HARAMBEE
REPUBLIC OF KENYA

MINISTRY OF WATER & SANITATION AND IRRIGATION

ANNUAL STATUS REPORT

ON

WATER, SANITATION AND IRRIGATION

Water is Life

Sanitation is Dignity

More Crop per Drop

MAY 2020

ANNUAL STATUS REPORT

PREPARED AND COORDINATED
BY
MINISTRY OF WATER & SANITATION AND IRRIGATION

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FOREWORD

The mandate of the Ministry of Water & Sanitation and Irrigation is to avail water in sufficient quantity and quality to support development of the country. The cardinal objective however, is inscribed in the Bill of Rights of the Constitution in article 43 (d) which states that every person has right to clean and safe water in adequate quantities, 43 (b) right to reasonable standards of sanitation and 43 (c) to be free from hunger and to have adequate food of acceptable quality. I would like to emphasize from the Ministry's perspective, that the constitutional requirement of these rights has been aligned with the Ministry's Policies, Plans programmes and mainstreamed at all its institutional levels. In order to be on track with all the above requirements the Ministry is implementing reforms in the Water Sector that aligns the institutional arrangements and operations to the CoK 2010 and the Water Act 2016 and Irrigation Act 2019.

Water is an important natural resource to all forms of life and their existence and is an essential prerequisite for inclusive economic growth, poverty reduction and sustainable socio-economic development. Therefore, prudent management of water resources by all concerned stakeholders is necessary for achieving the Government's aim of "ensuring water resources availability and accessibility by all". The Ministry of Water & Sanitation and Irrigation is mandated to set policies and strategies that ensure national development, management, regulation, protection, conservation, and equitable allocation of water resources to achieve progressive realization to right to water, sanitation and food security.

Sustainable use and management of water resources is key to the successful implementation of the Country's development agenda and achieving sustainable development goals. With Kenya classified as water scarce country while recognizing water as a key driver of all sectors of the economy, water requires serious attention and in particular allocation of the resources necessary for its management and development. However, allocation of enough resources for the water resources sector has been a challenge. Allocation of adequate resources to this Ministry will also ensure the country realizes the benefits of the 'Big Four Agenda'.

The country continues to experience serious sustainability challenges with regards to water resources availability, utilization, control and use. Climate change related hazards such as floods and droughts have greatly affected water resources in most parts of the country

resulting in reduced river recharge systems hence severe water scarcity amidst increasing demand for water by all sectors of the economy. The water sector is therefore increasingly faced with pressure to deliver and meet these demands. This calls for support on comprehensive sector policies and strategic planning to guide sector interventions in realization of the constitutional right to clean water by all. Sufficient investment planning, that is demand driven, is also necessary to ensure the existing gap is closed. This has to be accompanied by robust information management systems and efficient use technologies that ensure availability of accurate and reliable data.

Steadily improving visibility of sanitation and transboundary waters is also quite important for sustainable national development. This is why the Ministry successfully organised Kenya Sanitation Conference, held at the Kenyatta International Convention Centre from 28th – 31st October 2019 and 27th Nile Council of Ministers Forum held on 29th November, 2019 in Nairobi where Kenya took over the leadership of Nile Basin Initiative. Also the Ministry through Water Sector Trust Fund (Water Fund) was awarded prestigious 2019 United Nations Public Service Awards (UNPSA), after its Up-scaling Basic Sanitation for the Urban Poor (UBSUP) programme was selected as one of the winners of the award under the "*Delivering Inclusive and Equitable Services to Leave No one Behind*" category being the only institution from Africa

The irrigation potential is estimated at 1.913million acres (765,575 ha) as per the National Water Master Plan 2030 without water storage and can go up to 3 million acres (1.2 million ha). Out of this total potential only 504,880 acres has been developed accounting for 16% coverage while out of the country's total arable land only 5.8% is equipped with irrigation infrastructure. This calls for concerted efforts towards increasing access to agricultural water in a bid to increase yield to support food and nutrition security efforts and support growth in manufacturing vide agro-processing of surplus produce and value addition.

The Annual Status report is a crucial document that endeavours to track the state of the sector's development and key achievements towards realization of universal water and sanitation access, increase food security and its sustainable management through implementation of the developed policies and strategies. Equally, it provides opportunity to understand the challenges and emerging issues in the water, sanitation and irrigation sector. The report is a great attempt to keep the sector and stakeholders informed on progress and the bottlenecks to the sector's development. The Ministry and the sector institutions therefore, has to ensure that the challenges impeding sector development are adequately addressed towards realization of constitution progressive right to clean water, sanitation and food security for national development agenda.

This annual status report is coming at such a time when the country is experiencing the challenge of COVID-19 which is a global pandemic. In response to COVID-19 pandemic, the Government has put in place a robust approach to address the COVID-19 threat by establishing a National Co-ordination Committee on Corona Virus Pandemic (NCCCP) aimed at providing an expanded whole of government and society response to the unprecedented pandemic through the evaluation of the evolving risk and advising the Government on appropriate measures for preparedness, prevention and response in order to mitigate the public health impact. The pandemic has affected the ministry through the disruption of various activities. Most of the funds that were meant to implement projects and programmes related to water, sanitation and irrigation have been directed to activities to combat the disease. To this end, the Ministry in collaboration with other Government Agencies and stakeholders has put in place mechanisms and mobilized resources to address the COVID-19 threat by installing a total of 5,333 public hand washing points, several water storage tanks and drilling and equipping of boreholes in major urban centres especially in the informal settlements.

Lastly, I wish to appreciate the support by the National Assembly towards the fulfillment of the Ministry's mandate which entail programmes in conservation and protection of water catchments, development of water, sewerage and irrigation infrastructure; and development of sanitation facilities in rural marginalized and urban informal settlements. Also, I acknowledge the support the Ministry has been accorded by development partners in realizing the implementation of planned projects and programmes.

Sicily K. Kariuki (Mrs), EGH
Cabinet Secretary
Ministry of Water & Sanitation and Irrigation

PREFACE

The Kenya Vision 2030 goal and SDG 6 on water and sanitation under the social pillar is universal access by 2030. Despite Kenya being a water scarce country, the Ministry has an obligation to put in place plans, systems and mechanisms to achieve gradual realization of the universal access to water and sanitation and food security. This can be achieved through increasing water harvesting and storage, sewerage system coverage, expansion water supply networks, drainage and more irrigation schemes. In discharging its mandate, the Ministry is guided by key policy documents which include the Constitution of Kenya 2010, the Water Act 2016, Irrigation Act 2019, and the Big Four Agenda among other subsidiary regulatory frameworks. These policies emphasize the need for efficiency and better management in the utilization of water, sanitation and irrigation resources to enable the government achieve its economic growth, food security, poverty reduction through employment creation and social stability.

