WATER AND ENVIRONMENT NON-STATE ACTORS' ISSUE PAPER NATIONAL DEVELOPMENT PLAN - 2021-2025

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EXECUTIVE SUMMARY

NDP III, whose theme is sustainable industrialization for inclusive growth, employment and wealth creation, aims at increasing household incomes and improving the quality of life of the population. Its objectives are to:

1) Enhance value addition in key growth opportunities;
2) Increase the stock and quality of productive and service infrastructure;
3) Increasing productivity, inclusiveness and wellbeing of population;
4) Strengthening the private sector to drive economic growth; and
5) Strengthening the role of the public sector in the growth and development process.

NDPIII proposes a shift from sectoral planning to a programmatic approach with 15 proposed national programs linked to the 5 key objectives. Water, Environment, Natural Resources and Climate Change is one of the 15 programs. Its objectives are to (i) increase access to safe water supply and sanitation, (ii) improve multi-sectoral planning, regulation and monitoring of water resources (iii) enable green growth through sustainable management of the environment and natural resources and improved climate resilience. The program has three subprograms or components; (i) water supply and sanitation (ii) water resource management (iii) environment, natural resources and climate change.

Economic contribution of sector to economy

The economic contribution of water, environment, natural resources and climate to the Uganda's economy is well documented. Uganda's economy is largely dependent on environment and natural resources. Growth sectors like agriculture, tourism and industry depends on the environment and its ecosystem. The table below presents a summary of empirically estimated economic potential of the sector to the economy of Uganda.

Economic potential of environment and natural resources to economy

Strategy/contribution	Economic potential
Water, Sanitation and Hygiene (WASH)	
Increased access to irrigation facilities 144,000 households/ year	46.8 billion/year. Cumulatively by 2030 UGX 2.34 trillion
Sustainable and optimal water resources management	UGX 29.4 trillion (2020–2030)
Efficient waste management (solid and wastewater) for at least five cities and 15 municipalities	US$44.9 billion, equivalent to UGX 163.88 trillion over 10 year
Health care cost savings from water borne diseases	USD 1 billion over 25-year period
GDP loss due to poor sanitation	US$ 177 million or 1.1% of GDP per year
Sustainable Management of Rivers	1000 GHw per year by 2030
Enhanced supply of water for production	5% increase in livestock production by 2040
Increasing fisheries production by through water quality management	60% increase in fisheries by 2040
Environment and Natural Resources (ENR)	
Integrated soil fertility management of 41,000 ha/year	23.4 billion/year Cumulatively by 2030 UGX 1.17 trillion
Tourism development	US$1.874 billion or UGX 6.84 trillion/year

Sustainable forestry management	UGX 12.3 trillion (2020 – 2030)
Sustainable wetlands	UGX 12.3 trillion (2020 – 2030)
Renewable energy (biomass energy, solar energy, geothermal, and mini and large hydropower generation)	Ecosystem services of UGX1.04 trillion/year, equivalent to UGX10.4 trillion over 10 years Plus stand stock value UGX3.265 trillion, a fixed value.
Reducing respiratory diseases through energy efficient cooking technologies	US$ 8 billion saved in health care spending due to use wood fuel.

Source NPA - UGGS 2017/18 – 2030/31 and MWE (2016) Economic study

The Economic Study by MWE (2016) shows that the total cumulative health care cost savings for a 25-year period when the population have access to safe water and sanitation is US $1.0 billion. The same study shows that GDP per capita will be 9% higher in 2040 under enhanced investment in rural and urban safe water supply and sanitation; which translates into an extra US $111 per person per year. A study conducted by the World Bank (water and sanitation program) estimated that annually Uganda loses US$ 177 million or 1.1% of GDP due to poor sanitation calling for stronger focus on WASH.

Investing in the water, environment and natural resources sector yields economy wide benefits. Investing US$5.3 billion to the sector (26 years) will realize a cumulative GDP gain of US$38.1 billion (MWE, 2016).

The water, environment and natural resources sector contributes to attainment of regional and global goals/agenda. It will contribute to attainment of Sustainable Development Goals (SDGs) particularly SDG 6 (clean water and sanitation), SDG 13 (Climate Action), SDG 15 (Life on earth), SDG 2 (Zero hunger), SDG 3 (Good health and wellbeing), SDG 5 (Gender equality), SDG 7(affordable and clean energy), SDG 11 (sustainable cities and communities) and SDG 14 (life below water). The sector will contribute to attainment of the Paris Accord on Climate Change with commitments to reduce green house gases (GHG). It will also contribute to African Union (AU) Agenda 2063 regarding expanded and improved access to the necessities of life: water, sanitation, electricity and transport.

Uganda's Vision 2040 envisaged a green and clean environment with no water and air pollution while conserving the flora and fauna and restoring and adding value to the ecosystems. These global, reginal and national goals are unlikely to be achieved without prioritisation of investment to the sector.

Situation analysis

The key highlights of the situational analysis based on each of the 5 objectives is presented below.

(i) Objective 1: Enhance value addition in key growth opportunities

Water Resources: Uganda is well endowed with water resources in terms of ground water, surface water and precipitation/rainfall. 15.3% of Uganda's area is covered by open fresh water sources (Rivers, Lakes, Streams and Swamps) which are strategic natural resources vital for life sustenance, socio-economic development and

maintenance of the environment. The major problem with the water resource is water pollution caused by bacterial and chemical contamination of both groundwater and surface water resulting from inadequate sanitation facilities and unsafe disposal of municipal waste, industrial waste, poor farming practices and degradation of the catchments and wetlands. The rate at which Rivers and Lakes are silting is threatening some of them to disappear altogether and has increased the cost of treating drinking water.

Forestry: The forest cover has declined from 24% of Uganda's land area in 1990 to 9% in 2018. Forest cover declined from 4.9 million ha in 1990 to 1.83 million ha in 2015, a reduction of 3.05 million ha (57%) in just 25 years. The major cause of deforestation is biomass fuel cooking/combustion. 90% of Ugandan households use wood fuel which has exacerbated deforestation.

Wetlands: The national wetlands coverage as a percentage of the total land area declined from 15.6% in 1994 to 8% in 2014. It is estimated that Uganda loses 846 km^2 of its wetlands annually. At this rate, it is likely that there may be no wetlands left by 2040. The major causes of wetland degradation are poor farming practices, settlements, excessive water abstraction and mining.

Air Pollution: Air pollution is one of the leading global public health risks. For Uganda, data on air pollution is sparse and there is currently no framework for monitoring and regulating air pollution. Kampala has the second worst air quality in Africa (AirVisual, 2018). Recent studies carried out on air quality in Kampala indicated that the concentrations of particulate matter (PM2.5) were three times higher than the WHO air quality guidelines for ambient air (25 μg/m3). Air pollution problem is attributed to emissions from increasing municipal and industrial activities, particularly from increased traffic and reconditioned motor vehicles, and other anthropogenic activities

Climate change: The rising temperatures, as well as frequent erratic and extreme weather events are taking a toll on Ugandan economy. Droughts, floods, heat waves and landslides are becoming a common occurance in Uganda with devastating impacts on agricultural production, food security, forests, infrastructure, health systems, incomes, livelihoods and overall development. The major contributors to climate change include green house emissions caused by poor farming practices, deforestation, vehicles and industrial emissions.

(ii) Objective 2: Increase the stock and quality of productive and service infrastructure

Water for production: During the NDPII period, the sector targets to increase cumulative storage infrastructure to 55 MCM in 2019/20. As of June 2018, the cumulative water for production storage capacity was 39.32 million m^3. The functionality of the existing water for production infrastructure was 85%. Some of the existing infrastructure require rehabilitation and expansion.

Weather stations: Due to many years of neglect, there has been massive breakdown of most of meteorological equipment and systems. Automation of its weather monitoring and communication infrastructure has leaped from 10% district coverage to 43% during the NDPII period. Functional major manual stations have increased from 12 to 32 during the NDPII.

(iii) Objective 3: Increasing productivity, inclusiveness and wellbeing of population

Water, sanitation and Hygiene

During the period of NDP II (2016-18) the coverage of urban population with drinking has increased very marginally from 73% percent in 2016 to 77% in 2018. The growth in rural water coverage has been much more abysmal with only an increment of 3% during the period 2016 to 2018 from 67% to 70%. 66% of the villages had improved water sources (SPR, 2018). The Joint Monitoring Program (JMP) report (2017) shows that 36.8% rural drinking water basic service, 35.9% limited service and 4.5% safely managed service. The marginal increase is coverage has been accessioned by low investment which does not match the population growth rate.

Sanitation: progress in sanitation coverage has been quite stagnant around 79% for rural and 85% for urban areas. 12.6% of urban population (1.2 million) still practice open defecation. Hand washing facilities stagnated at 36.5% and 39.6% for rural and urban areas respectively.

The JMP report (2017) indicated that in urban areas, 41.7% had limited sanitation service and 26.1% had basic service. 27% had limited service and 34.3% had basic hygiene service. In rural areas, 10.4% had limited service and 16.2% basic sanitation. 33.2% had limited service and 17.3% had basic hygiene service.

The situation of WASH in school has also not made any notable progress during the NDP II period. The pupil stance ratio of school toilet remained at 70:1 against national norm of 40:1. A study by USAID/Sanitation for Health (2018) found 62% and 39% of the public and private schools had pupil stance ratio of 40:1 respectively.

The situation of WASH in Health Facilities remains at much worse condition causing poor infection prevention environment. In the West Nile region 92% of the HCFs provided limited sanitation services. 85.2% of the health centres in Kampala had limited sanitation facilities and 13% had unimproved sanitation facilities.

Municipal Waste: KCCA collects about 1300 tonnes per day which translates into 468,000 tonnes per annuum representing about 40%. It is estimated that 68% of the solid waste generated in urban areas is collected and safely disposed of. MWE (2018) economic study estimated the gap as 610,906 tonnes per year for solid waste disposal.

(iv) Objective 4: Strengthening the private sector to drive economic growth

The private sector plays a crucial role in water, environment and natural resource sector in terms of implementation, financing and degradation. It plays a critical role in the value chain of water, sanitation, environment and natural resources products and services. However, the local companies/ firms' capacity remains weak in terms of financial, technical and organizational capacity. This calls for deliberate effort to develop the capacity of local companies/firms through training, apprenticeship, reservation schemes and regulation.

(v) Strengthening the role of the public sector in the growth and development process

The public sector plays a crucial role to the growth and development of the water, environment and natural resources sector. It defines the strategic direction, planning, policy formulation, setting standards and governance. However, the public sector remains weak in terms technical skills, enforcement and governance. The situation is worse in newly created local governments which have failed to attract the required technical staff (Engineers and technicians).

