



Kira Municipal Council

ENVIRONMENTAL ACTION PLAN (EAP) FOR NAKALERE WETLAND IN KIMWANYI WARD, KIRA MUNICIPALITY

Final Report



June, 2025



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List of Acronyms

CSO	Civil Society Organisation
DLG	District Local Government
DLG	District Local Government
EAP	Environmental Action Plan
FGD	Focused Group Discussion
FMNR	Farmer Managed Natural Regeneration
GDP	Gross Domestic Product
GIS	Geographic Information System
GKMA	Greater Kampala Metropolitan Area
GKMA-IUDMP	GKMA- Integrated Urban Development Master Plan
GKMA-UDP	GKMA Urban Development Program
IEC	Information, Education, and Communication
IGAs	Income Generating Activities
LC	Local Council
LEC	Local Environment Committee
M&E	Monitoring And Evaluation
MC	Municipal Council
M&E	Monitoring and Evaluation
MoKMA	Ministry of Kampala Capital City and Metropolitan Affairs
MWE	Ministry of Water and Environment
NEA	National Environment Act
NEMA	National Environment Management Authority
NFA	National Forestry Authority
NGO	Non-Governmental Organization
PDP	Physical Development Plan
UGX	Uganda Shillings
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nation Development Programme
UNEB	Uganda National Examinations Board
UNFCCC	United Nations Framework Convention on Climate Change

EXECUTIVE SUMMARY

The Nakalere Wetland Environmental Action Plan was developed in accordance with the National Environmental Act of 2019 (cap 153) and the National Environment (wetlands, riverbanks and lakeshores management) regulations, 2000 which provide for conservation and management of wetlands in the country. It is the first management plan for the wetland and seeks to ensure sustainable utilization of the wetland resources. The EAP has identified key priority activities that will be implemented in the period between 2025-2030 to address the numerous environmental and social issues facing the wetland including severe degradation and encroachment by Kira Municipality's urban explosion.

The goal of this management plan is to ensure a well restored, demarcated, conserved and sustainably managed Nakalere wetland that contributes to community livelihood and prosperity. Implementation of the management plan will not only ensure sustainable management, but also contribute to the regional and international obligations on conservation of wetlands.

The Action Plan, which comprises six chapters, is a product of an extensive and highly participatory process that involved stakeholders from national government institutions like NEMA, Wakiso DLG, Kira Municipal LG, Kimwanyi ward, NGOs, private sector players, experts and local communities.

Nakalere River which originates from Ntinda-Kyambogo which is joined by several other streams along (Wabisaki, Lunkingiride, Nakyeke, Walufumbe, Kafukabi) drains through Nakalere Wetland creating riverine sub-catchment system with vast biodiversity before it drains the into Lwajjali wetland system in Kijabijo which afterwards crosses Gayaza Road at Nakasajja proceeding to Busiika and Ziobwe and eventually joining River Ssezibwa at Jimbi in Kasawo. It faces encroachment by mainly human settlements, and both commercial and subsistence farming activities with crops such as sugarcane, rice, maize, grown therein. Therefore, this EAP is meant to provide a guide for sustainable resource use taking into critical consideration the different livelihood opportunities existing and supported by the wetland specifically in the eight cells making up Kimwanyi Ward which are all traversed with this wetland.

Chapter one gives an introduction and background to the state of Uganda's wetland resources and how they have been utilised with cognizance of the intense pressure the wetland face from human activities, with an estimated 7% of the country's original wetland area already lost to conversion. Locally, at the municipal level; 67% of the wetland cover has been degraded with agriculture and housing settlements posing the biggest threat. The chapter also stresses the functions of the wetland and then gives a justification for developing this EAP and it concludes by highlighting the methodology used in developing the plan including the formulation of the future vision for Nakalere wetland by the local stakeholders involved.

Chapter two provides a review of policy, legal and institutional frameworks, at national and international levels, relevant for the conservation and sustainable development of Nakalere wetland. Chapter three presents in detailed the status of the wetland by clearly bringing out its location in Kira Municipality and its current size of about 184.406 Ha with studies revealing that 38.9% of the wetland specifically Kimwanyi ward had been lost since 1994. It also looked at physical and ecological characteristics of the wetland pointing out the different flora and fauna species present in the wetland; it looked at the various human/anthropogenic activities

taking place in the wetland and there impacts with agriculture and human settlements posing the most adverse impacts. It concluded with looking at the climate change impacts of heavy rains/flooding and drought and how they impact the wetland and biodiversity specie therein.

Chapter four reinforces the EAP vision, goal and strategic objectives to be put in place so as to help address the threats highlighted in Chapter three. The EAP interventions and operational objectives were categorized thematically into five interventions/operational objectives detailed further with specific actions, and rank of their priority level. Chapter Five gives the EAP implementation framework presented in a table format, it also highlights the different stakeholders to be involved and their responsibilities in the implementation process also presents the expected output and outcomes for each

Sub-activity, their performance indicators, an indicative budget as well as timeframe for implementation. Furthermore, it brings forth the monitoring and evaluation mechanism of the interventions to be put in place with recognition of the fact that successful implementation of the management EAP depends on how the activities are effectively executed, monitored and evaluated and, where necessary, adjustments made to ensure that the activities lead to achievement of the desired outcomes and objectives

Chapter six provides an analysis of stakeholders whose action or inaction directly or indirectly impact on the management of Nakalere wetland and its resources. The analysis further categorizes stakeholders in terms of power, interest and influence on the conservation and management of the wetland.

CHAPTER ONE

1.0. INTRODUCTION

Uganda is endowed with rich wetland resources, covering approximately 10% of its land area. These ecosystems are not merely picturesque landscapes but essential natural assets that have traditionally supported communities by providing building materials, crafts, fishing grounds, grazing land, seasonal agriculture, and domestic water. Moreover, wetlands serve as critical habitats for diverse wildlife, sustaining national biodiversity while offering vital ecological services and livelihood support. However, these invaluable ecosystems face significant pressure from human activities, with an estimated 7% of the country's original wetland area already lost due to conversion (Amaniga Ruhanga et al., 2009). This widespread degradation underscores the urgent need for targeted, sustainable management efforts.

As Kira Municipality's population expands, driven by Kampala's urban sprawl, its wetlands have increasingly become casualties of competing interests. Currently, approximately 67% of the municipality's wetland cover has been degraded, with agriculture and housing developments posing the greatest threats. This alarming trend of unsustainable land conversion highlights the critical need for localized intervention strategies to protect these vulnerable ecosystems amid growing human pressures.

1.1. Background.

The Greater Kampala Metropolitan Area (GKMA)—as defined under the KCCA Act (amended in 2020 and 2024)—comprises of Kampala Capital City Authority and the neighbouring districts of Wakiso, Mukono, and Mpigi. As Uganda's economic nucleus, the GKMA contributes approximately one-third of the national GDP and hosts 70% of the country's industrial base. Between 2014 and 2020, its population surged from 3.4 million to an estimated 5.6 million, fuelling rapid urban expansion that remains largely unregulated and uncoordinated. This expansion has resulted in: (i) persistent traffic congestion and insufficient transport infrastructure; (ii) environmental degradation and strained public services; (iii) increased disaster vulnerability; (iv) unregulated informality and erosion of landscape integrity.

The Nakalere Wetland, in particular, is experiencing both qualitative and quantitative deterioration, with approximately 39% of its area lost to anthropogenic activities. These include housing developments, commercial and subsistence agriculture, small-scale clay mining, and brick-making in areas such as Nakwero, Kitukutwe, Kiwologoma, Kimwanyi, and Kijabijo. Additionally, climate change-related impacts, such as global warming and extreme rainfall, have further altered the Nakalere wetland's ecosystem.

To address these systemic challenges, the GKMA Integrated Urban Development Master Plan (GKMA-IUDMP) was formulated as a strategic framework to guide sustainable metropolitan growth. The Plan underscores the critical role of effective development control, advocating for localized land use regulations and detailed planning at both municipal and ward levels to operationalize its broad vision through context-specific interventions.

The consequences of these activities are severe and multifaceted. Hydrologically, the wetland's natural functions are disrupted, leading to increased flooding in some areas and alarming water shortages in others. Water quality has also declined due to contamination. Ecologically, biodiversity is rapidly diminishing as critical habitats for feeding, nesting, breeding, and rearing continue to be destroyed, reducing overall productivity and destabilizing the ecosystem. Brick-making creates hazardous open pits, which serve as mosquito breeding grounds and pose

drowning risks, while also contributing to deforestation for wood fuel. Additionally, land use changes have led to increased nutrient and sediment accumulation, causing challenges such as siltation, eutrophication, and the spread of invasive water weeds, further suffocating the ecosystem.

This ongoing degradation threatens the ecological integrity of the wetland and significantly diminishes the quality of life for surrounding communities. Therefore, the formulation and implementation of the Nakalere Wetland Environment Action Plan is a matter of urgent priority. This plan is crucial in halting further losses, restoring essential ecological functions, and establishing a sustainable utilization framework that balances human needs with the long-term health of this irreplaceable ecosystem.

In response, the Government of Uganda—through the Ministry of Kampala Capital City Authority and Metropolitan Affairs (MoKMA) and Kira Municipal Council—initiated the preparation of the Environmental Action Plan (EAP) for Nakalere Wetland in Kimwanyi Ward under the GKMA Urban Development Program (GKMA-UDP). Financed by the World Bank, this initiative functions as a key implementation mechanism for both the Municipal PDP and the GKMA-IUDMP. The Plan translates metropolitan-level goals into actionable, site-specific strategies encompassing zoning, development control, infrastructure planning, and preservation of environmental and aesthetic assets.

This report has been prepared in accordance with the terms of reference for consultancy services related to the preparation of Kimwanyi Detailed Plan and the Environmental Action Plan (EAP) for Nakalere Wetland in Kimwanyi Ward.

1.2. Functions of Wetlands.

The functions of wetlands can be categorized into two broad aspects: ecological functions, which exist naturally without human intervention, and socio-economic functions, which arise from human utilization. These functions are outlined below, though they are not ranked by importance, as their significance varies by location and is often interrelated.

1.2.1 Ecological Functions.

- i. Water table maintenance – The impeded drainage of wetlands allows water to remain in place long enough for maximum infiltration, which in turn helps to recharge the groundwater table. A high-water table ensures adequate water availability for surrounding vegetation.
- ii. Erosion prevention – Wetlands regulate water flow, reducing its velocity. Without this natural barrier, downstream areas would experience the full erosive force of stormwater, leading to soil and stream bank degradation.
- iii. Regulation of water flow extremes – Wetlands function like natural retention basins, storing water during high-flow periods and gradually releasing it. This process enhances the availability of moisture for agriculture and other productive uses over extended periods.
- iv. Sediment trapping – Wetlands filter sediments carried by rivers from surrounding catchments. Slowed water flow allows suspended materials to settle, preventing silt accumulation in downstream dams, farmland, rivers, and lakes.
- v. Wildlife habitats and biodiversity hotspots – Wetlands provide vital habitats for diverse flora and fauna, including species that are entirely dependent on wetland ecosystems for survival. Notably, wetlands serve as natural habitats for the Sitatunga and Shoebill

stork. Uganda's national bird, the Crested Crane, also relies on seasonal grass swamps for breeding.

1.2.2 Social-Economic Functions.

- i. Provision of plant-based resources – Wetlands support the harvesting of papyrus and similar vegetation used for essential items such as thatching materials, mats, and baskets. Additionally, palms and small trees serve as building materials.
- ii. Fisheries – Wetlands sustain significant fish populations, providing an important source of food, particularly for communities distant from Uganda's main lake-based fisheries.
- iii. Livestock grazing – Wetlands, particularly their marginal areas with seasonally or permanently moist soils, serve as crucial grazing lands for livestock, particularly during dry seasons.
- iv. Water purification – Wetland vegetation absorbs impurities, naturally filtering water. This ecological service enables rural communities to access clean water at no cost.
- v. Nutrient and toxin retention – Wetlands trap nutrients and toxic substances, preventing their entry into downstream water bodies. This function safeguards water quality, ensuring the sustainability of aquatic ecosystems.
- vi. Tourism potential – The rich biodiversity of wetlands presents significant opportunities for tourism, which can generate revenue and promote conservation efforts.

1.3. Purpose of the Environment Action Plan.

Wetlands face escalating threats from human activities, climate change, and invasive species. Recognizing these challenges, the **Environmental Action Plan (EAP)** is necessary to mitigate environmental degradation and promote sustainable conservation. The key objectives of the EAP are to:

1. Identify environmental and social impacts affecting the wetland.
2. Develop appropriate mitigation measures to address degradation.
3. Implement conservation strategies to safeguard wetland ecosystems.
4. Monitor environmental parameters throughout implementation, ensuring proper reporting mechanisms.
5. Facilitate public engagement, transparency, and efficient resolution of grievances.
6. Identify key stakeholders and assess their information needs to foster collaboration

1.4. Objective of the Environment Action Plan.

The primary objective of the Environmental Action Plan (EAP) is to protect and enhance the ecological value of the Nakalere Wetland. This involves preserving biodiversity, maintaining essential ecosystem functions, and ensuring the sustainable use of wetland resources.

1.5. Methodology for Preparation of the Environment Action Plan.

The development of the EAP involved a multi-faceted approach, including an extensive literature review and consultations with key stakeholders such as government ministries, local authorities, academic and research institutions, non-governmental organizations (NGOs), and the private sector. A team of experts, coordinated by the Senior Environment Specialist at GIPEA, finalized the plan.

1.5.1 Literature review.

A review of existing literature provided a critical foundation for the development of the Nakalere Wetland Environmental Action Plan, ensuring alignment with established frameworks and leveraging prior knowledge. Key national and local planning documents were

systematically analyzed to understand policy contexts, legal obligations, and drivers of wetland degradation.

Among the primary documents examined were the National Environment Action Plan (NEAP), which outlines national environmental priorities, strategies, and legal frameworks, and the Kira Municipal Physical Development Plan (PDP), which defines land-use designations, urban growth patterns, spatial policies, and infrastructure planning relevant to the Nakalere Wetland.

1.5.2 Stakeholder Consultation and Engagement.

Stakeholder engagement was a pivotal aspect of the EAP development process, ensuring inclusivity and fostering collective responsibility for wetland conservation.

The first stakeholder meeting, held on March 16, 2025, at the Kira Municipal Headquarters, facilitated discussions between the consulting team and municipal officials. The meeting outlined the assignment's scope, objectives, methodology, and key milestones. On the same day, the consulting team, accompanied by members of the Physical Planning Office and the LC II Chairperson for Kimwanyi Ward, conducted a preliminary site visit to the wetland and adjacent riverbanks.

The second stakeholder meeting, convened at Kira Municipal Council Hall on May 28, 2025, brought together representatives from local government (political and technical) and private sector stakeholders. The objectives of this meeting were to:

1. Introduce the consulting team to key stakeholders.
2. Gather preliminary insights on the current state of the Nakalere Wetland and its riverbanks.
3. Align expectations on the scope, methodology, and deliverables of the assignment.

Further engagement occurred through Focus Group Discussions (FGDs) held between May 11–12, 2025. These discussions included municipal officials, brick makers, farmers, and residents settled within the wetland. Representatives from the eight target cells of Kimwanyi Ward (Kitukutwe, Kiwologoma, Kimwanyi, Nakwero A & B, Kijabijo A, B & C) participated, alongside local government technical personnel such as agriculture extension officers and community development officers.

The FGDs served two key purposes:

1. To foster collaboration and sustain community interest in wetland conservation.
2. To collect information on wetland ownership, usage patterns, degradation status, and feasible restoration strategies.

This engagement process strengthened relations between the consulting team and Kira Municipality, enhancing community support for conservation efforts.

1.5.3 GIS Mapping.

The consultant conducted a mapping exercise utilizing Geographical Information System (GIS) technology. Using an RTK GNSS receiver, field coordinates for the wetland were recorded in collaboration with municipal authorities, who facilitated access to local leaders and provided guidance on wetland extent identification.

A high-resolution Sentinel-2 satellite image covering the eight cells of Kimwanyi Ward was acquired and georeferenced. Multiple datasets—including rivers, roads, administrative boundaries, property boundaries (Cadastre) and the existing wetland extent—were integrated into GIS for analysis and map production. The consultant also reviewed Kira Municipality's PDP datasets to assess current land use patterns and proposed sustainable utilization strategies.

Ground-truthing exercises validated satellite imagery interpretations, correcting discrepancies before final map production. The resulting maps delineated wetland boundaries, river systems, administrative divisions, and key access routes.

1.5.4 Fieldwork, Physical Observations and Interviews.

Fieldwork and site observations were conducted to verify the actual status of the Nakalere Wetland. This exercise was carried out jointly by the consulting team, municipal officials, and community representatives from the eight target cells.

A structured Observation Checklist guided assessments of wetland degradation levels, ecological functions, and existing conservation measures. Observations captured details such as wetland acreage, riparian buffer zones, vegetation composition, and degradation patterns. Findings were recorded in a Wetland Observation Data Sheet, which supplemented GIS mapping outputs by providing ground-level insights not discernible from satellite imagery. Data gathered through direct observations and informal interviews with nearby residents further enriched the assessment.

These interviews were conducted with purposively selected individuals, including wetland farmers, brick makers, and nursery bed operators. The transect walk—facilitated by knowledgeable community members—enabled real-time identification of visible threats to wetland integrity and formulation of practical mitigation strategies.

1.5.5 Community Mapping of Present Situation.

Participatory Land Use Mapping was employed to actively involve community members in exploring local land-use planning challenges and establishing a connection between daily activities and the environmental conditions over time. This participatory approach facilitated a deeper understanding of how human interactions shape the wetland ecosystem, allowing stakeholders to identify sustainable practices and address emerging threats.