Universal access to water and sanitation will be progressively achieved annually. The water coverage has gradually increased from 53.3% in 2013 to 62.9% in 2018/19, While sewerage coverage in urban areas increased by 3.9% from 22.1% in 2013 to 26% in 2018/19..This was achieved due to the completion of some of the major projects which include: Kisumu water supply, Nyahururu water supply, Kericho Sewerage Improvement Project, Gigiri -Kabete Water Supply Keroka water supply, Isabenia water supply, Gatanga Community water project, Iten-Tambach-Sabor water supply, Chwele Water Supply, Siaya-Bondo water supply and sanitation, Chesikaki - Cheptais - Sirisia Water Supply, Baringo Rural Water rehabilitation Baricho Water supply expansion, Malindi water for Informal Settlement, Masinga - Kitui Water Supply Project Masalani Water & Sanitation Project, Eldas Enole Water Supply, Wote Water Supply & Sanitation Project, Isiolo water supply and sewerage, Maua water and sewerage, Garissa sewerage, Construction of Kangundo Road, Kibera, Upperhill and Kirichwa Ndogo Trunk Sewers, among many others.

In addition, access to safe water was enhanced for a total of 1.39 Million people and access to sanitation enhanced for a total of 485,985 people in the last five years by implementing various projects both in the Urban Poor and Rural Marginalized areas

In this regard, in an endeavor to achieve universal access to water and sanitation, the Ministry has drawn a road map to achieve universal coverage by the year 2030 by undertaking key projects and programs that will connect 200,000 people to water and

350,000 to sewerage system annually throughout the country. Also groundwater exploration is being used as alternative water source in water stressed counties in the country where in 2018/19 financial year, drilling of 71 boreholes in public schools to boost water supply was achieved.

In enabling the "Big Four Agenda" under increased food security, 59,528 acres of irrigation schemes were developed to yield approximately 66,000 tonnes of rice and 17,000 tonnes of maize annually. In Turkana County alone, 25,100 acres were developed to yield estimated 38,000 tonnes of maize and millet annually benefiting about 9,080 households. Further a total of 170 irrigation projects were constructed through National Expanded Irrigation Programme and Community Based Smallholder across all the 47 Counties covering about 140,000 acres benefiting over 88,000 farmers. Horticultural farming has been supported in 57 public schools in the country. In enabling the manufacturing sector, the Ministry has developed water storage and supply networks to connect water for industrial use in Nairobi, Mombasa, Nakuru, Kisumu, Machakos and Uasin Gishu Counties.

The Ministry is committed to address the challenges faced due to imbalance spatial distribution of water in the country. This will be achieved through stakeholders' participation, mobilization of resources to complete ongoing projects in the country especially small projects which give maximum returns within a short period of time and benefiting a greater population due to their wider spread. We welcome creative and innovative solutions, particularly initiatives that enhance the technical capacity of wastewater management, water pollution control and utilization of every drop of water.

In conclusion, the Ministry acknowledges that to achieve universal access to water, sanitation and increase food security is a concerted effort involving a host of different stakeholders including Parliament, and will continue engaging them in discharging its mandate and implementation during the next review period.

Dr. Andrew Tuimur, CBS
Chief Administrative Secretary
Ministry of Water & Sanitation and Irrigation

ACKNOWLEDGEMENT

The expanded mandate to the Ministry through Executive Order No. 1 of 2019 demonstrates the government's commitment to accelerate the development in the water, sanitation and irrigation sector. In this annual status report the Ministry has made tremendous success in the implementation of policy, legal and institutional framework; management, protection and conservation of water resources and transboundary waters; water coverage; sanitation coverage; water storage and flood control; irrigation expansion, land reclamation and resource mobilization.

Going forward, the Ministry is committed to supporting mobilization of resources, enhancing efficiency use of technology, strengthening of partnerships and collaboration among stakeholders, initiating and implementing pro-active human resource planning processes and effective deployment of staff to maximize performance to achieve quality and efficiency in service delivery, enhance completion of ongoing projects and programmes to increase water and sanitation coverage as well as food security. This will be achieved through strengthening synergies between Departments at the headquarters, Water Sector Institutions and other Government Agencies in fastracking those projects which give maximum returns in short period of time. These projects include; Construction of small dams including peace dams, drilling of boreholes, Cross-county water projects and Water for schools both for domestic use and micro-irrigation.

I would like to express sincere appreciation to the water, sanitation and irrigation sector players. Specifically, I wish to acknowledge the roles and contributions of all stakeholders, including our water sector institutions and technical staff. I urge all key stakeholders to own this status report as it will inform some of the policy guidelines that will be issued by the Ministry from time to time for effective service delivery to the Kenyan citizens.

I sincerely thank all those who participated in the preparation of this report. In particular, I would like to appreciate the invaluable contribution of the technical working group that was coordinated by Eng. SAO Alima, the Water Secretary comprising of Eng. James Muturi, Rolex Kirui, Georgia Musau and Nancy Koech, Heads of the departments in the Ministry and Heads of State Corporations. I also wish to appreciate the office of the Cabinet Secretary for providing leadership and direction on the preparation of this annual status report.

Joseph W. Irungu, CBS
Principal Secretary
Ministry of Water & Sanitation and Irrigation

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ACA	Athi Catchment Area
AfDB	Africa Development Bank
AWWDA	Athi Water Works Development Agency
AMCOW	African Ministers' Council on Water
ASALs	Arid and Semi-Arid Lands
BADEA	Arab Bank for Economic Development in Africa
BCM	Billion Cubic Metres
BWRCs	Basin Water Resources Committees
CAACs	Catchment Advisory Committees
CoK	Constitution of Kenya
COVID	Corona Virus Disease
CWWDA	Coast Water Works Development Agency
EAC	East African Community
ECDPs	Effluent Discharge Control Plans
ENNCA	Ewaso Ng'iro North Catchment Area
GDP	Gross Domestic Product
GOK	Government of Kenya
GIS	Geographic Information System
HYCOS	Hydrological Cycle Observing System
IGAD	Intergovernmental Authority on Development
IHP	International Hydrological Programme
IWRM	Integrated Water Resources Management
KEWI	Kenya Water Institute
KFS	Kenya Forest Service
KfW	German Development Bank
LADA	Land Degradation Assessment
LDN	Land Degradation Neutrality
LVNCA	Lake Victoria North Catchment Area
LVNWWDA	Lake Victoria North Water Works Development Agency
LVSCA	Lake Victoria Catchment Area
LVSWWDA	Lake Victoria South Water Works Development Agency
MAR	Managed Aquifer Recharge
MCM	Million Cubic Metres
MoUs	Memorandum of Understandings
MW	Mega Watts
NBI	Nile Basin Initiative
NIA	National Irrigation Authority
NRW	Non Revenue Water
NWCPC	National Water Conservation and Pipeline Corporation
NWHSA	National Water Harvesting and Storage Authority
NWMP2030	National Water Master Plan 2030
PAPs	Project Affected Persons
PPPs	Public Private Partnerships
RCGW	Regional Centre on Groundwater
RCMRD	Regional Centre for Mapping of Resources for Development
RQOs	Resource Quality Objectives
RRI	Rapid Results Initiative

RVCA	Rift Valley Catchment Area
SAGA	Semi-Autonomous Government Agency
SCAC	State Corporations Advisory Committee
SDGs	Sustainable Development Goals
SCMPs	Sub catchment Management Plans
SEZ	Special Economic Zone
SRC	Salaries and Remuneration Commission
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	United States Dollar
USGS	United States Geological Survey
WAB	Water Appeal Board
WASREB	Water Services Regulatory Board
WQM	Water Quality Monitoring
WRA	Water Resources Authority
WRMA	Water Resources Management Authority
WRUAs	Water Resource Users Associations
WSB	Water Services Board
WSIGCCF	Water Sector Inter-Governmental Consultation and Co-operation Framework
WSPs	Water Service Providers
WSTF	Water Sector Trust Fund
WT	Water Tribunal
WWDAs	Water Works Development Agencies
WWTP	Waste Water Treatment Plant

EXECUTIVE SUMMARY

This annual report is a detailed assessment status of the water, sanitation and irrigation sub-sectors. It provides the ministry situation analysis with highlight of the key achievements, lessons learnt, challenges, emerging issues and recommendations. The key projects including the "Big Four' to be implemented in the medium term period are also outlined in the report.

