

SCOPING AND SCENERIOS OPTIONS REPORT

UGANDA TEEB AGRIFOOD STUDY FOR MABAMBA BAY WETLANDS

Scenario Analysis Based on the TEEB AgriFood Evaluation Framework of Policies for Urban and Peri-Urban Agriculture and Wetland Restoration for the Mabamba Bay Wetland System, Uganda.



Submitted to;
UNEP TEEB

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1.0 INTRODUCTION

Urban and Peri-Urban Agriculture (UPA) has costs and benefits. The benefits include food supply, employment among other benefits along the multiple value chains. The costs include investment in agricultural production and externalities such as land degradation, pollution, greenhouse gas emissions, habitats and biodiversity loss. Thus, need for holistic appraisal of agriculture sector to amplify its benefits and reduce costs for economic growth, biodiversity and ecosystems conservation and improved human well-being. The overall objective of this study is to further the implementation of TEEBAgriFood in Uganda by **conducting scenario analysis based on the TEEB AgriFood Evaluation Framework of policies for urban and peri-urban agriculture, and wetland restoration, for the Mabamba Bay Wetland System, Uganda**. The specific expectation for this study includes the following undertakings.

- a) Collect spatially explicit data the extent on ecosystems, and on the provision of value of ecosystem services in the Mabamba Bay Wetland System, Uganda such as crop provisioning, water retention, soil retention, flood mitigation, biodiversity conservation, and carbon sequestration. It should be tested which models and methods give accurate, spatially explicit, physical and monetary quantification of these services. Models included in InVEST modules as well as more service-specific models (such as SWAT for hydrological modeling) should be considered.
- b) Describe the current functioning of urban and peri-urban agriculture and its impact on the Mabamba Bay Wetland System. Review the types, causes, location and extent of threats to ecosystem services in the study area, and the potential mechanisms for addressing these. Based on this and the guidance from UNEP-TEEB and UNEP-WCMC define clear policy question(s) and design an appropriate number of scenarios for analysis. Scenarios must include at least three plausible and realistic alternative management and policy options vis a vis business as usual;
- c) Undertake a scenario-based assessment to demonstrate the implications of various policy choices for the supply and value of ecosystem services in the study area;
- d) Prepare a report document the data sources, methodology, data quality, compilation process, findings, including policy implications and recommendations; Discuss in this report the implications of the scenarios for relevant ecosystem services and the socio-economic implications, including links to social and human capital;
- e) Participate in stakeholder consultation meetings to discuss and refine the scenarios to ensure policy relevance of the results.
- f) Present results at a final project dissemination event organized by UNEP-TEEB.

The following deliverables are earmarked for this study;

Number	Deliverable
Deliverable 1	Report on scope finalization of the assessment and scenario development options, including qualitative description of agriculture systems and policy priorities pertaining to urban and peri-urban agriculture and wetland restoration and links to the scenarios to be modelled. This scoping report should identify environmental variables and causal relations, including the ecosystem services to be modelled, other drivers of change, data sources, and proposed modelling techniques.
Deliverable 2	Draft integrated scenario modelling and valuation results. Preliminary finding from the spatial and biophysical scenario analysis, valuation of ecosystem services, comparison of human, social, manufactured, and natural capital stocks and magnitude and distribution of ecosystem services and residuals, for scenarios modelled versus business as usual.
Deliverable 3	Short summary of discussions held with Ugandan policy stakeholders and linkages to relevant policy.
Deliverable 4	Final integrated modeling and valuation results, including a roadmap of concrete steps to implement policy change, and presentation of the same at final project workshop

2.0 STUDY AREA AND SITUATIONAL ANALYSIS

The Mabamba Wetland is located in central Uganda covering both Wakiso (Kasanje Sub-County) and Mpigi (Kamengo Sub-County and Mpigi Town Council) Districts (**see figure I**). The wetland is dominated by papyrus and fringes Lake Victoria, the second largest freshwater lake in the World. Mabamba is being directly and indirectly impacted by increasingly growing urban and peri-urban settlements such as Wakiso Town, Mpigi Town, Kampala City and Entebbe Municipality.

The Mabamba wetlands area experiences two rainy season; long rainy season being April to May, and short rainy season being October to November. The mean annual rainfall is 1400 mm and average temperature is 22 C. However, climate change is experienced in this area and manifests itself through seasonal variability and extreme weather events such as floods and drought or prolonged dry periods. These impacts heavily on prevalent small-holder farming and linked food security.

The wetland is rich and diverse in biodiversity as epitomized by designation as a wetland of international importance, a Ramsar site under the Ramsar convention, an important bird area and a key freshwater biodiversity area. The Mabamba wetland landscape includes papyrus wetlands, peatlands, open water, islands, forests, settlements, plantations, agriculture and urban and peri-urban areas.

Mabamba wetlands hosts diverse flora and fauna and these include wetlands endemic specialist and generalist birds including the iconic Shoebill, Blue Swallow and Yellow Warbler. Other wild animals include semi-aquatic Sitatunga. Human-wildlife interactions are common in this wetlands landscape through crop raiding and human attacks and problematic animals include hippopotamus, Vervet Monkey, Sitatunga, Guinea fowl, Snakes and Bushbucks. The flora biodiversity includes papyrus and associated forest landscapes such as Nkima Forests and Kalangalo Forest Reserve. The water hyacinth is the dominant invasive species whose vibrancy and proliferation are nourished by eutrophication of wetlands and Lake Victoria.

The wetlands and associated landscapes are under environmental degradation driven by population increase, urbanization and climate change. The increasing value of land in Kampala and Entebbe area is driving migration and settlement towards the peri-urban and rural areas of Mabamba wetlands Districts. The causal factors or threats include deforestation, wetlands encroachment, wetlands reclamation and conversion, charcoal burning, brick-making, sand mining, poor agricultural activities. These have resulted in the loss of ecosystem services and exacerbated food insecurity.