Additionally, the community mapping exercise served as a ground-truthing mechanism, enabling verification and cross-referencing of satellite imagery data with real-world observations. This ensured accuracy in assessing land-use dynamics and informed decision-making for effective wetland conservation and management.

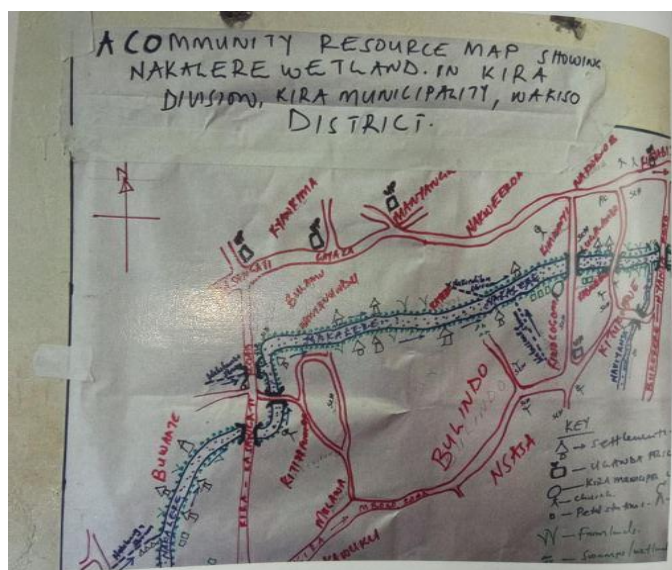


Figure 1:Community Resource map of Nakalere Wetland and its Catchment.

The mapping exercise systematically recorded key environmental challenges, categorizing them based on their occurrence in respective cells. The identified issues included, but were not limited to, poor waste disposal, flooding, siltation, soil erosion, farmland conversion, urbanization, and human settlement. Additionally, concerns such as limited access to clean water, low tree cover, uncontrolled brick-making, and unsustainable farming practices along wetland and

riverbanks were observed.

Furthermore, the presence of non-native/invasive species—notably eucalyptus and pine—was identified as a major threat. These species compete with indigenous vegetation, often leading to the clearance and removal of essential natural flora, which further destabilizes the wetland ecosystem.

1.5.6 Transect Walk.

The exercise was conducted across the selected villages of Kitukutwe, Kiwologoma, Kimwanyi, Nakwero A, and Kijabijo A, in collaboration with the LCII Chairperson for Kimwanyi Ward. This engagement allowed the consultant to develop a deeper understanding of the area while building rapport with local communities along the transect line. Additionally, it enabled the planning team and resource users to collect more detailed information about the wetland and its various uses.

Findings revealed that Nakalere Wetland plays a vital role in supporting the livelihoods of hundreds of community members in both the ward and the wider Kira Division. It directly provides essential services such as water, grass, vegetable cultivation, and fishing. Furthermore, the wetland serves an important cultural function, as it is frequently used by traditional healers and residents seeking interventions. Some religious groups also utilize the wetland as a baptism site, underscoring its significance beyond ecological and economic benefits.

1.5.7 Community Visioning of a desired future of Nakalere wetland and riverbanks.

Based on the developed maps (Figure 1) illustrating the current state of the Nakalere Wetland and Riverbank ecosystems in Kimwanyi Ward, stakeholders were guided through a visioning exercise to conceptualize their desired future state over the next five years.

This participatory process encouraged stakeholders to reflect on their aspirations for sustainable livelihoods and environmental management. Through collective discussion, the group reached a consensus on a shared vision for the Nakalere Wetland and Riverbanks, which was articulated as follows: ***“A well-managed, conserved, demarcated, and restored Nakalere Wetland, capable of sustainably supporting surrounding communities through income-generating activities.”*** The key features of this stakeholder vision are summarized in Table 1 below.

Table 1: Summary of Features of the Stakeholder Vision of Nakalere Wetland.

Desired Future for Nakalere Wetland in 5years (2025-2030).
▪ Clear boundary demarcation using pillars to visibly define the wetland, ensuring public awareness of its limits. ▪ Establishment of woodlots along wetland and riverbanks, coupled with household-level tree planting initiatives. ▪ Proper demarcation of the riverbank and wetland protection zone (buffer) to safeguard these ecosystems. ▪ Implementation of soil and water conservation measures, including tree planting, cover cropping, grass strips, and stone lines in upstream areas to prevent soil erosion, flooding, and siltation downstream. ▪ Ongoing community mobilization, sensitization, and mindset change to foster sustainable environmental stewardship. ▪ Designation of regulated brick-making zones, incorporating appropriate environmental management practices. ▪ Development of community eco-tourism sites along the riverbanks and wetland to promote sustainable economic activities. ▪ Integration of urban land-use planning to clearly outline designated areas for specific activities and intended land uses.

- Establishment of a designated waste disposal site, complemented by improved waste management strategies at the cell and household levels.
- Collaboration with existing tree nursery operators to enhance seedling production and distribution within communities.
- Expansion of tree nurseries to ensure a sustainable supply of high-quality seedlings.
- Regulation of agricultural activities, allowing farming only on the margins of the wetland to minimize ecological disturbances.
- Dredging and decongesting the silted river base, alongside reopening blocked water channels near the old bridge in Nakasajja to restore hydrological functions.

1.5.8 Action Plan Preparation.

Building on insights from the previous steps, a comprehensive Action Plan was drafted to address the identified environmental challenges and pressures affecting the Nakalere Wetland and Riverbanks. The plan outlines:

- Key issues and pressures impacting the wetland.
- Driving forces and root causes of environmental degradation.
- Proposed solutions and management measures, along with their implementation strategies.
- Financial resources required for effective execution of conservation efforts.
- Responsible authorities assigned to specific actions, detailing who should do what and when.

This structured approach ensures a clear framework for intervention, fostering sustainable wetland management while promoting community involvement in conservation efforts.

1.6. Document Structure.

This document is organized into seven chapters, each addressing key aspects of the Environmental Action Plan (EAP):

- Chapter One: Introduction – Provides an overview of the wetland profile, background information, functions of wetlands, the purpose and objectives of the EAP, and details on its development process.
- Chapter Two: Legal, Policy, and Institutional Framework – Outlines relevant policies, legislation, institutional structures, and multilateral environmental agreements governing wetland management.
- Chapter Three: Status of Nakalere Wetland – Examines the current condition of land and water resources, biodiversity, environmental disasters, and the impact of invasive alien species.
- Chapter Four: Key Interventions, Strategies, and Implementation Plan – Details priority actions for identified issues, expected outputs, timelines, responsible stakeholders, and indicators for monitoring progress.
- Chapter Five: Financing and Implementation – Presents the financial framework, review mechanisms, monitoring strategies, evaluation methods, and procedures for updating the EAP.
- Chapter Six: Stakeholder Consultations and Disclosure – Provides an overview of engagement processes, consultations with various stakeholders, and mechanisms for transparency and information sharing.
- Chapter Seven: Conclusion – Summarizes the findings and final recommendations of the Environmental Action Plan.

CHAPTER TWO

2.0. POLICY, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK.

2.1. Introduction.

This section outlines the legal, policy, and institutional frameworks governing environmental management in Uganda. It provides a concise overview of key legislative provisions, government policies, plans, and programs related to environmental assessment, resource utilization, and sustainable management. Additionally, it examines the implications of these frameworks for environmental conservation, particularly in the context of the Nakalere Environmental Action Plan (EAP).

Uganda's environmental governance is anchored in the National Environment Act, which establishes the National Environment Management Authority (NEMA) as the central regulatory body overseeing environmental protection. The National Environment Management Policy (1995) integrates environmental considerations into national development strategies, addressing issues such as pollution control, natural resource management, and climate change adaptation.

Furthermore, Uganda is a signatory to several multilateral environmental agreements, including the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD), reinforcing its commitment to global conservation efforts.

2.2. Policy framework.

The proposed project should be implemented under the following policy framework.

Table 2: Project relevant policies.

Policy	Description
The National Environment Management Policy, 1994	The overall goal of this policy is the promotion of sustainable economic and social development mindful of the needs of future generations. It calls for integration of environmental concerns into development policies, plans and projects at national, district and local levels. Hence, the policy requires that any activities for restoration of the wetland or policies likely to have significant adverse ecological or social impacts be managed.
The National Water Policy, 1999	The National Policy for the Conservation and Management of Wetland Resources aims at curtailing loss of wetland resources and ensuring that resource use is sustainable and equitably distributed to all people of Uganda. An Environment Action plan is required to ensure that wetland development is well planned and managed.
The National Land Policy 2013	The Uganda National Land Policy provides a framework for having an efficient and effective land delivery system. The policy seeks to harmonise and streamline the complex tenure regimes in Uganda for equitable access to land, and to clarify the complex and ambiguous constitutional and legal framework for sustainable management and stewardship. It also aims to ensure sustainable utilisation, protection and management of environmental, natural and cultural resources on land for socioeconomic development.
The National Wetlands Policy (1995)	Provides guidelines for wetland conservation, sustainable use, and restoration.
The National Climate Change Policy (2015)	Establishes strategies for climate resilience and adaptation.
The National Biodiversity Strategy and Action Plan (NBSAP) –	Aims to conserve Uganda's rich biodiversity and promote sustainable use of biological resources.

2.3. Legal framework.

Table 3: Relevant legal framework for the EAP.

Law	Description
The Constitution of the Republic of Uganda	The Constitution of Uganda serves as the supreme law, forming the foundation for national legislation, including environmental protection and natural resource management. Several constitutional objectives and articles explicitly address environmental governance: • Objective XIII – Mandates the state to protect critical natural resources, including land, water, wetlands, minerals, oil, fauna, and flora, on behalf of the people of Uganda. • Objective XXVII: (i) Requires the state to promote sustainable development and raise public awareness about the responsible management of land, air, and water resources for present and future generations. (ii) Stipulates that energy policies implemented by the state must ensure both basic human needs and environmental preservation are met. • Article 39 – Guarantees every Ugandan the right to a clean and healthy environment. • Article 237 (2b) – Asserts that the government holds natural lakes, rivers, wetlands, forest reserves, game reserves, national parks, and any land reserved for ecological or tourism purposes in trust for the people, ensuring its protection for the common good. • Article 245 – Empowers Parliament to enact laws aimed at: (a) Protecting and preserving the environment from abuse, pollution, and degradation. (b) Managing the environment to promote sustainable development. (c) Enhancing environmental awareness among citizens. This constitutional framework underscores Uganda’s commitment to conservation, sustainable resource management, and environmental protection, forming a strong legal basis for the Nakalere Environmental Action Plan (EAP) and related initiatives.
National Environment Act CAP 153, 2019	The National Environment Act serves as Uganda’s primary legislation governing environmental management. It establishes the National Environment Management Authority (NEMA) as the lead agency responsible for overseeing environmental issues and ensuring the sustainable management of natural resources. Under this Act, NEMA, in consultation with relevant lead agencies, is empowered to: • Issue guidelines, measures, and standards for environmental conservation. • Establish protected zones along riverbanks and lake shores, requiring consent for sustainable land use within these areas (Section 35). • Regulate activities in wetlands, prohibiting certain actions unless written approval is obtained from NEMA (Section 36). • Set waste management requirements and provide a framework for biodiversity conservation, including national strategies, plans, and programs for sustainability. • License activities that may cause pollution, ensuring compliance with prescribed environmental standards. Additionally, the Act mandates: • Environmental monitoring and impact assessments, including audits and ecological restoration orders. • Improvement notices, environmental easements, and performance bonds to enforce compliance. • The use of economic and social incentives to promote sustainable practices. • Civil and penal sanctions, including community service, for environmental violations. The Act also establishes key governance structures, including: • The Policy Committee on Environment, which provides strategic oversight.

	• The National Environment Fund, which supports environmental initiatives. • A collaborative framework for engagement with lead agencies and stakeholders in environmental management. This legislation plays a crucial role in safeguarding Uganda’s natural resources and ensuring sustainable development.
Water Act (Cap 152 of the Laws of Uganda)	The Water Act aims to ensure the sustainable management and utilization of Uganda’s water resources. Its key objectives include: • Promoting rational water resource management to support long-term sustainability. • Ensuring access to clean, safe, and sufficient water for domestic use by all individuals. • Facilitating the orderly development and utilization of water resources for non-domestic purposes, including industrial and agricultural activities. • Controlling pollution by regulating the storage, treatment, discharge, and disposal of waste that may contaminate water sources or harm human health and the environment. Key Provisions • Section 18 – Requires individuals or entities to obtain permits before abstracting water from natural surface sources (lakes, rivers, streams) or groundwater (aquifers, springs). • Section 31 – Prohibits waste discharge into natural water bodies unless explicitly authorized under the Act, ensuring the protection of water quality. These provisions reinforce Uganda’s commitment to water conservation, pollution control, and equitable access, forming a crucial legal framework for sustainable water management.
National Climate Change Act, 2021;	The Climate Change Act serves as Uganda’s legal framework for addressing climate-related challenges and implementing international commitments. Its primary objectives include: • Giving legal force to the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement within Uganda’s jurisdiction. • Establishing a regulatory framework for monitoring, reporting, and verifying the impact of climate change, as well as overseeing the implementation of climate-related programs. • Enhancing Uganda’s ability to adapt to the adverse effects of climate change, strengthening climate resilience, and developing mechanisms to reduce greenhouse gas emissions. Key Provisions • Section 5, Subsection 4(g) – Requires the Framework Strategy on Climate Change to outline research and development programs aimed at improving Uganda’s response to climate change. • Section 18 – Designates the Natural Resources Department of Local Governments as the authority responsible for climate change matters at the municipal level, ensuring localized implementation of climate policies. This Act plays a crucial role in guiding Uganda’s climate action efforts, aligning national strategies with global environmental commitments.
Land Act, Cap 227	The Land Act governs land tenure, ownership, and management in Uganda, ensuring that land use aligns with national environmental laws. It mandates that land utilization must comply with relevant legislation, including the Water Act and the National Environment Act, as outlined in Section 43. Additionally, Section 44 reinforces the constitutional obligation of the government and local authorities to protect environmentally sensitive areas for the collective benefit of all Ugandans. This provision ensures that critical ecosystems such as wetlands, forests, and water bodies are safeguarded against degradation and unsustainable exploitation.

The Physical Planning (Amendment) Act, 2020	An Act to amend the Physical Planning Act, 2010, to provide for the functions and powers of the Board; to establish a secretariat for the Board; to provide for the appointment of the Executive Director and staff of the Board; to streamline the composition of physical planning committees; to provide for offences and deterrent penalties for contravention of the Act and for other related matters. The Act requires any person developing in a planning area to obtain development permission. According to the National Environment Act, development permission is subject to receiving an EIA certificate.
The Wildlife Act (Cap 200)	Focuses on biodiversity conservation and the protection of wildlife habitats.
he National Forestry and Tree Planting Act (2003)	Guides afforestation, reforestation, and sustainable forest management

2.4. Regulations.

Table 4: Relevant Regulations to EAP.

Regulation	Description
The National Environment (wetlands, River banks and Lakeshores Management) Regulations, 2000;	Uganda's wetland protection regulations provide a structured framework for conservation, sustainable use, and management of wetlands, riverbanks, and lakeshores. These regulations outline: • Guidelines for wetland conservation and responsible utilization. • Inventorying procedures to document and monitor wetland ecosystems. • Requirements for wetland use permits, ensuring regulated activities comply with environmental standards. • Designation of protection zones for wetlands, riverbanks, lakeshores, and forests to prevent degradation and encroachment. The National Environment (Wetlands, River Banks, and Lake Shores Management) Regulations, 2000 serve as a key legal instrument in this regard, reinforcing Uganda's commitment to sustainable wetland management. Additionally, Uganda has officially gazetted all wetlands, legally recognizing them as protected ecosystems under the National Environment (Declaration of Wetlands) Notice, 2023.
The National Environment (Waste Management) Regulations, No.49. of 2020;	Uganda's waste management regulations establish strict guidelines to ensure that waste disposal does not contaminate water, soil, or air, nor pose risks to public health. The regulations outline responsibilities for waste generators, handlers, and product stewards, requiring compliance with environmental principles to prevent pollution, harm to human health, biodiversity loss, and broader environmental contamination. Key Provisions; • Section 4 & 5 – Mandates that all individuals and entities involved in waste generation or handling must implement measures to prevent pollution, safeguard human health, and protect biological diversity. • Section 27(1) – Empowers local governments to establish systems for domestic and municipal waste management, including collection, transportation, and disposal. • Section 27(2) – Allows local governments to enact ordinances and by-laws under the Local Governments Act, covering: ○ Waste segregation and reuse ○ Control of open waste burning ○ Efficient waste collection and transportation ○ Proper treatment and disposal methods

	• Section 86(1) – Regulates emissions from waste incineration plants, requiring operators to ensure that emission levels remain within prescribed environmental air quality standards. • Section 87 – Governs wastewater discharge, ensuring that hazardous substances from flue gas cleansing comply with the Act’s requirements, the Water (Waste Discharge) Regulations, and licensing conditions. These regulations reinforce Uganda’s commitment to sustainable waste management, pollution control, and environmental protection. You can find more details in the National Environment (Waste Management) Regulations, 2020.
National Environment (Standards for Discharge of Effluent into Water or Land) Regulations, 2020;	Uganda’s effluent discharge regulations establish strict standards for wastewater management, ensuring environmental protection and pollution control. These regulations set maximum permissible limits for effluent before discharge into water bodies or land, requiring compliance with established environmental standards. Key Provisions • Section 6(2) – Mandates that any entity intending to discharge effluent must ensure compliance with general chemical and microbiological discharge standards, as outlined in Schedule 2 of the regulations. • Effluent Treatment Requirements – All effluent must undergo treatment to meet prescribed standards before discharge, ensuring minimal environmental impact. • Section 9 – Requires individuals or businesses intending to discharge effluent to apply for an effluent discharge permit from the lead agency responsible for water resources. • Section 14 – Grants the lead agency authority to impose conditions on effluent discharge permits, ensuring adherence to environmental safeguards. For further details, you can review the National Environment (Standards for Discharge of Effluent into Water or Land) Regulations, 2020 and the Water (Waste Discharge) Regulations, 1998.