During the period under review a number of key achievements were realized under policy and legal framework, among them are: Operationalization of the Water Act, 2016 by establishing of institutions created by the Act, finalized the National Water Policy and forwarded it to the Cabinet for approval, Draft transition plan, Drafts National Land Reclamation Policy and bill, Enactment of Irrigation Act 2019, Hydrologists Act 2017 operationalized, draft Bill to repeal KEWI Act 2001 developed. In addition, four draft regulations namely: Water and Sanitation Services Rules; Water Resources Rules, Water Harvesting and Storage Rules, and Water Tribunal Rules were developed to implement the Water Act 2016. The draft irrigation regulation has successfully gone through stakeholder consultation, received AG's consent and will be submitted to Parliament soon. To strengthen collaboration and cooperation with the County Governments for effective service delivery, a Water Sector Inter-Governmental Consultation and Co-operation Framework (WSIGCCF) between the Ministry and Council of Governors was signed. Further, to foster collaboration on the use of shared water, three memorandum of understandings were signed with other riparian countries

On the implementation of programmes, the Ministry increased water coverage from 53.3% in 2013 to 62.9% in 2019 while sewerage coverage in urban areas increased by 3.9% from 22.1% in 2013 to 26% in 2018/19. To achieve universal access by the year 2030, a road map was developed to undertake key projects and programs that will connect 200,000 people to water and 350,000 to sewerage system annually throughout the country.To progressively achieve right to to clean and safe water in adequate quantities among the people of Kenya and ensure no Kenyan is left behind, twenty three water projects have been completed in marginalised areas benefitting over 70,000 people and about 3 million livestock through Equalization Fund .

Under the Water Infrastructure development, the Ministry rolled out implementation of Kenya Towns Sustainable Water and Sanitation program targeting rehabilitation and expansion of water and sanitation infrastructure in 28 towns across the country, connecting 2.1 million people to clean water and 1.3 million to sewer systems. To increase water harvesting and storage, commenced construction of large multipurpose dams namely

Karimenu II and Ruiru II in Kiambu, Thwake in Kitui/Makueni and is now fast-tracking implementation of resettlement action plan(RAP) for Mwache Dam which will supply water to Kwale and Mombasa to pave way for construction works to start.

To reduce high Non-Revenue Water which currently stands at 41% to acceptable levels, Standards to be used by Water Service Providers under the supervision of Water Services Regulatory Board (WASREB) were revised. Steadily improving visibility of sanitation and transboundary waters was achieved as the Ministry successfully organised Kenya Sanitation Conference, held at the Kenyatta International Convention Centre 28th – 31st October 2019 and 27th Nile Council of Ministers Forum held on 29th November, 2019 in Nairobi where Kenya took over the leadership of Nile Basin Initiative.

On Irrigation programme, the Ministry developed 59,528 acres under public schemes contributing an average 66,000 tons of rice and 17,000 tons of maize annually. Also developed 25,100 acres in Turkana to benefit 9,080 households and provide a stable supply of maize at an average of 38,000 tons of maize and millet. It also constructed 170 irrigation projects through National Expanded Irrigation Programme and Community Based Smallholder across all the 47 Counties with a total area of 140,000 acres directly benefiting over 88,000 farmers. Further, the Ministry constructed 9,985 household water pans by end of December 2019 across 23 counties. This translates to 10.5 million m3 of storage to irrigate about 10,000 acres of land.

In order to provide water and food security for schools, the Ministry drilled 71 boreholes to supply water to 71 public schools to support the old 4K clubs begin commercial irrigation using drip irrigation in greenhouses and Constructed 70 greenhouses in 57 public schools. To reduce land degradation, the ministry reclaimed an estimated 15,000 hectares into productive lands in Turkana, Garissa, West Pokot, Baringo, Laikipia, Isiolo, Tana River, Kwale, TaitaTaveta, Kajiado, Narok and Busia Counties.

Understanding the groundwater potential in the country is important and this is why groundwater mapping were carried out in southern parts of Turkana County and the whole of Marsabit County. The mapping of Wajir County has also been initiated. Further, under Water Resources Monitoring, the Ministry has enhanced data and information collection to assist in decision making and planning by installing 172 monitoring stations and upgrading 14 telemetric hydromet stations. Also it has developed and implemented 43 sub catchment management plans, 6 basin plans and 50 watershed manuals.

The Ministry has an authorized staff establishment of one thousand and forty-one (1,041) employees against an in post of four hundred and eighty (480) which give variance/gap of five hundred and sixty-seven posts (567). Out of the 480 in post, technical departments

constitute 45% of staff while shared services are 55%. In the Water Sector Institutions the total authorized establishment is three thousand and sixty one (3,061) employees against an in post of one thousand nine hundred and thirty nine (1,939) giving a variance/ gap of one thousand one hundred and twelve (1,112).From this analysis it is evident that the ministry requires additional human resources especially the technical staff to effectively and efficiently undertake its mandate. The ministry will also continue initiating and implementing pro-active human resource planning processes as part of talent retention and succession management to achieve quality and efficiency in service delivery.

In terms of budget implementation performance, the Water & Sanitation and Irrigation sub-sector had a budgetary allocation of Ksh.61. 67 Billion, Ksh. 53 Billion and Ksh. 49.61 Billion for financial years 2016/17, 2017/18 and 2018/19, respectively. During the same financial years, actual expenditures were Kshs. 49.12 Billion, Kshs. 43.43 Billion and Kshs. 42.34 Billion translating to absorption levels of 80%, 82% and 85%, respectively. However, over the next three years, the Ministry will require Kshs 406.5 Billion to implement planned projects and programmes where Kshs 226 Billion will be financial allocation from both GoK and development partners and this leaves a funding gap of Ksh. 180.5 Billion. This require for mobilization of additional financial resources by putting in place robust resource mobilization strategies for alternative sources of financing such as Public Private Partnerships (PPPs).

Inspite of the all these achievements ,the ministry still faces many challenges and emerging issues including but not limited to: Delays in project implementation due to inadequate funds to compensate project affected persons(PAPs) who have to be compensated for both land and disturbance; Liquidity challenges due to delayed disbursements and inadequate funding ; difficulties in non-recovery of loans for infrastructures developed using donor funds; Delayed approval of master lists for tax exemption by the National Treasury has negatively impacted on the implementation of some projects; delay projects' implementation; inconsistencies and deficiencies/lacuna in the Water Act 2016 has affected its implementation; lengthy process of consultations with large number of stakeholders especially the County Governments has delayed the finalization of strategies, policies and regulations as required by the Water Act 2016, Irrigation Act 2019 and other legal frameworks; Grabbed land meant for water and sanitation infrastructure ; weak effluent discharge management systems due to disjointed regulations for affluent discharge permit and lack of harmonized framework for implementation of the polluter pay principle and Low Capacity of farmers in irrigation farming and overall governance/management of irrigation schemes, aging farmers, volatile markets for agricultural produce, uncoordinated irrigation initiatives and human resource

capacity gaps and disruption of planned activities as a result of reallocation of financial resources to fight COVID- 19 pandemic among many others .

