecosystem degradation, and water contamination have a significant impact on both resource and management of water directly or indirectly therefore necessitating integrated, sustainable, and equitable water management to increase the lifespan of the ecosystem services from water (UNESC, 2006). Worldwide rivers are the most threatened ecosystems by multiple human pressures like pollution, water abstraction, river channelization, and damming ecosystem degradation through humans' increasing demand for food, health, and clean water.

Climate change on the other hand has posed a threat to human health, agricultural dynamics, and natural resources including rivers through flood and drought episodes that have interfered with the normal physical, chemical, and biological river characteristics. Anthropogenic effects on natural resources have interfered with the water towers that contribute to the well-being of the rivers.

Understanding the river health social indicators and governance aspects in the management and conservation of river ecosystems in the dry and wetlands is important to gaining a proper base for recommendations on the best practices to curb the river problems experienced over time. To bring to perspective theseaspects a study done by the STREM project team with a focus on R. Njoro and R. Mayanja in Kenya and Uganda respectively, through literature review, key informant interviews (KII), and stakeholder engagement workshops.

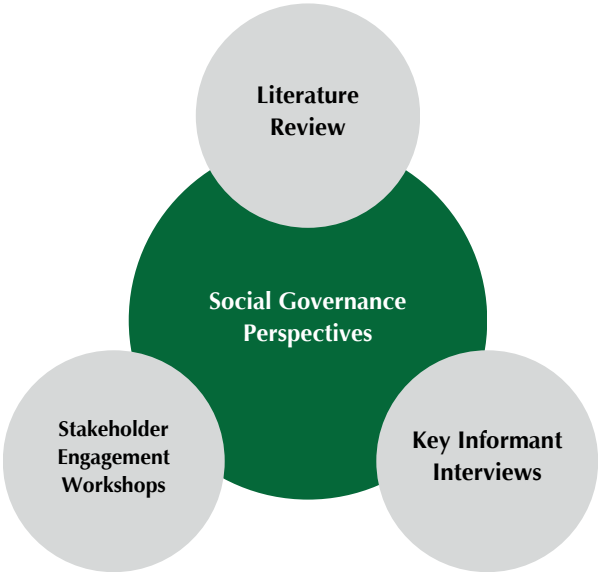

Figure 1: Method of Implementation

The main objective of this study is to create an understanding of the social and governance aspects to strengthen community-based research for river health and climate change mitigation in East Africa. The key questions answered are:

- **What are the drivers, pressures, and impacts that affect the state of rivers Mayanja and Njoro?**
- **What are the governance issues that contribute to the management and conservation of river ecosystems?**
- **What community based responses are relevant to management of rivers?**

River Management and Conservation from Communities' Lens

A river's well-being is largely dependent on human activity and the capacity of the river's resilience. Its management and detection of its degradation can be measured through the physical, chemical, and biological characteristics (Fairweather, 1999). Over the years humans have continued to interfere with the river's health in different ways including the construction of dams and bridges to control its flow as well as contamination at different levels. Due to intensification of human activities in a quest for economic development river health has become of primary concern as the ecology and environment are deteriorating by the day (Fairweather, 1999), (Anwar Sadat et al., 2020). This was exemplified by the participants in the stakeholder engagement in both R. Mayanja and R. Njoro engagements where population increase was highlighted as one of the pressures of river health degradation including deterioration of the quantity and quality of the river. As quoted from one of the stakeholders

> **"Rapid population growth has increased demand for settlement, food, and water, resulting in the degradation of the river."**

The population has been assessed as having a direct impact on the development, conservation, and management of natural resources. Researchers have determined that there is a direct relation between rapid population growth, economic development, and environmental degradation through uncontrolled growth of urbanization, industrialization, expansion of intensification of agriculture, and destruction of natural habitats (Gore, 1999). The world's population is growing, but the challenge is particularly acute in Africa as the population is projected to triple by 2050(World Economic Forum, 2021).

Population as a dimension of influence

The population of Africa currently stands at approximately 1.37 billion and is expected to rise in the coming years. However, if caution is not taken, this could have negative consequences. As the population grows, there is a greater need for land for settlement and agricultural activities, which are crucial to the African economy. Unfortunately, this has led to increased destruction of the riparian areas. Ecosystems are being degraded, which is driving biodiversity loss.

One of the major challenges that Africa has been facing for centuries is the severe degradation of large rivers, their catchments, floodplains, and lower estuarine reaches. The consequences of this degradation are being felt both locally and globally. (Gore, 1999) (Feld et al., 2011). In Burkina Faso, human activity and habitat loss have caused a significant decline in fish populations. (Meulenbroek et al., 2019).