2.5. Institutional Framework.

Key institutions responsible for ensuring compliance with legal requirements for the EAP.

Table 5: Relevant Institutional Framework for the EAP.

Institution	Description
The National Environment Management Authority (NEMA)	The National Environment Act, 2019 establishes the National Environment Management Authority (NEMA) as Uganda's principal agency responsible for regulating, monitoring, supervising, and coordinating environmental activities. Key Functions of NEMA (Sections 8-9) NEMA is mandated to: • Advise on environmental and climate change policies – Formulate and implement policies, plans, and programs to support sustainable environmental management. • Integrate environmental concerns into national and sectoral development plans – Work collaboratively with lead agencies to mainstream environmental considerations in development strategies. • Issue environmental compliance certificates – Regulate and certify activities to ensure adherence to environmental standards. • Monitor and coordinate environmental stakeholders – Oversee engagement with private sector entities, intergovernmental organizations, NGOs, cultural institutions, indigenous communities, and religious institutions on environmental matters. • Regulate environmental practitioners – Supervise professionals involved in environmental and social impact assessments and environmental audits to maintain compliance. • Review and approve environmental reports – Assess environmental impact studies, audits, and other technical submissions to ensure compliance with legal frameworks. • Issue permits and licenses – Grant approvals for activities that may affect the environment, ensuring they align with sustainability principles. This legal framework positions NEMA as the guardian of Uganda's environmental integrity, ensuring sustainable development and responsible resource management.
Municipal Environment and Natural Resource Committee	The National Environment Act (NEA) establishes a structured framework for environmental management at both urban and district levels. It mandates the formation of Municipal/District Environment and Natural Resource Committees, which are responsible for overseeing the management, conservation, and sustainable use of natural resources within their respective jurisdictions. These committees, in consultation with NEMA (National Environment Management Authority), are empowered to develop and enforce bylaws regulating various environmental aspects within their areas of governance. The committee is responsible for: • Coordinating municipal council activities related to environmental and natural resource management. • Developing District Environment Action Plans to guide conservation efforts. • Integrating environmental concerns into all municipal plans and approved projects. • Preparing the District State of the Environment Report, documenting environmental conditions and trends. • Assisting in the formulation and enforcement of bylaws for environmental protection. • Monitoring activities within its jurisdiction to ensure they do not negatively impact the environment.

Local Community Resource Users and Stakeholders	Local communities serve as primary resource users and wetland managers, exercising their responsibilities through local councils and administrative units such as parish and division authorities. These entities are tasked with: • Planning and implementing management strategies for wetland conservation. • Developing sustainable land-use alternatives to ensure responsible resource utilization. • Participating in the formulation of management plans, ensuring community-driven solutions to environmental challenges. This governance structure fosters community involvement, accountability, and sustainable environmental stewardship, ensuring that Uganda's natural resources are effectively managed for present and future generations.
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CHAPTER THREE

3.0. STATUS OF NAKALERE WETLAND.

3.1. Location and Size.

Nakalere Wetland is a seasonal riverine wetland situated along Nakalere Stream/River, forming part of the Lwajjali Wetland catchment system and the Lake Kyoga drainage system.

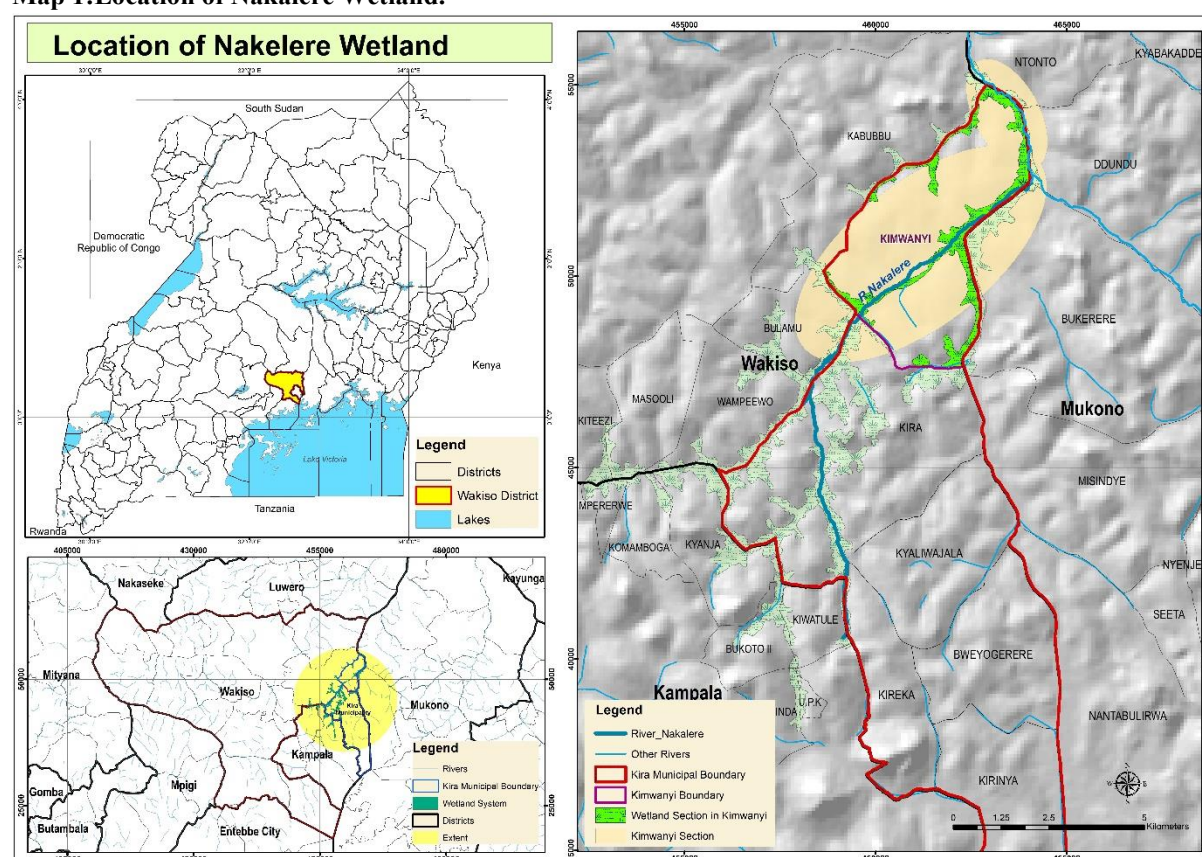
The wetland is located at Latitude 00°23'15''N, Longitude 32°37'56''E, within Kira Municipality, spanning several parishes and cells (as detailed in Table 6).

The estimated area coverage of Nakalere Wetland within Kimwanyi Ward is approximately 184.406 hectares. Its waters originate from Kinawataka Stream, located in Ntinda-Kyambogo, near the Uganda National Examinations Board (UNEB). It traverses several villages within Kimwanyi Ward covering a distance of 5.86km.

Table 6: Areas where Nakalere Wetland is situated in Kira Municipality.

Parishes/Wards	Cells
Kimwanyi	Kimwanyi, Kijabijo A, B, & C and Nakwero A, B, Kitukutwe, Kiwologoma
Kira	Mulawa, Kira, Najjeera, Kungu, Bulindo and Buwaate
Kireka	Naalya

Map 1: Location of Nakalere Wetland.



3.2. The Current State of Nakalere Wetland.

The degradation of Nakalere Wetland reflects Uganda's broader environmental challenges, particularly as urban expansion and population growth in Kira Municipality intensify. With approximately 38.9% of the wetland already degraded, competing land-use interests have placed immense pressure on this fragile ecosystem.

Wetlands serve as critical habitats for rare and endangered species, meaning their destruction can lead to species extinctions or local extirpation. However, a significant challenge lies in public perception—many residents undervalue wetlands, failing to recognize their long-term ecological and economic benefits.

Beyond biodiversity, wetland flora plays a vital role in floodplain and fringing wetland ecosystems, supporting food-web systems essential for fish populations. Addressing these challenges requires community awareness, policy enforcement, and sustainable conservation strategies to protect Nakalere Wetland and its ecological functions.

Recent reports highlight Uganda’s declining wetland coverage, with projections indicating further depletion unless restoration efforts are accelerated.



Plate 1: Encroachment of Nakalere Wetland by Agricultural Farms in Kijabijo Cell.

Table 7: Status of Nakalere Wetland in Kimwanyi Ward

Wetland	Area Coverage in 1994 (Ha)	Area Coverage in 2025 Intact (Ha)	Area Depleted (Ha)	Percentage Loss (%)
Nakalere Wetland	301.573	184.406	117.167	38.85

Source: NFA-JICA Wetland data, 1994

3.3. Physical and Ecological Characteristics.

3.3.1 Climate.

The Nakalere Wetland region experiences a bimodal rainfall pattern, with two distinct wet seasons:

- March–May
- September–November

The peak flooding period typically occurs in April, exacerbating soil erosion and wetland degradation. Conversely, the dry seasons (June–August and December–February) result in reduced water levels and drought stress, impacting ecological stability and water availability. Field observations identified severe erosion, particularly in Kijabijo A and Nakwero B, characterized by:

- Gullies on slopes due to surface runoff.
- Sediment accumulation in the wetland, indicating upstream soil loss from heavy rains.
- Erosion along road sections, contributing to siltation and wetland degradation.

Addressing these issues requires integrated watershed management, including soil conservation measures, flood control strategies, and sustainable land-use planning to mitigate erosion and safeguard wetland ecosystems.

3.3.2 Topography.

Nakalere Wetland is situated in shallow, narrow valleys, shaped by fluvial (riverine) and colluvial (hill-wash) processes, characteristic of Uganda’s Victoria Basin.

Elevation and Slope Characteristics;

- Elevation ranges between 1,135–1,190 meters above sea level (a.s.l.), with gentle slopes exhibiting minor topographic variation.
- The wetland features U-shaped valleys with gradual side slopes (5–15% gradient), indicative of low-energy water flow and steady sediment deposition.

Surrounding Landscape;

- Bordered by low-lying hills with elevations between 1,200–1,300 meters a.s.l.
- The hills consist of lateritic soils, commonly utilized for agriculture and human settlements.

These geomorphological characteristics influence hydrology, sediment transport, and land-use patterns, playing a crucial role in shaping Nakalere Wetland's ecosystem.

3.3.3 Nakalere River: Course, Flow Patterns, and Tributary Network.

a) River Course and Tributary Network.

Nakalere River originates from Ntinda-Kyambogo (behind UNEB) as a small stream, flowing northward to Ntinda-Buye, then eastward to Naalya Interchange, where it is known as Kinawataka Stream. It crosses the Northern Bypass, entering a valley between Kiwatule and Naalya National Housing Estate, where it is joined by Lunkingiride Stream (from Kyaliwajjala).

The river continues northward to Najjeera, where it merges with Kafukabi Stream, then proceeds to Buwaate, intersecting the Kasangati-Kira Road. Further downstream, it is joined by Walufumbe Stream and two secondary streams from Kasangati (behind Greenhill Academy PS). It then moves eastward to Mulawa, Bulindo, and Kimwanyi, where it converges with Nakiyanja River (from Mukono) in Kijabijo A, ultimately draining into Lwajjali River. Lwajjali River then crosses Gayaza Road at Nakasajja, continuing to Busiika and Ziobwe, before joining River Ssezibwa at Jimbi in Kasawo.

b) Flow Patterns.

The upper sections of Nakalere River exhibit variable flow patterns, with both fast- and slow-moving waters:

- Fast-flowing sections are observed in wide engineered culvert channels along road crossings in Kimwanyi, Nakwero, and Kijabijo.
- Slow-moving waters dominate areas where siltation from erosion has reduced channel depth, leading to dense wetland vegetation in Nakwero and Kijabijo.
- The dense wetland formation in Nakwero/Kijabijo A results from scattered flow energy, creating multiple divergent streams that drain into Lwajjali River.

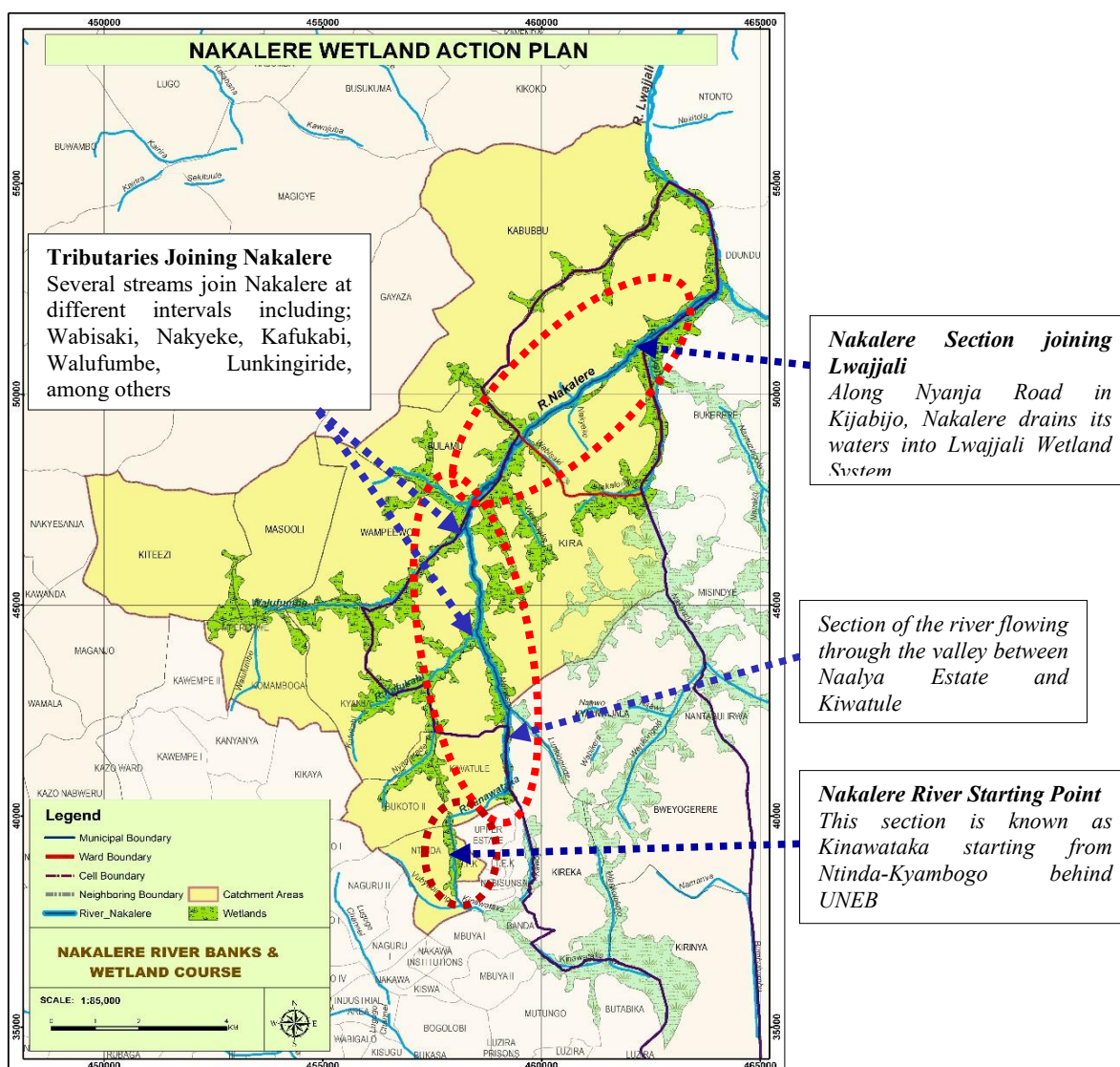
Lwajjali River itself exhibits sluggish, meandering flow with a 0.5–1% gradient, characterized by seasonal flooding in low-lying areas such as Busiika and Kijabijo B.

c) Tributaries of Nakalere River.

The main streams in the wetland sub-catchment include:

- Wabisaki Stream
- Nakyeke Stream
- Walufumbe Stream
- Kafukabi Stream
- Two additional streams from Kasangati, which join Nakalere River at different intervals.

This hydrological network plays a crucial role in wetland ecology, flood regulation, and biodiversity conservation.



Map 2: Nakalere River Course and Tributaries.

Table 8: Tributaries of the Nakalere River.

Tributary	Confluence Points	Flow characteristics
Lunkingiride	Kyaliwajjala/Naalya	- Seasonal, flashy runoff from urbanized slopes. - Perennial, moderate flow from Wakiso farmlands. - Influenced by Intermittent, rainfall - Perennial, high baseflow from Mukono's wetlands
Kafukabi	Najjeera	
Wabisaki, Nakyake	Bulindo	
Walufumbe and two other Streams from Kasangati	Behind Greenhill Academy P/S	
Nakiyanja	Kijabijo A	

3.3.4 Biodiversity Features.

Nakalere Wetland hosts a rich diversity of native aquatic vegetation, playing a crucial role in water filtration, flood regulation, and habitat stability.

a) Dominant Wetland Vegetation.

Papyrus (*Cyperus papyrus*) – Forms dense swamps, particularly in Kijabijo, Kitukutwe, and Nakwero, with its umbrella-shaped flower clusters. Sedges (*Cyperaceae* family) & Reeds

(*Phragmites mauritianus*) – Act as natural water regulators, absorbing floodwaters and gradually releasing moisture during dry seasons.

Vegetation for Erosion Control & Wildlife Habitat – These plants reinforce wetland banks, stabilizing soil and creating nesting grounds for species such as Grey-crowned Cranes, monkeys, and egrets.

b) Transitional Biodiversity & Riparian Vegetation.