Going forward, the Ministry has put in place mechanisms to overcome these challenges by: Fast-tracking the finalization of the various three strategies namely; National Water Services and Sanitation Strategy, National Water Resources Management Strategy, National Water Harvesting and Storage Strategy and integrated Irrigation Development ; Construction of several dams to increase water storage to have enough water for domestic, industrial and irrigation needs , mobilization and allocation of more resources to ongoing key projects which give immediate returns so as to complete them and achieve 80% water coverage by the year 2022; To address the inadequate financial resources, the Ministry will rationalize its activities to match the expected liquidity flow. In addition, the Ministry will continuously engage the National Treasury and Parliament with a view to enhance allocation for the projects, ensure prompt disbursement and provide funds for implementation of resettlement action plans in time. Continuous engagement of the National Treasury to enhance communication with project implementation agencies and grant exemption from remission of duty and taxes ; mobilize resources to enhance additional human resources , bridge the skills gap and put in place a robust succession management strategy ; enhance regulatory frameworks that govern management of inter-county water resources use to minimize conflicts as well exploring new investment opportunities in water, sanitation, irrigation and land reclamation to increase access to water and sanitation as well as food security and creation of employment.

1.0 INTRODUCTION

The Ministry of Water & Sanitation and Irrigation was formed after the merger of the former State Department for Irrigation and the Ministry of Water and Sanitation through Executive Order No. 6 of 22nd August 2019.

The Ministry was originally mandated as per Executive Order No. 1 of June 2018 (revised) to protect, conserve, and manage Water Resources, achieve progressive realization to right to water, sanitation and food security in accordance to article 43(b) (c) and (d) of the constitution for socio-economic development of the Nation. In addition, it is also mandated to offer consumer protection to water users, hydraulic engineering, sector coordination and resource mobilization. The functions of the Ministry are: Water Resources Management Policy, Water and Sewerage Services Management Policy, Waste Water Treatment and Disposal Policy, Water Catchment Area Conservation, Control and Protection, Water Quality and Pollution Control, restoring the rivers and lakes water balance, Sanitation Management of Public Water Schemes and Community Water Projects, Water Harvesting for Domestic and Industrial Use and Flood Control Management.

However, with the merger the expanded mandate now includes; National Irrigation policy, Management of Irrigation schemes and mapping, Designating and developing areas ideal for irrigation schemes and Water harvesting and storage for irrigation. This mandate is guided by laws and policies which emphasize the need for efficiency and better management in the utilization of natural resources to enable the government achieve its strategic goals of economic growth, poverty reduction and social stability.

Sustainable water resources use and management is key to successful implementation of the national development agenda. With Kenya classified as water scarce country while recognizing water as a key driver of all sectors of the economy, water requires serious attention and in particular allocation of the resources necessary for its management and development. However, allocation of enough resources for the water resources sector has been a challenge. Provision of adequate resources to this sector will also ensure the country realizes the benefits of the 'Big Four Agenda'. It will also lead to achievement of the Kenya Vision 2030 development agenda under the social pillar on attainment of universal access to water by 2030 and the economic pillar on food security. Further, it will assist in achievement of Sustainable Development Goals, especially Goal No. 6 on "Ensuring Availability and Sustainable Management of Water and Sanitation for all" in which the sector is targeting to increase the percentage of national population with access to safe water from 63% in 2020 to 80% by 2022 and 100% by 2030. The sector also targets to increase the percentage of the national population with access to sewerage from 26% in

2020 to 40% by 2022. Further, it will contribute towards achieving SDG 2 on hunger; food security and agriculture through implementation of livelihood enhancement activities. Provision and allocation of water for irrigation development will be key in the attainment of this goal. Similarly, conservation and protection of riparian land in Kenya has become increasingly important. This is in order to secure our water bodies from encroachment and pollution which have become serious threats in the recent past. On the same note, it is important that safety and stability of our water infrastructure is ensured. Regulating the development of the infrastructure is a matter of priority for the sustainability of investments.

Furthermore, enhancing the quality and utility of country's water information including water monitoring and data collection network; restoring the water catchment areas including the aquifers for water balance; restoring the river basins water balance; reducing pollution levels and enhancing water quality must be a matter of priority. There is need to support water resources programmes as this will create an enabling environment for other sectors to grow and also minimize the water scarcity shocks. The reliability and access to water resources is a fundamental human right under the economic and social rights Article 43, (1), (d), to clean and safe water in adequate quantities and the state has the obligation under the constitution to preserve and ensure the right is achieved. The well managed water resources will enhance the country's negotiating position with the other riparian countries on equitable sharing of transboundary resources will assist the country in negotiating with other countries that share trans-boundary waters. Further, the cost for water infrastructure development and maintenance will reduce significantly due to improved quality and quantity of water

In addition, it is important to note that water sources are not only affected by poor land use and land management practices but land degradation also cause an estimated annual economic loss of about 3% to the national GDP or about USD 390million annually (MTP 2008-2012). Land waste leads to dam siltation that is the norm in Kenya. GIS and remote sensing data (2012) obtained over a period of 20 years indicate, there is a serious and increasing level of severity of land degradation and land waste that is affecting the capacity of Kenya's land to conserve, store and release water resources sustainably thereby compromising water security, land productivity and increasing conflict among communities. Therefore, this calls for additional resources to achieve Sustainable Development Goal No. 15 to halt and reverse land degradation and target to achieve land degradation Neutrality (LDN) by 2030.

It is also vital to note that the twin challenges of intensive rainfall and flooding often followed by biting droughts that Kenya frequently suffers is associated with changing rainfall patterns and poor land management practices that lead to a weak environmental

water storage followed by high surface water runoff estimated at over 52% of annual rainfall. This phenomenon is one of the key drivers of the recurrent problems of food and water insecurity. The low national per capita surface water storage which is estimated at 103.1m³ of which only 3.1m³ is for domestic, livestock, industrial and irrigation use with the balance being for hydroelectric power, the ministry plans will incorporate land rehabilitation and reclamation to enhance environmental water storage and increased land productivity.