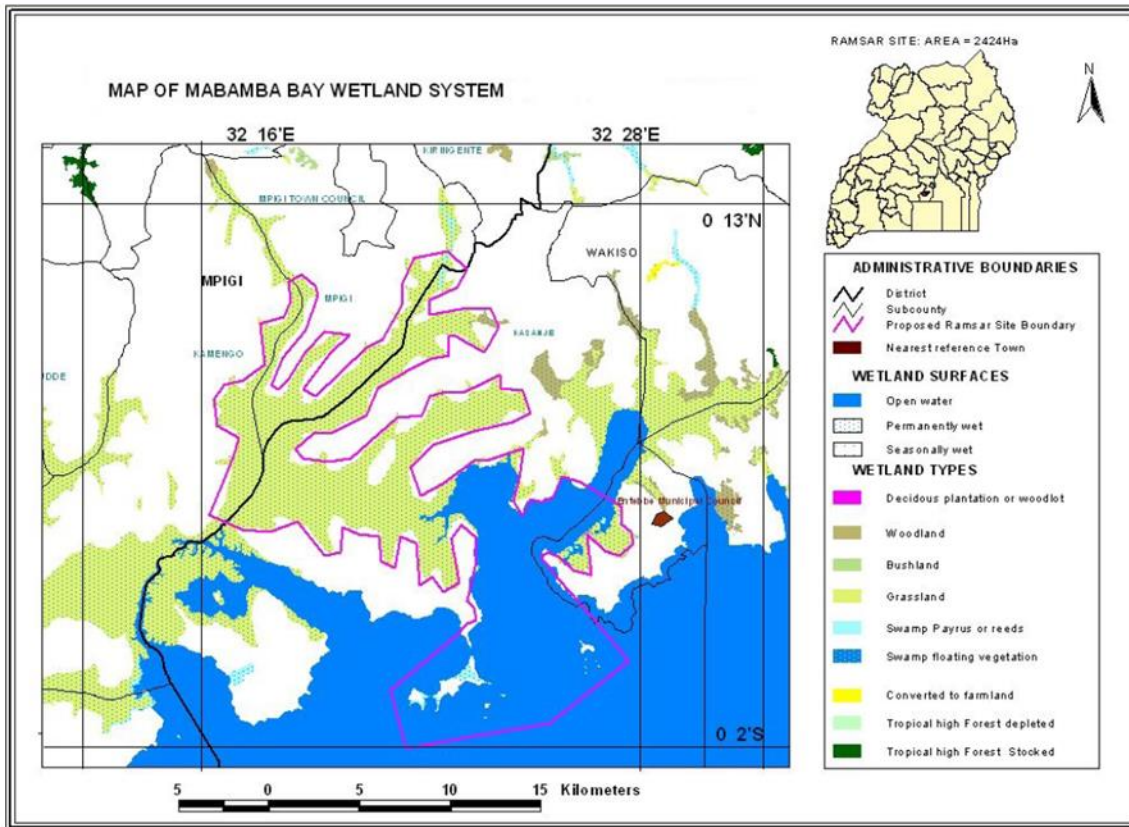


Figure I: Map of Mabamba Wetlands System and Administrative Jurisdictions (Source; Nature Uganda, 2014)

2.1 Mabamba Wetlands Ecosystem Services and Socio-Economics

The Mabamba wetlands ecosystem is premium in terms of biodiversity and ecosystem services. This imperative is well captured in its criteria that resulted into it being designated Ramsar site;

- Criterion 2: Mabamba Bay supports vulnerable, endangered, or threatened bird species
- Criterion 4: Mabamba Bay Wetland System acts as a refuge for several bird and fish species
- Criterion 5: Mabamba Bay Wetland System regularly supports 20,000 or more waterbirds.
- Criterion 6: Mabamba Bay Wetland System regularly supports 1% of the individuals in a population of one species of waterbirds.

The Mabamba wetlands landscape is associated with multiple ecosystem services and goods. These includes water supply, carbon sequestration, micro-climate amelioration, pollination services, flood mitigation, drought buffering, siltation trapping, tourism among others. These ecosystem services support multiple livelihoods and overall local economy.

These ecosystem services are at the heart of socio-economic activity of the inhabitants and associated with livelihoods such as fishing, pond and cage aquaculture, small-holder farming, livestock husbandry, flower farming, craft-making, tourism and hunting. The following ecosystem services are derived from Mabamba Wetlands landscape based on our preliminary assessment:

No	Category	Ecosystem Services	Stakeholders
1.	Provisioning	Water supply (domestic, livestock, irrigation)	Local community
		Fishing/capture fisheries	Local community
		Wild meat/Hunting	Local community
		Medicinal plants	Local community
		Papyrus	Local community
		Pasture/Fodder	Local community
		Fuel wood/Biomass	Local community
		Crops/Horticulture/Floriculture/Yams, Sugarcane	Local community
		Livestock (chicken, pigs, goats, cattle, sheep, Bees/Honey)	Local community
		Fish farming/Aquaculture (pond and cage)	Local community
		Sand mining	Local community
		Brick making	Local community
		2.	Regulation
Water purification	Local and Regional community		
Flood regulation	Local community		
Pollination	Local community		
Erosion regulation	Local community		
Aquifers recharge	Local community		
3.	Supporting	Carbon storage/sequestration	Local, Regional and Global community
		Soil formation/fertility; sediments and soil traps/deposits	Local community
		Nutrients Retention	Local community
		Breeding and Nursery Grounds	Local and Regional Community
4.	Cultural	Tourism/Birdwatching	Local, Regional and Global community
		Boat transport	Local community

	Research and Education	Local, Regional and Global community
	Habitat and Biodiversity	Local, Regional and Global community
	Cultural sites	Local Community

The area being close to the major urban centres of Kampala, Entebbe, Wakiso and Mpigi supports a thriving urban and peri urban agricultural system. The key agricultural enterprises in the area include crop farming, livestock rearing, horticulture, apiculture, aquaculture and floriculture. Most households are engaged in both crop and livestock production (36%), piggery and poultry (24%), and maize production (14%). The major crops grown include yams (arrow roots), bananas (plantain), cassava, maize, common beans, sweet potatoes, ginger, ground nuts and green leafy vegetables and fruits (MAAIF and UBoS, 2019). The above mentioned urban and peri urban farming activities are practiced in diverse locations including home compounds, along roadsides, in undeveloped plots, in wetlands/swamps, under power lines and on waste dumpsites. The above-mentioned locations differ with respect to access to natural capital assets, specifically the amount of land available for farming and access to water, which factors dictate farmer plot sizes, type of crops or livestock and gardening techniques.

This scoping appraisal noted that higher food transport costs, restricted movement due to COVID and high food prices increased the role of urban and peri urban agriculture in the food supply options of many households within and close to the wetland system. However, urban pressure and wetland encroachment presented constraints to urban and peri urban agriculture in the area. Currently, limited access to land ranks among the most critical challenges to urban and peri urban agriculture in the area with farmers competing for available land with urban type developments such as housing, brick making and recreational facilities which give higher returns on investment than farming. Farmers are also wary of government evictions in the name of wetland demarcation and restoration.

2.2 National and Sub-National Policy Context and Priorities

The National Development Plan III (2020/21 – 2024/25) provides the overall national economic policy framework for Uganda. The vision of the plan is a transformed Ugandan society from a peasant to a modern and prosperous country within 30 years. The goal of the plan is increased household incomes and improved quality of life of Ugandans while the theme is sustainable industrialisation for inclusive growth, employment and wealth creation. The National Development Plan's area-based commodity planning approach clusters Uganda into nine agro-ecological zones with preferred agricultural commodity mixes and prescribed support to maximise value addition for the selected commodities. Mabamba Bay Wetland System is located in the Lake Victoria Crescent agro-ecological zone which is

prescribed for banana growing, horticulture, robusta coffee, poultry/piggery and aquaculture development and prioritisation. The area is also identified for nature based eco-tourism focusing on bird watching especially of the rare Shoebill (*Balaeniceps rex*) and the threatened Blue Swallow (*Hirundo atracaerulea*), the Papyrus Gonolek (*Laniaruis mufumbira*) and the Papyrus Yellow Warbler (*Chloropeta gracilirostris*).

The National Development Plan is operationalized through District Development Plans at the sub national level. The vision of the current District Development Plans for Wakiso District and Mpigi Districts is a transformed society from a peasant to modern and prosperous districts. Its theme and mission is competitiveness for sustainable wealth creation, employment and development. The DDPs emphasized tourism and commercialisation of agriculture, increased production, agro-processing and marketing and value addition in line with the National Development Plan's programming for agriculture and agro-industrialisation.