The wetland also supports pockets of richer biodiversity, particularly along the Lwajjali River banks in Kijabijo B, including: Mugavu (*Syzygium cordatum*), Water fig "Musambya" (*Ficus verruculosa*), Wild date palm (*Phoenix sylvestris*), Thatch grass & Elephant grass (*Pennisetum purpureum*) and Wild millet (*Echinochloa pyramidalis*). These species contribute to soil retention, grazing, and ecosystem stability.

c) Medicinal & Pollination-Supporting Plants.

Water Primrose (*Ludwigia peploides*) – Used in traditional medicine. Edible Dayflower (*Commelina diffusa*) – Supports pollination and local healing practices. This diverse flora underscores Nakalere Wetland's ecological significance, providing essential ecosystem services while supporting biodiversity conservation.



Plate 2: Native Biodiversity Species Within Nakalere Wetland; Papyrus (Left), and Wetland Sedges and Grasses (Middle-Right).

The integrity of Nakalere Wetland's native flora is increasingly threatened by invasive alien tree species, which undermine both its ecological stability and socio-economic value.

3.3.5 Key Invasive Species;

- Eucalyptus (*Eucalyptus grandis/camaldulensis*)
- Pines (*Pinus caribaea/patula*).

These non-native trees, found on wetland fringes and adjacent uplands, pose significant environmental risks due to their:

- High-water consumption, which disrupts the wetland's water table, affecting papyrus, sedges, and fish breeding grounds.
- Release of growth-inhibiting chemicals, leading to soil degradation and acidification.
- Dense shade, which suppresses native undergrowth, reducing biodiversity.

3.3.6 Impact on Wetland Ecology;

The unchecked spread of these species reduces the diversity of indigenous wetland vegetation, affecting:

- Water filtration and flood regulation functions.
- Habitat availability for wetland-dependent species such as Grey-crowned Cranes, egrets, and monkeys.
- Local livelihoods, particularly those reliant on sustainable wetland resources.

3.3.7 Management Strategies;

To preserve Nakalere Wetland's ecological functions, urgent invasive species management is required, including:

- Selective removal and controlled reforestation with native species.
- Community-led conservation initiatives to restore degraded wetland areas.
- Policy enforcement to regulate land-use practices near wetland zones.

For further insights on invasive species management, you can explore WWF's practical guide or review Uganda's Global Register of Introduced and Invasive Species.



Plate 3: Invasive alien species along the wetland; eucalyptus and sugarcane plantation (Left & Middle) in Kijabijo, Pine trees in Kimwanyi (right).

3.3.8 Fauna and Human-Wildlife Interactions in Nakalere Wetland.

a) Avian Biodiversity in Nakalere Wetland.

Nakalere Wetland's mosaic of papyrus, reeds, trees, and grasslands creates a critical habitat for a diverse bird community, supporting both resident and migratory species.

Key Bird Species;

- Grey Crowned Cranes (*Balearica regulorum*) – Utilize grasslands for perching, and are dependent on open spaces for nesting.
- Hadada Ibis (*Bostrychia hagedash*) – Forage on undisturbed muddy fringes, relying on soft sediments for feeding.
- Weaver Birds (*Ploceus spp.*) – Construct intricate nests within papyrus, thriving in densely vegetated wetland areas.
- Egrets (*Egretta spp.*) – Inhabit shallow water zones, often seen wading and hunting for fish and invertebrates.

b) Ecological Importance of Intact Native Vegetation;

These birds rely directly on the preservation of native wetland flora, which provides:

- Essential perching, nesting, and feeding grounds.
- Protection against habitat fragmentation and biodiversity loss.
- A stable food-web system, supporting wetland ecosystem resilience.

Given Nakalere's ongoing habitat degradation, conservation efforts such as wetland restoration, invasive species control, and sustainable land-use practices are vital to protecting these species and ensuring long-term ecological balance.



Plate 4: Bird Species Within Nakalere Wetland in Kijabijo; Crested Cranes (left), Hadada ibis (Middle) & Egret (Right).

3.3.9 Mammals and Habitat Use;

Nakalere Wetland supports a variety of mammal species, including:

- Vervet monkeys (*Chlorocebus pygerythrus*) – Utilize wetland-edge trees such as Water Figs (*Ficus verruculosa*) for refuge and fruit, but frequently venture into adjacent gardens, leading to human-wildlife conflicts.
- Edible rats – Present in the wetland but heavily hunted for bushmeat, impacting local populations and potentially disrupting the ecosystem's food web.

a) Impact of Domestic Livestock;

The presence of cattle, goats, and sheep in Kijabijo and Nakwero exerts significant pressure on the wetland's critical buffer zones, leading to:

- Soil compaction from hooves, reducing water infiltration.
- Destruction of sedges and reeds, which normally stabilize wetland banks and prevent erosion.
- Increased vulnerability to siltation, as trampling accelerates soil erosion.
- Suppression of shrub and sapling regeneration, limiting vegetation recovery.

b) Ecological Balance and Human Activities;

All fauna species in Nakalere Wetland exist in a delicate balance, relying on natural wetland cover for survival. However, hunting, habitat encroachment, and agricultural expansion continue to pressure wildlife populations, threatening biodiversity and ecosystem stability.

c) Potential Conservation Strategies;

To mitigate these challenges, conservation efforts could focus on:

- Community-led wildlife management to reduce human-wildlife conflicts.
- Sustainable livestock grazing practices to minimize wetland degradation.
- Habitat restoration initiatives to support native species recovery.

3.3.10 Soil and Geology of Nakalere Wetland Sub-Catchment.

3.3.10.1 Soil Composition.

Nakalere Wetland's sub-catchment is predominantly characterized by Gleysols, which are further classified into:

- Grey sands – Derived from alluvium and hill wash.
- Black and grey clays – Formed from river alluvium.
- Peat sands and clay – Resulting from papyrus residue and river alluvium.

These soils are highly productive, supporting agricultural activities in sections of Kimwanyi, Kijabijo, and Nakwero. Key crops cultivated include:

- Large-scale farming – Sugarcane, rice, and maize.
- Subsistence farming – Bananas, cassava, beans, and yams.

3.3.10.2 Geology of Kira Municipality.

Kira's geology falls under the Buganda-Toro system, consisting of:

- *Argillites (phyllites and schists)* with basal quartzites and amphibolite, occurring locally.
- Undifferentiated gneisses, including elements of partly granitic and metamorphosed formations.

The undulating terrain features flat-topped hills, while valleys contain natural drainage channels that flow into two major basins:

- Lake Victoria Basin
- Lake Kyoga Basin

This geological and soil composition plays a crucial role in wetland hydrology, agricultural productivity, and ecosystem stability.

3.4. Nakalere Wetland Economic Significance and Environmental Challenges.

Nakalere Wetland and its riverbanks play a crucial role in Local Economic Development within Kimwanyi Ward and Kira Municipality, offering social, ecological, and economic benefits.

Several ongoing activities contribute to the local economy, including:

- Settlements – Both semi-permanent and permanent structures exist within the wetland buffer zone.
- Crop farming – Cultivation of sugarcane, rice, maize, bananas, cassava, beans, and yams.
- Sand mining and brick making – Providing construction materials for urban expansion.
- Livestock grazing – Cattle, goats, and sheep utilize wetland areas for pasture.

Despite legal provisions designating a 50-meter buffer zone for wetlands and rivers, some structures within Nakalere Wetland have existed for decades, with owners claiming land rights despite environmental regulations.

While these activities support economic livelihoods, they also pose significant environmental risks, including:

- Wetland degradation due to unregulated land use.
- Loss of biodiversity affecting native flora and fauna.
- Increased soil erosion and siltation from sand mining and livestock grazing.
- Water pollution from agricultural runoff and construction waste.

To ensure sustainable wetland management, interventions such as community awareness programs, enforcement of buffer zone regulations, and eco-friendly economic alternatives are essential.

3.5. Economic Activities and Its Impact on Nakalere Wetland.

1. Agriculture

Crop production is a major economic activity for the local community, with over 75% of residents relying on the wetland for their livelihoods. Both commercial and subsistence farming are prevalent along the wetland and riverbanks, benefiting from fertile soils, water access, and available land.

a) Types of Farming and Crops Grown.

- Large-scale farming is dominant in Kijabijo A & B, Kimwanyi-Silobera, and Nakwero B, with key crops including:
 - Sugarcane
 - Rice
 - Maize

- Subsistence farming is more widespread, with crops such as:
 - Vegetables (cabbages, Nakati, Dodo, spinach)
 - Cassava, bananas, and yams
 - Surplus produce is sold in local and regional markets.

A local farmer in Kijabijo along Nyanja Road noted that land scarcity and unemployment have driven many into wetland farming as a means of survival.

b) Environmental Challenges from Agricultural Activities.

Despite its economic benefits, agriculture poses serious environmental threats to Nakalere Wetland:

- Use of rudimentary tools and excessive pesticides impacts water quality and quantity.
- Subsistence farming is permitted without tillage, but large-scale farming has led to extensive wetland tilling in Kijabijo A and Nakwero B.
- Farmers dig channels to drain wetland water for irrigation, contributing to declining water levels and periodic flooding.
- Encroachment by Eucalyptus plantations in Kiwologoma, Kimwanyi-Silobera, Kijabijo, and Nakwero further threatens wetland stability.
- Soil erosion from surrounding gardens leads to sedimentation and siltation, degrading the wetland's ability to filter pollutants and stabilize riverbanks.

c) Balancing Agriculture and Wetland Conservation.

To mitigate these challenges, sustainable farming practices and wetland conservation strategies are essential. Solutions could include:

- Eco-friendly irrigation techniques to reduce water depletion.
- Agroforestry initiatives to replace invasive species with native vegetation.
- Community awareness programs on wetland protection.



Plate 5: Agriculture Activities in Nakalere Wetland-Commercial Sugarcane growing in Kijabijo A (left), Yams gardens in Kijabijo (Middle), Tree nurseries in Kijabijo (right).



Plate 6: Other Agriculture activities in the wetland; Beans and banana plantations in Kijabijo (left & middle), Maize plantation along the river banks in Nakwero (right).

2. Brickmaking and Its Environmental Impact on Nakalere Wetland.

Brickmaking has become a major economic activity in Nakalere Wetland, particularly during the dry season, when water availability is crucial for the process. The construction boom in

Kira Municipality over the past decade has intensified demand, turning brick production into a profitable business.

a) Environmental Consequences.

Despite its economic benefits, brickmaking has led to severe wetland degradation, especially in Kijabijo A cell, where clay peat soils provide ideal raw materials for brick production. Key environmental impacts include:

- Open borrow pits left behind after soil extraction, causing landscape scarring and water stagnation.
- Loss of wetland vegetation, stripping the once green belt bare.
- Pools of muddy water and exposed soil, disrupting natural drainage and habitat stability.
- Tree stumps dotting the area, indicating deforestation and loss of native flora.

b) Broader Wetland Destruction Trends.

Studies indicate that brickmaking is one of the leading causes of wetland destruction in Uganda. In Kijabijo Wetland, encroachment and unregulated land use have triggered flooding, erosion, and biodiversity loss.

c) Potential Solutions for Sustainable Brickmaking.

To mitigate environmental damage, interventions could include:

- Restoration of borrow pits through land reclamation and reforestation.
- Regulation of brickmaking activities to ensure sustainable soil extraction.
- Community-led conservation efforts to rehabilitate degraded wetland areas.

For further insights, you can explore the impact of brickmaking on Uganda's wetlands and local efforts to restore Kijabijo Wetland.



Plate 7: Brick Making Site in Nakwero-Canaan Estate.

3.6. Waste Disposal Challenges.

Kira Municipality Kimwanyi in particular, faces significant waste management challenges, primarily due to rapid urbanization, overcrowding, and informal settlements. The high consumption rates among urban dwellers result in large quantities of solid waste and sewage, exceeding the municipality's technical and financial capacity for collection and disposal.

a) Key Issues Affecting Waste Management.

- Land tenure complexities – Many tenants lack land rights, making domestic waste management difficult.
- Overwhelming waste volumes – The municipality generates 20–30 tons of garbage daily, but only 1–4 tons are collected, leading to a low collection efficiency of 20%.
- Indiscriminate waste disposal – Due to high collection costs, much of the waste is dumped illegally in wetlands, roadsides, unauthorized dumpsites, and drainage channels.
- Limited municipal capacity – The gazetted landfill at Compost receives only a fraction of the collected waste, while private collectors handle some disposal.

b) Environmental and Public Health Risks.

The poor waste management system contributes to:

- Water and soil contamination from illegal dumping.
- Increased flooding risks due to blocked drainage channels.
- Health hazards from uncollected waste, leading to disease outbreaks.

c) Potential Solutions.

To improve waste management, Kira Municipality could consider:

- Expanding waste collection infrastructure to increase efficiency.
- Implementing community-led waste segregation and recycling programs.
- Strengthening enforcement of waste disposal regulations to curb illegal dumping.
- Encouraging private-sector partnerships to enhance waste collection and processing.

For further insights, you can explore this study on the underlying causes of poor waste management in Kira Municipality and this research on public participation in solid waste management.



Plate 8: Garbage deposition in Nakalere Wetland in Nakwero.

Nakalere Wetland, a critical ecosystem supporting biodiversity and flood regulation, is increasingly becoming a target for illegal waste dumping. Its proximity to emerging settlements and growth centers such as Kijabijo, Nakwero, and Kiwologoma has made it a convenient dumping ground, leading to severe environmental consequences.

Field findings indicate the accumulation of:

- Organic waste (food scraps, market refuse).
- Polyethylene and plastic pollutants, which do not decompose and leach toxins into water sources used by communities downstream.
- Water contamination – Pollutants seep into wetland water, affecting local water quality.
- Flooding risks – Garbage blocks drainage channels, exacerbating flooding during heavy rains.
- Wetland degradation – Continuous waste accumulation destroys native vegetation and disrupts aquatic habitats.

Uganda's National Environment (Waste Management) Regulations, 2020 outlines strict waste disposal guidelines to prevent environmental degradation. Additionally, penalties for environmental violations are enforced under Uganda's National Environment Act, 2019.

Potential Solutions

To mitigate illegal waste dumping, interventions could include:

- Strengthening enforcement of waste disposal regulations.
- Community-led waste management initiatives.
- Improved municipal waste collection infrastructure.
- Public awareness campaigns on responsible waste disposal.

For further insights, you can explore Uganda's waste management regulations and penalties for environmental violations.

3.7. Informal Settlements and Wetland Encroachment.

A significant portion of Kira Municipality's residents live in informal settlements within or near wetlands, including Nakalere, Lwajjali, Nakyelongosa, Namanve, Kinawataka, Nsawo,

Lunkingiride, Nakiyanja, and Wabikere wetlands. These wetlands serve as critical water catchment areas, providing social, environmental, and economic benefits. However, rapid urban expansion has led to increased human settlement, threatening their survival.

a) Drivers of Wetland Settlement in Kimwanyi Ward.

The study found that historical drivers of wetland settlement are part of broader challenges facing Kira Municipality today. Key factors include:

- Complex land tenure laws – Uganda’s overlapping land tenure system makes it difficult to regulate land ownership, leading residents to view themselves as legitimate occupants of wetlands.
- Registered land titles within wetlands – Cases in Kitukutwe and Kiwologoma show that some locals have acquired land titles within wetland areas.
- Poverty and landlessness – Many residents lack alternative housing options, forcing them to settle in wetlands.
- Population pressure – Rapid urbanization has increased demand for land, pushing communities into fragile ecosystems.
- Community fragmentation – Weak social structures and limited enforcement contribute to continued wetland encroachment.

b) Challenges in Wetland Protection.

Despite calls from NEMA and municipal authorities for residents to vacate wetland areas, including forced evictions, many return due to economic necessity and lack of alternatives. This cycle of settlement and eviction continues to degrade wetland ecosystems, reducing their ability to regulate floods, support biodiversity, and provide clean water.

c) Potential Solutions.

To address these challenges, interventions could include:

- Strengthening land tenure regulations to prevent wetland encroachment.
- Providing alternative housing solutions for displaced communities.
- Enhancing community awareness on the importance of wetland conservation.
- Implementing sustainable urban planning to balance development and environmental protection.



Plate 9: Encroachment by Settlements in Kitukutwe (left-middle) & market stalls in the wetland in Kijabijo (right).



Plate 10: Plots gazetted within the wetland in Canaan Estate-Nakwero A.

3.8. Impact of Road Infrastructure Development on Nakalere Wetland.

a) Hydrological Disruptions.

Road construction in Kijabijo along Bukerere-Nyanja Road and Canaan Road has significantly altered wetland hydrology, leading to:

- Drainage of saturated soils, reducing water retention capacity.
- Compaction of wetland substrates with murram, affecting soil permeability.
- Installation of engineered culverts, artificially redirecting natural water flow.
- Blockage of seasonal water channels, disrupting papyrus and sedge ecosystems.

These changes have dried upstream sections, allowing invasive eucalyptus species and farms to colonize former wetland areas, while downstream sections experience excessive flooding, drowning native flora.

b) Road Expansion and Wetland Degradation.

Roads in Kitukutwe, Kiwologoma, Nakwero, and Kijabijo have created linear pathways that accelerate wetland destruction by:

- Facilitating settlement expansion, increasing land encroachment.
- Enabling garbage dumping, as waste trucks gain access.
- Encouraging conversion of wetland edges into brickmaking pits and vegetable gardens.

c) Potential Solutions.

To mitigate these impacts, interventions could include:

- Eco-sensitive road planning to minimize wetland disruption.
- Restoration of blocked water channels to maintain hydrological connectivity.
- Stronger enforcement of wetland protection laws to regulate land use.
- Community-led conservation initiatives to rehabilitate degraded areas.



Plate 11: Road Infrastructure Sections that go through Nakalere Wetland in Kijabijo (Left), Nakwero (Middle).