To increase agricultural production, there is urgency for more investment in irrigation and innovations. In irrigated agriculture, water taken up by crops is partly or totally provided through human intervention. Irrigation water is withdrawn from a water source (river, lake, aquifer or reservoir) and applied to the farm through an appropriate conveyance infrastructure. To satisfy their water requirements, irrigated crops benefit from both more or less unreliable natural rainfall, and from irrigation water. Irrigation provides a powerful management tool against the vagaries of rainfall and makes it economically attractive to grow high-yield seed varieties and to apply adequate plant nutrition as well as pest control and other inputs, thus giving room for a boost in yields. The yield response of crop to water availability and the synergy between irrigation, crop variety and inputs is significant. For instance, sugar yield can increase by over 200% under irrigation as compared to rain fed irrigation. In Kenya under rain fed conditions, a well-managed sugarcane field should yield roughly 45-53 tonnes per hectare however under irrigation 110 to 150 ton/ha can be achieved in the sub-tropics. This is therefore a good solution to increasing the volume of sugarcane to spur growth of the sugar sector in Western Kenya. Many other crops fall under this category that include cotton, tomatoes, fruits, palm oil, macadamia, soya beans, cashew nuts among others. Further to this, the growth in manufacturing sector will also be heavily driven by the increase in agro-processing ventures in the country to be achieved through surplus production. Irrigation increases predictability, allows for production planning and it is very well targeted through contract farming noting that irrigation schemes have a very high level of farmers' organization.

Lastly, the availability of water confers opportunities to individuals and communities to boost food production, both in quantity and diversity, to satisfy their own needs and also to generate income from surpluses. Irrigation has a land-augmenting effect and can therefore mean the difference between extreme poverty and the satisfaction of the household's basic needs. To have an impact on food security, irrigation projects need to be integrated with an entire range of complementary measures, ranging from credit, marketing and agricultural extension advice to improvement of communications, health and education infrastructure.

After the promulgation of the Constitution of Kenya, 2010 there was need to align the Water Act 2002 to the new law (Water Act, No. 43 of 2016). This was mainly due to introduction of devolved units (counties) to replace the earlier provinces and districts. The counties were given the responsibility of services delivery while the National Government retained the role of water resources conservation and management and infrastructure development. The Ministry developed and enacted the new Water Act 2016 to repeal Water Act 2002. The new Water Act 2016 Section 10 (4) states that the Cabinet Secretary shall prepare and issue an annual report on the state of national water resource strategies in Kenya. This report is the Annual Status Report for the Financial Year 2019/2020.

2.0 SITUATATION ANALYSIS

2.1 Highlights of Significant Achievements

2.1.1 Policy and legal framework

The Ministry of Water & Sanitation and Irrigation has been providing policy direction in the water sector and implementing various programmes for the National Government. The key achievements that the Ministry realized include operationalization of the Water Act, 2016 by establishing all institutions created by the Act except Water Tribunal. A draft transition plan was developed and public consultation undertaken.

The Ministry finalized the National Water Policy and forwarded it to the Cabinet for approval. Draft Transboundary Water Policy and legal framework and Drafts National Land Reclamation Policy and bill to streamline the coordination of reclamation and rehabilitation of degraded and wasted lands were also developed. The Irrigation Act was enacted in 2019 and draft Irrigation Regulations developed. Further, the Ministry operationalized the Hydrologists Act 2017 and the Board of the Hydrologist Registration Board were appointed and inaugurated. Kenya Water Institute (KEWI) has developed a draft Bill to repeal KEWI Act 2001. The Ministry developed four draft regulations (Water and Sanitation Services Rules; Water Resources Rules; Water Harvesting and Storage Rules; and Water Tribunal Rules) to implement the Water Act 2016.

Signing of The Water Sector Inter-Governmental Consultation and Co-operation Framework (WSIGCCF) between the Ministry and Council of Governors was done aimed at forging collaboration and cooperation in water and sanitation service delivery through effective cross-sectoral co-ordination. Further, three Memorandum of Understandings (MOUs) for joint management of the shared water resources between Republic of Kenya and neighbouring countries were developed and implemented. The two MOUs are between Republic of Kenya and United Republic of Tanzania for the joint management of Mara River Basin and Challa-Jipe and Umba River Basin. The third MOU is between Republic of Kenya and Republic of Uganda for joint management of Sio-Malaba-Malakisi River Basin.

2.1.2 Programmes Implementation

During the review period, the Ministry has achieved the following:

(i). On implementation of various programmes, the Ministry has increased water coverage from 53.3% in 2013 to 62.9% in 2019 while sewerage coverage in urban areas increased by 3.9% from 22.1% in 2013 to 26% in 2018/19. In this regard, in endeavor to achieve universal access to water and sanitation, the Ministry has

drawn a road map to achieve universal coverage by the year 2030 by undertaking key projects and programs that will connect 200,000 people to water and 350,000 to sewerage system annually throughout the country.

(ii). Under the Water Infrastructure development, the Ministry rolled out implementation of Kenya Towns Sustainable Water and Sanitation program targeting rehabilitation and expansion of water and sanitation infrastructure in 28 towns across the country, connecting 2.1 million people to clean water and 1.3 million to sewer systems.

(iii). On water harvesting and storage, the Ministry commenced construction of large multipurpose dams namely Karimenu II and Ruiru II in Kiambu, Thwake in Kitui/Makueni and is now fast-tracking RAP implementation for Mwache Dam in Kwale/Mombasa to pave way for construction works to commence.

(iv). Developed Non-Revenue Water Standards to be used by Water Service Providers under the supervision of County Governments to reduce Non-Revenue Water to acceptable levels.

(v). The Ministry successfully organised Kenya Sanitation Conference, held at the Kenyatta International Convention Centre 28th – 31st October 2019 and 27th Nile Council of Ministers Forum held on 29th November, 2019 in Nairobi.

(vi). On Irrigation programme, the Ministry developed 59,528 acres under public schemes contributing an average 66,000 tons of rice and 17,000 tons of maize annually. Also developed 25,100 acres in Turkana to benefit 9,080 households and provide a stable supply of maize at an average of 38,000 tons of maize and millet. It also constructed 170 irrigation projects through National Expanded Irrigation Programme and Community Based Smallholder across all the 47 Counties with a total area of 140,000 acres directly benefiting over 88,000 farmers. Further, the Ministry constructed 9,985 household water pans by end of December 2019 across 23 counties. This translates to 10.5 million m3 of storage to irrigate about 10,000 acres of land.

(vii). In order to provide water and food security for schools, the Ministry drilled 71 boreholes to supply water to 71 public schools to support the old 4K clubs begin commercial irrigation using drip irrigation in greenhouses and Constructed 70 greenhouses in 57 public schools.

(viii). Under Equalization Funds, the Ministry completed 23 projects in Lamu, Marsabit, Mandera and Tana River counties with a total storage volume of 1.3 million^3 benefitting over 70,000 people and about 3 million livestock.

(ix). Reclaimed an estimated 15,000 hectares under Land reclamation into productive lands in Turkana, Garissa, West Pokot, Baringo, Laikipia, Isiolo, Tana River, Kwale, TaitaTaveta, Kajiado, Narok and Busia Counties.

(x).Successfully mapped groundwater in southern parts of Turkana County, the whole of Marsabit County. The mapping of Wajir County has also been initiated.

(xi). Under Water Resources Monitoring, the Ministry has enhanced data and information collection by installing 172 monitoring stations and upgrading 14 telemetric hydromet stations. Also it has developed and implemented 43 sub catchment management plans, 6 basin plans and 50 watershed manuals.

2.1.3 Legal

The Ministry also unlocked the legal and contractual issues and ensured smooth implementation of ongoing projects like Northern Collector Tunnel, Oloitoktok water supply, Kirandich II water and sewerage project, Karimenu II, Umaa and Badasa Dams.