Particularly unsustainable use of water, unsustainable farming practices, and ecological degradation, including illegal logging, have been identified as drivers that negatively impact the status of River Njoro and R. Mayanja owing to the increase in population. The destruction of forests has led to intermittent flow of the river as well as the biodiversity loss within the River ecosystems.

"In 2006, the Sigotik area was covered in vegetation, but it is now bare and overly farmed" as noted in the stakeholder interviews with Professors from Egerton University and a representative from the county government in Kenya.

Indicators are therefore crucial in showing the environmental influences of society. To distinguish the status of the environment from human pressures on it and how societies are reducing pressures to ameliorate the worsening conditions, the OECD model for the state of the environment uses three separate types of indicators: pressure, state, and reaction. Generally, the rate of influence on the health of rivers has been demonstrated by chemical and physical variables; however, macroinvertebrates are also important markers of contamination that require further investigation in addition to these variables. (Feld et al., 2011).

Understanding these indicators is a way to make informed decisions on conservation/response measures. The R. Njoro and R. Mayanja ecosystems have very similar variables that can inform other management and conservation issues in different avenues. To have a holistic solution-based approach the STREM project involved both the macroinvertebrates and socioeconomic methods to understand the different indicators for evidence-based solutions.

Indicators for understanding conservation

The state of both Rivers has diminished significantly over the years due to socioeconomic issues. However, the response mechanisms show there is hope in getting to the ideal Rivers within the two countries and East Africa.

DPSIR Framework Aspects	R. Njoro	R. Mayanja
Drivers	Anthropogenic activities Land-use changes Policy issues Population growth Climate change	Anthropogenic activities (uncontrolled extraction of resources) Land-use changes Population growth Politics
Pressures	Demand for water resources Pollution (Physical, chemical, and biological)	Pollution Poor waste management
States	Reduced biodiversity Increased siltation Increased species Intermittent river flow Vegetation loss	Reduced biodiversity
Impacts	Emergence of water-borne diseases Increased erosion Increased effects of climate change Loss in biodiversity Reduced water quality & quantity	Reduced water quality & quantity Wetland encroachment Loss of biodiversity
Responses	Community awareness and sensitization Policy development and amendments Tree plantation	Compensation Demarcation of wetlands Policy development and amendments Proper waste management

Table 1: DPSIR Framework from community's perspective

There have been efforts to restore and conserve the rivers across space and time key examplesare the conscious response strategies that have been made by R. Njoro and R. Mayanja. River restoration is a tool that was brought to attempt to reverse or manage the effects of habitat destruction and ecosystem degradation. This tool has been extrapolated to the African continent through different initiatives and strategies to restore degraded ecosystems. However, restoring and sustaining multiple ecosystem benefits, especially in transboundary river basins, is a complex and challenging task in the developing world that needs collective and coherent multi-stakeholder action (Feld et al., 2011). More can be done through capacity building and knowledge sharing through basic and applied education.

African wetlands are important in the provision of river ecosystem goods and services therefore sustaining the livelihoods. Knowledge and education on their importance need to be a priority to manage, conserve, and restore these ecosystems with the changing dynamics of economic development, climate change, and other shocks. In the African continent, knowledge of the processes, functions, and values of wetlands is limited with wetland inventories yet to be produced in many regions (van der Zaag, 2005) (Denny, 2001). Patrick Denny (Denny, 2001) in his publication proposed a research strategy that sought issues related to wetlands knowledge gaps.

> **"In as much the community is well knowledgeable about the need to protect wetlands some are still not aware, and some are just ignorant"**
>
> - Key stakeholder from Makerere University

The intrinsically linked two-pronged approach involved firstly studies for inventory assessment and monitoring of wetlands and secondly research into processes, structure, and functioning of wetland ecosystems. He adds that the latter has a long-term perspective, and the former has an immediate urgency. Therefore, basic research should go hand in hand with problem-solving studies (Denny, 2001). R. Njoro is on its way to contributing to the long-term sustainability of the river through community strategies they are already implementing through their community group NJORO Water Recourse Users Association (WRUA).

Monitoring of water quality (chemical and biological), pegging, awareness creation, and implementation of laws such as boundary establishment are some of the activities that are creating impact. However, for sustainability to be realized there must be collaboration among research, academia, and communal actors to facilitate evidence-based and impactful learnings and solutions through better communication.