The institutional arrangements particularly for sanitation remains fragmented in many ministries which affects performance accountability. Ministries, Departments and agencies operate in silos with no synergies between them. This has affected the coordination of programs leading to duplications and wastage of resources.

Sector Financing: the funding gap of the sector is expected to increase from UGX 3.380 trillion in 2016/17 to UGX 7.999 trillion per year by 2029/30 if the current level of funding does not change substantially. Donor funding (grants) reduced from 42% of external financing in 2015 to 29% in 2018. 71% of external funding 2018 was in form of loans which raises the question of debt sustainability if the current trends continue.

Policy and legal Gaps

Refugee response: Uganda is host to over 1.2 million refugees primarily living in rural settlements across 11 Districts in north and south of the country. These refugees have contributed water, sanitation and environmental degradation. Government with support from non-state actors are actively scaling up efforts to restore degraded areas, reduce demand on natural resources and promote green livelihoods. A comprehensive refugee response framework should consider water, sanitation and environmental services.

Institutional home for Sanitation: The management of sanitation remain fragmented and it has no institutional home. The non-legally binding Memorandum of Understanding between the MoWE, MoH and MoES has not been successful in improving household and institutional sanitation and hygiene. This has contributed to continued underfunding of sanitation and lack of accountability for its performance.

Subsidy for sanitation: For the past two decades, government has maintained the policy no subsidy for household sanitation. This policy has had varying successes with some areas attaining high basic sanitation coverage and others have remained behind. The NDP III goal of inclusive growth (leave no one behind) may not be realised if this policy is not reviewed to address the barriers in areas with low sanitation coverage.

Proposed key projects

Program components have been identified in 9 national programs, as water and environment development and management forms part of the core programs targeting industrialisation. The summary of proposed key projects for each program component under the national programs is show in the table below.

Proposed key projects by program

National Program	Proposed Program Components – Sector level	Possible Project
Agro-Industrialization	Water Resource Management	Integrated Water Resource Management Sustainable Management of Rivers
	Climate change management	Climate change resilience and adaptation
	Forest Management	Agro-forestry
	Water and sanitation	Safe drinking water supply and sanitation
Mineral-based industrialization	Water for production	Water for mining and industry
	Water resource management	Water pollution control Waste water treatment/ cycling
	Environment management	Air pollution control
	Water and sanitation	Safe drinking water supply and sanitation
Tourism Development	Water resource management	Development of tourist attractions along major Rivers and Lakes through PPPs
	Environment management	Conservation of biodiversity
	Water supply and sanitation	Safe drinking water supply and sanitation
Private Sector Development	Water resource management	Enforcement of laws and regulations
	Water supply and sanitation	Public- private partnerships along the value chain
	Capacity development of private sector	Apprenticeship program for the private sector
Sustainable Energy Development	Water resource management	Sustainable Management of Rivers
	Forest management	Promotion of biomass energy efficient technologies
Transport and ICT Interconnectivity	Water resource management	Sustainable Management of Rivers and lakes
	Climate Change	Climate Change adaptation of transport infrastructure
	Sanitation	Provision of sanitation facilities along major highways
Human capital	Water supply and	Institutional WASH

Development	sanitation	
Sustainable Urban Development	Water supply and sanitation	Safe drinking water supply and sanitation
		Waste (solid and liquid) treatment
Water, Environment, Natural Resource & Climate Change Management	Environment Management	1. Sustainable forestry management
		2. Sustainable wetlands management
		3. Nature based tourism development
		4. Improving Air Quality and Industrial Waste Management
		5. Institutional Capacity enhancement for Environmental risk management
	Climate Change Adaptation and Mitigation	1. Disaster preparedness, management and response project
		2. Climate mitigation, adaptation and Resilience building
	Sustainable and optimal water resources management	Lake, and River Catchment restoration and protection project
		Water hyacinth/weed harvesting project
		Enforcement water quality regulations
		Sanitation improvement project
		Ambient water quality
	Sustainable hydropower generation	Integrated Water Resource Management
	Water for production	Multipurpose bulk water supply project for cattle corridor/ dry belt
		Water for production infrastructure rehabilitation/expansion.
		Production rainwater harvesting project
		Public private partnerships water for production infrastructure development project
		Solar pumping irrigation systems
	Urban water supply	Small towns and rural growth centres water supply project
		Large towns/municipal water supply rehabilitation/expansion project
		Public private partnership municipal water supply project
		Urban water supply asset management project
	Rural water supply	Rural unserved/underserved villages water supply project
		Rural water facilities rehabilitation/ expansion project
		Domestic rainwater harvesting project
		Regulation of functionality assurance through O&M PPPs Establishment of Rural Water Utilities
	Sanitation and hygiene	Rural sanitation and hygiene improvement project
		Urban sanitation and hygiene improvement project
		Rehabilitation and expansion of municipal sewerage systems
		Faecal sludge treatment/ management

		Institutional sanitation (schools. health centres and public places)
	Efficient waste management	Solid waste treatment project
		Municipal waste water treatment project
	Human Capital	Capacity building for MWE, NEMA, NFA and Local Governments and utilities
	Cross cutting	Gender, Governance and HIV/AIDS
		Promotion energy efficient cooking technologies

1. INTRODUCTION

1.1 Background/context

The National Planning Authority (NPA) is in the process of formulating the third National Development Plan (NDP III) to succeed the current NDP II which expires in June 2020. NDP III, whose theme is sustainable industrialization for inclusive growth, employment and wealth creation, aims at increasing household incomes and improving the quality of life of the population. It focuses on natural resource led industrialization to drive the country's socio-economic transformation to a middle-income country status. Its objectives are to:

6) Enhance value addition in key growth opportunities;
7) Increase the stock and quality of productive and service infrastructure;
8) Increasing productivity, inclusiveness and wellbeing of population;
9) Strengthening the private sector to drive economic growth; and
10) Strengthening the role of the public sector in the growth and development process.

NDPIII proposes a shift from sectoral planning to a programmatic approach with 15 proposed programs linked to the 5 key objectives. This paper outlines how integrated planning across programs for Water, Environment and Natural Resources and Climate Change is essential to support the objectives and to achieve green growth and sustainable industrialization.

Given its critical role to the success of NDP III, Water, Environment, Natural Resources and Climate Change will also be anchored as a program. Its objectives are to (i) increase access to safe water supply and sanitation, (ii) improve multi-sectoral planning, regulation and monitoring of water resources (iii) enable green growth through sustainable management of the environment and natural resources and improved climate resilience.

The program has three subprograms or components; (i) water supply and sanitation (ii) water resource management (iii) environment, natural resources and climate change. The key contributions of these components to attainment of program and NDPIII objectives include:

- Human Capital - healthy, educated, productive, and skilled communities;
- Sustainable access to Water for People, Production, Energy, and Environment;
- Natural Capital Management of Eco-tourism, Forestry and Blue Assets – biodiversity, forests, wetlands, lakes and rivers and fisheries;
- Regulation, management and mainstreaming of Environment and Natural Resource Management, and Climate Change Mitigation and Adaption Measures; and
- Humanitarian-Development Nexus - inclusion of relevant planning and projects for refugee and host communities.

1.2 Economic Potential of water, environment and natural resources

The economic contribution of water, environment and natural resources to the Ugandan economy is well documented. Table 1 summarises the economic potential of the various strategies outlined in Uganda Green Growth Development Strategy (UGGDS) and MWE (2016) Economic study to the Ugandan economy.

*Table 1**: Economic potential of environment and natural resources to the economy***

Strategy/contribution	Economic potential
Water, Sanitation and Hygiene (WASH)	
Increased access to irrigation facilities 144,000 households/ year	46.8 billion/year. Cumulatively by 2030 UGX 2.34 trillion
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Reducing respiratory diseases through energy efficient cooking technologies	US$ 8 billion saved in health care spending due to use wood fuel.

Source NPA - UGGS 2017/18 – 2030/31 and MWE (2016) Economic study

1.2.1 Water supply, sanitation and Hygiene (WASH)

Water supply, sanitation and hygiene are vital to the productivity and wellbeing of the population. Studies show that provision of safe drinking water and sanitation improves the health of the population and saves productive time. The Economic Study by MWE (2016) shows that the total cumulative health care cost savings across the 25-year period when the population have access to safe water and sanitation is US $1.0 billion. The same study shows that GDP per capita will be 9% higher in 2040 under enhanced investment in rural and urban safe water supply and sanitation; which translates into an extra US $111 per person per year.

A study conducted by the World Bank (water and sanitation program) estimated that annually Uganda loses US$ 177 million or 1.1% of GDP due to poor sanitation

calling for stronger focus on WASH. Sustainable increase in household income entail increasing earnings and savings on avoidable expenses.

1.1.2 Integrated Water Resource Management

The water resources management component cuts across many programs of NDPIII and is essential to ensure enough and sustainable Water for People, Production, Energy and Environment.

Water for Production is a raw material for beverage industries, a coolant for industrial machinery and reservoir for discharging industrial waste. Water is the major input in agriculture and therefore increased agricultural productivity and production cannot be attained without prioritising water for irrigation of crops and watering livestock. Sustainable agro-based industrialisation can only be attained through continuous and reliable supply of agricultural raw materials. By 2040, livestock production would increase by 5% due to enhanced water supply (MWE, 2016)

Water for Environment supports the fishing industry that is among the five major foreign exchange earners of Uganda. Sustainable management of the water resources is critical for the survival of the fishing industry. It is currently being threatened by water pollution and weak enforcement of fishing regulations. Enhanced investment in productive fisheries in Uganda will increase productivity by almost 60% by 2040 due to water quality improvements (MWE, 2016).

Water for Energy is the major input in the hydropower generation which is the engine of industrialisation in Uganda. Sound River management will lead to an annual increase in generation of over 1000 GWh by 2030 (MWE, 2016).

1.1.3 Environment and Natural Resources and Climate Change

Uganda's economy is largely dependent on environment and natural resources. Growth sectors like agriculture, tourism and industry depends on the environment and its ecosystem. Studies show significant contribution of the environment resources to the GDP.

A 2010 study of the forestry sector indicated that forestry may have contributed the equivalent of 8.7 percent of Uganda's GDP in 2010 (MWE 2016). A 2011 synthesis of forestry sector data indicated that forest resources may have contributed at least $1.3 billion/year to national income (MWE, 2011). 90% of the Ugandan population depend on wood fuel for cooking (NEMA, 2017). Government would save up to $8 billion in health care spending over 25 years due to reduced respiratory diseases by promoting energy efficient cooking stoves (MWE, 2016).