3.9. Conservation of Green Belt Along Nakalere Wetland: Benefits and Ecological Concerns.

The 1.2km green belt along Nakalere Wetland and riverbanks in Kimwanyi represents a deliberate effort to enhance human-nature relationships through vegetation management. The area is well-maintained, featuring grasses and planted tree species, primarily pine, which serve to:

- Bind soil together, reducing erosion.
- Minimize surface runoff, preventing siltation in the wetland.

Ecological Concerns of Pine Dominance.

While pine trees provide some soil stabilization benefits, their ecological impact raises concerns:

- Alteration of soil pH – Pines increase acidity, affecting wetland nutrient balance.
- Out competition of native wetland-edge trees – Species like Water Berry (*Syzygium cordatum*) and Wild Date Palm (*Phoenix sylvestris*) struggle to thrive.
- Poor habitat for indigenous birds and insects – Compared to native species, pine trees offer limited ecological support for wetland-dependent wildlife.

Potential Solutions for Sustainable Green Belt Management.

To enhance biodiversity and ecological balance, interventions could include:

- Integrating native tree species alongside pine to restore wetland-edge vegetation.
- Monitoring soil health to prevent excessive acidification.
- Encouraging community-led conservation efforts to preserve native flora and fauna.



Plate 12: Green belts along Nakalere wetland in Kimwanyi.

3.10. Environmental Impact of Informal Car Washing.

Informal car washing operations along wetland edges in Kijabijo and Kimwanyi pose a severe environmental threat. These youth-led enterprises, driven by high unemployment and access to free water, have led to the discharge of toxic pollutants into the wetland, including:

- Engine oils and grease, contaminating wetland soils.
- Heavy metals (lead, zinc), poisoning aquatic life.
- Synthetic detergents, suffocating insect larvae and degrading papyrus and sedge root systems.

Studies highlight that washing bays near wetlands contribute to water pollution, habitat destruction, and biodiversity loss.



Plate 13: Washing Bays within the Wetland; Vehicular and Boda-Boda washing bay in Kijabijo along Lwajjali.

Other Economic Activities in Nakalere Wetland.

Beyond car washing, Nakalere Wetland supports various economic activities, including:

- Fishing, providing food and income for local communities.
- Papyrus harvesting and mat making, sustaining traditional crafts.

While these activities offer economic benefits, unregulated practices threaten wetland sustainability. Strengthening environmental regulations, promoting eco-friendly alternatives, and enhancing community awareness are crucial for balancing economic development with conservation.

3.11. Impacts of the Anthropogenic Activities.

Due to the increasing human activities in the wetland, the following issues have emerged. (*Table 9 below*).

Table 9: Impacts Emanating from the Unsustainable Use of Nakalere Wetland.

Main Issue/impact	Causes	Potential Impact
Conversion for Settlement Urbanization & industrialization	▪ High Demand for Fuelwood: The excessive reliance on fuelwood as a primary energy source has led to significant deforestation and environmental degradation. ▪ Weak Policies and Institutional Frameworks: Inadequate policies and ineffective institutional structures have hindered the sustainable management and conservation of natural resources. ▪ Limited Awareness Among Local Communities on the Risks of Settling in Wetlands: Many local communities lack sufficient knowledge about the environmental hazards and long-term consequences of settling in wetlands, leading to degradation and loss of biodiversity. ▪ Population Pressure: Rapid population growth has intensified the demand for land and resources, exacerbating environmental stress and unsustainable land use practices. ▪ Absence of Clearly Defined Wetland Boundaries: The lack of well-delineated wetland boundaries has contributed to encroachment, mismanagement, and the gradual depletion of wetland ecosystems.	▪ Wetland Pollution: The contamination of wetlands due to human activities, industrial discharge, and agricultural runoff has led to the degradation of these fragile ecosystems. ▪ Improper Waste Disposal in Wetlands: The indiscriminate dumping of waste into wetlands has contributed to environmental pollution, harming aquatic life and disrupting natural water purification processes. ▪ Deforestation: The large-scale clearing of trees has resulted in habitat loss, reduced biodiversity, and weakened the ability of wetlands to regulate water flow and support ecosystems.
Over grazing in wetlands and along riverbanks	▪ Overstocking Excessive livestock numbers beyond the carrying capacity of the land lead to resource depletion, environmental degradation, and reduced productivity. ▪ Inadequate Animal Management Poor livestock management practices, including insufficient feeding, healthcare, and breeding strategies, negatively impact animal welfare and productivity. ▪ Socio-economic Constraints of Farmers Financial limitations, lack of access to agricultural inputs, and economic hardships hinder farmers from adopting sustainable and efficient farming practices. ▪ Drought and Declining Precipitation Reduced rainfall and prolonged drought conditions strain water resources,	▪ Decline in Vegetative Cover: The depletion of plant cover due to human activities and environmental changes weakens ecosystems, reducing their resilience and biodiversity. ▪ Encroachment of Invasive Species: Land degradation often leads to the proliferation of invasive weeds, brush, and trees, disrupting native ecosystems and diminishing soil fertility. ▪ Accelerated Soil Erosion and Bank Instability: Poor land management practices and deforestation contribute to severe soil erosion, resulting in collapsing riverbanks and degradation of arable land. ▪ Decline in Wetland Ecosystem Services: The degradation of wetlands reduces their ability to provide essential ecological functions, including water filtration, flood mitigation, and habitat support.

	diminish pasture availability, and threaten agricultural sustainability. ▪ Unsustainable Land Use Practices Improper land utilization, including deforestation, soil erosion, and encroachment on fragile ecosystems, exacerbates environmental degradation and reduces agricultural viability.	▪ Reduction in Soil Productivity: Unsustainable land use practices lead to soil depletion, making it less fertile and less capable of supporting sustainable agriculture. ▪ Emergence of Native and Secondary Vegetation: Environmental disturbances can trigger the uncontrolled spread of native and secondary plant species, altering natural habitats and land usability. ▪
Flooding	▪ Unsustainable Development in the Catchment Area: Unregulated infrastructure expansion and resource exploitation in catchment areas have led to environmental degradation, reduced water quality, and ecosystem disruption. ▪ Impact of Climate Change: Changing climatic patterns, including rising temperatures, unpredictable rainfall, and extreme weather events, have exacerbated environmental vulnerabilities and altered natural ecosystems. ▪ Land Conversion and Burning: The transformation of wetlands and forests into agricultural fields, such as sugarcane plantations, or urban developments contributes to habitat loss, soil depletion, and increased carbon emissions from burning vegetation. ▪ Poor Land Management Practices: Inadequate land use strategies, including deforestation, soil erosion, and unsustainable farming methods, accelerate environmental degradation and reduce the long-term viability of natural resources.	▪ Soil and Riverbank Erosion: Unsustainable land practices and deforestation contribute to the degradation of soil and destabilization of riverbanks, leading to loss of fertile land and increased sediment runoff. ▪ Bed Erosion: The gradual wearing away of riverbeds due to excessive water flow, human activities, and reduced vegetation cover weakens the structural integrity of aquatic ecosystems. ▪ Siltation of Rivers and Wetlands: The accumulation of silt and sediments in water bodies reduces water quality, disrupts aquatic habitats, and impairs the ecological functions of rivers and wetlands. ▪ Landslides: Deforestation, poor land management, and extreme weather conditions increase the risk of landslides, causing destruction to infrastructure, ecosystems, and communities. ▪ Vegetation Damage: Habitat destruction, overgrazing, and unsustainable development lead to the degradation and loss of essential vegetation, affecting biodiversity and environmental stability. ▪ Water Quality Degradation Due to Pollutants: The introduction of pollutants—such as industrial waste, agricultural runoff, and domestic waste—contaminates water sources, threatening aquatic life and public health. ▪ Impact on Habitats, Flora, and Fauna: Environmental degradation negatively affects habitats and biodiversity, leading to reduced wildlife populations, disrupted ecosystems, and loss of native flora.
Poor farming practices along the riverbanks and in wetlands	▪ Weak Legal and Policy Frameworks: Inadequate laws and ineffective policy enforcement have hindered sustainable land and resource management, leading to environmental degradation and misuse of natural ecosystems. ▪ Limited Land Accessibility: Restricted access to land due to legal, economic, or social constraints affects individuals and communities, limiting opportunities for sustainable agriculture, development, and conservation efforts.	▪ Soil Erosion Unsustainable land management practices, deforestation, and excessive agricultural activities contribute to the loss of fertile topsoil, reducing land productivity and increasing environmental vulnerability. ▪ Wetland and Riverbank Degradation Encroachment, pollution, and poor conservation efforts have led to the deterioration of wetland ecosystems and riverbanks, compromising their ability to support biodiversity and regulate water flow. ▪ Water Quality Deterioration The introduction of pollutants, including industrial waste, agricultural runoff, and domestic effluents, has degraded

	▪ Influence of Attitudes and Cultural Factors: Deep-rooted cultural beliefs, traditions, and societal attitudes impact decision-making regarding land use, conservation, and resource management, sometimes leading to unsustainable practices.	water quality, affected aquatic ecosystems and posed risks to human health.
Removal of natural vegetation cover	▪ Depletion of Wetland Vegetation for Various Uses: The widespread harvesting of wetland vegetation for fuelwood, construction materials, craft-making, brick production, and agricultural expansion has contributed to environmental degradation. This practice threatens biodiversity, disrupts wetland ecosystems, and reduces the natural benefits wetlands provide, such as water filtration and habitat support.	▪ Impact of Tree Loss and Vegetation Depletion on Wetlands and Riverbanks: The removal of trees and vegetation weakens the stability of wetland and riverbank ecosystems, exposing topsoil to erosion. Without natural root systems to anchor the soil, increased runoff accelerates sediment displacement, reducing the land's ability to withstand water flow and leading to downstream degradation.
Soil Erosion	▪ Vegetation Clearance The large-scale removal of vegetation disrupts ecosystems, reduces biodiversity, and exposes soil to erosion, diminishing land stability and productivity. ▪ Soil Tillage and Overgrazing Intensive soil cultivation and excessive grazing degrade soil structure, deplete nutrients, and accelerate erosion, leading to long-term land degradation. ▪ Unsustainable Farming Practices and Agricultural Intensification Poor land management, monoculture farming, and excessive use of chemicals contribute to soil depletion, reduced water retention, and environmental degradation, threatening long-term agricultural sustainability.	▪ Pollution and Sedimentation in Waterways: The accumulation of pollutants and sediments in streams and rivers obstructs water flow, degrades water quality, and threatens aquatic species by reducing oxygen levels and disrupting habitats. ▪ Wetland Degradation Due to Sedimentation: Excessive sedimentation in wetlands leads to the loss of open water areas, promoting the overgrowth of aquatic vegetation and altering the natural balance of wetland ecosystems.
Uncontrolled brick making	▪ Weak Legal and Policy Frameworks: Inadequate laws and ineffective policy enforcement have hindered sustainable land and resource management, leading to environmental degradation and misuse of natural ecosystems. ▪ Limited Land Accessibility: Restricted access to land due to legal, economic, or social constraints affects individuals and communities, limiting opportunities for sustainable agriculture, development, and conservation efforts.	▪ Emissions and Pollution from Heavy Trucks and Machinery: The operation of heavy trucks and industrial machinery releases significant air pollutants, including carbon emissions and particulate matter, contributing to environmental degradation and poor air quality. ▪ Water Contamination from Mining Waste: Waste generated from mining activities can seep into nearby water sources, polluting streams and rivers with hazardous substances, thereby threatening aquatic ecosystems and water safety. ▪ Deforestation Due to Firewood Demand for Brick Production: The extensive use of firewood for brick firing accelerates deforestation,

	▪ Limited Alternative Employment Opportunities: The lack of diverse employment options forces many individuals to rely on land-based activities, increasing pressure on natural resources and contributing to unsustainable land use. ▪ Population Pressure and Rising Demand for Building Materials: Rapid population growth, coupled with increasing demand for construction materials, has led to excessive land exploitation, deforestation, and environmental degradation.	leading to habitat loss, reduced biodiversity, and disruption of ecological balance. ▪ Environmental Consequences of Deforestation: The removal of trees for various purposes exacerbates air pollution, soil erosion, and land degradation, contributing to desertification and reducing available fuel sources for other human activities. ▪ Sedimentation and Its Impact on Water Flow Excessive sedimentation in water bodies alters base flow dynamics, clogging waterways and affecting the natural movement of water, which can lead to long-term ecological imbalances.
Disposal of Garbage/waste	▪ Weak Policies and Institutional Frameworks: Inadequate regulatory policies and ineffective institutional structures have hindered the sustainable management and conservation of wetlands, leading to environmental degradation. ▪ Limited Public Awareness of Wetland Waste Disposal Risks: Many local communities lack sufficient knowledge about the environmental hazards and long-term consequences of improper waste disposal in wetlands, resulting in pollution and ecosystem disruption.	▪ Environmental Pollution The release of pollutants into the air, water, and soil leads to contamination, affecting ecosystems, human health, and overall environmental quality. ▪ Health Risks from Unsanitary Landfills Open and poorly managed landfills contribute to the contamination of drinking water, increasing the risk of infections and the spread of diseases. ▪ Habitat Destruction Environmental degradation, including deforestation and pollution, results in the loss of natural habitats, threatening biodiversity and disrupting ecosystems. ▪ Decline in Aesthetic and Scenic Value The deterioration of landscapes due to pollution, waste accumulation, and habitat destruction diminishes the natural beauty and appeal of affected areas.
Inadequate policy and institutional frameworks	▪ Insufficient Funding for Policy Implementation: The limited availability of financial resources hampers efforts to effectively publicize and enforce existing environmental policies, weakening their impact on sustainable management. ▪ Absence of Localized Byelaws and Ordinances: The lack of area-specific regulations prevents tailored approaches to addressing unique environmental challenges, resulting in ineffective governance and resource protection. ▪ Limited Human Capacity and Staffing Constraints: Inadequate staffing and a shortage of skilled personnel hinder the efficient execution of conservation, enforcement, and management strategies necessary for environmental sustainability.	▪ Wetland Encroachment: The unauthorized expansion of human settlements, agriculture, and infrastructure into wetlands has led to habitat destruction, loss of biodiversity, and disruption of natural ecosystems. ▪ Decline in Wetland Functionality: Environmental degradation, pollution, and excessive land use have diminished wetlands' ability to provide essential ecological services such as water filtration, flood control, and habitat support.



Plate 14:Alteration of river flow patterns by channels dug to drain water to farms in Kijabijo (Left-Middle).

3.12. Climate Change Impacts.

The surge in water levels in the Lwajjali, Nakiyanja, and Nakalere rivers, particularly during the heavy rains in April, significantly intensified their erosive power. This resulted in the destruction of sections of Nyanja Road, damage to drainage infrastructure, and the formation of a 30-foot-long depression at the road crossing in Nakasajja. Additionally, the increased water flow eroded stones used in road construction, further weakening infrastructure stability.

The floodwaters, rising to approximately 2 feet, caused extensive damage, washing away farms, submerging parts of Kijabijo Market, and leading to road flooding, disrupting transportation and local livelihoods.



Plate 15:Destruction and erosion of part of Nyanja Road in Kijabijo (Left), flooding of the wetland (Middle-Right).

During the dry season, the Nakalere and Lwajjali wetland systems experience severe stress, marked by significant river narrowing and declining water levels. The lack of replenishment flows diminishes aquatic habitats, threatening species such as fish and water birds. This cyclical transition from flooding to drought exemplifies a climate-induced impact, disrupting the natural balance of wetland ecosystems.

Additionally, landscapes previously eroded by heavy rains transform into cracked, unstable terrain during dry periods, further weakening soil integrity. This deterioration leaves native vegetation, such as papyrus, increasingly vulnerable to encroachment by invasive species like eucalyptus, which can alter the ecosystem structure.

Critically, these drying cycles impair groundwater recharge, jeopardizing community water access in Nakwero and Kijabijo. Furthermore, the concentration of pollutants from waste dumps and washing bays in stagnant pools exacerbates environmental contamination, posing risks to both human health and biodiversity.

CHAPTER FOUR

4.0. KEY INTERVENTIONS, STRATEGIES AND IMPLEMENTATION MODALITIES.

4.1. Introduction.

The Nakalere Wetland Vision, as outlined in Chapter One, presents a collective, medium-to-long-term desired future state for the wetland and riverbanks. This vision serves as the foundation for developing realistic and locally attainable strategies aimed at sustainable conservation and management.

The vision was formulated through extensive stakeholder engagement, ensuring that it directly addresses the key issues and driving factors contributing to wetland and riverbank degradation. To achieve this vision, five strategic objectives have been developed, providing a structured approach to restoration, protection, and sustainable utilization of wetland resources.

4.2. Strategic Objectives for Nakalere Wetland Conservation.

The overarching goal of this Action Plan is to promote the conservation of the Nakalere Wetland System, ensuring its ability to sustain both ecological integrity and socio-economic functions by 2030. The specific strategic objectives include:

- a. **Enhancing Ecological Restoration Efforts:** Strengthening wetland and riverbank stabilization through afforestation, vegetation cover regeneration, and other ecosystem enrichment techniques to restore biodiversity and resilience.
- b. **Pollution Control and Improved Waste Management:** Implementing comprehensive pollution control measures and sanitation improvement at both source locations and ungazetted dumping sites within the municipality to preserve water quality and wetland health.
- c. **Diversification of Livelihood Opportunities:** Expanding alternative income-generating activities (IGAs) for local communities surrounding the Nakalere wetland and riverbanks, reducing reliance on environmentally harmful practices.
- d. **Strengthening Legal and Institutional Frameworks:** Enhancing institutional capacity for wetland management by establishing monitoring and enforcement structures at the village, parish/ward, and municipal levels to support effective governance.
- e. **Awareness and Stakeholder Sensitization:** Increasing public awareness and engagement through targeted sensitization programs that educate stakeholders on sustainable wetland management practices.
- f. **Facilitating Stakeholder-Led Conservation Actions:** Implementing enabling interventions that empower stakeholders within Kira Municipality to take an active role in safeguarding and managing the wetland.