The National Development Plan is cognisant of the challenges of agricultural intensification including encroachment of wetlands and natural forests, loss of biodiversity including agricultural biodiversity, soil erosion and sedimentation of river and lake systems and pollution. The plan therefore emphasized the role of sector agencies responsible for environmental management, agricultural extension education, wetland management, forest conservation and their respective policy instruments and relevant regulatory frameworks. The plan highlights the following cross-cutting roles;

The National Environmental Management Authority is responsible for the National Environment Management Policy (2017) and sets the overall goal, objectives and key principles for environmental management in Uganda. The policy provides a basis for the harmonization of sectoral and cross-sectoral policies and provides a multi-sectoral approach to resource planning and management, a comprehensive legal framework, and the development of a new sustainable conservation culture. The overall policy goal is to achieve sustainable social and economic development which maintains or enhances environmental quality and resource productivity on a long-term basis that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The policy sets cross-sector policy objectives, guiding principles, strategies and key initial actions needed for the management of biological diversity, access to genetic resources, water resources, wetlands, land use, natural heritage site, pollution and waste management and regulates the use of urban and peri urban spaces especially wetlands for livestock rearing, agriculture and aquaculture.

The National Environment Management Authority developed Uganda's second national biodiversity strategy and action plan (NBSAP II 2015-2025) in 2014. The second NBSAP was based on the theme of "Supporting Transition to a Middle-Income Status and Delivery of the Sustainable Development Goals" and was guided by the goal "to enhance biodiversity

conservation, management and sustainable utilization and fair sharing of its benefits by 2025". The planned actions in the NBSAP contribute to achieving the goals of "Uganda Vision 2040", the National Development Plan, the 2030 Agenda for Sustainable Development, the Strategic Plan for the Cartagena Protocol on Biosafety and the CBD Gender Plan of Action. The implementation of the NBSAP II is harmonized with the implementation of the two sister Rio Conventions and other multilateral environmental agreements and has also benefited from a CBD Secretariat led Voluntary Peer Review mechanism/methodology that assesses and reviews the level of implementation of NBSAPs, examines country commitments to biodiversity conservation, builds national capacity in NBSAP Voluntary Peer Reviewing (VPR) and shares experiences and lessons learnt from other countries.

The Directorate of Agricultural Extension Services is responsible for the National Agricultural Extension Policy 2016. The purpose of the National Agriculture Extension Policy 2016 is to transform agricultural extension from a system of parallel institutionally fragmented public and non-state actors to well coordinated, harmonised, regulated pluralistic services with multiple providers addressing diverse needs. The second dimension of the new policy direction is to address the extension needs along the entire value chain to achieve synergistic integration with other agricultural support services for optimum returns on investment.

The National Agriculture Extension Policy 2016 is operationalized by the National Agricultural Extension Strategy. The strategy itself is designed to achieve high level national policy objectives including the Comprehensive National Development Policy Framework 2009, the National Development Plan as well as the continental Comprehensive African Agricultural Development Program (CAADP) and the UN Sustainable Development Goals.

Both the National Agriculture Policy and the National Agriculture Extension Policy identify urban and peri urban agriculture as practices that may increase agricultural productivity in the face of a changing climate. Both policies cross reference other relevant policies to ensure that agricultural expansion and productivity including urban and peri urban agriculture does not jeopardise Uganda's ecosystems and exacerbate climate change. The green growth aspirations in the agriculture sector are further strengthened by the National Organic Agriculture Policy (2019). The policy aims to promote and propagate a competitive and sustainable organic agriculture sub-sector that contributes to better farm incomes and sustainable livelihoods benefiting from increased farm productivity with limited use of external farm inputs.

The Directorate of Fisheries Resources Management is responsible for the National Fisheries and Aquaculture Policy 2018. The National Fisheries and Aquaculture Policy 2018 replaced the National Fisheries Policy of 2004 that previously guided the management and development of the fisheries sector in Uganda. The rationale for the new policy derives from the Uganda Vision 2040, the National Development Plan II and the UN Sustainable

Development Goals 2 and 14 which aim to end hunger, achieve food security, improve nutrition and promote sustainable agriculture as well as increasing the economic benefits to least developed countries from the sustainable management of fisheries respectively. The new policy also addresses some aspects of the Comprehensive National Development Policy Framework 2009 that ushered in the Vision 2040 and the National Development Planning dispensation which the old policy did not address.

The vision of the National Fisheries and aquaculture Policy 2018 is a modern, productive, profitable and sustainable fisheries and aquaculture sub-sector. The mission is to transform the fisheries and aquaculture sub-sector into a highly productive sub-sector through improved governance and use of appropriate technologies for sustainable development. The policy goal is to increase fisheries and aquaculture production including through urban and peri urban aquaculture systems to 1.7 million tonnes of fish output annually so as to contribute to food security, nutrition and economic growth.

3.0 STUDY APPROACH AND METHODOLOGY

Our study approach will be anchored on The TEEBAgriFood Evaluation Framework that provides a comprehensive and universal approach to capture all positive and negative impacts and externalities across the entire agri-food value chain in Mabamba wetlands landscape, therefore unpacking the hidden costs and benefits of agriculture and food systems. The framework can be used to test interventions that have already been applied or are proposed stimulate positive livelihood and biodiversity benefits, and specifically whether they produce any hidden or unaccounted for outcomes on natural, human, social and manmade (produced) capitals. The TEEBAgriFood Evaluation Framework is critical for evaluation of food systems and their complex linkages to the environment, society and human health. The study approach will employ the following methods;

Stakeholder mapping and analysis for identification of interest and multiple and plural benefits being accrued from the Mabamba wetlands landscape. **Land-use and cover mapping** for habitat types classification (**typology generation**) and **spatial analysis** of ecosystem services critical for urban and peri-urban agriculture and wetlands ecosystem integrity. **Mapping of ecosystem services and valuation** following total economic valuation approach in the Mabamba wetlands landscape in relation to urban and peri-urban agriculture and wetlands ecosystem integrity. **Identification and mapping of urban and peri-urban agriculture value chains** and linkage with Mabamba wetlands landscape ecosystem services. **Literature review and stakeholder consultations** for Mabamba wetlands landscape visioning and development options conceptualization. This will ultimately result into **scenario options and analysis** of selected development pathways for informing and influencing prevailing policies, strategies, plans and practices for sustainability.

Our scenarios; Business As Usual, Grey Scenario, Green Scenario and Green-Grey Scenario will be analyzed based on the undermentioned six categories of measures and used to quantify and value benefits and costs to surrounding communities and the value chain impacts.