> **"There has been a breakdown of communication within and outside institutions that are hindering us from realizing the ideal R. Njoro"**
>
> -Key STREM project team member after discussions with the different stakeholders

A research, training, and capacity-building approach is encouraged among different stakeholders in the global north and south as well as from the community level to the national level to create a basis for co-management of wetlands (van der Zaag, 2005). The key impact is in community awareness creation as the initiatives and their (community) active participation.

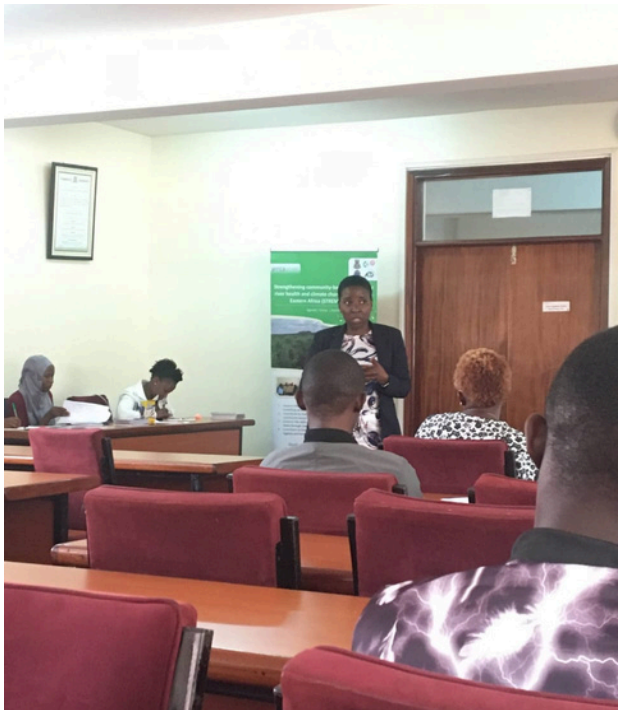

Figure 2: Participants during the stakeholder engagement session

Governance and Institutional Arrangements in River Management

Over the past decade, political geographers have documented diverse situations in how different social actors constrain, create, and shift scales and levels to serve their interests (Swyngedouw 1997a, b). Actors can change power and authority by working at different spatial levels. They can alter access to resources, and the decision-making processes concerning those resources. Scale choices can be a means of inclusion or exclusion. This sentiment was shared by communities from R. Njoro and R.Mayanja who felt that all the laws and regulations are made by the government without their input, yet they are expected to adhere to the same.

Analyzing at a particular level may express power (Swyngedouw 1997b). Environmental assessments, for example, are subject to biases arising from the choice of scales (Lebel 2005). Actors help produce scales through their activities, and scales, in turn, constrain and guide these activities by providing (or taking away) resources (Williams 1999). Understanding actors shapes scale and is likely an ongoing, dynamic, economic, and political process (Delaney and Leitner 1997). In a process aptly labeled "state simplification" (Scott 1998), states first appeal to wider interests as they simplify diverse local systems and then use the newly unified systems to rationalize development planning and environmental management.

People, institutions, and landscapes are made to fit levels and scales in the states' systems of accounting and monitoring. Local-level knowledge and institutions are seen as local in scope, relevance, and power, whereas the rules and knowledge of the state have much bigger scope and significance. The capacity of states to circumscribe how scale is represented—whether through policies, laws, or media campaigns and, if necessary, reinforced through threats and exercise of force—has most of the time far exceeded those of other actors working at more local levels. This capacity is further reinforced by state control of data gathering, analysis, and dissemination. (Morrill 1999).

The greater power of larger places and higher levels has several underlying reasons, including the dependence of local areas on other places; the greater mobilization capacity of interest groups at higher levels; the heterogeneity of interests and attitudes across local areas and the dominance of national mass media by higher levels (Morrill 1999). Power is reflected in, and reproduced by, the capacity to control and capture resources from various levels. The scale (and levels) at which a problem is experienced, analyzed, and discussed, or the "scale of meaning," may not correspond to the scale of the decision-making bodies (Towers 2000).

One of the intervention's aims may, therefore, be enabling the "scale capabilities" of the less powerful (Rankin 2003). Shifting across levels and scales is often important to social movements (Williams 1999). The ability to use scale typically varies among stakeholders (Swyngedouw 1997b). Actors often need to strategically navigate regulations and dependencies (Cox 1998). Empowerment may need the ability to work across multiple scales. There is often a large gap between small geographical areas where environmental and social injustices occur and the larger administrative or jurisdictional levels where they can be addressed politically (Williams 1999).