A 2014 study was extrapolated to indicate that wetlands contribute ecosystem services estimated at $4.9 billion/year. The total economic contribution of wetlands in three agro-ecological zones of Uganda is estimated at US$10,948; US$10,388 and US$11,358/ha/year. Approximately 5 million Ugandans depend directly on wetlands for their water supply needs, valued at US$25.0 million per year

(UNDP/NEMA/UNEP, 2009). Nature based tourism was recognized for having contributed 9% of GDP and 26% of earnings from exports of goods and services in 2012/13.

The projected damage associated with climate change inaction for agriculture, water, road infrastructure and energy (2010-2050) is estimated to cost between US$273 and US$437 billion, equivalent to US$7-US$11 billion per annum (MWE 2015). UNHS (2017) reported that the major cause of poverty rise from 19% to 36% was attributed to drought (75%), storms (25%) and floods (15%). MWE (2018) estimated Uganda's Green House Gases (GHG) emissions to increase to 18,053,293 tonnes by 2030. The estimated cost is UGX 4.9 trillion.

Overall, the contribution of water resources, sanitation and hygiene, and environment and natural resources to attainment of NDPIII goal and objectives is significant. The MWE (2016) indicated that water and environment sector investments can yield significant economy-wide impacts by 2040.

The benefits to GDP directly exceed the investment costs (about 8 times) – when undiscounted. Investing US$5.3 billion to the sector (26 years) under the Moderate Investment scenario will realize a cumulative GDP gain of US$38.1 billion. But investing US$8.4 billion to the sector (26 years) under the High Investment Scenario will realize a cumulative GDP gain of US$ 67.2 billion. The investment required is approximately US$4.3 billion for water development and US$4 billion for environmental management over 26-year period.

Uganda's Vision 2040 envisaged a green and clean environment with no water and air pollution while conserving the flora and fauna and restoring and adding value to the ecosystems.

1.1.4 Contribution to Sustainable Development Goals

The WASH and ENR Programs will contribute to attainment of the Sustainable Development Goals which Uganda has committed to attain by 2030. The Program is aligned to SDG 6 (clean water and sanitation), SDG 13 (Climate Action) and SDG 15 (Life on earth). The Program will contribute to the attainment of SDG 2 (Zero hunger), SDG 3 (Good health and wellbeing, e.g. SDG 3.2, ending preventable deaths of under 5s and 3.3, combating water-borne diseases), SDG4 (quality education, e.g. 4.4 upgrading education facilities to make them more gender sensitive and 4a.1 Proportion of schools with access to: (a) electricity; (b) the Internet for pedagogical purposes; (c) computers for pedagogical purposes; (d) adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic handwashing facilities (as per the WASH indicator definitions), SDG 5 (Gender equality), SDG 7(affordable and clean energy), SDG8, e.g. 8.3 supporting entrepreneurship, creativity and innovation, encouraging formalisation and growth of micro-, small- and medium-sized enterprises, SDG 9 (Industry, innovation and infrastructure), SDG 11 (sustainable cities and communities), SDG 14 (life below water) and SDG 16 (peace, justice and strong institutions), and SDG17, e.g.17.17 encouraging and promoting effective public-private and civil society partnerships.

It will also contribute to African Union (AU) Agenda 2063 regarding expanded and improved access to the necessities of life: water, sanitation, electricity, transport and internet connectivity. The Program is aligned to Vision 2040 regarding development and utilisation of water resources, sustainable utilization of the ENR and adaptation and mitigation of the effects of climate change.

2 SITUATIONAL ANALYSIS OF WATER AND ENVIRONMENT SECTOR IN UGANDA

2.1 Enhance value addition in Key Growth Opportunities

Water Resources: Uganda is well endowed with water resources in terms of ground water, surface water and precipitation/rainfall. 15.3% of Uganda's area is covered by open fresh water sources (Rivers, Lakes, Streams and Swamps) which are strategic natural resources vital for life sustenance, socio-economic development and maintenance of the environment.

The internal renewable water resources are an indication of the amount of water generated in our rivers from rainfall. The total renewable water resources in Uganda is 43.3 km3/year with 69 percent contributed by neighboring upstream countries. This underscores the need for collaborative management of trans-boundary water resources flowing from Kenya, Tanzania, and Rwanda under the Nile and Lake Victoria basins. The average annual recharge for ground water from rainfall ranges from 19.1mm to 39.9 mm

The major water quality problem is bacterial contamination of both groundwater and surface water resulting from inadequate sanitation facilities and unsafe disposal of municipal waste. The other causes of water pollution are poor agricultural practices (use of fertilizers, pesticides herbicides and cultivating up to lake shores and river banks), untreated industrial waste and degradation of the wetlands/catchments. Mining particularly of oil is associated with use of heavy metals polluting water sources in the Albertine region.

Wastewater is also a major pollutant of lakes and rivers. For example, pollution from Kampala city has resulted in deterioration of water quality in the Inner Murchison Bay on Lake Victoria. Eutrophication resulting from excessive quantities of nutrients reaching water bodies can cause algal blooms that may lead to oxygen deficits and fish kills or promote the excessive growth of weeds such as water hyacinth. The deteriorating water quality now poses a threat to public and ecosystem health and requires costly advances in water treatment to reach standards where it is suitable for human consumption (NEMA, 2017).

The rate at which Rivers and Lakes are silting is threatening some of them to disappear altogether. This has been caused by watershed/catchment degradation, soil erosion, poor agricultural practices, degradation of the wetland and deforestation. Rivers like Manafa, Sipi and Ntungwe are facing serious sedimentation due to degradation of the catchment areas.

Crater lakes, rivers and streams are under serious threat of eutrophication because of cultivation and degradation of buffer zones and unregulated commercial farming

that uses fertilizers. The high loads of nutrients and sediment being transported into the water bodies are a manifestation of degradation in the catchments.

NDPII target is implementing water resources management reforms, promoting catchment based integrated water resources management, and ensuring affordable safe water is reliably managed through public-private partnerships and new rural water utilities to supplement existing urban water utilities and so integrate the rural population into the agro-industrial growth plan. Implementation of catchment-based water resources management is ongoing in 4 Water Management zones and 15 catchments. Implementation of some interventions in 11 catchments (Rwizi, Mpanga, Semliki, Aswa, Albert Nile, Awoja, Maziba, Katonga, Lokok, Lokere and Mpologoma) is ongoing. Compliance to abstraction permit conditions is 77% and 63% for waste water discharge permit conditions.

Water for production: Currently only 31,000 households practice irrigation, with shallow wells (44%) being the most frequently used source, followed by gravity flow (16%) and deep well systems (13.5%). The other sources of irrigation water are rainwater harvesting (5.6%), pumping from surface water systems or ponds (3.5%), municipal water supply (2.4%) and others (12%).

It is estimated that only 15,150 ha of land are fully irrigated and only 8,656 ha are fully equipped for irrigation. Approximately, 36,000 ha of agricultural land are drained for agricultural production purposes. The national target for irrigation potential is 567,000 ha. Some irrigable land is within catchments with adequate surface water resources while the other requires considerable investment in bulk water transfer from one catchment to another.

During the NDPII period, the sector targets to increase cumulative storage of water for production from 27.8 Million Cubic Meters (MCM) in 2012/13 to 55 MCM in 2019/20. As of June 2018, the cumulative water for production storage capacity was 39.32 million m^3 with functionality of facilities at 85%; at the current level of funding, it is unlikely that the NDPII target will be met.

TMWE (2018) using macroeconomic models estimated the demand for water for production storage capacity of 163.67 million m^3 by 2030. It assessed the storage capacity gap as 125 million m^3, irrigation area 104,156 ha and 756 facilities for rehabilitation. The proportion of irrigation potential utilised is 0.49% against the target for 2030 of 4%.

Analysis of value chain for water for production shows insufficient storage capacity (tanks and dams), silting of dams and tanks due to degradation of catchments plus inadequate/lack of distribution systems. The O&M of the WfP facilities is a big challenge.

Forestry: The forest cover has declined from 24% of Uganda's land area in 1990 to 9% in 2018. 12% is under strict nature reserve. Forest cover declined from 4.9 million ha in 1990 to 1.83 million ha in 2015, a reduction of 3.05 million ha (57%) in just 25 years. Uganda's forest land cover declined from 2.6 million ha of forest land in 2010 to 1.96 million ha in 2015.

As recently as 2005, Uganda had a total of 3.6 million ha of forest land compared to 4.9 million ha in 1990, a reduction of 30% over a period of 15 years. The rate of loss accelerated between 2005 and 2010 to, 6.4% per annum, from 3% between 2000 and 2005. The rate of forest loss seems to have declined to 2.2% per annum between 2010 and 2015, but most of the damage had been done

Deforestation has now reached catastrophic levels, and alternative solutions must be developed, together with more extensive use of energy efficient stoves. UNHS (2017) reported that over 90% of Ugandan households use wood fuel with 64.4% using firewood (80.8% in rural and 22.3% in urban) and 29.8% charcoal (15.5% in rural and 66.4% in urban). The amount of forestry products extracted is between 28 to 48.7 million tonnes per annum. The products extracted include charcoal, fuel for household, commercial and industrial use, poles and sawn timber. According to UNHCR (2017), the per capita daily consumption of wood fuel in Uganda is 3.5kg. This translates to 47 million kg per year. This means that every year about 47 million trees are being destroyed in Uganda which translates into 47,000 hectares. According to SPR (2018), 6,075 hectares of trees were planted in FY 2017/18 which represents 13% of the forests destroyed in that year. This requires restoration of 3.05 million ha of forest cover over 22 years which translates into a rate of restoration of 138,600 ha/year.

The declining forestry cover coupled with climate change are likely to affect water levels and flow in the major Rivers and Lakes which will affect the hydro power generation to run industries. There is need for direct investments into ecosystem restoration to reduce deforestation. The estimated gap in forest coverage is 4,025,558 ha by 2030. This translates into 309,658 ha per year. The estimated total cost of restoring the forests is UGX 28.0 trillion; which translate into UGX 2.154 trillion per year.

Wetlands: Wetlands in Uganda provide a wide range of tangible and non-tangible benefits. The tangible benefits include water for domestic use and watering livestock, support to dry season agriculture, provision of handicrafts, building materials, food and medicines. The non-tangible benefits include flood control, purification of water, maintenance of the water table, micro climate moderation, storm protection (Kakuru and others 2013).

The national wetlands coverage as a percentage of the total land area declined from 15.6% in 1994 to 8% in 2014 (UNDP and NEMA 2017). It is estimated that Uganda loses 846 km^2 of its wetlands annually. At this rate, it is likely that there may be no wetlands left by 2040. Once a wetland is degraded, it becomes very costly and almost impossible to restore it to its original ecological state (NEMA, 2017). According to the 2015 wetland cover data set, 8.9% of wetlands is intact, 4.1% degraded and 2.6% completely lost (SPR, 2018).