1. **Natural capital stocks.** Most natural capital stocks can be evaluated using a spatial unit, such as land cover or number of species per a given unit area. For assessment of green food production this will include the extent and location of green food production and distinguishing biophysical characteristics of alternative production methods. Spatial natural capital measurements will include:
 - i. Vegetation type
 - ii. Habitat (including connectivity)
 - iii. Biodiversity soil type and soil structure

- iv. Water resources (groundwater, surface water, and rainfall)
 - v. Stored carbon (biomass and soil)
- 2. **Ecosystem Service Flows.** Ecologist specialists shall summarize how changes in natural capital result in changes to ecosystem service flows. Conversely, the absence of natural capital can cause ecosystem dis-services - harms generated from changes to the ecosystem, such as risk for flooding or erosion. **Ecosystem services flows to be assessed will include (as a minimum):**
 - i. Soil fertility, erosion, degradation
 - ii. Water quantity (seasonal flows)
 - iii. Water quality (filtration, natural treatment)
 - iv. Carbon sequestration
 - v. Pollination
 - vi. Biological control (and linking to concepts of ecological resilience)
- 3. **Agriculture outputs.** Food and other products will be quantified, including outputs that are directly used or consumed by households (subsistence). This to demonstrate household resilience (both from an income perspective as well as from an insurance (against crop failure) perspective).
- 4. **Agriculture inputs.** Any inputs used in production have an economic and environmental footprint. For each value chain, inputs will be quantified. This facilitates comparison of the marginal financial and environmental costs associated with each value chain. Valuation of the environmental impact of inputs may be helpful to aggregate the financial and environmental costs.
- 5. **Residuals.** In addition to changes in natural capital extent or condition, this study shall measure waste or emissions generated along the value chain.
 - i. Water nutrient pollution
 - ii. Water, soil, and air health pollution
 - iii. Sedimentation
 - iv. Solid waste
 - v. GHG emissions
- 6. **Quantitative human and social outcomes and impacts.** This can include labour demand and supply, impacts upon education and training, as well as health outcomes from production methods or from final goods.

Thus, aim at informing agricultural production in Mabamba wetlands landscape that secures equitable food security and conservation of associated ecosystems and biodiversity for sound economic development and environmental sustainability

Data sources, and proposed modelling techniques

Potential Products/ Services	Valuation Method	Data Needs	Potential Sources of Data
Agricultural crops	Market prices	Production volume, local units and conversion, cost of production, and Market prices	Local market prices and quantity supplied, Uganda Bureau of Statistics, District level responsible offices, literature and annual reports
Domestic watersupply	Market Price	Number of households whose water source is from the wetland. Average water use per household Water use price	Uganda Bureau of Statistics, state and national level reports
Communal grazing	Market Price	Number of cattle which graze from the wetland	Review of existing literature, national and state level reports
Livestock watering	Market Price	Number of cattle which drink water from the wetland, average amount of water consumed per head per day	Local market price, national and state level reports
Fish	Market Price	Amount of fish extracted per annum, cost of fish extraction, price of fish	Local market prices, literature, reports at federal & state levels, Uganda Bureau of Statistics
Fodder	Surrogate, Market prices	Quantity in kg, sacks and other local measures to be converted to kg, estimated cost of production	Household surveys, Local market prices, literature, reports at federal & state levels, Uganda Bureau of Statistics
Carbon sequestration	Market Price	Above ground Biomass (AGB); Below Ground Biomass (BGB,	Existing literature on estimated CO ₂

		Soil biomass); International Voluntary Carbon Market; Total Area Under Vegetation; IPCC Carbon Default Values	sequestration at local or regional level, IPCC reports Reports on National and/or regional and/or local level carbon sequestration levels
Flood Control	Market price and/or avoided cost	Number of Households around the wetland, estimated cost that would have been incurred for flood control	Available literature global and TEEB database
Water Purification	Market price and/or avoided cost	Total number of households that uses wetland as a major source of water, cost that would be incurred for water purification	Exciting literature, national and regional level report
Soil protection (prevented soilerosion)	Avoided cost	Cost of 1 ton of sediment removal Ratio of sediment entering rivers or reservoirs to total soil lost Soil erosivity for restored and non-restored forest (tons/ha)	Literature reports from ministry of water and resources and irrigation, Uganda National Lands Commission, and State Lands Commission, National and/or Regional and/or Local level soil maps
Education and Research	Averted cost Revealed price Value Transfer	Cost learning institutions would incur to visit other wetlands of similar nature Funds spent by researchers	Annual reports from learning institutions/ market information, existing literature Records from research clearing institutions, and research institutions
Habitat for Biodiversity	Revealed price and/or value transfer	Expenditures (budget allocated) for biodiversity conservation by national and international actors (agents)	National budget allocation, budget set by international actors and NGOs, annual reports and literature.

Models for estimation of the baseline economic values of ecosystem services

Ecosystem service	Valuation technique	Model	Model Explanation
Domestic Watersupply	Market price	$V_w = l * m * n * 365 \text{ day}$	<p>l = Household's dependent on wetlands for water supply m = Average use of water per household n = Market price per m^3 (US\$) V_w = Gross annual value of water for domestic consumption (US\$)</p>
Water for Irrigation	Production function	<p>1. Agronomic model</p> $\ln Y_{ic} = \ln a + b \ln LD + c \ln W + d \ln LA + e \ln S + f \ln CH + g \ln I + h \ln CA$	<p>Y = Yield in tons; i = location; c = croptype; LD = Land size; W = Irrigation water; LA = labour; S = seed CH = chemicals; I = implements; CA = capital; a = is the specific total factor productivity which explains effects in total output (CV) not caused by inputs; b to g = are the output elasticities of the input variable</p>
		<p>2. Economic model</p> $MP_W = \frac{\partial \ln Y}{\partial \ln W} \cdot \frac{Y}{W}$ $P_{shadow} = P_{output} \cdot MP_W$	<p>MP_W = Marginal product of irrigation water P_{shadow} = Shadow price of irrigation water P_{output} = Output price of irrigation water</p>
Water for Livestock	Market price	<p>$V_{lw} = p * q * r * 365$ Adopted from (Kakuru et al., 2013)</p>	<p>V_{lw} = value of livestock grazing p = Number of cattle obtaining water from wetlands q = Amount of water consumed per day per head of cattle r = Cost of water per 20 liters (US\$)</p>
Crop farming in the wetland	Market prices	$T_v = (Q_i * P_i) - C_i$	<p>T_v is the economic value of the product/output, Q_i is the quantity of good/product; P_i is farm gate price of the product, C_i is the cost of production.</p> <p>The value of costs and benefits will be calculated per hectare to develop the enterprise budget</p>

Livestock grazing in the wetland	Market price	$V_g = o * p$ Adopted from (Kakuru et al., 2013)	V_g = value of grazing o = Number of cattle raised in wetlands p = Average value of pasture consumed per day per animal (US\$)
Grass harvesting	Surrogate, Market prices	$T_v = (Q_i * P_i) - C_i$	Where, T_v is the economic value of the product/output, Q_i is the quantity of good/product; P_i is farm gate price of the product, C_i is the cost of production,
Capture fisheries	Market price	$V_f = (Q_f * P_f) - C_f$	V_f = Value of fish Q_f = Quantity of fish harvested P_f = Price of fish, say, per tonne C_f = cost of extracting fish, say, per tonne
Products from Papyrus & other related grasses	Market price	$T_v = (Q_i * P_i) - C_i$	Where, T_v is the economic value of the product/output, Q_i is the quantity of good/product; P_i is farm gate price of the product, C_i is the cost of production,
Fuelwood	Market price	$T_v = (Q_i * P_i) - C_i$	Where, T_v is the economic value of the product/output, Q_i is the quantity of good/product; P_i is farm gate price of the product, C_i is the cost of production,
Natural medicine	Market price	$T_m = (Q_m * P_m)$	T_m - the economic value of medication
			Q_m – number of people treated by natural medication P_m - estimated price of medication
Pottery	Market price	$T_v = (Q_i * P_i) - C_i$	Where, T_v is the economic value of the product/output, Q_i is the quantity of good/product; P_i is farm gate price of the product, C_i is the cost of production,