2.1.4 Rapid Results Initiative

The 100 days Rapid result initiative (RRI) was undertaken by the Ministry fast track the completion of water projects across the sector. This was done in 2018 and involved groundbreaking, inspection and commissioning of projects. Within the 100days period a total of 13 projects on water services and sewerage and 1 on surface water telemetric station were commissioned across the country and a total of 20 stations were inspected. In addition transition of all water sector institutions apart from Water Appeals Board (WAB) was undertaken as well as finalization of National Water Policy and development of 2 draft amendment bills, 3 draft strategies and 3 draft regulations.

2.1.5 Strategic Plan

The Ministry finalized a five-year strategic plan for the period 2018-2022 through a consultative process which included County Governments and published it. However, it is currently being revised to include strategies on Irrigation and Land Reclamation as well as other emerging issues facing the ministry.

2.2 Regulatory Frameworks

The Ministry of Water & Sanitation and Irrigation has various Acts, Regulations, Policies and strategies. These are operational, under implementation, being amended or developed. These include:

2.2.1 Water Act 2016

Water Act 2016 is an Act of Parliament to provide for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes. It came in force on April 2017 when the Cabinet Secretary published notices in the Kenya Gazette, announcing the commencement of the Water Act, No. 43 of 2016.

The Water Act 2016 is undergoing implementation in terms of establishment of Water Sector Institutions as per the new Act, development of Water and Sanitation Services Strategy; National Water Resources Strategy; and Water Harvesting and Storage Strategy. Further, the Water and Sanitation Services Rules; Water Resources Regulations; Water Harvesting and Storage Rules; and Water Tribunal Rules are also being developed.

However, Water Act 2016 has various gaps which call for its amendment. Sections for amendments have been identified and subjected to comments from stakeholders and forwarded to the office of the Attorney General (AG) which recommended that the proposed amendments are substantive and beyond inclusion in the miscellaneous amendment bill. The AG has since developed Water Act 2016 amendment bill. The amendments and modification to the Water Act include: Augmentation of the mandate of regulatory body responsible for water resources; the role of counties in water resources management; institutional framework for the Water Tribunal; enhancement of offences and penalties; make miscellaneous amendments to harmonize provisions of the Water Act; and for connected purposes. Also proposals on the role of the Regional Centre for Groundwater Research, Education and Training which an institution under the ministry will be included in the amendments.

2.2.2 Establishment of the Water Sector Institutions as per the Water Act 2016

Among the changes introduced by the Water Act, 2016 was the transformation of some existing water sector institutions and establishment of new ones. Some of these include the transformation of the Water Appeal Board into the Water Tribunal; the Water Services Trust Fund to Water Sector Trust Fund; the Water Resources Management Authority (WRMA) to Water Resources Authority (WRA) and changing Catchment Areas Advisory Committees (CAACs) to Basin Water Resources Committees (BWRCs) and Water Services

Boards to Water Works Development Agencies (WWDAs). The Act requires the establishment of the National Water Harvesting and Storage Authority (NWHSA).

The Ministry has established and operationalized Water Resources Authority, National Water Harvesting and Storage Authority, Water Services Regulatory Board, Water Sector Trust Fund and nine Water Works Development Agencies according to requirements of the law. The institutional framework for the Water Act 2016 is shown in figure 1 below;

It is worth noting that Water Appeal Board has not transited to Water Tribunal. The Water Act, 2016 only provided for appointment of Tribunal Chairman but did not provide for the number or procedure of appointment of other board members. This has made it difficult to hear and determine one hundred and twenty-two (122) cases which are pending before the court.

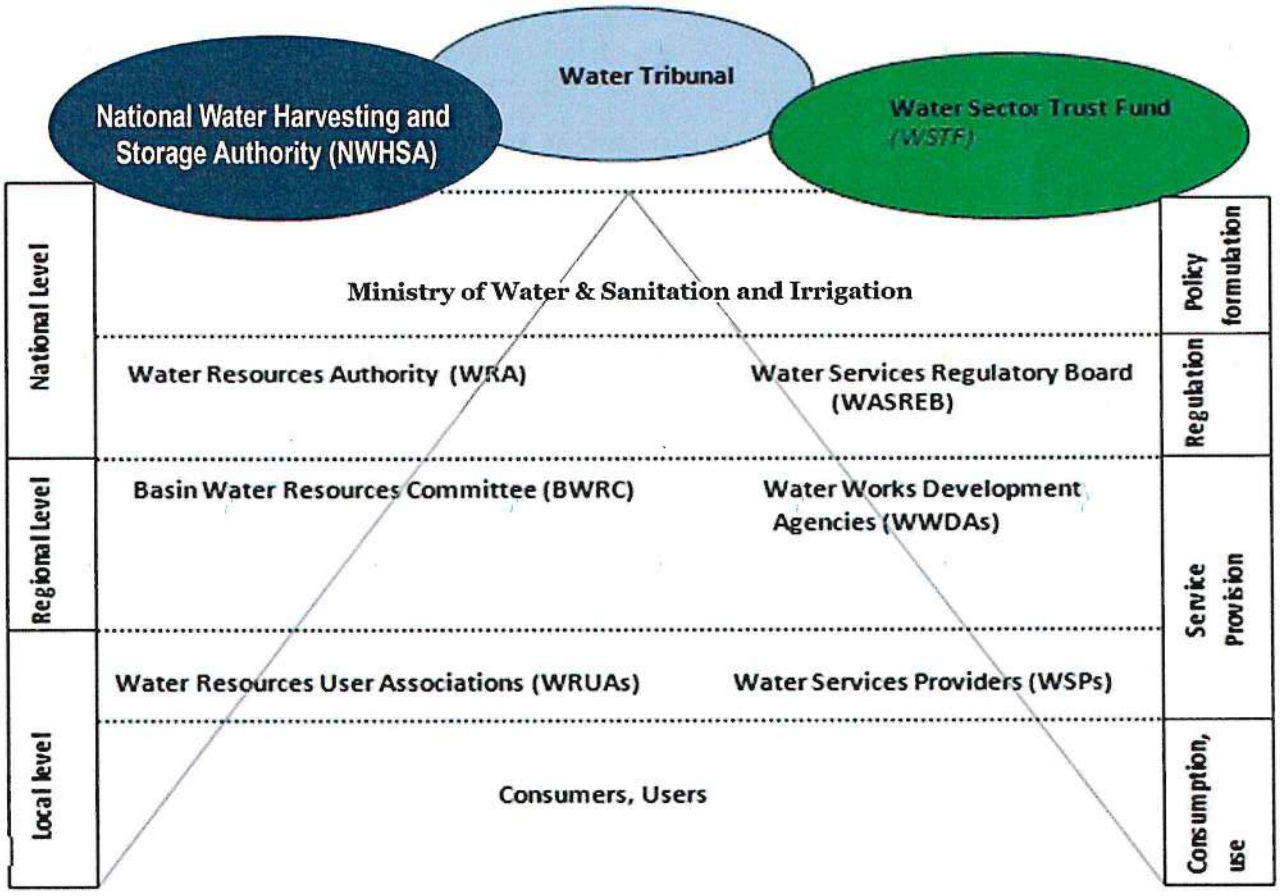

Figure 1: Institutional framework as per Water Act 2016

2.2.3 Development of Regulations, Policies and Strategies

The Ministry engaged the services of a consultant Ernest and Young to develop Water Services, Water resources, Water Harvesting and storage and Water Tribunal regulations to guide in implementation of the Water Act 2016. Public participation has been undertaken across the country and comments collected from all relevant stakeholders to improve the documents. The regulations are to be forwarded to the Attorney General's office for further action after final comments are made. The draft irrigation regulation has successfully gone through stakeholder consultation, received the AG's consent and will soon be submitted to Parliament.