The wetland catchment area around Lake Victoria alone shrank by more than half, from 7,167.6 km2 in 1994 to 3,310 km2 in 2008. The wetland catchment of Lake Kyoga has also fallen from 15,008.3 km2 in 1994 to 11,028.5 km2 in 2008 (Aryamanya- Mugisha 2011).

Causes of wetland degradation include direct sewage release into wetlands, poor management of gravity water schemes, expanding settlements, brick making, sand mining, cultivation of river bank, excessive water abstraction for industrial use, clearance of vegetation and poor agricultural practices. These activities resulted in extensive soil erosion, reduced water quality and quantity due to siltation, change of a river's course e.g. River Semliki, proliferation of invasive species such as Water hyacinth (Eichornia crassipes) and Kariba weed (Salvinia Molesta), pollution from chemicals and eutrophication.

Uganda has 12 sites designated as wetlands of international importance (Ramsar sites) within a surface area of 454,303 ha. The Ramsar sites are also important bird areas and attract hundreds of birders from across the world and from within the country.

The estimated requirement for restoration of wetland coverage is 1,180,830 ha. This translates into 90,833 ha per year. The estimated cost is UGX `14 trillion in 13 years which translates into annual invest of UGX 1.076 trillion.

Climate change: The rising temperatures, as well as more erratic and extreme weather events are likely to take a disproportionate toll on Uganda. The impacts of climate change (droughts, floods, storms, heat waves and landslides) will most likely reduce the benefits derived from the natural resource base and this will have serious consequences on agricultural production, food security, forests, water supply infrastructure, health systems, incomes, livelihoods and overall development. Since 2010, rainfall variability in Uganda alone has caused crop yield losses worth an annual equivalent of US$6 billion/year (MWE 2015).

Air Pollution: Air pollution is one of the leading global public health risks, however, its magnitude in many developing countries' cities is not fully known. For Uganda, data on air pollution is sparse and there is currently no framework for monitoring and regulating air pollution. Yet, Kampala has the second worst air quality in Africa (AirVisual, 2018). Recent studies carried out on air quality in Kampala indicated that the concentrations of particulate matter (PM2.5) were three times higher than the WHO air quality guidelines for ambient air (25 μg/m3). In general, the air pollution problem is attributed to emissions from increasing municipal and industrial activities, particularly from increased traffic and reconditioned motor vehicles, and other anthropogenic activities.

Following recent environmental management reforms in Uganda, there is a strong need for support in facilitating implementation of a green growth strategy in the country attempting to decouple their expected industrialization and urbanization from the historically correlated environmental degradation. Among others, the Environment Act proposes redesigning of existing industrial plants, introduction of new and appropriate technologies, developing guidelines to reduce/ minimize existing sources of air pollution. The 'Uganda Green Growth Development Strategy (UGGDS)' aims to ensure that the goals of the Uganda Vision 2040 are attained in a sustainable manner, highlighting also the need for sustainable agriculture production through the greening of the value chains of strategic commodities. Absence of adequate data and air quality regulations, therefore is a great hinderance in

conducting air pollution impact assessment on human pollution health as well as implementing quality monitoring and enforcement strategies.

2.2 Increase productivity, inclusiveness and wellbeing of Population

Water, sanitation and Hygiene

Importance of potable water and improved sanitation and hygiene practices leading to healthy Ugandan for improved productivity cannot be over emphasized. However, during the period of NDP II (2016-18) the coverage of urban population with drinking has increased very marginally from 73% percent in 2016 to 77% in 2018. The growth in rural areas has been much more abysmal with only an increment of 3% during the period 2016-2018 from 67% to 70%. 66% of the villages had improved water sources (SPR, 2018). In the area of sanitation, the progress has been quite stagnant. The progress in population practicing handwashing has remained almost stagnant at 36% during the NDP II. This shows that NDP II target for rural safe water supply is unlikely to be met by 2019/20. The population growth rate of 3.0% per annuum is higher than the rate of investment.

The situation of WASH in school has also not made any notable progress during the NDP II period. The pupil stance ratio of school toilet remained at 70:1 as against national norm of 40:1. The situation of WASH in Health Facilities remains at much worse condition causing poor infection prevention environment. Poor WASH conditions are the primary reasons for large number of preventable diseases which is addressed will not only reduce the cost on Health expenditure but also will create a healthy Ugandan who will be more productive. It may be noted that the need for quality WASH needs to be provided for all Ugandans right through the life cycle including at the early age of child in view of evidence that poor WASH conditions impact the development of a child manifested through stunting and repeated bouts of diarrhea.

The districts with lowest safe drinking water coverage are those in water stressed areas where the ground and surface water potential is very low. Table 1 shows 25 districts that have the lowest coverage in the country. To raise safe water coverage in these districts to national level will require substantial investment in expensive technologies.

Table 2: Districts with lowest basic safe water coverage

	District	Coverage	
		2017/18	2015/16
1	Kyegegwa	33%	36%
2	Buvuma	34%	35%
3	Kakumiro	35%	NA
4	Rakai	37%	41%
5	Sembabule	37%	35%
6	Isingiro	39%	34%
7	Mubende	39%	32%
8	Buyende	39%	39%

9	Kisoro	43%	43%
10	Kiruhura	44%	38%
11	Lyantonde	46%	45%
12	Yumbe	47%	45%
13	Wakiso	47%	42%
14	Kaliro	50%	64%
15	Amudat	50%	35%
16	Pakwach	54%	N/A
17	Mayuge	55%	53%
18	Namutumba	59%	62%
19	Ibanda	60%	64%
20	Bundibugyo	60%	58%
21	Nakapiripirit	61%	60%
22	Namayingo	61%	51%
23	Kyankwanzi	61%	50%
24	Kasese	61%	57%
25	Kagadi	61%	NA

Source: SPR 2018 and SPR 2016

The Joint Monitoring Program (JMP) report (2017) on Sustainable Development Goal (SDG # 6), universal and equitable access to safe and affordable drinking water by 2030 shows that Uganda is unlikely to meet this target unless there is substantial increase in the level of investment. The report shows that in 2017, Uganda was at 36.8% rural drinking water basic service, 35.9% limited service and 4.5% safely managed service.

It is also noted that only 66% of rural villages are provided with safe water source with only 85% of water systems are functional at any given point of time. Hence there is need to augment the resources for accelerating coverage in the rural areas. At the same time there is need to provide more attention to strengthen the functionality of water systems. Various models tried for strengthening operation and maintenance system including community-based management system has led to limited results and there is need to refine these approaches in order to build upon the efforts made so far leading to improved functionality of water system.

The introduction of functionality assurance PPPs is imperative in the NDPIII period, and the establishment for Rural Water Utilities, and affordable price plans to balance maintenance costs, within public-private-partnership O&M frameworks should be prioritised.

MWE (2018) using macroeconomic models estimated the gap to reach the SDG target by 2030 as 47,349 villages without safe water sources, 28,780,503 people without improved water source and 52,272,805 without safely managed drinking water. 68,785 rural water sources will require maintenance by 2030. It estimated increased funding up to UGX 4.1 trillion per year to address this gap.

The NDP II target is to increase urban water supply from 77 percent (2012/13) to 95 percent (100 percent NWSC towns) (2019/20). As of June 2018, the population using an improved drinking water source in urban was 77%. However, 60% and 83% complied with *E. coli* standards in small and large towns respectively. This means that the real safe water coverage (urban) that meets national standards is lower than the 77%.

Sanitation: The NDP II did not provide specific targets for rural and urban sanitation. However, according to the SPR (2018) access to rural (basic) sanitation was 79%. 8% of the rural population was practicing open defecation. In urban areas, access to basic sanitation facilities (improved and unimproved) was 87.4%. However, the population with access to improved sanitation facilities not shared with other households was 36.3%. 12.6% of urban population (1.2 million) was practicing open defecation. Hand washing facilities stood at 36.5% and 39.6% for rural and urban areas respectively. UNHS (2017) reported that only 6.2% of the households had hand washing facilities with water and soap. Table 3 presents the districts with lowest sanitation coverage.

Table 3: Districts with least sanitation coverage

	District	Percent
1	Kotido	13%
2	Moroto	15%
3	Amudat	25%
4	Napak	30.5%
5	Kaabong	31%
6	Nakapiripirit	36.4%
7	Buvuma	38%
8	Gomba	55%
9	Nakasongola	57%
10	Bukomansimbi	57%
11	Pader	59%
12	Lamwo	59%
13	Kyankwanzi	59%
14	Namayingo	61%
15	Abim	61%

Source: SPR 2018

The national pupil stance ratio was 73:1 and 40% of the schools had functional hand washing facilities. A study by USAID/Sanitation for Health (2018) found 62% and 39% of the public and private schools had pupil stance ratio of 40:1 respectively.

The JMP report (2017) indicated that in urban areas, 41.7% had limited sanitation service and 26.1% had basic service. 27% had limited service and 34.3% had basic hygiene service. In rural areas, 10.4% had limited service and 16.2% basic sanitation. 33.2% had limited service and 17.3% had basic hygiene service.

WASH in Health Care Facilities: It is ironic that Health facilities meant to provide good health care are not adequately equipped to ensure appropriate infection prevention control environment due to lack of poor WASH environment.

For instance, in West Nile, 85% of healthcare facilities had limited water supply due to lack of reliable water source within their premises and relied mainly on rain water harvesting during the rainy periods. The sanitation status was also of significant concern, whereby in the West Nile region 92% of the HCFs provided limited sanitation services. Majority of the healthcare facilities visited had ordinary pits/drainable latrines for use by patients/caregivers and staffs. Some latrines were not useable or did not meet the needs of specific groups (staff, women and people with limited mobility). None of the toilets/latrines had provision for lighting at night.

Majority of healthcare facilities had no provision for the disposal of placentas and the latrines were used as placenta pits.

These findings were corroborated by Makerere University, Emory University, and WaterAid Uganda (2019) which reported that 85.2% of the health centres in Kampala had limited sanitation facilities and 13% had unimproved sanitation facilities. The same study reported that 48.1% of the HCF had limited water supply, 46.3% had basic and 5.6% had improved water supply.

This shows that investment in WASH services provision for healthcare facilities is required to improve patient's safety, enhance staff motivation and retention, reduced child mortality and morbidity and prevent WASH related diseases.

Municipal Waste: KCCA collects about 1300 tonnes per day which translates into 468,000 tonnes per annuum. It is estimated that 68% of the solid waste generated is collected and safely disposed of. The construction of Kampala solid waste treatment plant is in advanced stages of completion at Bugolobi.