Carbon sequestration & storage	Market prices	$-VR = (Qr * Pc * Sr) - (Qd * Pc * Sd)$ <p>This is adapted from InVEST model</p>	VR=the carbon sequestration value of conservation transition; Qr=carbon sequestration (CO ₂) in restored area; Pc=the international carbon sequestration price; Sr = the area restored (ha); Qd is the carbon sequestration (CO ₂) in degraded area; Sd is the area degraded (ha)
*Water purification	Market price and/or avoided cost	$Vp = A * B$ <p>Adapted from (Verma and Negandhi, 2011)</p>	Vp is the economic value of water purification A= total purification cost per household in the absence of the wetland B= total number of households who uses the wetland as a source of water
Sediment control	Avoided cost	$Vk = K * G * \sum_{i=1}^n Si * (di - do)$	Where Vk is the economic value of soil-erosion regulation; -K is the cost of a ton of sediment removal; -Si is the area of forest-vegetation types in hectares; -G is the ratio of sediment entering rivers or reservoirs to total soil lost; -di is the erosivity of non-restored land (tons/ha); and do is the erosivity of restored land (tons/ha).
Flood control	Market price and/or avoided cost	$Vw = A * B$ <p>Adapted from (Merriaman, 2016)</p>	Vw - value of water attenuation A- Total household likely damaged by disaster without wetland ecosystem B- Estimated cost per household for flood control or storm surge protection or wave attenuation
Education & research	Averted cost of travel	$Ve = A * B$	Ve = Value of wetland for education A= Total trips made likely to be made by schools for wetland educational tours in a year B= Estimated cost per trip to the nearest wetland of similar nature

	Research expenditures	$\sum_{i=1}^n RE_i$	RE= research expenditures
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4.0 STAKEHOLDERS MAPPING AND ANALYSIS

Stakeholder mapping and analysis is critical when looking to engage with the most relevant people towards attaining the goals and objectives of the Project. Food security, and environmental conservation are cross cutting issues that affect and are influenced by several groups of people at local, national, and regional scale. Urban and Peri Urban Agriculture and Wetlands conservation are critical for the sustainable development of the project area and by extension, the country. Hence, stakeholder engagement at every step of the project is critical for provision of the link between the science, policy and society; improving the relevance and benefits of the project to the beneficiaries and getting access to additional resources and information on UPA and Wetlands Conservation. The stakeholder mapping and analysis was conducted following the guidelines of the Toolkit for Ecosystem Services Site-based Assessment (TESSA toolkit).

At the International and Regional Levels, Mabamba Bay Wetland is a critical resource for water resources protection, climate change mitigation, and adaptation, and eco-tourism, owing to its magnificent biodiversity. As such, international and regional organizations that have worked and are still working in the region are key stakeholders, like the Food and Agriculture Organization, the International Union of Conservation of Nature, GIZS, and the Nile basin Initiative among others.

At the National Level, there are stakeholders who are charged with steering wetlands and environmental management activities in Uganda, including the Mabamba Bay Wetland. The National Stakeholders include The Ministry of Water and Environment; The Department of Climate Change under the ministry; The Wetlands Management Department that spearheads wetland management activities in Uganda. The National Forest Authority that is conserved with biodiversity conservation. The National Environment Management Authority which regulates development and environmental management including UPA activities, agro-waste management, biodiversity and wetlands conservation; The Ministry of Tourism, Wildlife and Antiquities and the department of wildlife conservation with the mandate of policy formulation and coordination on biodiversity and habitat management; and Uganda Wildlife Authority which is a government parastatal that promotes the wise use and conservation of wildlife resources and wild spaces, which includes wetland ecosystems.

Stakeholders who are involved in **Urban and Peri-Urban Agriculture and Agricultural development** in Uganda includes the Ministry of Agriculture, Animal Industry and Fisheries that is responsible for the formulation, review and implementation of national plans, policies,

strategies, regulations and programs dealing with agriculture including UPA. Working under the ministry, are also the Department of Agricultural Planning, Department of Crop Production and Marketing, and the department of Aquaculture Management and Development. Ministry of Local Government. Directorate of Crop Resources that supports sustainable crop production. The Directorate of Fisheries Resources Management that promotes sustainable management and use of fisheries resources. Directorate of Agricultural Extension Services that manages and disseminates technical innovations, knowledge and information towards agricultural commercialization in Uganda, which is critical in UPA development.

Academic and Research Institutions are also critical stakeholders as their research on species and habitats is critical in informing wetlands investment and management plans. These include the Institute of Environment and Natural Resources, Makerere University. Other research organizations which can provide useful information on UPA and wetlands conservation as stakeholders includes the National Agricultural Research Organization that focuses on forestry, fisheries and agronomy. National Agricultural Advisory Services which is a government programme for Agricultural development in Uganda.

There are also **Civil Society Organizations** that work on UPA and Wetlands conservation in Uganda, including the Mabamba Bay wetlands. These include Nature Uganda which undertakes monitoring, research and advocacy on the conservation of wetlands. The Wildlife Conservation Society which is keen on biodiversity conservation even in wetland ecosystems. Uganda Wildlife Education Centre which is approximately 20km from the wetland and promotes its conservation; Environmental alert which is involved in Agricultural Development, alternative income generating activities, and afforestation; and Nature Palace Foundation which manages an information centre and capacity building on community leadership; and BUCADEF (Buganda Cultural and Development Foundation) which is involved in Subsistence agricultural development within the project area. ADRA Uganda that is involved in agricultural development, livelihoods development and environmental conservation. Other key stakeholders include the HOPE LVB (Ecological Christina Organization) and Pathfinder International who are involved in Natural Resource Conservation and Livelihoods improvement. Urban Farmers, agricultural extension agents. Uganda Centre for Sustainable Urban Agriculture.

At the local level, there are technical and local authorities formed around the Lake Victoria region that are critical for wetlands conservation and ensuring sustainable use of natural resources including for the support of UPA. They include the Lake Victoria Local Authorities Association (LVLAC). Site Support Groups at the local level includes the Mabamba Bird Guides and Conservation Association which is promoting conservation through community involvement; Mabamba Wetlands Craft Association, Mabamba Wetland Ecotourism Association. Local households that are using the wetland for growing cash crops and for subsistence purposes, the local communities, the Mabamba Bay Management Authority,

and local businesses that depend on the Mabamba Bay Wetland resources and the value chain players in the agricultural and tourism industry within and depending on Mabamba bay Wetland resources.