4.3. Overview and General Prioritization of the Strategic Objectives.

The proposed interventions are informed by the physical and social conditions of the Nakalere Wetland and Riverbanks, as well as insights and experiences from similar challenges faced in other regions. Additionally, they incorporate stakeholder input gathered through workshops and meetings, ensuring that the strategies are locally relevant and practical.

To facilitate effective implementation, interventions are categorized according to the strategic objectives outlined in Section 4.2. Given the constraints in human resources and funding, executing all interventions simultaneously is not feasible. Therefore, a prioritization framework has been established based on urgency, with interventions classified into four priority levels:

- Critical

- High
- Medium
- Low

These priority levels do not reflect the relevance of the interventions but rather the order of implementation over time. Ideally, if capacity constraints were not a limitation, all interventions would be executed simultaneously in an integrated and coordinated manner to maximize impact.

Table 10: Priority Levels and Relevance of the interventions.

	Priority Levels
1.	CRITICAL Interventions classified as Critical Priority require immediate implementation, as they serve as foundational prerequisites for the successful introduction of subsequent measures. These interventions should ideally be executed within the first six months, with a maximum timeframe of one year, following the approval of the Action Plan at the Division and Municipal Council levels. By prioritizing these interventions, stakeholders can establish a strong framework for sustainable wetland conservation, ensuring that essential groundwork is laid for long-term ecological and socio-economic benefits.
2.	HIGH The proposed interventions are highly relevant to the key challenges affecting the Nakalere Wetland and Riverbanks and are expected to yield significant improvements in their management and conservation. These activities aim to halt harmful practices and promote sustainable environmental stewardship. Given their urgency, these interventions should be implemented within the short term, ideally within 1 to 2 years following the approval of the Action Plan. This phased approach ensures that critical measures are prioritized while allowing for effective resource allocation and capacity-building to support long-term sustainability.
3.	MEDIUM Interventions categorized as Medium Priority should be implemented within 2 to 4 years following the approval of the Action Plan. These activities are essential for long-term sustainability, addressing key environmental and socio-economic challenges while building upon the foundational efforts of Critical and High-Priority interventions. By executing these interventions within the medium term, stakeholders can ensure gradual progress, resource optimization, and effective adaptation to evolving environmental and community needs.
4.	LOW Interventions categorized as Long-Term Priority should be implemented within 4 to 5 years following the approval of the Action Plan. These activities focus on sustained environmental restoration, policy reinforcement, and community adaptation, ensuring the long-term resilience of the Nakalere Wetland and Riverbanks. By executing these interventions in the longer term, stakeholders can build upon previous efforts, strengthen institutional frameworks, and implement comprehensive conservation strategies that support ecological stability.

Table 11: Overview of the Nakalere Wetland Action Plan Strategic Objectives and Interventions.

	Category/ Strategic Objective	Interventions/ Strategies	Location	Priority level
1	Ecological restoration efforts through vegetation cover and afforestation and other stabilization techniques along Nakalere wetland and riverbanks for ecosystem enrichment.	▪ Revegetation Using Native Species: Restoring wetland vegetation through the planting of native species such as papyrus (<i>Cyperus papyrus</i>), miscanthus grass, and fig trees to strengthen biodiversity and ecosystem stability. ▪ Physical Demarcation of Protected Zones: Establishing a 30-meter buffer zone using GPS technology and concrete markers, ensuring that all human activities within this area are strictly prohibited to prevent encroachment and degradation. ▪ Construction of Check Dams: Utilizing locally sourced materials to build check dams, which help slow water flow in channels, reducing erosion and improving water retention. ▪ Encouraging and Incentivizing Tree Planting: Promoting tree growing at both group and household levels by providing assorted seedlings, fostering community participation in conservation efforts. ▪ Community Training and Sensitization on Tree Management: Conducting educational programs to enhance community awareness on tree management, ensuring sustainable practices that support wetland conservation.	Entire Municipality for household tree planting. Woodlots along Nakalere Wetland and Riverbanks	Critical
2	Enhancing, diversifying businesses and livelihood opportunities for local communities around Nakalere wetland and riverbanks.	▪ Awareness on Alternative Income-Generating Activities: Conducting educational campaigns and community outreach programs to inform local populations about diverse livelihood opportunities, reducing dependence on environmentally harmful practices. ▪ Initiation of Alternative Income-Generating Activities: Supporting the establishment of mushroom farming, beekeeping, poultry farming, welding, and carpentry—particularly targeting youth empowerment and economic diversification. ▪ Skills Development and Conditional Start-Up Capital: Providing vocational training and capacity-building programs, coupled with revolving start-up capital, to enable community groups to launch and sustain small-scale enterprises. ▪ Eco-Tourism Development: Promoting eco-tourism initiatives such as bird-watching trails, educational tours, and nature-based tourism, fostering environmental conservation while generating economic benefits for local communities.	Required in all the 8 cells of Kimwanyi ward	Critical
		▪ Training Community Members in Fish Farming: Conducting hands-on training programs to equip interested individuals with technical skills in fish farming, including pond management, fish breeding, feeding techniques, and disease control.		Low

		▪ Provision of Tools and Materials for Fishpond Setup: Supplying essential equipment and materials such as pond liners, aeration systems, fish fingerlings, and feeding supplies to support the establishment of community-based fish farms.		
3	Strengthen legal and institutional frameworks for sustainable wetland and riverbanks management at all levels.	1. Formulation of Byelaws and Ordinances • Developing byelaws at the Division level and ordinances at the Municipal level to regulate activities within and adjacent to the wetland. • Ensuring that these legal frameworks address key environmental concerns, including pollution control, land use restrictions, and conservation measures. 2. Popularization and Enforcement of Regulations • Raising public awareness about the importance and implications of the newly formulated byelaws and ordinances. • Strengthening enforcement mechanisms through community engagement, monitoring structures, and legal compliance measures. For further guidance, you may find the Step-by-Step Guidelines for Making Ordinances and Byelaws in Uganda helpful, as it provides a structured approach to local law-making and enforcement.	Required in all parts of the municipality.	High
		1. Quarterly Coordination Meetings with Stakeholders • Organizing regular stakeholder meetings to provide updates on wetland protection progress, assess ongoing efforts, harmonize approaches, and prevent duplication of activities. • Ensuring effective collaboration among government agencies, local communities, and environmental organizations. 2. Reactivating Local Environment Committees and Patrols • Establishing and re-energizing Local Environment Committees to oversee wetland conservation efforts. • Deploying community-led patrols to monitor compliance and prevent illegal activities. 3. Relocation of Encroachers to Alternative Sites • Identifying suitable relocation areas for individuals and businesses encroaching on wetland zones. • Implementing resettlement programs that provide alternative livelihood opportunities to minimize environmental impact. 4. Demarcation of Wetland Boundaries • Using GPS technology and concrete markers to establish clear wetland boundaries in accordance with MWE regulations. • Ensuring strict enforcement of land-use restrictions within protected zones.	Required in all the 8 cells of Kimwanyi Ward where Nakalere wetland is situated.	High
4	Enabling interventions	1. Community Meetings and Barazas		Medium

	that create a conducive environment for implementation of others	- Organizing interactive forums such as barazas to facilitate dialogue between stakeholders and local communities. - Encouraging participatory discussions on wetland conservation and sustainable practices. 2. Multimedia Awareness Campaigns - Utilizing video shows, radio announcements, and talk shows to disseminate key messages on wetland protection. - Leveraging theatre performances to creatively engage audiences and promote conservation awareness. 3. Development of Customized Awareness Materials - Designing brochures, posters, and banners tailored to specific environmental concerns. - Distributing Information, Education, and Communication (IEC) materials to reinforce conservation messages.		
		1. Community-Based Monitoring and Supervision - Establishing local monitoring systems to track implementation progress and ensure compliance with conservation guidelines. - Encouraging community participation in environmental oversight to foster accountability and transparency. 2. Training and Capacity Building for Local Environment Committees (LEC) - Providing specialized training on environmental management, internal procedures, conflict resolution, and community engagement to strengthen local governance. - Equipping LEC members with technical knowledge and practical skills for effective wetland protection. 3. Formation of Interagency Task Forces - Instituting multi-sectoral task forces to facilitate monthly coordination meetings, ensuring alignment of efforts across different agencies. - Promoting collaborative decision-making to address environmental challenges holistically. 4. Provision of Materials and Tools for LEC Operations - Supplying essential equipment to support monitoring, enforcement, and conservation activities. - Ensuring that LEC members have the necessary resources to perform their roles effectively.		High
		1. Wetland Buffer Demarcation Establishing clear boundaries to protect wetland ecosystems from encroachment.		Critical

		- Utilizing GPS technology and concrete markers to define a 30-meter buffer zone, ensuring regulated land use. 2. Community Engagement Meetings - Conducting interactive forums to involve local stakeholders in wetland conservation efforts. - Encouraging collaborative decision-making and fostering community ownership of restoration initiatives. 3. Procurement and Installation of Concrete Pillars - Working jointly with the Local Environment Committee (LEC) and community members to install concrete pillars, reinforcing wetland demarcation. - Ensuring long-term protection by marking critical wetland zones to prevent unauthorized activities. 4. Procurement and Planting of Assorted Tree Seedlings - Engaging LEC and community members in afforestation efforts, planting native tree species to restore degraded wetland areas. - Strengthening ecosystem resilience and promoting biodiversity conservation.		
5	Pollution Control, Improvement of solid waste management and sanitation practices	1. Mandatory Installation of Effluent Treatment Systems - Requiring all industries to install effluent treatment plants (ETPs) to prevent hazardous waste discharge into water bodies. 2. Improvement of Solid Waste Collection and Management - Enhancing waste collection systems to ensure proper disposal and minimize environmental pollution. 3. Designation and Development of Solid Waste Dumpsites - Establishing at least one regulated dumpsite per ward to streamline waste disposal and prevent illegal dumping. 4. Feasibility Study on Solid Waste Collection Business Case - Conducting market analysis to assess the viability of commercial waste collection services and identify investment opportunities. 5. Support for Solid Waste Management Plant Expansion - Providing funding and technical assistance to selected investors for the establishment or expansion of solid waste processing facilities. 6. Occupational Health and Safety Training for Entrepreneurs - Conducting training programs to equip entrepreneurs with safety protocols, waste handling procedures, and environmental compliance measures. 7. Procurement and Installation of Waste Segregation Bins - Deploying segregation bins in trading centers, markets, and institutions to encourage proper waste sorting and disposal.	Entire Municipality especially where waste collection is carried out.	High

		8. Promotion of Biogas Digesters in Neighbouring Settlements - Advocating for the use of biogas digesters to convert organic waste into renewable energy, reducing reliance on traditional fuel sources. 9. Monthly Community Clean-Up Campaigns - Initiating regular clean-up drives to engage communities in waste management efforts and promote environmental responsibility. 10. Community Training on Waste Collection and Sorting - Educating local populations on proper waste disposal techniques, fostering a culture of sustainable waste management. 11. Encouragement of Waste Reuse and Recycling Ventures - Supporting businesses and initiatives that focus on waste repurposing, contributing to a circular economy and reducing landfill dependency.		
		1. Enabling Household Waste Collection and Management - Establishing structured waste collection systems to ensure proper disposal and minimize environmental pollution. - Encouraging household-level waste segregation to facilitate recycling and reduce landfill dependency. 2. Supporting Community-Based Entrepreneurs in Waste Bin Production - Providing technical and financial assistance to local entrepreneurs for the manufacturing of household waste collection bins. - Promoting locally made, durable, and affordable waste bins to enhance accessibility and encourage responsible waste disposal. 3. Enforcing Household-Level Waste Management - Implementing strict regulations to ensure compliance with proper waste disposal practices. - Conducting community awareness campaigns to educate residents on effective waste management techniques.		High

4.4. Detailed Breakdown of Strategic Interventions and Activities.

Detailed strategies/interventions for each strategic objective are explained below including pre-conditions underpinning their successful implementation.

4.4.1 Increased Ecological Restoration Efforts through vegetation cover and afforestation and other stabilization techniques along Nakalere wetland and riverbanks for ecosystem enrichment:

The functionality of the Nakalere Wetland and Riverbanks is heavily dependent on vegetative cover, both within and around its ecosystems. To promote revegetation and ecosystem restoration, the following interventions have been identified:

a) Tree Planting Initiatives.

- Indigenous tree species will be planted in buffer zones and neighboring institutions to enhance biodiversity.
- Exotic trees, valued for their commercial benefits, will be planted by individual farmers for domestic and commercial use.

b) Revegetation Using Native Species.

- Restoring wetland vegetation with papyrus (*Cyperus papyrus*), miscanthus grass, and fig trees to strengthen biodiversity and ecosystem stability.

c) Wetland Buffer Demarcation.

- Using GPS technology and concrete markers to establish a 30-meter buffer zone, prohibiting human activities within protected areas.

d) Erosion and Flood Control Measures.

- Constructing check dams and terraces from locally sourced materials to slow water flow, reducing flooding, erosion, sedimentation, and siltation.

e) Farmer Managed Natural Regeneration (FMNR).

- Encouraging natural regrowth of indigenous trees in farmlands along the wetland to restore vegetation cover.

f) Live Fencing for Wetland Protection.

- Establishing live fencing to demarcate wetland boundaries, increase vegetation cover, and prevent soil erosion.

g) Energy Conservation Initiatives.

- Promoting Energy-Saving Stoves through a market-based approach to boost demand and supply.
- Supporting sustainable charcoal production using efficient conversion techniques such as the Casamance kiln and Green Charcoal Associations.

h) Briquette Production for Alternative Fuel.

- Supporting women and youth groups in briquette production to reduce reliance on charcoal and firewood.
- Providing training, input support, and technical assistance for briquette-making enterprises.

i) Wetland Rehabilitation and Restoration Works.

- Implementing biological and physical earthworks, including check dams, sediment traps, diversion ditches, and drainage channels to restore wetland health.

j) Establishment of a Central Tree Nursery.

- Setting up a Municipality-managed nursery to raise indigenous tree seedlings for distribution.
- Strengthening Private Nursery Operators to ensure quality seedling production and certification for market access.

k) Public-Private Partnership for Tree Nurseries.

- Supporting business-minded community members to establish tree nurseries through a transparent tendering process based on criteria such as:
 - Access to land for nursery establishment.
 - Strategic location for accessibility.
 - Prior business experience and community reputation.

To support tree nursery development and community-based afforestation, the following interventions are proposed:

1. Training and Technical Support for Tree Nursery Establishment.

- The Municipal Council will provide training and technical assistance to selected members/groups in nursery bed establishment, management, and financial planning.
- A grant will be allocated to cover start-up costs, ensuring sustainability.
- Members/groups will participate in exchange visits to well-managed tree nurseries, learning best practices from experienced operators.

2. Procurement of Nursery Tools and Materials.

- Essential nursery tools and materials will be provided on a co-financing arrangement, ensuring shared responsibility and commitment.
- Routine monitoring and technical support will be offered by the Municipal Natural Resources Department to ensure proper nursery management.

3. Encouraging and Incentivizing Tree Growing at Group and Household Levels.

- Community training and sensitization will be conducted through meetings to educate members on the importance of trees, tree growing techniques, and management.
- Interested community members will be required to express their commitment in writing and prepare their land for tree planting, fostering ownership of the process.
- Assorted tree seedlings will be procured from the supported nursery and distributed to interested and affected community members for planting on private and communal land along the Wetland and Riverbank.

4.4.2 Enhancing and Diversifying Livelihood Opportunities for Nakalere Wetland Communities.

To promote sustainable economic growth while reducing pressure on the wetland, the following interventions have been identified:

1. Promotion of Nature-Based Enterprises.

- Supporting bankable nature-based businesses such as micro-irrigation, piggery, apiary, horticulture, fish farming, poultry farming (ducks and chickens), and small-scale grazing.
- Providing technical training, input support, market linkages, financial services access, and technical backstopping to ensure business viability.

2. Development of Eco-Tourism Opportunities.

- Establishing bird-watching trails, educational tours, and other eco-tourism initiatives to generate income while promoting conservation.

3. Regulation of Sand Mining.

- Balancing short-term economic gains with long-term environmental sustainability through registration, group organization, and designated mining zones.
- Implementing post-mining treatment and management guidelines to restore mined areas.

4. Support for Alternative Income-Generating Activities.

- Assisting sand miners and brick makers in transitioning to retail, irrigated vegetable farming, animal husbandry (poultry and piggery), and other ventures.

- Providing skilling programs, revolving start-up capital, and business management training.

5. Enhancing Economic Value of Abandoned Mines Through Fish Farming.

- Establishing self-sustaining fish farming systems in abandoned sand and clay mines.
- Training communities in pond construction, fish stocking, harvesting, marketing, and financial management.
- Supplying tools and materials through the Municipal Production and Marketing Department.

6. Promotion of Small-Scale Irrigation Systems.

- Encouraging sub-irrigation for high-value crops such as vegetables.
- Providing training and materials on a co-funding basis.
- Linking farmers to irrigation companies like Kickstart, which offer subsidized irrigation kits.

These interventions aim to strengthen local economies, promote environmental sustainability, and empower communities.

4.4.3 Strengthening Legal and Institutional Frameworks for Sustainable Wetland Management.

Effective conservation of wetlands and riverbanks depends on strong policies and institutions. Weak governance leads to higher degradation rates, making it essential to implement strategies that reinforce wetland protection.

1. Formulation of Byelaws and Ordinances.

- Developing byelaws at the Division level and ordinances at the Municipality level to regulate activities within and adjacent to the wetland.
- Ensuring a participatory process involving local communities, leaders, and the private sector to foster ownership and compliance.