MWE (2018) using macroeconomic models estimated the gap as 610,906 tonnes per year for solid waste disposal, 47,595,980 people requiring improved sanitation, 51,151,465 requiring safely managed sanitation, 35,532,276 people for hand washing at home and 12,296,652 people for hand washing at school by 2030. The model estimated UGX 2.9 trillion required for improved sanitation, UGX 2.1 trillion for hand washing at home and UGX 160 billion for hand washing at schools.

Analysis based on SDGs shows that only 20% of the urban population is using safely managed drinking water services located on premises. In Kampala City only 38% have water on premises (KCCA, 2018). The JMP report shows that in 2017, 59.4% of urban population had basic service, 17.8% had limited service and 15.7% had safely managed service. This shows that if the investment is not increased to UGX 4.1 trillion per year, the SDG targets will not be met by 2030.

2.3 Objective 4: Strengthening the private sector to drive economic growth

The private sector plays a crucial role in water, environment and natural resource sector in terms of implementation, financing and degradation. It plays a critical role in the value chain of water, sanitation, environment and natural resources products and services. However, the local companies/ firms' capacity remains weak in terms of financial, technical and organizational capacity. This calls for deliberate effort to develop the capacity of local companies/firms through training, apprenticeship, reservation schemes and regulation.

2.4 Strengthening the role of the public sector in the growth and development process

The public sector plays a crucial role to the growth and development of the water, environment and natural resources sector. It defines the strategic direction, planning, policy formulation, setting standards and governance. However, the public sector

remains weak in terms technical skills, enforcement and governance. The situation is worse in newly created local governments which have failed to attract the required technical staff (Engineers and technicians).

The institutional arrangements particularly for sanitation remains fragmented in many ministries which affects performance accountability. Ministries, Departments and agencies operate in silos with no synergies between them. This has affected the coordination of programs leading to duplications and wastage of resources.

2.5 Analysis risks, threats and opportunities

In this section presents the analysis risks and opportunities related to water, environment and natural resources to the objectives and programs of NDPIII. Table 4 provides a summary of the analysis under each of the 19 programs of NDPIII.

Table 4: Analysis risks, threats and opportunities of water, environment, natural resources and climate change program in relation to other NDPIII programs

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
Enhancing value addition in key growth opportunities	Agro-Industrialization (productivity, production, storage, exports and value addition), livestock/animal resources and fisheries; vegetables, fruits and fruit products; and grain and pulses)	• Deforestation – greatest challenge in land use in Uganda: -Forest cover is being converted to low agriculture productivity; • Wetland encroachment for agriculture production; • Degradation of soil fertility and quality especially due to unsuitable varieties of seed and crops promoted which drives farming to more fragile ecosystems (such as wetlands) in search of fertile soil; • Water resources – insufficient water for production and inadequate catchment management; • Climate change – drought can threaten productivity: -Carbon emissions from production; • Low aquifer yields and weak hydro-geology in some areas; • Inadequate irrigation infrastructure; • Inadequate safe water supply for human use; • Droughts and floods disrupt the supply system; • Water pollution from agro-chemical substances; • Alteration of rainfall patterns (heavy and multiple); • High demand for water for production	Mitigations: • Sustainable land-use planning – public sector strengthening for multi-sectoral coordination/ coherence (lands, production, environment; • Integrated Water Resources, and Catchment Management; • Stabilization of the hydrological cycle and micro-climates; • Proper Sanitation and Hygiene ensures limited or no transmission of preventable diseases thus improving on health of the work force and saving productive time Opportunities: • Advancing water supply for production and human use • Capacity building for behavior transformation theory of change (e.g. farming practices and charcoal production); • Value addition of locally appropriate non-wood forest products and crops that provide environmental services – agricultural produce: honey/apiary, shea nut, etc.); • Wetland preservation for ecosystem sustainability; • Increased hydropower generation; • Planning for high demand water users like the beverage industry (beer, soft drinks) and their associated large waste water foot print **Innovations:** • Design and Promote of Climate Smart Agriculture; • Circular economy (looking at waste to value chains); • Increase access to sustainable energy for productive uses;

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
			• Good hydrogeology and productive aquifers in most areas; • Technology options are well known and available; • Agro-forestry to improve yields while maintaining cover;
	Mineral-based industrialization	• Pollution from extraction and refining – water and air pollution; • Potential degradation of high-value biodiversity sites (special concerns around Albertine region; • Carbon emissions from production; • Flood disruption of supply chain; • Inadequate water for production; • Water and sanitation related diseases affect the health and productivity of laborlore.	<u>Mitigations:</u> • Waste Water Management; • Regulation of private sector for emissions and effluent discharges; • Protection of ecologically sensitive sites for eco-tourism; • Increase access to sustainable energy (hydropower) for productive uses; • Catchment Management; • Proper Sanitation and Hygiene ensures limited or no transmission of preventable diseases thus improving on health of the work force and saving productive time. <u>Opportunities:</u> • Water supply for: Hydro-fracturing/ hydraulic fracturing during mining, and coolant for machinery; • Sustaining Clean water supply for human use (workers); • Private sector investment in affected communities and eco-systems; • Increase access to sustainable energy (hydropower) for productive uses;
	Manufacturing	• Deforestation threatening the supply of timber and other forest products; • Unsustainable exploitation of natural resources (fishing immature fish); • Increased Carbon emissions; • Industrial Waste Management - pollution of land, air and	<u>Mitigations:</u> • Consolidation of water infrastructure O&M framework ensuring reliable supply for manufacturing industries; • Regulation of private sector for emissions and effluent discharges; • Integrate Water Resource Management/Catchment Management; wetland developments;

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
		water; • Need for sustainable water for production; • Water-borne disease affecting labour productivity; • Inadequate safe water and sanitation services to most of the population with industrial potential due to absence of water distribution infrastructure in many urban and rural areas; • Excessive down-time: Safe water infrastructure is not reliably operational / functional due to frequent and prolonged down-time;	Opportunities/Innovations: • Private sector investment in affected communities and eco-systems; • Increased access to sustainable energy for productive uses; • Supply for industrial raw materials (timber, shea butter etc); • Extended industrial developments in crafts and housing; • Revenue of feed materials for agriculture (manure) and energy.
	Export Development and Promotion	• Pollution of water bodies affecting fish exports; • Outbreak of diseases like cholera; • International public perception of unsustainable or inequitably produced exports; • Climate Change causing drought and floods which affect agriculture exports;	Mitigations: • Promotion of Sustainably produced/ certified goods for international markets such as FSC certified wood products, bamboo organic produce, pulse for the rapidly expanding non-meat protein market (e.g increasing demand for peas, pulses, and nuts; • Consolidation of water infrastructure O&M framework ensuring reliable supply for agro-export industries; Opportunities: • Market and promote potential products that deliberately support communities and biodiversity (e.g. Gorilla conservation, agro/ livestock produce, waste recycle Excess hydropower supply.
	Tourism Development	• 9% of GDP is from tourism largely related to eco-tourism; attractions must be protected; Loss of Habitat and Degradation of Protected Areas by industry and community encroachment, urbanization; • Inadequate WASH infrastructure including lack of	Mitigations: • Strengthen governance and multi-sectoral coordination for greater protection/enforcement, regulation of private sector; • Promote/protect urban forests e.g. Entebbe (being used for waste a disposal);

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
		sanitation facilities along the highways.	• Community supports for alternative livelihoods; Opportunities: • Potential for Eco-system conservation, advancing tourism, and wetlands sustainability (11 wetlands designated as Ramsar Sites); • Private sector investment in affected communities and eco-systems; • Improvement of infrastructure for tourism (e.g. water & sanitation, renewable energy, roads); • Continuous water supply for human consumption.
Strengthen private sector capacity to drive growth and create jobs	Private Sector Development	• Over-use of natural resources; • Insufficient enforcement and protection of natural resources; • Weak management capability; • Weak vocational training base; • Weak regulation and failure to set standards; • Weak public information related to standards, and regulations; • Weak enforcement of regulations and standards;	Mitigations: • Preservation and preference schemes for local contractors/ service providers; • Create strategies to enable and regulate private sector; • Integrated Water Resource Management/ Catchment Management; Opportunities: • Public- private partnerships; • Capacity development for private sector: - Setting of Training institutes focused on business skills, professional management and accountability structures; • Participation in value chain e.g. water and sanitation value chain (O&M, emptying, transportation and treatment of faecal sludge) • Integrate private sector into rural Water Utility development plans and water infrastructure O&M functionality; Innovations:

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
			• Private sector levies for consumption of natural resources;
	Skills Development	• Lower education rates contribute to both high population growth and increased environmental pressure: Access to primary and secondary education is critical to address root causes of environmental degradation - especially poverty and population growth. • Poor sanitation, and hygiene affect girls' enrolment and retention in institutions;	• Capacity development for small urban and rural water utilities (knowledge translation through trainings); <u>Mitigations:</u> • Standards monitoring and regulation enforcement; <u>Opportunities:</u> • Training for Climate Resilient practices and technologies; • Capacity development for governance and regulation of rural water utilities; • Capacity development for hygiene and sanitation improvement; • Regulatory skills in rural public service delivery; • Technician and engineering skills in rural and small urban water supply Operation and Maintenance, water treatment and quality monitoring; • Administration and management skills in rural water financing; • Skill development to meet the skill gaps in operation and maintenance of WASH infrastructure in community and institutions <u>Innovations:</u> • Creation of appetencies for Innovative WASH, on- job trainings and internships;
	Technology Transfer, Adoption and Development	• Low rates of adoption of biomass energy-saving technology such as: stoves and solar; • technology suitable for sustaining O&M and reliable functionality of rural and small-town water supply and sanitation	<u>Opportunities</u> • Enabling environment for technology transfer: -Behavior change campaigns; • Transfer of technologies for safe management of water supply e.g. Solar pumping of water, pre-paid automatic water

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
			dispensers and software, water treatment and quality monitoring. Innovations: Development of technologies to ensure financial sustainability and management of safe water supply e.g. • solar pumping of water • pre-paid automatic water dispensers and software water treatment and quality monitoring
Consolidate & increase stock and quality of Productive Infrastructure	Transport and ICT Interconnectivity	• Increasing carbon emissions from transport sector: - extremely poor air quality in Kampala; • Inadequate systems for management of e-waste; • Limited climate resilient infrastructure (roads, bridges, culverts etc.); • Rapid siltation and sedimentation of Rivers and Lakes; • Increasing Water weed/hyacinth;	Mitigations: • Integrate cleaner production in development plans including direct financing; • Design and uphold lower carbon transportation options (such as SGR); • Revision of national standards to ensure climate resilience; • Regulation, and enforcement on tailpipe emissions (pollution tax); Innovations: • Development of regional e-waste management facilities/centers of excellence.
	Sustainable Energy Development	• Deforestation: - High biomass consumption; • Destruction of water falls for electricity generation; • Poor quality solar assets; • Proliferation of solar e-waste; • Combustion of energy fuels producing carbon emissions; • Catchment degradation; • Siltation and sedimentation of Rivers;	Mitigations: • Adoption of energy efficient technologies should be part of the National Development Plans and strategies; • Hydropower generations Opportunities/Innovations: • Design Economic instruments to increase access/affordability of energy (green funds, subsidizes); • Enhance multi-sectoral coordination. • Biomass energy • Use of solar energy in water pumping and distribution