At the district level, at the **Mpigi District** Local Government, there is the Mpigi District Agricultural Office and the department of Production and Marketing that deals with crops, fisheries, veterinary, and commercial services with the mandate of transforming subsistence farming to sustainable commercial agriculture. There is also the department of Community Based Services that focuses on empowering communities and also promoting gender responsive development. The department of Natural Resources that focuses on Environmental conservation, Sustainable Land Use management, Wetlands Conservation and Sustainable Use of Natural resources within the district. There are also farmer cooperatives like Mpigi and Kituntu Farmers' Cooperatives who are critical stakeholders. As the main economic activity in Mpigi is agriculture, with crops like Sweet Potatoes, Beans, Cassava, Maize, Coffee, Cotton, Tomatoes, Onions, avocado, and Groundnuts being grown, the agriculture value chain players, are also key stakeholders.

At the **Wakiso District Local Government,** there is the Department of Natural Resources that is mandated to implement the National Environment Management Policy and the National Wetland Management Policy within the district. There is also the department of production and Markets that works on Agriculture (crop and Livestock), and fisheries towards transformation of farming from subsistence to commercial. There is also the Department of Physical planning which ensures proper urban management, and development that does not cause negative impacts on the environment. The main economic activities within the district are apiculture, cattle keeping, commercial fish farming, horticulture, and piggery. The agricultural value chain players in these sub-sectors are also valuable stakeholders.

Our engagement of stakeholders will be at three level: national, district and sub-county level. Two Districts are earmarked for engagement: Wakiso and Mpigi Districts. Three Sub-Counties are earmarked for engagement: Kasanje (in Wakiso District) and Mpigi Town Council and Kamengo (in Mpigi District). The engagement of Kampala City and associated Municipality and Towns impacting on Mabamba Wetlands Landscape is planned.

5.0 SCENARIO OPTIONS DEVELOPMENT

The scenarios options factors both direct and indirect drivers of change in Mabamba wetlands landscape and impacting urban and peri-urban agriculture. The drivers of

Mabamba wetlands landscape include population increase, urbanization and climate change. The appraisal captures the baseline economic values future change factoring decision on developing and managing Mabamba wetlands landscape and impacting urban and peri-urban agriculture. This will be informed by stakeholder consultations and literature review. The following scenarios have been earmarked for analysis

- 1) Business as Usual Scenario
 - Baseline situation
- 2) Alternative Grey Scenario
 - High land cover change to arable land
 - Increase expansion of unsustainable UPA
 - Focus on agriculture and food production
 - Encroachment into Mabamba Wetlands for Agriculture/Settlements
- 3) Alternative Green Scenario
 - Low land cover change to arable land
 - Mabamba Wetlands Restoration/Green Infrastructure
 - Mabamba Wetlands Biodiversity protection
 - Sound land use planning
 - Resilience building of agricultural production system
 - Strong enforcement of policies and regulations
- 4) Alternative Green-Grey Scenario
 - Medium land cover change to arable land
 - Optimal expansion of sustainable UPA
 - Hybrid of conservation and sustainable UPA growth

5.1 TIME SCALE OF SCENARIOS SETTING

Uganda developed a national Vision 2040 aimed at transforming the national economy from a peasant economy to a modern and prosperous one. The third National Development Plan (NDPIII) is the third in a series of six NDPs that will guide the nation and deliver the aspirations of the country as articulated in Uganda Vision 2040. The dominance of agriculture as a source of livelihoods positioned Agro-Industrialisation (AGI) as a central focus of Uganda's national development planning process. First AGI presented an avenue for promoting inclusive and equitable growth. Second, Uganda has a positive trade balance in agro-industrial products. Third, AGI provides an opportunity to add value to agricultural raw materials in order to support the expansion of the export of processed products. Fourth, it provides an opportunity for import substitution. Fifth, it provides an opportunity to address the high post-harvest losses, minimise losses to disasters, stabilise prices and increase household incomes. Additionally, the backward and forward linkages between agriculture and agro processing will necessitate that Uganda sustainably transform agro value chains to ensure sufficient supply for domestic industries to undertake transformative sustainable manufacturing while creating employment. The goal of the NDP programming in agriculture, therefore, is to increase commercialisation and competitiveness of agricultural production and agro-processing.

The year 2025 marks the end of the implementation of NDP III. The same year will mark the mid-term implementation of Uganda's Vision 2040's 30 year timeframe whose end term is 2040. This study therefore sets 2025 as the short-term time point for scenario analysis. The mid-term time point for scenario analysis is 2030 which marks implementation completion NDP IV. Year 2040, the end-term for Uganda's Vision 2040 is the long-term time point for scenario analysis. Overall our change assessment will consider baseline at 2021 and future time-stamp at 2040 for scenario analysis.

5.2 SCENARIO SETTING

The key ecosystem services and functions derived from the wetland system and its catchment therefore include (a) Provisioning of water for domestic and livestock use, (b) Provisioning of fish for home consumption and commercial purposes, (c) Provisioning of raw materials for local handicrafts including mats, bags and household utensils, (d) Provisioning of construction materials especially timber, building poles, sand and clay bricks, (e) Provision of medicinal herbs, honey and wild meat, (f) Regulating water flow and underground water re-charge and controlling the natural water cycle, (g) Regulating the local micro-climate, (h) Supporting fish breeding activities especially in the wetlands, (i) Supporting ecotourism activities and enterprises including bird watching, (j) Supporting agricultural productivity with rich ferrasols and pollination, (k) Sinking and storing carbon through carbon sequestration and storage in the soil, in below and above ground wetland biomass, (l) Cultural services including Nansubuga cultural hill with its beautiful view of Entebbe airport, State House and Entebbe peninsula and the Mabamba caves.

A number of underlying factors related to changing economic opportunities due to industrialization, livelihoods/income generation, agricultural growth, human settlements and tourism have been noted to affect the continued supply of the above mentioned ecosystem goods and services in the area. Notably, dry season incursion into the swamps by fishermen, extensive sand mining, housing growth and the associated land use changes and agricultural intensification continue to exert pressure on the wetland system and the services it can provide. Uganda registered an average rate of wetland and forest loss of up to 3.74 percent and 1 percent per annum respectively, costing the national economy US\$ 3.8 – 5.7 million per year (NEMA 2009). These rates of degradation are evident in the Mabamba Wetland System signifying extensive destruction of forest and wetland habitats and vegetation and biodiversity loss. The implementation of the National Development Plan III and its infrastructure and agro-industrialisation program could exacerbate current rates of habitat fragmentation, environmental damage and biodiversity loss if not strengthened with the appropriate regulatory measures, frameworks and green growth interventions.

5.2.1 Driving Forces Analysis

The main driving forces are population, urbanization and climate change. Other driving forces include agricultural production systems, corruption, Gross domestic product and infrastructural development. This is explored through indicators such as yields of rainfed crops, yields of irrigated crops, area of rainfed arable land, area of irrigated arable land, livestock numbers, livestock yields, agricultural input costs, nutrition, dietary diversity, poverty, equity, wetlands extent or cover change and biodiversity.