National Water Policy has developed and submitted to Cabinet for approval. Other policies such as transboundary water policy and Land reclamation policy are in draft forms and the Ministry will present them to stakeholders for their comments before being finalized. The Water Harvesting and Storage, Water Services and Water Resources Strategies have been drafted and will be finalized before the end of FY 2019/20.

2.2.4 Irrigation Act 2019

The Irrigation Act 2019 is an Act of Parliament to provide for the development, management and regulation of irrigation, to support sustainable food security and socioeconomic development in Kenya, and for connected purposes. It was operationalized on 16th August 2019. Under the Irrigation Act 2019, the National Irrigation Authority has been established.

Some gaps and inconsistencies that hinder smooth and effective implementation of the Act have been identified necessitating some amendments to the Act especially in the appointment of the Board. The Board of Irrigation Authority has not yet been appointed due to the proposed amendments of the Act. The amendments have been forwarded to the Attorney General for further processing. The draft Irrigation Regulations has been drafted and is undergoing stakeholder consultations.

2.2.5 Hydrologists Act 2017

The Hydrologists Registration Board (HRB) is a State Corporation established under the Hydrologists Act No. 19 of 2017. The Board was gazetted vide Notice no. 6466-8 of the Kenya Gazette Vol. CXXI No. 90 of 19th July 2019 and was subsequently officially inaugurated on 5th December, 2019. The HRB is the only professional body affiliated directly to the Ministry of Water & Sanitation and Irrigation and is domiciled within Maji House.

The mandate of the Board involves developing, regulating, coordinating and overseeing the practice of Hydrology in Kenya, as well as promoting standards of professional competence and practice amongst hydrologists. In so doing, the Board will work closely with stakeholders in both the public and private sectors, especially those involved in hydrological activities, and with academic and higher learning institutions to develop hydrological programs suitable for maintaining a steady flow of well-trained and competent hydrologists in perpetuity. The Board is also mandated to coordinate research, investigations and surveys in the hydrological field and certify hydrological studies and reports necessary for design of hydraulic structures.

The HRB has applied to the State Corporations Advisory Committee (SCAC) for categorization and is in the process of preparing its Development and Human Resource Instruments, the Hydrologists Rules and Regulations, and the 5-Year Strategic Plan. The Board is currently entirely dependent on the Ministry's support for all ongoing activities.

2.2.6 KEWI Act 2001

KEWI is a Semi-Autonomous Government Agency (SAGA) established under the KEWI Act 2001. The institution is charged with the responsibility of capacity building for the water sector and it plays a key role of addressing the human resource needs and provides solutions to challenges facing the sector. KEWI currently has four campuses namely, Nairobi, Kisumu, Kitui and Chiakariga campuses located in Nairobi, Kisumu, Kitui, and Tharaka Nithi Counties, respectively with a total student population of 1,101. The Act is currently under review for the institution to execute its mandate effectively by aligning it to the Constitution 2010.

2.2.7 RCGW Legal Notice No. 252

The Regional Centre on Groundwater Resources Education, Training and Research (RCGW) is established as a State Corporation under the State Corporations Act vide Legal Notice 252 of 18th December, 2015 and with a broad mandate of initiating and conducting research in mapping and assessment of aquifer systems; and management, conservation, protection and governance of groundwater resources.

The Centre has finalized on its Human Resource instruments with an establishment of 80 posts and the organization structure; launched its first Strategic plan (2018-2022) and initiated groundwater research programme.

Currently the Centre has a full Board of Directors and Management composed of a substantive C.E.O, 5 contracted staff, 4 interns and 7 deployed staff from the parent Ministry .The Centre is currently engaging Salaries and Remuneration Commission (SRC)

for the approval of salary structure to paves way for the recruitment of staff. The centre is also working on proposals to be incorporated in the Water Act 2020 Amendments.

2.3 Status of Human Resources

With the release of Executive Order No. 1 of 2018, the Ministry undertook a review of the Organization structure and staff establishment in the initial period of 2019 but it was yet to be approved by the Public Service commission. Vide re- organization of Government as per the Executive Order No. 1 of 2019; the State Department of Irrigation was brought back to form the current Ministry of Water & Sanitation and Irrigation.

This has therefore necessitated a review of the organizational structure and staff establishment for the two which has since been initiated to collapse the existing organizational structures, staff establishments, budgets and payroll into one for ease of administration and optimization of resources use. The Ministry of State for Public Service and the Public Service Commission will guide and advice on the merger and ideal staffing levels for the Ministry.

The Ministry has an authorized staff establishment of one thousand and forty-one (1,041) employees against an in post of four hundred and eighty (480) which give variance/gap of five hundred and sixty-seven posts (567). Out of the 480 in post, technical departments constitute 45% of staff while shared services are 55% as per the summary in table 1 below;

Table 1: Current staffing levels per approved departments

S/No.	Department	Authorised establishment	In-post	Variance
1.	Water, Sewerage and Sanitation Technical	113	83	-30
2.	Water Infrastructure Development	80	0	-80
3.	National Water Resources Technical Sub-total	**134**	**52**	**-82**
	Geologists	34	20	-14
	Hydrologists	36	11	-25
	Chemists	29	15	-14
	Researchers	19	3	-16
	Lab Technologies	15	3	-12
4.	Transboundary Waters Technical	54	0	-54
5.	Irrigation Technical	120	48	-72
6.	Land Reclamation Technical	61	25	-36
7.	Water Storage And Flood Control Technical	64	9	-55
	Sub-Totals Technical Services	**626**	**217**	**-409**
8.	Shared Services	415	263	-152
	Grand total	**1,041**	**480**	**-561**

In the Water Sector Institutions, the total authorized establishment is three thousand and sixty-one (3,061) employees against an in post of one thousand nine hundred and thirty-nine (1,939) giving a variance/ gap of one thousand one hundred and twelve (1,112) as presented in table 2.