The politics-of-scale metaphor has been stretched to cover a lot of different relationships. In this paper, we use this metaphor to refer to the situations where different actors contest the spatial extent and resolution of information, and decisions, and contrast this with the politics of place and position (see Fig. 1). The "politics of position" refers to politics among locations that depend on their relative physical position, for example, between upstream and downstream water users or those on different banks of a river. The "politics of place" refers to the unfolding of power relations among stakeholders that arise because of the special characteristics of the places interacting beyond those arising from levels or positions.

However, politics can either be positive or negative and its influence can hinder growth in many aspects. A key example from Uganda from a stakeholder highlights that **"Interference by the elite for personal gains has posed a significant challenge in the management of Rivers in Kenya."** Therefore there needs to be a balance spearheaded by the leadership in place for impact to be achieved.

Governance Perspective from Ugandan Voices

To further illustrate the issue of governance from a Ugandan perspective, a case study was held in Uganda's river Mayanja, and the different stakeholders were engaged to air their voices on governance issues and propose solutions to the challenges facing their river's health. These proposed solutions were as highlighted below, though they were not only limited to these because they continue to be an iterative and evolving conversation. One of the interviewees highlighted that,

> **"Political interference has posed a significant challenge to the conservation of wetland ecosystems. Corrupt politicians who are well-connected often engage in land grabbing of public resources, including conserved and protected areas."**

Demarcation of the wetland areas

Stakeholders propose clear boundaries through governance to define areas where human activities can be done without hurting the wetland and its processes. Washing bays and farming areas should be found at a clear distance from the wetland to prevent wastewater with detergents or fertilizers and pesticides from entering water systems. With the help of government officials and community groups, these goals have been achieved in other contexts and can be achieved for the River Mayanja wetland too but require strict follow-up.

Proper waste management

Mayanja River, an urban river, faces a significant challenge of pollution, particularly from plastics and domestic waste. Waste disposal from both households and industries should be responsibly managed with clear instructions and restrictions from waste management authorities. Garbage should be disposed of in designated areas or treated to minimize negative environmental impacts. Poor waste management practices by residents such as littering of waste could turn wetlands into dumping sites, turning the river into an eyesore. This issue was highlighted in one of the Key Informant Interviews, where a respondent explained that,

> **"Pollution from plastics is a major concern in streams and rivers, with inadequate waste management systems worsening the situation."**

Compensation and Regulation of the activities in wetlands

Individuals and communities alike may be forced to leave their homes due to eviction to pave the way for the development of projects or as a result of government order. Whether it be by individual landowners or government entities like road reserves, those who are evicted should be compensated. This compensation will help them find suitable places to live, rather than resorting to settling in wetlands which may seem to be inexpensive or even free, but unsuitable for long-term habitation.

Effective regulation of mainly human activities in wetlands is essential. Encouraging the use of sustainable fishing methods is a better alternative than allowing the use of undersized nets and fish poisoning by nearby communities. Similarly, farming methods should be regulated in wetlands and their surrounding areas. Farmers should be encouraged to adopt organic farming techniques and grow crops that are suitable for water-logged areas. A thorough assessment to find the most suitable crops to be grown in wetlands needs to be done to opt for wetland-conserving crops and avoid negative impacts on the wetlands. For instance, studies suggest that the eucalyptus tree is hydrophilic and draws water from the wetland, while the bamboo tree also known as the "water tree" has a positive impact on the wetland.

The National Environment Management Authority (NEMA) has issued guidelines for the sustainable use of natural resources in Uganda. It is important for people to easily access and follow these guidelines to conserve, manage, and rehabilitate wetlands.

Discouraging investors from setting up their businesses in wetlands

With development increasingly being the goal in most developing countries, constructing roads, buildings, and factories has taken priority at the expense of conserving natural resources. Permanent structures, such as factories next to wetlands, degrade the wetlands. A case of wetlands being covered for road construction has been witnessed in both local and global contexts. Therefore, strict laws discouraging local and international communities from degrading the wetlands in the name of development need to be implemented and enforced.