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
			• Creating wealth from waste (faecal sludge management through fuel briquettes) and solid and liquid waste management for productive use/recycle/reuse
	Sustainable Urban Development	• Rapid Population growth, and urbanization - urban centers contribute 70% of GDP; • Urban poverty – planning is a big gap and allocation of resources – deliberate urban planning and budget allocation not just for districts but for cities; • Inadequate WASH infrastructure; • High Waste production and environmental nuisance; • Shortage of faecal sludge treatment plants outside Kampala.	<u>Opportunities:</u> • Integrate structural development with green spaces, safe walk ways; • Increase quality water distribution and clean energy; • Improve and sustain solid and liquid waste management. • Proper Sanitation and Hygiene ensures limited or no transmission of preventable diseases thus improving on health of the work force and saving productive time • job creation for the large youth population in line with water and sanitation <u>Innovations:</u> • Earn from waste segregation; • Advance recycling and re-use industries.
Increase productivity, inclusiveness and wellbeing of Population	Human capital Development	Inadequate skills/expertise i	• Capacity development for small urban and rural water utilities • Capacity development for governance and regulation of rural water utilities • Capacity development for hygiene and sanitation improvement • Creating employment opportunities through various products related to water sanitation and hygiene • Capacity development for environment and natural resources. • Employment opportunities based on natural resources-based industries • Employment opportunities from Tourism sector which is mainly nature based

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
			• Proper Sanitation and Hygiene ensures limited or no transmission of preventable diseases thus improving on health of the work force and saving productive time
	Gender & Social Protection	• Sustained Environmental degradation will affect most women and girls who largely depend on natural resources for their survival;	Mitigations: • Incentive measures to support natural-resource dependent communities e.g. Payment for ecosystem services; • Address root causes of poverty – Education, Fair wages etc. • Safe water supply to reduce burden on women and girls. • Women and Child friendly WASH infrastructure in community and institutions including those who are differentially abled • Gender mainstreaming in WASH and ENR • Menstrual hygiene management • Sanitation and hygiene to reduce disease burden • Pro-poor tariff structure for safe water supply
	Environment, Climate Change and Natural Resource Management	• Continued Environmental degradation: - insufficient screening and mitigation at design phase; • Inadequate budget appropriation for mitigation measures, and catchment management. NDC – Uganda is focusing on adaption rather than mitigation, increasing resilience, mainstream climate resilience and adaption, prioritize ecosystem-based adaption approaches to address issues of landslides and draughts etc.; • Limited finances for institutional latrines O&M: - Only 33% of public schools provide funds for O&M for latrines, and only 7% of them provide adequate funds (World Bank, 2017); and Only 17% of school latrines had ever been emptied (World Bank, 2017); • Information gap on existing policy – NDC, NCCP; advocate for 30% national contributions and 70% international – need a mobilization tool to financing flor	Mitigations: • Monitor and evaluate Environmental laws, and regulations (environmental screening / planning / adequate budget appropriation for projects) for compliance; • Strengthening of public sector regulation; • Integrated Water Resource Management/Catchment Management: -Financing of catchment management plans; • Provision of WASH to the unserved communities • Sustain the WASH infrastructure created through various mechanisms ensuring achievement of SDG (especially 6.1 and 6.2) • Proper Sanitation and Hygiene ensures limited or no transmission of preventable diseases thus improving on health of the work force and saving productive time • Integrated approach to onsite sanitation and faecal sludge management • Develop models that KCCA can use for early warning and mitigation measures

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
		climate change for National Climate Fund; • Weak O&M policies, procedures, regulations, and activities: - Ad-hoc water prices that hinder access to safe water, and industrial potential; • Onsite Sanitation polluting ground water. • Water resource pollution increasing cost of treatment for drinking water • Lack of faecal sludge treatment facilities in rural areas • Flooding in Kampala City • Operation and maintenance of Water for production facilities	• Strategy for addressing O&M gaps <u>Opportunities:</u> • Capacity building for CSOs and GOU to access Global Environmental Facilities for Climate Adaptation – CSOs need to design projects to access global funding; • Income source from the organic fraction of domestic waste (fertilizer and energy production); • Implementation of the National O&M framework.
Strengthen the role of the State in development	Defense, Peace and Security Program		
	Legislation, Justice, Law, and Order Program	Governance / Capacity / Human Resources – good laws but lack of capacity to implement/enforce; Legal framework for climate mitigation and adaption incomplete/in progress	<u>Mitigations:</u> • Mainstreaming of ENRCC in planning, budgeting, implementation and monitoring across sectors; • Implementation of the new National Environment Act Climate Change Bill Needs to be finalized; • Strengthen governance of Integrated Water Resource Management/Catchment Management Committees – enable enforcement through community structures.

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
	Community Mobilization and Mindset change	• Behavior change for sustainable cooking - alternative technologies: energy-saving stoves and cooking baskets; • Behavior change for environmental protection and restoration (wetland encroachment, tree-growing, agroforestry).	Mitigations: • Behavior change and marketing campaigns for ENRCC-related issues; • WASH being a vehicle for Behaviour change and social transformation and Social and behaviour change communication being an integral part of WASH interventions. • Recognition of regulated pricing of water being a lesser burden than ad-hoc pricing • Recognition of regulated water pricing being a benefit to household income through savings in health costs and increases in productivity •
	Public Sector Transformation	• Inadequate funding for Districts: – operational level of the public sector, key for implementation and enforcement; • Deficiency in multi-sectoral coordination for land-use management, and responsibility, Inter-agency coordination – MDAs, e.g. MLHUD land titles in wetlands; • Policies are not implemented effectively nor updated; • Multiplicity of uncoordinated sponsors and aid agencies /development partners creating an unmanageable workload for government offices with coordination duties • Inefficient Procurement procedures thus missing management of failing to ensure efficient use of public funds, effective service delivery, and willingness to pay for service by population. • Sector capacity in regulation of rural water utilities and public private partnership development and management • Capacity in water pricing regulation • Inadequate sector coordination • Weaknesses in sector governance	Mitigations: • Implement transparent measures for National Capital Accounting; • Transit to performance- based PPP out-sourcing with private-sector service providers vs traditional procurement procedures; • Evaluation of the real cost of public administration and service delivery • Scheme Sub-programs and projects to ensure feasibility and standardization; • Design Regional Development Investment Boards (government, and major development partners) to coordinate aid, charity, and public funds for public sector transformation; • Sector capacity in regulation of rural water utilities and public-private partnership development and management; • Capacity in water pricing regulation.

Objective	Program	Risks/Threats/Issues	Opportunities/ Mitigation /Innovations
	Development Plan Implementation Program	• Need for multi-sectoral coordination to ensure "sustainable" industrialization that effectively mainstream ENRCC across programs;	• Documentation of intervention that is successful, lack of benchmarks.

2.6 Sector Financing

The analysis of the water and environment sector since the start of NDP III is presented in Table 5 and figures 1 to 4. It is evident from Table 5 that the funding gap is increasing and will hit UGX 7.999 trillion per year by 2029/30 if the current level of funding does not change substantially. Figure 1 shows declining share of the MWE budget. Figure 2 shows falling amount of grants and increasing loans to the sector. This shows reduced donor interest in funding the sector. Figure 3 shows that more than half of the sector budget is allocated to urban water supply yet less than a third of the Ugandan population live in urban areas.

Table 5: Funding trends for water and environment sector

	2014/15	2015/16	2016/17	2029/30
Gap	165.29	61.823	3,380	7,999
Requirement	676.47	811.423	5,120	10,000
Budget	511.2	749.6	1,740	2,001

Source SPR, 2018

*Figure 1: **MWE share of the national budget (2015/16 to 2017/18)***

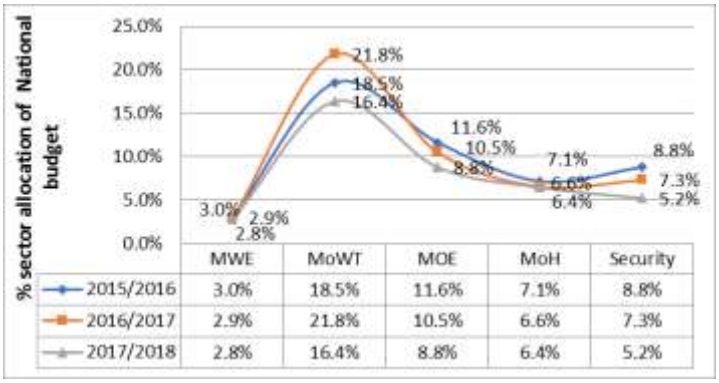
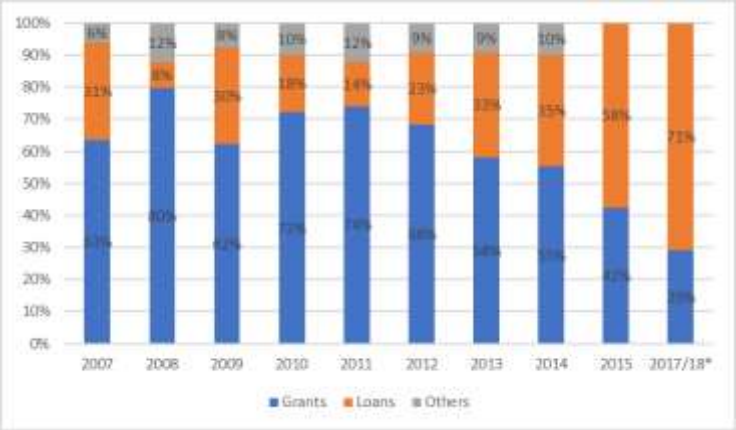
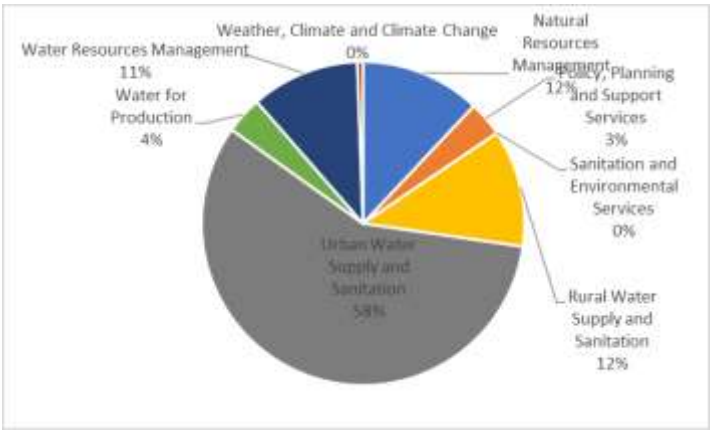


Figure 2: **Trends in routes of development partner support to the sector since 2007**[1]



Source: *UNICEF 2019 (unpublished)*

Figure 3: **On-budget development allocations to the WASH sector from 2015 to 2018**



Source: *UNICEF 2019 (unpublished)*

A study conducted under the development of the National Biodiversity Strategy and Action Plan II showed that the funding gap for ENR was $440 million

[1] Data for 2007-2015 derived from the OCED-DAC data-base. Data for 2017/8 derived from the mapping of development partners funds undertaken by the MWE.