5.2.2 5.2.3 Specific of Scenario Settings

Changes in the productivity of the wetland system for the above-mentioned key ecosystem values will be modelled to depict the behaviour of the wetland under various scenarios including the business as usual (BAU) scenario, enhanced National Important Bird Area Conservation Strategy scenario (Green scenario) focusing on Wetland Conservation and Wise Use (WCWU), Increased agricultural production and wetlands encroachment scenario (Grey scenario) and hybrid scenario of optimal agricultural production and conservation of wetlands (Green-Grey Scenario) . The three scenarios, benchmarked against the National Development Plan (NDP III) programs on agro-industrialisation, infrastructure development and intensification of urban and peri urban agricultural activities and increased ecotourism will be constructed with the following characterizations. The Business as Usual (BAU) scenario will envisage baseline scenario, grey scenario will envisage intensified agriculture and agro-industrialisation, infrastructure development and population influx into the area without the requisite development controls and conservation investments, green scenario will envisage increased conservation scenario and Green-Grey scenario will envisage hybrid of increased agricultural production and conservation. The Grey scenario will therefore underline declining productivity and overall reductions in the values of key ecosystem goods and services. The Wetland Conservation and Wise Use scenario (Green scenario) on the other hand, will envisage the implementation of an enhanced National Important Bird Area Conservation Strategy (involving interventions of wetland restoration and wise use, modern urban and peri urban farming with fish farming, afforestation and modern animal husbandry) and Green-Grey Scenario envisage optimum agricultural production and conservation of wetlands and underlying natural resource base. The analysis will apply the Integrated Valuation of Ecosystem Services and tradeoffs models (InVEST) to reveal the response of ecosystem productivity to conservation interventions or non-intervention.

5.2.3.1 Business as Usual

This is the baseline scenario as at 2021. The baseline has seen increasing pressure on land for agriculture and settlements. Intense pressure on wetlands in terms of encroachment, pollution and eutrophication. **Thus STATUS QUO condition.**

5.2.3.2 Alternative Grey scenario

This scenario is based on agricultural expansion and intensification for purposes of increased food production and food security. **Thus of HIGH land cover change to arable land.** It is driven by policy of improving urban and peri-urban agriculture, agro-industrialization and migration of population to peri-urban and rural areas for agricultural land. This results into encroachment and reclamation of wetlands for agriculture. Additionally involve pressure on land for agriculture resulting into general landscape degradation without associated externalities to Mabamba wetlands.

5.2.3.3 Alternative Green Scenario

This scenario is based on green growth aspirations in the agriculture sector as reflected in the National development agenda and National Organic Agriculture Policy of growing agricultural sector for food security with reduced externalities. **Thus of LOW land cover change to arable land.** This involves requisite enforcement, investment and reduced corruption in implementation. It is reinforced by strong water, wetlands and biodiversity protection agenda as captured in associated policies, laws, regulations, strategies and plans and enforcement and implementation of the same.

5.2.3.4 Alternative Green-Grey Scenario

This scenario represents optimum agricultural production and sound conservation of wetlands and underlying natural resource base. It involves mix of agricultural development and sustainable utilization and conservation of Wetlands. **Thus of MEDIUM land cover change to arable land.**

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7.0 ANNEXES

7.1 ANNEX I: PERSONS CONSULTED

NATIONAL LEVEL:

No	Name	Designation	Jurisdiction	Contact
1	John Birantana	Senior Policy Analyst	MAAIF, Department of Agricultural Planning	0752699075 birajohnnie@yahoo.com
2	Carol Kagaba	Senior Wetland Officer	Ministry of Water and Environment	ckagaba2001@yahoo.com
3	Nicholas Magara	Regional Wetland Coordinator/Central	Ministry of Water and Environment	maganik@yahoo.com
4	Oliver Namirimu	Wetland Officer/Ramsar Sites	Ministry of Water and Environment	olivnamirimu@gmail.com
5	Peter Ndugga	Wetland Officer/GIS	Ministry of Water and Environment	npetermichael@gmail.com

WAKISO DISTRICT

No	Name	Designation	Jurisdiction	Contact
1	Kityo Moses	Fisheries Officer	Kasanje Sub County	0701524530
2	Mukasa Archilles	Agriculture Officer	Kasanje Sub County	0701005282
3	Lubega Arnold	Veterinary Officer	Kasanje Sub County	0774851249
4	Lubulwa Henry	District Agriculture Officer	Wakiso District	0770957297
5	Wilson Ssenfuma	Tour Guide	Kasanje Sub-County	0780351047/0758830133

MPIGI DISTRICT

No	Name	Designation	Jurisdiction	Contact
1	Azalia Kaggwa	District Agriculture Officer	Kamengo Sub County	0772323867
2	Francis Kakande	Farmer and LCI Chairman	Kamengo Sub-County, Luwala Village	0753902446
3	Asiimwe John Paul	Tour Guide	Kamengo Sub County	

4	Bakaluba Fred	Boat Rider	Kamengo Sub County	0772584767
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7.2 ANNEX II: GOVERNANCE INSTRUMENTS APPRAISED

Environment and Wetlands Policies			
No	Instrument	Brief	Link
1	The National Environmental Management Policy (2017)	Provisions for regulation and management of Urban and Peri Urban Agricultural Spaces, and the management of wetlands	
2	The National Forestry Policy (2001)	Contains provisions for ameliorating impacts of drought, watershed protection and soil conservation	https://www.nfa.go.ug/images/UgandaForestryPolicy2001.pdf
3	National Water Policy, 1999	promotes the principles of Integrated Water Resources Management (IWRM) as a means to ensuring sustainable management and utilization of water resources in Uganda	http://extwprlegs1.fao.org/docs/pdf/uga158331.pdf
4	Strategic Investment Plan for the Water and Environment Sector Uganda (2018 – 2030)	Guidelines for investments and strategic interventions towards environment and water resources (wetlands) conservation	https://www.mwe.go.ug/sites/default/files/library/Water%20and%20Environment%20Sector%20Investment%20Plan%20%202018.pdf
5	National Policy for the Conservation and Management of Wetland Resources, 1995	Curb the rampant loss of wetlands, ensure the sustainable utilization of wetland resources, provide for equitable distribution of wetland benefits, support the maintenance of wetland biodiversity and ecosystem functions	https://www.ramsar.org/sites/default/files/documents/library/national_wetland_policies_-_uganda.pdf

6	Mabamba Bay Wetland Community Action Plan	Intervention action guidelines for the conservation and sustainable use of Mabamba Bay Wetland	http://www.natureuganda.org/downloads/Mabamba%20Bay%20Community%20Action%20Plan.pdf
7	National Land Use Policy, 2014	Provision for sustainable use of land to meet agricultural, urbanization, habitation and environmental development needs	https://www.jlos.go.ug/index.php/document-centre/land-justice/366-uganda-national-land-policy/file
8	National Climate Change Policy, 2015	Guidelines towards promoting sustainable development and green economy, which includes UPA and wetlands conservation	https://www.mwe.go.ug/sites/default/files/library/National%20Climate%20Change%20Policy%20April%202015%20final.pdf
9	The National Policy for Disaster Preparedness and Management, 2010	Contains provisions for reducing the vulnerability of people, livestock, plants and wildlife to disasters in Uganda.	https://www.ifrc.org/docs/IDRL/Disaster%20Policy%20for%20Uganda.pdf
Environment and Wetland Laws			
No	Instrument	Brief	Link
10	The Water Act, CAP 152	Act provides for, among other things, the use, protection and management of water resources including wetlands	https://www.mwe.go.ug/sites/default/files/library/Uganda%20Water%20Act.pdf
11	The National Environment Act, 2019	provides protection to wetlands under its clauses 37 and 38. Prohibits reclamation or draining of wetlands, thereby providing guidance towards sustainable use of wetlands resources for UPA purposes	https://nema.go.ug/sites/all/themes/nema/docs/National%20Environment%20Act,%20No.%2005%20of%202019.pdf
12	The National Environment (Wetlands, River Banks and Lake Shores	Regulation and guidelines for the sustainable management and protection of wetlands in Uganda	http://nema.go.ug/sites/all/themes/nema/docs/wetlands_river_banks.pdf