Community awareness on the importance of wetlands

As unanimously stated by the Ugandan stakeholders, it is unfortunate that many people lack knowledge of the vital role that wetlands play in our ecosystem. Lack of sufficient awareness has over time shaped the wrong perspective of viewing wetlands as resources to be exploited without any concern for their intrinsic value. To create a positive attitude towards wetlands conservation, communities need to be sensitized and made aware of the many ecosystem services and benefits that these areas provide. Communities living around R. Mayanja have received several benefits because of their river conservation efforts. The communities understand the ecosystem well and can help create positive change by raising awareness and sensitizing others on the same. Well-established community authorities are necessary for the sustainable enforcement of relevant laws on environmental conservation and specifically wetlands protection. The community-based authorities can monitor violations, regularly check the river, and carry out awareness campaigns on wetlands protection. This support from the community is a plus for the government in wetland management.

Governance Perspective from Kenyan Perspective

Contradicting laws on the delineation of riparian land

Environmental Management and Coordination (water quality) regulations, 2006 states that riparian land starts at the highest watermark (highest recorded flood level) with a minimum distance of 6 meters and a maximum distance of 30 meters on each side of a river. "The water rules recommend a minimum distance of 6 meters and a maximum distance of 5 meters from the top edge of a river". The Survey Act states that riparian land should not be less than 30 meters in width above the high-water mark and it does not consider that rivers have distinctive characteristics. The law on Survey Act only applies to government land and not privately owned land. The Survey Act also permits the government to reduce the riparian land in exceptional circumstances. The Physical Planning Act of 1998 recommends riparian land to be 10 meters in width on each side of the riverbank in areas that do not flood. Article 62 of the Kenya Constitution 2010 states that rivers and all land between high and low water marks are public lands. The constitution further states in Article 67 that public land should not be owned privately. The Survey Act, Physical Planning Act, and Environmental Management and Coordination do not consider the high and low water marks as stated in the constitution.

Implementation of existing laws

Nakuru County Climate Change Act 2021 was enacted by the Nakuru County assembly to enhance climate resilience through the development, management, implementation, regulation, and monitoring of adaptation and mitigation measures and actions. Some of the guiding values and principles are; community-driven and bottom-up planning of response to climate change, commitment to informed participation of communities in planning and implementation of climate change interventions, respect and integration of knowledge perspectives, and experiences of communities in climate change response, among others. The goals of laws relating to river health will only be achieved if they are implemented by national and county governments.

From the engagements, several policy documents have been developed to guide the management of R Njoro including the Catchment Management Plan for the Njoro River; Nakuru Climate Change Act of 2021; Njoro River Rehabilitation Strategy; Water Policy 2021, and CDIP. However, there is a need for sensitization and awareness creation of these laws and proper implementation where all stakeholders are involved.

Role of stakeholders in R. Health management

Institutions have a crucial role in formulating the terms of people's access to natural resources and in determining the decisions made regarding their use, including who gets to make what choices and how. Rivers ecosystems are no different. Jentoft (2004) points out that without them [institutions], rivers, like other socio-economic processes, could not exist (p. 138). People simply wouldn't know how to behave. Institutions must therefore have an impact on the procedures, features, and results of river health management. Governments and users collaborate to manage numerous rivers worldwide through co-management agreements, which necessitate that institutions influence the structure, practices, and outcomes of co-management.

Understanding the several organizations that have an impact on co-management, as well as the how and what results can inform the design, support, and implementation of co-management.

This is essential given the lack of evidence of success associated with co-management in some parts of the world in delivering more sustainable fisheries (Béné et al., 2009, Hara and Raakjær Nielsen, 2003).

As highlighted by Njoro River stakeholders **"There has been miscommunication within and between institutions (academia, community, and government)"** reducing their impact vis a vis the plans laid down. The NjoWRUA community association has been doing a lot including monitoring of River Njoro and Pegging making it difficult for co-implementation, impact learning, and knowledge sharing to improve co-conservation and management of river ecosystems.

Positive Interventions: Responses from Kenya and Uganda

In response to the drivers and pressures affecting the health of rivers in Uganda, policies have been proposed to address these challenges. One directive involves canceling land titles given to people in wetland ecosystems. Additionally, policies are being reviewed and updated to deal with current and emerging issues. The National Environment Management Authority (NEMA) officials work closely with the wetland authority to enforce regulations on industries discharging effluents into the environment.

Water conservation initiatives have also been proposed, such as establishing a buffer zone between settlements and riverbanks. Community sensitization and awareness creation were also indicated to be one of the mechanisms in protecting the environment; non-governmental organizations (NGOs) have been engaging in environmental work and sensitizing communities in slum areas on environmental issues. Tree planting initiatives have also been implemented, and a project is underway to quantify the number of plastics produced, lost to the environment, and ending up in the aquatic system.