2.7Value Chain Analysis

Table 6 shows the Value Chain Analysis for water supply starting with water catchment management, water harvestings and storage, water treatment, water transmission, distribution and waste water treatment.

Table 6: Value Chain Analysis for water supply

	Water Catchment Management	Water harvesting and Storage	Water Treatment	Water transmission	Distribution and utilization for production and domestic use	Waste water collection, treatment and safe disposal
Activities	• evelop catchment management plans • estore and protect water catchments • evelop and enforce regulatory frameworks • stablish and build capacity of catchment governance structures • ommunity mobilisation and participation in catchment protection • round water recharging	• rocure earth moving equipment • onstruct communal and private multi-purpose water storage reservoirs for domestic, irrigation, livestock, aquaculture, industry and the environment use • ehabilitation of old reservoirs • cientific ground water source finding for reliable and sustainable ground water source for both drinking and production purposes •	• ontrol Water pollution • et up low cost water treatment facilities • nforcement of water quality standards •	• stablish multipurpose infrastructure for bulk water transfers • mprove functionality of water infrastructure • ehabilitate/ upgrade existing water supply infrastructure • onstruct piped water supply systems • sset management	• onstruct mini micro irrigation schemes and large irrigation schemes in strategic areas • et up Management/ governance system • ormulate affordable tariff regulations for rural water supply & WfP • romote integrated planning	• onstruct waste water treatment plants • ecycle waste water and reused for domestic and industrial purposes • nforce safe disposal of waste water

Constraints/ issues/challenges	• egradation of catchments • oor enforcement of existing laws and regulation • nadequate technical and financial capacity of implementing agencies •	• igh cost of water reservoirs • eak management/ governance structures • limate change • imited water storage facilities at household and community levels • ver exploitation of water resources	• igh costs of water treatment caused by sedimentation and heavy load of nutrients and minerals • oor sanitation (E-coli) • egradation of water catchment	• igh costs of network maintenance • Weak capacity for O&M • nadequate financing for capital replacements and expansion • limate change (floods and droughts)	• nplanned urban growth • ack of tariff regulations for rural water supply • eak governance structures • olitical will	• eak enforcement – unsafe waste water disposal in open drains, rivers and lakes • ultural practices
Actors	MoLG, MWE, LGs, NEMA, NFA, MoLHUD, Communities CSOs	MWE, private sector, LGs, MoAAIF, MoTI CSOs	MWE, UNBS, NWSC, private sector CSOs	MWE, NWSC, private sector CSOs	MWE, private sector, LGs, MoAAIF CSOs	MWE, private sector, LGs, MoAAIF, MoTI CSOs
Potential projects	Restoration and protection of water catchments Development of catchment and sub catchment management plans for	Water for production Rural Water Utilities,	Water treatment plants	Regulation of functionality assurance through O&M PPPs Establishment of Rural Water Utilities Multipurpose bulk water supply Financing of capital replacements	Irrigation systems	Waste cycling plants

Table 7: Service Value Chain Analysis for Sanitation

	Containment	Emptying	Transportation	Treatment	Reuse/disposal
Activities	• Construction of sewerage systems • Construction of water bore toilets (septic tank) • Construction of lined and unlined pit latrines	• Sewerage network • Cesspool emptier trucks • Gulpers • Manual emptying • Pit covered and closed	• Sewerage network & pumping station • Cesspool emptier truck • Transfer stations	• Faecal Sludge Treatment Plant • Waste Water Treatment Plant	Reuse of treated Faecal Sludge to make compost (soil conditioner), energy - briquettes, etc) and disposal in the environment
Constraints/ issues/challenges	• High cost of sewerage systems and lined pit latrines • Cultural practices which promote open defecation • Weak enforcement of public health Act • Weak supply chain networks especially in rural areas	• Lack of emptying services in rural areas • High cost of emptying services • Majority of Treatment plants not designed to receive sludge from unlined pits • Unregulated Pit emptying	• Lack of cesspool emptier truck in rural areas • High costs of trucks	• Lack of FST plants in small towns and rural areas •	Limited awareness and market for the products Limited knowledge on technologies for production of the different products Existing

					national Standards do not favour the use of faecal sludge
Actors	MWE, NWSC, MoH, Urban Authorities, MoES, Institutions (schools, health units etc), households, suppliers of material and sanitation entrepreneurs CSOs	MWE, NWSC, MoH, Urban Authorities, MoES, Institutions and sanitation entrepreneurs CSOs	NWSC and sanitation entrepreneurs CSOs	MWE, NWSC, MoH and sanitation entrepreneurs CSOs	NWSC, Urban Authorities and sanitation entrepreneurs, farmers and households
Potential projects	Safe disposal of faecal waste Financing of improved toilets	Regulation of FS emptying services in urban authorities	**Financing options for Sanitation entrepreneurs**	Regional and Decentralised Feacal sludge treatment plants	**Review of standards for the use of faecal sludge**

Table 8: Service Value Chain Analysis for Solid Waste Management

	Generation	Storage	Collection	Transportation	Treatment/ processing	Reuse/disposal
Activities	• treet littering • omestic waste • ndustrial waste • usiness waste • edical waste	• orting by type of waste • rovision of skips • urchase of garbage storage containers	Collection by • unicipal/town Authorities • rivate collectors • treet pickers • ired labour	• unicipal trucks • ompany trucks • treet pickers • heel barrow/ bicycle transporters	• onstruction of waste treatment plant • orting of waste by type	• aste recycling into various products including manure, briquettes, crafts • onstruction of landfills/ dumping sites

			• umping in opened drains and spaces			
Constraints/ issues/challenges	• ittering of waste •	• ack of waste storage containers • aste is not sorted by type	• ow wiliness to pay • oor infrastructure • imited capacity of collectors	Use of inappropriate trucks to transport waste causing litter and air pollution	Lack of incinerators for medical waste	Air and ground water pollution by landfills
Actors	Households, owners of businesses and Urban Authorities CSOs	Households, institutions and Urban Authorities CSOs	Urban Authorities, Street pickers, companies and causal labourers CSOs	Urban Authorities, Street pickers, companies and causal labourers CSOs	Urban Authorities	Urban Authorities
Potential projects		Provision of garbage skips to urban towns		Provision of garbage trucks and earth moving equipment	Waste treatment plants	Waste recycling plants

Table 9: Value Chain Analysis for Environment and natural resources

Forestry

	Production	Harvesting	Transportation	Processing	Storage	Value addition	Marketing	Ecosystem services
Activities	• seeds production and multiplication • stablishing nursery beds • tree planting • maintenance of forests • enforcement	Procurement of saw mills Harvesting of trees	Hire trucks Transportation of timber	Establishment timber processing plants	• stablishing storage facilities for timber products • reservation of the timber	• kills development • cquiring modern technology • stablishing and equipping workshops	• establishing outlets/ stores • export of timber and other products	• carbon trading • ecotourism • Herbal medicines
Constraints/ issues/challenges	• encroachment on forest land • forest fires	High cost fuel	Poor infrastructure – roads	High cost of power	Lack of modern storage facilities	Lack of skills and technology	Barriers to exports	Limited market
Actors	NFA, MWE, farmers	NFA, private companies, farmers	Transport companies, farmers	MoTI, private companies, urban authorities	Urban Authorities, private companies	MoTI, UNBS, private companies	MoTI, UNBS, private companies, Urban Authorities	NEMA, MoTWLA, farmers

Potential projects	Commercial tree planting							

Forest Products – Shea butter

	Production	Harvesting	Transportation	Storage	Value addition/ Processing	Marketing
Activities	Enforcement – to prevent cutting of shea trees Establish plantations	Hiring labour Provision of harvesting and sun drying facilities	Hire trucks Transportation of shea butter	Construct stores	Establish plant for processing shea butter	Establishing outlets/ stores Exporting shea butter Advertising/ marketing
Constraints/ issues/challenges	Illegal cutting of shea trees	Shortage of facilities for sun drying	Poor road infrastructure	Lack of storage facilities in rural areas	Lack of processing plant	Trade barriers
Actors	NFA, LGs, Communities, farmers CSOs	Farmers CSOs	Farmers and transporters	Farmers. Private companies CSOs	MoTI, UNBS, private companies CSOs	MoTI and private companies
Potential projects	Shea butter development					

2.8 Policy and legal framework

The water and environment sector has well established policy and legal frameworks but the challenge remains with lack of capacity to implement them. The areas that require reforms include:

Refugee response: Uganda is host to over 1.2 million refugees primarily living in rural settlements across 11 Districts in north, and south of the country. The Government of Uganda is in the process of developing a Comprehensive Refugee Response Framework including a Water and Environment Refugee Response Plan (WERRP) led by MoWE and Energy Response Plan led by MEMD among other sectoral plans. Increasingly, service delivery for refugees is being included through national systems including health, education and water supply. To date, two refugee settlements have been gazetted to National Water and Sewerage Corporation and eventually all settlements will shift to a utility approach. Similarly, refugee host communities are being included in catchment management planning. Environmental management is an ongoing challenge however, OPM, Districts, NFA, NEMA and MoWE with support from non-state actors are actively scaling up efforts to restore degraded areas, reduce demand on natural resources and promote green livelihoods. Planning and budgeting for refugees will be included in the next 5-year District Development Plans, national sector plans and NDP III.

Institutional home for Sanitation: The management of sanitation remain fragmented and it has no institutional home. The non-legally binding Memorandum of Understanding between the MoWE, MoH and MoES has not been successful in improving household and institutional sanitation and hygiene. This has contributed to continued underfunding of sanitation and lack of accountability for its performance.