	Management) Regulations, No. 3/2000		
13	THE National Environment (Environmental and Social Assessment) Regulations, 2020.	Enabling sustainable development in natural ecosystems (including wetlands) through protection against development impacts	https://nema.go.ug/sites/all/themes/nema/docs/National%20Environment%20(Environmental%20and%20Social%20Assessment)%20Regulations%20S.I.%20No.%20143%20of%202020.pdf
14	The Local Governments Act, 2005	The Act devolves the management of wetlands to Local Governments to ensue country-wide demarcation, restoration and management planning of wetlands	https://ulii.org/akn/ug/act/1997/5/eng%402000-12-31
15	The National Environment Bill, 2017	Provides for proper environmental planning at the national and district levels – which is critical for UPA; and sustainable use and proper management of the environment and natural resources including wetlands	https://nema.go.ug/sites/default/files/NEMA%20Bill%202017%20latest%2024%20Nov%202017.pdf
Cross-Cutting / Development Policies			
No	Instrument	Brief	Link
16	National Development Plan (NDPIII) Programs	Provisions and guidelines for agricultural development in Uganda, with Agriculture as one of the key sectors.	http://www.npa.go.ug/wp-content/uploads/2020/08/NDPIII-Finale_Compresed.pdf
17	The Uganda National Poverty Eradication Action Plan	Recognizes the unique contribution of wetlands and environmental resources to poverty reduction and builds on integrated approaches to sustainable livelihoods while protecting the environment.	https://www.imf.org/external/pubs/ft/scr/2014/cr14354.pdf

18	Uganda's "Vision 2040" Development Agenda	Prioritizes Agriculture as one of the key development sectors in Uganda and provides guidelines for development by 2040	http://www.npa.go.ug/uganda-vision-2040/
19	Uganda National Urban Policy, 2017	Promoting equitable economic development in urban areas, including promotion of urban agriculture	https://mlhud.go.ug/wp-content/uploads/2019/07/National-Urban-Policy-2017-printed-copy.pdf
Agriculture Policies			
No	Instrument	Brief	Link
20	Uganda National Irrigation Policy, 2017	Development and sustainable management of irrigation resources to achieve sustainable agricultural development	https://www.mwe.go.ug/sites/default/files/library/Uganda%20National%20Irrigation%20Policy.pdf
21	The National Agriculture Policy, 2013	Provides a roadmap and guideline towards increased and sustainable production for UPA	https://www.agriculture.go.ug/wp-content/uploads/2019/04/National-Agriculture-Policy-1.pdf
22	National Organic Agriculture Policy, 2019	Transformation of agricultural sub-sectors, environmental sustainability and food and nutrition security.	https://www.agriculture.go.ug/wp-content/uploads/2020/09/National-Organic-Agriculture-Policy.pdf
23	Agriculture Sector Strategic Plan 2015/16 – 2019/20	Transformation of the agricultural sector to be more commercial	https://www.agriculture.go.ug/wp-content/uploads/2019/05/Agriculture-Sector-Strategic-Plan-ASSP.pdf
24	National Strategy for Youth Employment in Agriculture, 2017	Youth involvement in UPA and Agricultural extension services	https://www.agriculture.go.ug/wp-content/uploads/2019/05/National-Strategy-for-Youth-Employment-in-Agriculture-NSYEA-1.pdf
25	Local Governments Urban Agriculture Ordinance, 2006	control and regulation of urban agriculture and related matters	https://www.kcca.go.ug/uploads/acts/Kcc%20Urban%20Agriculture%20Ordinance,2006.pdf

26	Local Governments Livestock and Companion Animals Ordinance, 2006	Critical in informing on Urban and Peri-urban livestock Keeping for the Project	https://www.kcca.go.ug/uploads/acts/Kcc%20Livestock%20Ordinance.pdf
27	National Agricultural Extension Strategy 2016/17 – 2020.21	Informs on guidelines for commercialization of UPA.	https://www.agriculture.go.ug/wp-content/uploads/2019/04/National-Agricultural-Extension-Strategy-(NAES).pdf
28	National Adaptation Plan for the Agricultural Sector, 2018	Promoting sustainable agricultural sector, improving climate resilience	https://www.agriculture.go.ug/wp-content/uploads/2019/09/National-Adaptation-Plan-for-the-Agriculture-Sector-1.pdf
29	National Seed Policy, 2018	Inform on regulation, availability, accessibility and affordability of safe and high-quality seeds for UPA	https://www.agriculture.go.ug/wp-content/uploads/2019/05/Ministry-of-Agriculture-Animal-Industry-and-Fisheries-National-Seed-Policy.pdf
30	Guidelines for Mainstreaming Climate Change Adaptation and Mitigation in Agricultural Sector Policies and Plans	Informs on nature positive production – environmental conservation and UPA	https://www.agriculture.go.ug/wp-content/uploads/2019/09/Guidelines-for-Mainstreaming-Climate-Change-Adaptation-and-Mitigation-in-the-Agricultural-Sector-Policies-Plans-1.pdf
31	Food and Nutrition Policy, 2003	promotion of organic farming to produce safe and healthy food for local consumers	http://extwprlegs1.fao.org/docs/pdf/uga145392.pdf
32	National fertilizer Policy (2016)	provides for use of both organic and inorganic fertilizers to increase soil fertility with the aim of increasing production of agricultural products to	http://extwprlegs1.fao.org/docs/pdf/uga172925.pdf

		sustain the domestic and international market demands.	
33	National Fisheries and Aquaculture Policy, 2017	promote sustainable management and utilization of water resources and enhance fisheries production	http://extwprlegs1.fao.org/docs/pdf/uga201565.pdf
Agriculture Laws			
No	Instrument	Brief	Link
34	National Agriculture Advisory Services Act, 2001	Informing on institutional arrangement at local and international level through the National Agricultural Advisory Services	https://www.agriculture.go.ug/wp-content/uploads/2019/04/The-national-Agricultural-Advisory-Services-Act-2001.pdf
35	Agricultural Chemicals Control Act, 2007	Informing on agro-waste management guidelines.	https://www.agriculture.go.ug/wp-content/uploads/2019/04/Agricultural-Chemicals-Control-Act-2007.pdf
36	Agricultural Research (Establishment and Management of the Zonal Competitive Agricultural Research and Development) Regulation, 2004	Guidelines on agricultural research provisions in Uganda	https://www.agriculture.go.ug/wp-content/uploads/2019/04/Agricultural-Research-Establishment-and-Management-of-the-Zonal-Competitive-Agricultural-Research-and-Development-Fund-Regulation-2004.pdf