Similarly, various stakeholders, such as government, communities, and universities, have implemented numerous responses to address community challenges in R. Njoro. Through a collaborative manner, some of the initiatives highlighted include:

Tree planting initiatives: Co-operative Bank and KARLO have led tree-planting initiatives in five communities around River Njoro and Lake Nakuru to support community resilience efforts. Waste management has also been improved by clearing two major regional damp sites. From the validation workshop, a community leader confirmed that **"since our last engagement I have mobilized communities to carry out tree planting activities and create awareness on the importance of improving and maintaining R. Njoro's health."**

Community Sensitization: Capacity building and awareness creation initiatives have been implemented in the community to increase knowledge and understanding of water management, and conservation among various issues. These initiatives have been delivered through multiple platforms, including television, local radio stations, and social media, to simplify information dissemination and reach a wider audience. However, there is a need for further community sensitization efforts.

> **"There is a further use of CBOs to engage the community at two levels; citizen science – understanding the system, key issues, collecting data and reporting, and giving oversight on the physical attributes of the river. Capacity building using CBOs also gives a sense of ownership to the community."**

-Highlighted by a county government representative.

Pastoralist-farmer competition during droughts has reduced due to community engagement forums and water agreements. Increased sensitization, participation, and engagement between government, locals, and universities have occurred, exemplified by the County Integrated Development Plan (CIDP) with community input. Locals also engage in wastewater projects spearheaded by government ministries and relevant other organizations.

Policy Development and Amendment: The development and amendment of diverse policies and regulations have been implemented in response to pressures and drivers in various areas. For instance, the Sub-Catchment Management Plan for the Njoro River has been developed. Still, it is to be operationalized, while the Nakuru Climate Change Act of 2021 has been developed but is yet to be adopted.

Egerton University also developed the Njoro River Rehabilitation Strategy, and it has successfully rehabilitated 25 acres of land at the source of River Njoro, fenced and rehabilitated along the university's boundary. Additionally, the Water Policy 2021 promotes stakeholder participation and was developed in line with the Water Act of 2016, which established River Use Associations and Basin Water Committees to facilitate resource mobilization and engagement between the National, County, and local governments.

The CIDP is a five-year plan that guides development priorities. The Ministry of Water has inter-governmental coordination frameworks for effective collaboration between government levels. Executive Order No. 1 of 2022 maintains the Ministry of Water, Sanitation, and Irrigation as it was in 2020, avoiding any re-organization of functions or shift in mandate.

Rivers and wetlands are vital resources for communities worldwide. However, human activities have put a strain on their functionality due to overexploitation and improper use. Wetlands have been encroached upon, unsafe agricultural and fishing practices have been adopted, waste materials are being disposed of into rivers, and industries have been opened along riverbanks.

Proper management of these resources is essential to ensure their sustainability and longevity. The collaboration of key environmental stakeholders plays a vital role in the management of river health, as it promotes awareness and understanding of the importance of these resources. When communities as key institutions come together to work towards the protection and restoration of rivers and wetlands, they contribute to ensuring that these resources continue to provide benefits for generations to come.

Conclusion

To emphasize, Rivers and wetlands are critical ecosystems, home to a diverse range of plant and animal species, and they provide numerous benefits such as water filtration, flood control, and carbon storage. The loss of wetlands threatens biodiversity, exacerbates climate change, and increases the risk of natural disasters such as floods and droughts. It is essential to find sustainable solutions that balance the needs of human populations with the preservation of wetland ecosystems. To continue enjoying these benefits and positive action from the government in terms of formulating regulations and policies, researchers giving evidence on the impacts of actions and best practices and communities by taking the rivers as their own and cherishing them is key.

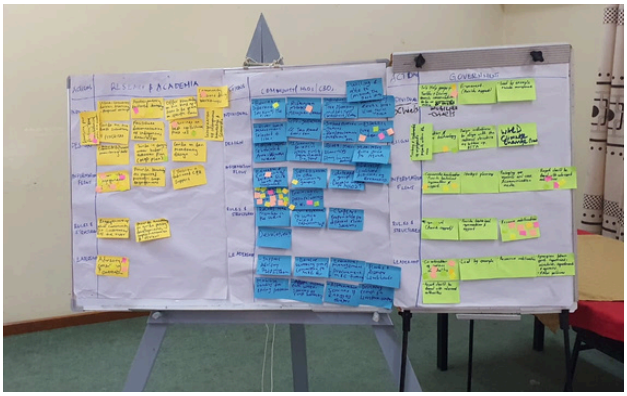

Figure3: Stakeholder engagement discussion highlights and recommendations

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