Subsidy for sanitation: For the past two decades, government has maintained the policy no subsidy for household sanitation. This policy has had varying successes with some areas attaining high basic sanitation coverage and others have remained behind. The NDP III goal of inclusive growth (leave no one behind) may not be realised if this policy is not reviewed to address the barriers in areas with low sanitation coverage.

Financing operation and maintenance: Currently the emphasis is capital investment and only 10% of the budget for the District Water and Sanitation Conditional Grant is allocated for O&M. As water facilities continue to age, the maintenance is increasing beyond the capacity of communities. There is need to focus more resources to O&M of water facilities.

Inadequate financing of Sector: Currently the funding of water, environment and natural resources is 3% of the national budget and has remained stagnant since the start of NDPII. There is need for sustainable financing of ENR including Environmental Levy, Environmental Taxes, Environmental Impact Assessment (EIA) fees, Enforcement Fines and Charges, Wetland User Permit Fee, Wetland Restoration orders, Biodiversity Offsets, Water abstraction permit fees, Water source protection charge, and Effluent discharge permits fees.

3. PROGRAM COMPONENTS

3.1 Results for NDPIII

i. Increased basic safe and clean water supply to 79% for rural population and 95% for urban population by 2015.
ii. Proportion of villages with a functional water source increased from current level of 66% to at least 90 %
iii. Increased functionality levels of rural water supplies to per sub-county per quarter to exceed 97% average spot-functionality
iv. Increased basic sanitation and hygiene coverage to 70% for rural households and 80% for urban households
v. Increased level of WASH services in Schools and Health facilities
vi. Increased water for production storage capacity to 75 million cubic meters
vii. Improved quality of water resources
viii. Restored and protected ecosystem
ix. Improved air quality and reduced Industrial pollution
x. Enhanced Institutional capacities for Environment management
xi. Climate Change adaptation and mitigation
xii. Inclusion of refugee and host communities

3.2 Proposed interventions for NDP III

Programs	Proposed interventions
Agro-Industrialization	• Construct multipurpose water supply systems • Promote value addition of ecosystem products (timber, shea butter, honey etc) • Developing a strategy for addressing O&M gaps for water for production facilities
Mineral-based industrialization	• Improve air quality and industrial waste management • Enhance environment monitoring in Albertine graben • Construct multipurpose water supply systems
Tourism Development	• Biodiversity conservation • Develop tourist attractions on major water bodies, forests and wetlands
Private Sector Development	• Promote public private partnerships for both Water and Sanitation Services • Strengthen the capacity of Water and Sanitation service providers to deliver quality services to households • Job creation for the large youth population in line with water and sanitation
Sustainable Energy Development	• Integrated water resource management
Transport and ICT Interconnectivity	• Water transport development
Public Sector	• Build the capacity of central institutions and Local Governments in ENR

Transformation	• Improve the human, technical, and institutional capacity of UNMA • Training and skilling for WASH in emergencies including refugee settlements • Integrated planning within key sectors
Human capital Development	• Improving Institution Safe Water, Sanitation and hygiene (WASH in public Schools)
Skills Development	• Vocational training for operation and maintenance of existing and future WASH infrastructure. • Equip sector training institutes to produce appropriate vocational human resources
Sustainable Urban Development	• Improve waste management in towns and cities including faecal sludge management • Establish waste treatment/ recycling plants • Prioritise investment in water supply and sanitation in areas with low or no service coverage • Finalise and implement refugee response regarding water and sanitation • integrated approach towards onsite sanitation and faecal sludge management implementation • Develop models that KCCA can use for early warning and mitigation measures for floods
Water, Environment, Natural Resource & Climate Change Management	• Rehabilitate and expand existing piped water supply systems • Construct new safe water supply systems and sewerage treatment systems in unserved areas including those in schools and Health facilities • Establish multipurpose bulk water supply systems • Restore and protect water catchments • Establish affordable tariff for different categories of customers and rural water utilities for management of water systems • Improve operation and maintenance of water supply systems • Strengthen the enforcement of public health Act • Implement national climate change policy and strategy • Promote commercial tree planting • Support protection and restoration of critical and degraded fragile ecosystems • Expand and equip environmental protection force • Promote awareness and use of weather and climate information • Implement the National Climate Change Policy • Enhance mainstreaming of Environment, Climate Change and disaster risk management in planning and budgetary processes • Operation and maintenance of Water for production facilities • Implement Catchment based Water Resource Management strategy • institutionalise the O&M fund for both urban and rural water supplies • Implement CLTS and post ODF support for communities • capacity development for the sector to harness global financing opportunities existing in climate change through mainstreaming adaptation actions in sector • Financing modalities for Water resource development to focus on green finance options • Finalise the legal framework for climate change adaptation and mitigation • Strengthen research in environment and Climate Change • Restore degraded ecosystems (forests, wetlands etc) • Promote carbon credit trading • Integrated ecosystems management • Strengthen enforcement environment laws and regulations

3.4 Projects

Proposed National Program	Proposed Program Components (Sector-level)	Possible Project MDAs/Vote level	Indicative Outputs
Agro-Industrialization	Water Resource Management	Integrated Water Resource Management Sustainable Management of Rivers	Catchment Management Plans implemented Communities sensitized on hydrological cycle and micro-climates Hydropower generation for industries
	Climate change management	Climate change resilience and adaptation	Floods control facilities established
	Forest Management	Agro-forestry	Trees planned
	Water and sanitation	Safe drinking water supply and sanitation	Safe drinking water supply and sanitation systems
Mineral-based industrialization	Water for production	Water for mining and industry	Water supply systems for mining and industry
	Water resource management	Water pollution control Waste water treatment/ cycling	Permits enforced Waste water treatment plants
	Environment management	Air pollution control	GHG reduced
	Water and sanitation	Safe drinking water supply and sanitation	Safe drinking water supply and sanitation systems
Tourism Development	Water resource management	Development of tourist attractions along major Rivers and Lakes through PPPs	Tourist sites developed
	Environment management	Conservation of biodiversity	Fauna and flora conserved
	Water supply and sanitation	Safe drinking water supply and sanitation	Safe drinking water supply and sanitation systems
Private Sector	Water resource	Enforcement of laws and	Compliance with permits

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Development	management	regulations	
	Water supply and sanitation	Public- private partnerships along the value chain	PPP projects implemented
	Capacity development of private sector	Apprenticeship program for the private sector	Private sector personnel trained
Sustainable Energy Development	Water resource management	Sustainable Management of Rivers	Hydropower generated
	Forest management	Promotion of biomass energy efficient technologies	Biomass energy efficient technologies adopted
Transport and ICT Interconnectivity	Water resource management	Sustainable Management of Rivers and lakes	Navigable Rivers and Lakes
	Climate Change	Climate Change adaptation of transport infrastructure	Transport infrastructure adapted to climate change
	Sanitation	Provision of sanitation facilities along major highways	Highways with sanitation facilities
Human capital Development	Water supply and sanitation	Institutional WASH	Safe water supply and sanitation systems for public institutions (schools, HCF, public places etc)
Sustainable Urban Development	Water supply and sanitation	Safe drinking water supply and sanitation	Safe drinking water supply and sanitation systems
		Waste (solid and liquid) treatment	Waste treatment plants constructed
Water, Environment, Natural Resource & Climate Change Management	Environment Management	Sustainable forestry management	Forest reserves restored and protected
			Commercial forestry plantations
			Woodlots established
		Sustainable wetlands management	Wetlands restored and protected
			Wetlands marked and protected
		Nature based tourism development	Eco-tourism
		Improving Air Quality and	Air quality standards and guidelines

		Industrial Waste Management	developed Waste reused, recycled or reduced by industries CO2 emission equivalent reduced Private sector investments in industrial waste management mobilized Resource efficiency and cleaner production practices adopted in Industrial sector
		Institutional Capacity enhancement for Environmental risk management	Monitoring Equipment and tools purchased Computerized system for Environmental Compliance monitoring and supervision Efficiency in environmental permitting and licencing Reduced environmental degradation
	Climate Change Adaptation and Mitigation	Disaster preparedness, management and response project	Disaster preparedness
			Disaster risk reduction
			Disaster response
		Climate mitigation, adaptation and Resilience building	Mitigations implemented
			Adaptation measures implemented
	Sustainable and optimal water resources management	Lake, and River Catchment restoration and protection project	Lakes and River banks restored
		Water hyacinth/weed harvesting project	Lakes and Rivers cleared water hyacinth/ weed
		Enforcement water quality regulations	Permit compliance
		Sanitation improvement project	Safe disposal of human waste
		Ambient water quality	Ambient water
	Sustainable hydropower generation	Integrated Water Resource Management	
	Water for production	Multipurpose bulk water supply project for cattle corridor/ dry belt	Quantity of water supplied
		Water for production infrastructure	Infrastructure rehabilitated/ expanded

		rehabilitation/expansion.	
		Production rainwater harvesting project	Rainwater harvesting systems
		Public private partnerships water for production infrastructure development project	PPP projects implemented
		Solar pumping irrigation systems	Solar pumping systems
	Urban water supply	Small towns and rural growth centres water supply project	Basic safe water supply systems
		Large towns/municipal water supply rehabilitation/expansion project	Safe water supply on premise
		Public private partnership municipal water supply project	PPP water supply systems
		Urban water supply asset management project	Functional urban water supply systems
	Rural water supply	Rural unserved/underserved villages water supply project	Villages and institutions (Schools and Health Facilities) with improved water sources
		Rural water facilities rehabilitation/ expansion project	Water facilities rehabilitated/ expanded
		Domestic rainwater harvesting project	Rainwater harvesting systems
		Regulation of functionality assurance through O&M PPPs Establishment of Rural Water Utilities	
	Sanitation and hygiene	Rural sanitation and hygiene improvement project	Households with improved latrines/toilets Households with functional hand washing facilities
		Urban sanitation and hygiene improvement project	Safe disposal of human excreta
		Rehabilitation and expansion of municipal sewerage systems	Rehabilitated/expanded sewerage systems
		Faecal sludge treatment/ management	FS Treatment Plants

		Institutional sanitation (schools. health centres and public places)	Institutional sanitation and hygiene facilities
	Efficient waste management (solid and wastewater) for at least five cities and 15 municipalities	Solid waste treatment project	Treatment plants, land fills
		Municipal waste water treatment project	Waste water treatment plants
	Human Capital	Capacity building for MWE, NEMA, NFA and Local Governments and utilities	Staff recruited and trained
	Cross cutting	Gender, Governance and HIV/AIDS	Gender, governance and HIV/AIDS mainstreamed in Projects/programs
	Sustainable use biomass energy for electricity, domestic cooking and industrial energy	Promotion energy efficient cooking technologies	

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