2. Popularization and Enforcement of Regulations.

- Translating byelaws and ordinances into local languages for accessibility.
- Conducting community-wide sensitization through radio talk shows, road drives, and peer-to-peer learning.
- Encouraging collaborative waste management, where residents report illegal dumping, incentivized by the Municipal Council.

3. Development of a Management Information System.

- Establishing an online solid waste crime database to track illegal waste disposal.
- Leveraging Uganda Police's CCTV network to identify and apprehend offenders.

4. Stakeholder Coordination and Engagement.

- Holding quarterly coordination meetings to update stakeholders on wetland protection progress and harmonize efforts.
- Re-energizing Local Environment Committees (LECs) to monitor illegal activities and lead sensitization campaigns.

5. Wetland and River Boundary Demarcation.

- Collaborating with MWE to mark clear wetland boundaries, reducing conflicts over land use.
- Engaging affected stakeholders in dialogue, sensitization, and participatory planning to ensure smooth implementation.

6. Buffer Zone Sub-Zoning for Sustainable Use.

- Restricted Zone (20 meters): Protects wetland integrity, allowing grass harvesting, grazing, fish farming, and water-loving vegetation while prohibiting soil disturbance, crop farming, and permanent structures.

- Outer Zone (10 meters): Supports regulated farming, tree planting, sand mining, and approved infrastructure, with strict erosion control measures.
- Landowner Support: Encouraging vegetation preservation, erosion control, and runoff infiltration with Municipal Council assistance.

These interventions aim to strengthen governance, improve conservation efforts, and promote sustainable wetland management.

4.4.4 Pollution Control, Solid Waste Management, and Sanitation Improvement.

To enhance waste management efficiency and environmental sustainability, the following interventions are proposed:

1. Improvement of Waste Collection and Management.

- Designating at least one solid waste dumpsite per ward to streamline waste disposal.
- Decentralizing garbage collection by engaging private entrepreneurs to establish and manage waste collection businesses.
- Introducing selected waste collection enterprises to stakeholders (markets, institutions, households) through Municipal Council-organized meetings.
- Providing seed funding and technical assistance to support business development and expansion.

2. Occupational Health and Safety Training.

- Conducting training programs for waste collection entrepreneurs, covering policy development, safety procedures, and operational best practices.
- Training community structures (market committees, local leaders, traders) in solid waste collection and sorting.
- Installing waste segregation bins in trading centers, markets, and institutions, with enforcement led by private waste collectors and local leaders.
- Initiating monthly community clean-up campaigns, engaging stakeholders in selecting cleanup days and developing byelaws to govern the activity.

3. Encouraging Waste Recycling and Reuse Ventures.

- Supporting waste-to-wealth business initiatives, prioritizing plastic recycling, organic waste conversion to animal feed or fertilizers.
- Providing grants and technical support to interested community members for business establishment and expansion.
- Offering training in recycling techniques, marketing, and business management.

4. Household-Level Waste Collection and Management

- Mandating the construction of solid waste collection bins for all households.
- Supporting community-based entrepreneurs in producing plastic or wooden waste bins for sale.

5. Mandatory Effluent Treatment for Industries.

- Requiring all industries to install effluent treatment systems, with monthly compliance inspections by NEMA.

6. Sanitation Improvements for Wetland Communities.

- Mandating the use of eco-San toilets and biogas digesters for households near Nakalere River and Wetland to prevent water contamination.
- Providing training, exposure visits, and grants to support eco-San toilet entrepreneurs.
- Learning from KCCA's waste management model to enhance municipal waste strategies.

These interventions aim to strengthen waste management systems, improve sanitation, and promote environmental sustainability.

4.4.5 Enabling Interventions for Effective Implementation.

To create a conducive environment for the successful execution of wetland conservation strategies, the following interventions are proposed:

1. Awareness and Sensitization Campaigns.

- Developing Information, Education, and Communication (IEC) materials focused on wetland and riverbank conservation, solid waste management, sanitation, and hygiene.
- Disseminating materials through radio campaigns (talk shows, spot messages), community caravans, meetings/barazas, and drama/theatre performances.
- Led by the Municipality Community Services Department, in collaboration with political leaders and technical officers, targeting both Nakalere wetland communities and the entire Municipality.

2. Community-Based Monitoring and Supervision.

- Establishing Local Environment Committees (LEC) to oversee implementation, mobilization, supervision, coordination, and reporting of environmental offenses.
- Ensuring adequate capacity-building, support, and supervision to strengthen community-led monitoring structures.
- Aligning LEC operations with the Catchment-Based Integrated Water Resources Management framework promoted by the Ministry of Water and Environment (MWE).
- Requiring monthly progress reports from LECs to the Municipal Council.

3. Multi-Stakeholder Engagement.

- Bringing together local leaders (Ward and Village level), Town Agents, farmers, sand miners, brick makers, religious leaders, and representatives of other interest groups to foster collaborative conservation efforts.

4.4.6 Buffering Nakalere Wetland.

Wetland buffering entails the strategic establishment of vegetated zones around wetlands to safeguard their ecological integrity and functionality from the adverse effects of surrounding development and human activities. These buffer zones serve as natural filtration systems, mitigating erosion, removing pollutants, and providing crucial habitats for species that rely on wetland ecosystems.

A 30-meter buffer zone will be established using GPS technology and concrete markers to establish a buffer zone, prohibiting human activities within protected areas in order to safeguard Nakalere Wetland. Activities within this buffer zone should be designed to preserve the wetland's ecological functions and biodiversity. Key conservation measures include maintaining or restoring native vegetation, minimizing chemical usage, and preventing any actions that could alter the wetland's water flow or contribute to erosion.

4.4.6.1 Buffer Zone Design.

- Streamside Zone. The area closest to the stream or wetland, requiring highly restricted activities to protect the physical and ecological integrity of the water body.
- Middle Core. A zone allowing for passive recreation and certain stormwater management practices.
- Buffer zone. The outermost zone, potentially supporting turf but preferably native shrubs and trees for pollutant removal.

Some of the detailed lay out at appropriate activities to be done in Nakalere Wetland;

a). Restoration and Maintenance:

- Maintaining or restoring native vegetation: Establishing or maintaining a buffer strip of native plants can help stabilize streambanks, prevent erosion, and improve water quality by filtering pollutants.
- Mowing the buffer: Mowing the buffer can help reduce damage to ground-nesting birds and waterfowl.
- Thinning trees or shrubs: If thinning is necessary, cuttings can be placed in piles throughout the buffer to provide wildlife habitat.
- Establishing a buffer zone and transition zone: These zones help protect the wetland from external impacts.

4.4.6.2 Activities to Avoid in Nakalere wetland.

- Excavation, grading, or dredging of soil, sand, gravel, or other materials: These activities can disrupt the wetland's natural functions and water flow.
- Dumping, discharging, or filling with any material: This can contaminate the wetland and harm wildlife.
- Excessive fertilizer or pesticide use: These chemicals can leach into the wetland and harm aquatic life. This is mostly used in agricultural field which are within the wetland.
- Replacing natural vegetation with riprap, rocks, or fill: This can disrupt the wetland's natural functions and water flow.
- Encroachment into the wetland area: This can destroy habitat and disrupt the wetland's natural functions.



Plate 16: Existing surveyed plots and buildings in Nakalere Wetland.

4.4.6.3 Benefits of Wetland Buffers.

- Water Quality Improvement. Buffers help control soil erosion and remove pollutants like sediments, nutrients, and chemicals from stormwater runoff before they reach the wetland, thus improving water quality.
- Habitat Protection. They provide vital habitat for wetland-dependent species, including nesting birds, aquatic invertebrates, and amphibians.
- Flood Control. Buffers can slow down runoff, reducing the speed and volume of water entering the wetland, which can help prevent flooding and erosion.
- Biodiversity Enhancement. They can increase the diversity of plant and animal life in the area by creating corridors and connecting different habitats.
- Property Value Protection. Buffers can help stabilize streambanks and protect property from erosion and flooding, which can increase property values.

4.4.6.4 Factors Influencing Buffer Effectiveness.

- Buffer Width. Wider buffers are generally more effective at removing pollutants and providing habitat.
- Vegetation Type. Native shrubs and trees are more effective at removing pollutants and heat from stormwater runoff than turf.

Management Practices. Proper management practices, such as controlling erosion and preventing the use of fertilizers, can further enhance buffer effectiveness.

CHAPTER FIVE

5.0. IMPLEMENTATION PLAN AND STRATEGY.

5.1. Anticipated Funding Sources for Nakalere Wetland Action Plan.

To ensure effective implementation of the Nakalere Wetland Action Plan, funding will be sourced from the following avenues:

1. Government Allocations.

- Central Government, District Local Government, and Municipal Council will provide financial support through local revenues and budgetary allocations.

2. Development Partner Support.

- Resource mobilization from international and local development partners, including UNDP, Green Climate Fund, NGOs (e.g., Nature Uganda), community groups, and CSOs such as Rotary and Lions Clubs.

3. Private Sector Co-Financing.

- Entrepreneurs and private sector players interested in wetland conservation will contribute through co-financing arrangements for specific interventions.

4. Community Contributions.

- Household-level interventions, such as eco-San latrines, waste collection bins, tree planting, and soil/water conservation measures, will be self-financed by community members.

These funding sources aim to ensure sustainability, inclusivity, and effective implementation of the Action Plan.

Table 12: Implementation Plan/Strategy for Nakalere Wetland Action Plan (2025-2030).

Nakalere Wetland Action Plan (2025-2030) Implementation Plan.				
Interventions	Activities	Time Frame	Implementation Cost	
			Particulars	Amount (UGX)
1) Pollution control, Improving Waste Management and Sanitation Practices.				
Improve solid waste collection and management	Designate at least one dumping site per ward for solid waste and biogas digesters for organic waste	Continuous	Community meeting (2), compensation of land owners.	74,000,000
	Conduct feasibility study on the business case for solid waste collection.		Consultant (20 days)	40,000,000
	Procure and install 30 waste segregation bins in the trading centres, markets, and selected institutions.		Waste segregation bins (30)	15,000,000
	Initiate and undertake monthly community clean up campaigns.		Community meetings (2), 2 days allowances for joint committee (3 Wakiso DLG officials, 3 Municipal officials)	4,480,000
	Train community structures and communities on collection and sorting of solid waste for disposal.		Community trainings (3), transport and allowance for DLG official (3 days), allowance for Municipal official (3days)	5,750,000
Pollution control	Mandatory installation of effluent treatment systems by all industries. Use of Ecosan toilets.		Quarterly compliance, audit inspections with NEMA Officials (2), Municipal Official (2).	
Encourage and support ventures that utilize. (Reuse or recycle) solid waste.	Identify interested entrepreneurs in solid waste management & provide them co-funding and technical support.		Funding (1), introductory community meetings (4)	35,000,000
	Equip the entrepreneurs with skills in recycling or upcycling of the waste material.		Community trainings (4), transport and allowance for DLG official (4 days), allowance for Municipal official (4 days)	8,000,000
	Conduct occupational health and safety training to the selected entrepreneurs and co-develop with them necessary policies and procedures		Consultant (5 days)	6,500,000
2) Increasing Vegetation Cover.				
Scale up revegetation	Planting native species (e.g., papyrus, Miscanthus) in degraded areas.	2 years	Native species nursery beds	2,000,000
Establish and support at least one tree nursery as a business.	Identification of interested local entrepreneur to run a nursery bed through a transparent tendering process		Community meetings (2), 2 days allowances for joint committee (3 Municipal officials, 1 external resource person)	6,000,000
	Technical and financial support to successful entrepreneur			
Encourage and incentivise tree	Community training and sensitisation on tree planting and management.		Community trainings (3), transport and allowance for DLG official (3 days), allowance for Municipal official (3days)	5,500,000

growing at group and household level.	Provision of assorted seedlings		Assorted seedlings (100,000)	80,000,000
3) Enhancing businesses and livelihood support options for local communities around Nakalere Wetland.				
Regulate sand mining	Designating areas for sand mining		Community meeting (1)	3,000,000
	Registration of sand miners and organising them into groups		Community trainings (6) for sand miners	4,500,000
Enhance economic value of abandoned sand mines through fish farming.	Training of interested community members on fish farming		Community trainings (4)	6,500,000
	Provision of tools and materials for setting up the fishponds.		Fishing tools and materials (2)	18,000,000
Promote small-scale irrigation system	Trainings and provision of the materials on a co-funding basis		Community trainings (6), co-funding (3)	39,000,000
Initiate alternative income generating activities	Skilling and conditional start-up capital provided on revolving basis through groups.		Community trainings (20), startup capital (10 groups)	100,000,000
Support Eco Tourism	Put in place, Eco-tourism pilot projects.			
4) Enabling interventions.				
Awareness and sensitization on environment management	Community barazas (with educational music and videos).	2 years	1 per quarter	29,000,000
	Radio campaign (60 minutes talk show & associated spot messages).	3 years	Radio talk shows and associated spot messages (6 per year), allowances for the Municipal officials (2 per show)	32,000,000
	IEC materials (brochures, flyers, t-shirts, calendars, etc)	1 year	Procuring the materials (4000 units)	15,000,000
Community-based monitoring and supervision of implementation	Training the Local Environment Committee (LEC) on environment management, internal working procedures, conflict resolution, among others.	1 year	Community trainings (3), transport and allowance for DLG official (3 days), allowance for Municipal official (3 days)	4,250,000
	Provision of materials and tools to the LEC to use in performing their roles	2 years	Materials and tools	4,500,000
Nakalere wetland and riverbanks buffer demarcation	Community engagement meetings		Community meetings (6), allowance and transport for the Municipal officials (3 each 6 days).	
	Surveying and opening boundaries of Nakalere Wetland.	1 year	Hiring surveyors (2), working under the supervision of the Municipal/DLG land officer.	8,800,000
	Procurement and installation of concrete pillars jointly with the LEC and community members		Concrete pillars procurement and installation costs (200)	6,900,000

	Procurement and planting of assorted tree seedlings jointly with the LEC and community members.		Assorted seedlings (10,000)	
Wetland Protection	Construction of check dams and terraces	2 years		
Provision of conditional incentives through revolving funds.	Sensitisation meetings about the revolving funds		Community meetings (12), allowance and transport for Municipal officials (2 each 12 days).	18,000,000
	Provision of the funds		Funds (to 4 groups)	60,000,000
5) Enactment of byelaws	Developing the byelaws through a community-driven process.		Consultant (10 days), community meetings (3)	24,750,000
	Monitoring and enforcement of compliance			
Monitoring and evaluation;	Final evaluation using satellite imagery and community feedback, with a focus on long-term sustainability.	3-5 years	Quarterly monitoring visits	
TOTAL				

5.2. Monitoring and Evaluation Framework for Nakalere Wetland Conservation.

Effective monitoring and evaluation (M&E) are essential for tracking progress, ensuring accountability, and measuring the impact of interventions. The framework is built on a logical structure, with key performance indicators (KPIs) aligned to specific objectives.

1. Key Monitoring Indicators.

- Restored wetland area (measuring ecological recovery).
- Reduction in illegal activities (tracking enforcement effectiveness).
- Biodiversity counts (assessing species richness and ecosystem health).
- Community participation levels (evaluating stakeholder engagement).

2. Participatory Monitoring Approach.

The monitoring indicators, disaggregated by objectives, will compare performance against clearly set targets (Table 17). The general principles of participatory M&E will be adopted to ensure inclusivity and transparency.

3. Monitoring Groups and Responsibilities.

- Community User Groups – Oversee local wetland activities, supported by the Implementation Committee.
- Implementation Committee Members – Track activities, inputs, and output achievements, with support from Wakiso District Local Government.
- Relevant Institutions – Ministry of Water and Environment (Wetland Management Department) and NEMA will ensure compliance with environmental policies and standards.
- CSOs/CBOs – Evaluate overall performance and impact on biodiversity, community livelihoods, and environmental sustainability.

Optimized Reporting Mechanisms.

- **Quarterly Monitoring Reports:** Detailed documentation of implementation progress, challenges, and outcomes.
- **Stakeholder Review Forums:** Regular community meetings to ensure participatory feedback and adaptive improvements.
- **Annual Impact Assessments:** Comprehensive evaluations of environmental, socio-economic, and governance improvements.

Strengthening Stakeholder Engagement in M&E.

To ensure participatory monitoring, the following groups will be actively involved:

1. Community User Groups – Oversee local wetland activities, supported by the Implementation Committee.
2. Implementation Committee Members – Monitor input and output achievements, working with Wakiso District Local Government.
3. Government Institutions (MWE, NEMA) – Ensure compliance with policies and environmental standards.
4. CSOs/CBOs – Assess biodiversity impact and socio-economic outcomes of interventions.

Table 13: Monitoring and Evaluation Mechanism.

Objective	Output	Indicators (What to Monitor)	Means of Verification	Responsible Institutions
Restoring degraded sections of Nakalere Wetland	- Restored wetland - Increased wetland coverage providing essential services	- Hectares of wetland restored/naturally regenerating - No. of beneficiaries from wetland products - Length (km) of demarcated buffer boundary	- Field visits - Compliance monitoring reports - Standing boundary pillars - Accountability reports	Monitoring Committee, Kira MC
Increasing stakeholder awareness on sustainable wetland management	- Improved appreciation of wetland value - Reduced encroachment	- No. of sensitization meetings held - No. of people penalized for wetland destruction	- Knowledge, Attitude, and Practice (KAP) Survey - Community interviews - Behavioural observations	Municipal Council, Local Leaders
Strengthening wetland governance and institutional capacity	- Functional committees established - Trained environment focal persons at Municipal level	- No. of environment committees formed and trained - No. of joint enforcement inspections conducted	- Official records - Quarterly progress reports - Observation of committee operations	Municipal Committee, Ministry of Water & Environment (MWE)
Improving livelihoods through alternative Income-Generating Activities (IGAs)	- Livelihood projects funded and operational - Adoption of sustainable enterprises	- No. of funded IGAs - No. of fish ponds, hatcheries, irrigation farms established - Household income changes	- Economic surveys - Community feedback sessions - Project reports	Municipal Production & Marketing Department, NGOs, CSOs

CHAPTER SIX

6.0. STAKEHOLDER CONSULTATIONS AND DISCLOSURE.

6.1. Stakeholder Identification.

Stakeholder engagement is a systematic process aimed at understanding and involving stakeholders in project activities and decision-making. It ensures that public consultation and information disclosure remain continuous throughout the conservation process.

Overall Aim of Stakeholder Engagement is to:

- Inform stakeholders about the Environmental Action Plan (EAP) for Nakalere Wetland.
- Identify stakeholder concerns and incorporate mitigation measures based on their input.
- Strengthen ownership of the Action Plan among stakeholders and the community.

Specific Objectives for stakeholder engagement included;

1. Raise Awareness – Inform relevant stakeholders about the EAP of Nakalere Wetland.
2. Gather Insights – Obtain stakeholder views and concerns to determine the most suitable implementation approaches.
3. Enhance Ownership – Foster stakeholder and community involvement to ensure long-term commitment to the Action Plan.

Table 14: Roles and Responsibilities of Key Stakeholders identified.

Stakeholders	Roles
Community	▪ Abiding by Established By-laws: Adhering to the rules and regulations set by the Management Committee to maintain environmental integrity. ▪ Implementation of Conservation Policies: Supporting the enforcement of wetland protection measures to prevent degradation and promote sustainability. ▪ Engaging in Alternative Income-Generating Activities: Exploring eco-friendly economic opportunities such as beekeeping, fish farming, and sustainable agriculture to reduce pressure on wetland resources. ▪ Sensitization of Fellow Community Members: Raising awareness about the importance of wetland conservation through peer education, community meetings, and outreach programs. ▪ Reporting Wetland Abuses: Actively monitoring and reporting illegal activities to the Management Committee to ensure accountability and compliance.
Local leaders (LC1-Chairpersons)	▪ Acting as Role Models: Leading by example to inspire responsible environmental stewardship and community cooperation. ▪ Mobilization Efforts: Encouraging active participation in conservation initiatives and fostering collective action. ▪ Monitoring the Management Committee: Ensuring accountability and transparency in the implementation of wetland conservation efforts. ▪ Resolution and Dispute Handling: Facilitating conflict resolution mechanisms to address concerns and maintain harmonious community relations. ▪ Sensitization and Awareness Campaigns: Educating community members on wetland protection, sustainable practices, and environmental laws. ▪ Linking Communities to Development Partners: Establishing partnerships with NGOs, government agencies, and private sector players to secure resources and technical support.
Government (Central and Local Gov't)	Development and Dissemination of Resource Guidelines; • Creating clear, accessible guidelines for wetland protection, sustainable land use, and environmental best practices.

	- Ensuring wide distribution among local communities, institutions, and policymakers. Registration of User Group Associations; - Formalizing community-based environmental groups to strengthen collective action and advocacy. - Establishing legal recognition for resource user associations to enhance participation in conservation efforts. Universal Application of Environmental Laws; - Ensuring strict enforcement of wetland protection regulations across all sectors. - Strengthening compliance monitoring through government agencies and local committees.
CSOs	Resource Mobilization and Proposal Writing; - Training community groups in fundraising strategies and grant proposal writing to secure financial support. - Leveraging local and international funding opportunities for wetland conservation projects. Lobbying and Advocacy; - Engaging government agencies, NGOs, and private sector players to influence policy decisions. - Promoting community-led advocacy campaigns for stronger environmental protections. Building Community Capacity; - Conducting training programs on wetland management, sustainable agriculture, and conservation techniques. - Strengthening local leadership structures to enhance community-driven environmental governance. Acting as Environmental Watchdogs; - Establishing monitoring committees to track illegal activities and report violations. - Encouraging community participation in environmental oversight and protection efforts.

Stakeholders were identified through review of relevant national policies, legislation and through consultations with guidance from the Municipal Council. The stakeholder concerns and comments are summarized in *Table 14 below*.

Table 15: Summary of Concerns and Comments of Stakeholders.

Desired Future for Nakalere Wetland in 5years (2025-2030)
To enhance the sustainability and resilience of the Nakalere Wetland and Riverbanks, the following strategic interventions are proposed: ▪ Boundary Demarcation and Protection ○ Installing pillars along the wetland to clearly delineate boundaries for public awareness. ○ Demarcating riverbanks and wetland protection zones to prevent encroachment. ▪ Vegetation and Soil Conservation Measures ○ Maintaining woodlots along the wetland and riverbanks. ○ Tree planting at household level to enhance biodiversity. ○ Implementing soil and water conservation techniques such as cover cropping, grass strips, and stone lines to prevent erosion, flooding, and siltation. ▪ Community Engagement and Sensitization ○ Conducting continuous mobilization and mindset change programs to encourage sustainable practices. ▪ Sustainable Land Use and Economic Activities ○ Designating areas for brick making with appropriate environmental management measures. ○ Developing eco-tourism zones along the riverbanks and wetland. ○ Ensuring proper urban land use planning to regulate activities and prevent environmental degradation. ▪ Waste Management and Tree Nursery Support

- Designating waste dumpsites and improving waste management at household and community levels.
- Supporting existing tree nursery operators to increase seedling production.
- Establishing additional tree nurseries to provide reliable seedlings for afforestation efforts.
- **Regulation of Agricultural Activities**
 - Ensuring agricultural activities are carried out only on the margins to minimize environmental impact.
- **River Restoration and Water Flow Management**
 - Dredging and decongesting the silted river base to restore natural water flow.
 - Reopening blocked water channels along the old bridge in Nakasajja to improve hydrological balance.

6.2. Conclusion.

The Environmental Action Plan (EAP) serves as a comprehensive roadmap for restoring Nakalere Wetland as both a functional ecosystem and a socio-economic asset. This plan integrates:

- ✓ Ecological Restoration – Bringing back vital wetland functions to support biodiversity and regulate natural processes.
- ✓ Community Empowerment – Engaging local populations in sustainable livelihoods and conservation activities.
- ✓ Policy & Enforcement – Strengthening governance through strict adherence to Uganda’s environmental laws.

Key Success Factors.

- Collaboration Across Sectors – Effective implementation depends on coordinated efforts between government, local communities, NGOs, and private sector players.
- Long-Term Commitment – Continuous engagement through monitoring, enforcement, and adaptive management ensures sustainability.
- Multi-Stakeholder Participation – Encouraging ownership at all levels guarantees lasting environmental protection.

Appendices

Appendix 1: References.

- 1) Kira Municipal Physical Development Plan (2019-2040).
- 2) NEMA Wetland Management Guidelines.
- 3) National Environment Action Plan (NEAP)
- 4) Uganda National Environment Act (2019).
- 5) Wetlands and Riverbanks Restoration and Sustainable Management Action Plan for Kasese Municipality 2023-2028.

Appendices

Appendix 1: Data Collection Checklist

Field Objectives

- 1) Assess the current ecological state of Nakalere Wetland and riverbanks.
- 2) Identify human activities driving encroachment and pollution.
- 3) Document climate change impacts (flooding, drought) on the wetland.
- 4) Evaluate community awareness and engagement in conservation.
- 5) Gather stakeholder recommendations for the Environmental Action Plan (EAP).

Nakalere Wetland Observation Guide

Purpose: Record visible evidence of encroachment, pollution, ecological health, and climate impacts.

A. General Site Characteristics

- 1) GPS COORDINATES: Record location points for hotspots (encroachment, pollution, erosion). Lat _____ Long _____ Village Name _____
- 2) DATE/TIME: _____
- 3) WEATHER CONDITIONS: Sunny ☐ Rainy ☐ Dry ☐ Flooded ☐
- 4) WETLAND BOUNDARIES:
 - Are boundaries marked (e.g., fences, signs)? Yes/No.
 - Note natural markers (e.g., vegetation changes, water edges).

B. Physical and Ecological Observations

1) WATER SYSTEMS

Water Presence:

- Is the wetland/river dry, seasonal, or perennial?
- Water color (clear ☐ muddy ☐ oily ☐ green-algae ☐.

Flow Patterns:

- Stagnant pools ☐ | Slow-moving ☐ | Fast-flowing ☐.
- Blockages (e.g., trash, vegetation dams).

2) VEGETATION

Dominant Plant Species:

- Native species (e.g., papyrus, reeds): Estimate coverage (%).
- Invasive species (e.g., water hyacinth, eucalyptus): Document extent.

Signs of Disturbance:

- Cleared vegetation ☐ | Burnt areas ☐ | Grazing ☐.

3) WILDLIFE

Biodiversity Indicators:

- Birds (species/types observed: _____).
- Fish (dead/alive, visible in water: Yes/No).
- Amphibians/reptiles (e.g., frogs, snakes).

4) SOIL AND EROSION

Bank Stability:

- Exposed roots ☐ | Collapsed sections ☐ | Gulley erosion ☐.

Sediment Deposition:

- Silt build-up in water ☐ | Sand mining pits ☐.

C. Human Activity Indicators

1) ENCROACHMENT

Structures:

- Temporary huts ☐ | Permanent houses ☐ | Farm sheds ☐.

- Distance from wetland edge: ____ meters.

Farming:

- Crops observed (e.g., rice, maize): _____.
- Irrigation methods (e.g., pumps, canals).

Sand Mining:

- Active excavation sites ☐ | Abandoned pits ☐ | Trucks/tools present ☐.

2) POLLUTION

Waste Types:

- Plastic ☐ | Household trash ☐ | Medical waste ☐ | Agricultural waste ☐.
- Estimate quantity (scattered ☐ | heaps ☐ | widespread ☐.

Water Contamination:

- Foam/scum ☐ | Oil sheen ☐ | Foul odor ☐ | Dead fish ☐.

Industrial Activity:

- Pipes discharging into wetland ☐ | Chemical containers ☐.

C. Infrastructure

- Drainage systems ☐ | Bridges ☐ | Roads cutting through wetland ☐.
- Condition: Well-maintained ☐ | Damaged ☐ | Blocked ☐.

D. Climate Change Impacts

1) FLOODING EVIDENCE:

- Debris lines on trees/buildings ☐ | Waterlogged crops ☐ | Erosion scars ☐.

2) DROUGHT EVIDENCE:

- Cracked soil ☐ | Shrinking water channels ☐ | Dry wells ☐.

3) VEGETATION STRESS:

- Wilting plants ☐ | Dead trees ☐ | Invasive species takeover ☐.

E. Community Interactions

1) ACTIVITY LOG:

- Time: Morning ☐ | Afternoon ☐ | Evening ☐.
- People observed: Fishing ☐ | Farming ☐ | Fetching water ☐ | Dumping waste ☐.

2) LIVESTOCK:

- Grazing cattle/goats ☐ | Number observed: ____.

3) CULTURAL/RELIGIOUS USE:

- Ritual sites ☐ | Medicinal plant harvesting ☐.

F. Immediate Risks

1) SAFETY HAZARDS:

- Open waste pits ☐ | Unstable riverbanks ☐ | Polluted water contact ☐.

2) CONFLICT SIGNS:

- Warning signs ☐ | Damaged property ☐ | Restricted access barriers ☐.

Field Questionnaire (For community members, farmers, and businesses)

A. Demographic Information

- 1) Location: Nearest village/zone to wetland: _____
- 2) Do you live within 1 km of the wetland? Yes/No
- 3) Household size: ____ Dependents under 18: ____

B. Environmental Observations

WETLAND HEALTH:

- 1) Have you observed changes in water quality (e.g., color, smell)? Yes/No.
Describe: _____

- 2) Are there fewer fish/frogs/birds than before? Yes/No. Specify species lost: _____

FLOODING/DROUGHT:

- 1) In the past 2 years, how many times has flooding affected your home/land? _____
2) During droughts, where do you fetch water? _____

C. Human Activities

PERSONAL INVOLVEMENT:

- 1) Do you or your family engage in wetland activities? Farming ☐ Fishing ☐ Sand mining
2) If yes, for how many years? _____

ECONOMIC DRIVERS:

- 1) What percentage of your income comes from the wetland? <20% ☐ 20–50% ☐ >50%
☐
2) If farming, do you use wetland water for irrigation? Yes/No

D. Pollution

WASTE DISPOSAL:

- 1) Where do you dispose of plastic waste? Wetland ☐ Pit latrine ☐ Burn ☐ Other: _____
2) How do you manage human waste at household level?
3) Do you separate biodegradable/non-biodegradable waste? Yes/No

HEALTH IMPACTS:

- 1) Has anyone in your household fallen sick from contaminated water in the past year?
Yes/No
2) If yes, what illnesses? Diarrhea ☐ Skin rash ☐ Typhoid ☐

E. Climate Change

PERCEPTIONS:

- 1) Do you believe climate change is affecting the wetland? Yes/No/Unsure
2) Rank these climate impacts by severity (1=Low, 5=High):
Erratic rainfall ☐☐☐☐☐
Heatwaves ☐☐☐☐☐
Strong winds ☐☐☐☐☐

F. Awareness & Participation

KNOWLEDGE:

- 1) Are you aware of the Nakalere Wetland's role in preventing floods? Yes/No
2) Have you attended any environmental training? Yes/No. If yes, by whom? _____

WILLINGNESS TO ENGAGE:

- 1) Would you volunteer time to protect the wetland if provided tools? Yes/No
2) Should encroachers be relocated? Yes/No. If yes, where? _____

G. Recommendations

PRIORITY ACTIONS:

- 1) Rank these solutions (1-Most urgent, 2-urgent, 4-Least Urgent):
▪ Arrest illegal sand miners
▪ Build community waste collection points
▪ Plant native trees along riverbanks
▪ Train farmers on organic practices

Interview Guide (For community leaders, local officials, environmental experts, and NGOs)

A. General Observations

CURRENT STATE OF THE WETLAND

- 1) Describe the current water levels, vegetation cover, and wildlife diversity in Nakalere Wetland.
2) Are there visible signs of degradation (e.g., invasive species, soil erosion, drying streams)?

3) *How does the wetland's condition today compare to 10–15 years ago?*

COMMUNITY DEPENDENCY:

- 1) *What resources do community members extract from the wetland (e.g., water, fish, medicinal plants, clay)?*
- 2) *How many households rely directly on the wetland for livelihoods?*

SEASONAL CHANGES:

- 1) *How do wet and dry seasons affect the wetland's health and usability?*
- 2) *Are there seasonal shifts in human activities (e.g., farming cycles, water collection)?*

B. Human Activities and Encroachment

ENCROACHMENT DRIVERS:

- 1) *Which specific areas of the wetland are most encroached? Map hotspots if possible.*
- 2) *What socioeconomic factors push people to encroachment (e.g., population growth, lack of land titles, poverty)?*
- 3) *Are there conflicts between encroachers and conservation efforts? Describe.*

HUMAN ACTIVITY-SPECIFIC DETAILS:

- 1) *Farming: What crops are grown? Are fertilizers/pesticides used? How large are the plots?*
- 2) *Sand Mining: Who owns/operates sand mining sites? How is sand transported?*
- 3) *Settlements: Are structures temporary or permanent? Do they have permits?*

LAW ENFORCEMENT:

- 1) *Which institutions are responsible for enforcing wetland protection laws?*
- 2) *What penalties exist for encroachment? Are they applied consistently?*
- 3) *Are local leaders complicit in illegal activities?*

C. Pollution

POLLUTION SOURCES:

- 1) *Domestic Waste: Where do households dispose of plastics, sewage, and wastewater?*
- 2) *Industrial Waste: Are there nearby factories or workshops discharging chemicals?*
- 3) *Agricultural Runoff: Do fertilizers/pesticides from farms enter the wetland?*

IMPACTS:

- 1) *Are there reports of waterborne diseases (e.g., cholera, dysentery) linked to pollution?*
- 2) *Have fish populations or bird species declined due to contaminated water?*

WASTE MANAGEMENT:

- 1) *Are there waste collection services? If not, why?*
- 2) *Do community clean-up initiatives exist? How often?*

D. Climate Change Impacts

FLOODING:

- 1) *How frequently do floods occur? Which areas are worst affected?*
- 2) *Do floods destroy crops/homes? How do communities recover?*
- 3) *Are there early warning systems in place?*

DROUGHT:

- 1) *How long do dry spells last? Has groundwater availability decreased?*
- 2) *Do droughts lead to conflicts over water access?*

ADAPTATION STRATEGIES:

- 1) *What traditional practices help communities cope with floods/droughts?*
- 2) *Are climate-resilient crops or water-saving technologies promoted?*

E. Community Awareness & Engagement

KNOWLEDGE GAPS:

- 1) *What misconceptions do people have about wetland benefits (e.g., flood control, carbon storage)?*
- 2) *Are women/youth included in conservation discussions?*

EXISTING INITIATIVES:

- 1) *Which NGOs or projects have worked here? What succeeded/failed?*
- 2) *Are there community bylaws or taboos protecting the wetland?*

BARRIERS TO PARTICIPATION:

- 1) *Why might some groups resist conservation efforts (e.g., loss of income, distrust of authorities)?*
- 2) *Is there compensation for those asked to leave encroached areas?*

F. Recommendations

IMMEDIATE ACTIONS:

- 1) *Should law enforcement be strengthened, or is community sensitization more urgent?*
- 2) *What infrastructure is needed (e.g., waste bins, gabions for erosion control)?*

LONG-TERM SOLUTIONS:

- 1) *Could alternative livelihoods (e.g., eco-tourism, beekeeping) reduce dependency on the wetland?*
- 2) *How can climate-smart practices be integrated into local farming/fishing?*