Table 2: A Summary of Human Resources in Water Sector Institutions

Water Sector Institution	Required number of staff as per Establishment	In-Post	Variance / Gap	Remark
Water Resources Authority(WRA)	1,173	740	-433	The technical staff is only 261 (37%).
Water Services Regulatory Board (WASREB)	56	30	-26	Reviewing staff establishment in line with expanded mandate as provided for in Water Act 2016
Water Sector Trust Fund (WSTF)	173	72	-101	7 staff in permanent and pensionable terms of employment while others are in renewable 3 year contracts
Kenya Water Institute (KEWI)	314	72	-242	The organizational structure and Human Resource instruments have been partially implemented.
National Water Harvesting And Storage Authority (NWHSA)	212	196	-16	The organizational structure and Human Resource instruments are currently under review
Regional Centre On Groundwater Resources, Education and Research	80	1	-79	Currently has a chief executive officer, six (6) members of staff deployed from the ministry, five (5) temporary staff, and four (4) graduate interns
National Irrigation Authority (NIA)	350	291	-59	
Tana Water Works Development Agency (TWWDA)	105	67	-38	Currently under review as per the Water Act 2016.
Athi Water Works Development Agency (AWWDA)	85	77	-8	
Northern Water Works Development Agency (NWWDA)	55	38	-17	
Coast Water Works Development Agency	173	170	-3	

Lake Victoria South Water Works Development Agency (LVSWWDA)	80	54	-26	
Lake Victoria North Water Works Development Agency (LVNWWDA)	88	57	-31	
Tanathi Water Works Development Agency	72	38	-34	
Rift Valley Water Works Development Agency (RVWWDA)	45	36	-9	This will be reviewed as per the Water Act 2016 due to creation of Central Rift and North Rift Water Works Development Agencies.
Totals	3,061	1,939	-1,122	

2.4 Financing

The Water & Sanitation and Irrigation sub-sector had a budgetary allocation of Ksh.61.67Billion, Ksh. 53Billion and Ksh. 49.61Billion for financial years 2016/17, 2017/18 and 2018/19, respectively. During the same financial years, actual expenditures were Kshs. 49.12 Billion, Kshs. 43.43 Billion and Kshs. 42.34 Billion translating to absorption levels of 80%, 82% and 85%, respectively.

However, for the next three years, the Ministry will require Kshs 406.5 billion to implement planned programmes and projects. It is projected that Kshs 226 Billion will be the total financial allocation from both GoK and development partners and this leaves a funding gap of Ksh. 180.5 Billion which have to be mobilized by putting in place robust resource mobilization strategies for alternative sources of financing such as public private partnerships (PPPs). Table 3 summarizes the resource requirements and deficits.

Table 3: Summary of Resource Gap (KShs. Millions) 2019/20 – 2022/23 financial years

Expenditure	Baseline estimates 19/20 in Ksh. Millions	Requirement in Ksh. Millions			Projected Allocation in Ksh. Millions		
		2020/21	2021/22	2022/23	2020/21*	2021/22	2022/23
Recurrent	6,510	9,437	12, 032	14,163	6,292	6,240	6,584
Development	65,472	98,298	126,504	146,066	64,655	70,582	71,642
Subtotal (MTEF)	71,982	107,735	138,536	160,229	70,947	76,822	78,226
Recurrent Deficit/Funding gap					-3,145	-5,792	-7,579
Development Deficit/Funding gap					-33,643	-55,922	-74,424
Total Deficit/ Funding Gap					**-36,788**	**-61,714**	**-82,003**

*Projected figures are as per Budget Policy Statement (BPS).

2.5 Status of Water Resources

2.5.1 Overview

According to the National Water Master Plan 2030, Kenya is endowed with both surface and groundwater resources. However, the country is classified as water scarce with dwindling water availability against increasing and competing needs for water. According to the Water Master Plan 2030, the country has limited natural renewable water resources estimated at 42.1 BCM/year, which consists of 20.6 BCM/year of surface water and 21.5 BCM/year of groundwater recharge. Currently per capita water availability is about 450 m^3 /capita/day against global benchmark of 1000m^3/capita/day and the trend is projected to decline as we move towards the year 2050. Further, water resource is not evenly distributed both spatially and temporally, whereby arid and semi-arid areas constitute 80% of the country.

The rising water demands, from the key economic sectors and rising urbanization and industrialization trends continue to exert enormous pressure on the scarce water resource. Further, the water resources are facing emerging challenges that relate to climate change, water resource conflicts, catchment degradation, uncontrolled and unregulated and inefficient use of water resources, encroachment of riparian land and wetlands and inadequate subsector resources allocation. Despite the challenges on water resources, the demand for the already limited resources is projected to increase tremendously by year 2050, according to water master plan 2030. This therefore calls for a deliberate effort towards sustainable management of water resources and adequate allocation of resources in the sub-sector.

Water Resource drives all sectors of the economy and therefore, sustainable management coupled with adequate resource allocation to this subsector will ensure that the country realizes the benefits of the 'Big Four Agenda' and achieves the vision 2030 development agenda on achievement of universal access on water by 2030 and the economic pillar. Further, the reliability and access to water resources is a fundamental human right in the Constitution of Kenya, 2010, under the economic and social rights ,Article 43, (1), (d), to clean and safe water in adequate quantities and it is the state's obligation under the constitution to preserve and ensure the right is achieved. The country has also obligation of achieving Sustainable Development Goals, especially Goal No. 6 on "Ensuring Availability and Sustainable Management of Water and Sanitation For all" under which WRA is required to undertake water allocation planning; Goal No. 13 on " urgent action to combat climate change and its impacts" where WRA undertakes catchment conservation and protection; and Goal No. 15 on " Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification,

and halt and reverse land degradation and halt biodiversity loss" which is part of Authority's mandate on water resources protection. The well managed water resources will also assist the country in negotiating with other countries that share water resources with as trans-boundary waters.

In cognizant of the need for sustainable Management of Water Resources, the Ministry of Water & Sanitation through Water Resources Authority develops and implements water resources management strategies geared towards sustainable water resources management. The WRMS seeks to strengthen the management of water resources with deliberate efforts to increase water availability through sustainable management, enhanced water resources monitoring and assessment by mapping surface and groundwater to quantify on availability of both the surface and groundwater resources and make it available for utilization and improve accuracy on water resources information; Strengthen water resources protection and conservation, catchment restoration, pollution control to enhance water quality; manage water related disaster and strengthen the financing in the water sub sector.

2.5.2 Water Resources Management

Kenya has five major "water towers", namely, Mt. Kenya (199,558 ha), Aberdares Range (103,315 ha), Cherangani Hills (128,000 ha), Mt. Elgon (73,089 ha), and Mau Forest Complex (400,000 ha) and several other small water towers. These water towers form the upper catchments of all the main perennial rivers in Kenya. On the other hand, the rivers in ASALs run out seasonally when heavy rainfall occurs.

Water Resources Management is carried out at River basin level. The country is divided into six major catchment areas as shown in figure 2 with respective areas as follows

1. Lake Victoria North Catchment Area (LVNCA)- (18,374 km²)
2. Lake Victoria South Catchment Area (LVSCA) -(31,734 km²)
3. Rift Valley Catchment Area (RVCA) (130,452 km²)
4. Athi Catchment Area (ACA) (58,639 km²)
5. Tana Catchment Area (TCA) (126,026 Km²)
6. Ewaso Ng'iro North (210,226 km2)

Figure 2: Water Resources Catchment Areas

2.5.3 Water Resources Availability

According to the National Water Master Plan 2030, the renewable water resources is estimated at 42.1 BCM/year, which consists of 20.6 BCM/year of surface water and 21.5 BCM/year of groundwater recharge, assuming that the sustainable groundwater yield is 10% of the groundwater recharge, the available water resources was estimated at 22.5 BCM/year as indicated in Table 4. The available per capita water resource was estimated at 586m³/y/capita. The Available per capita is dwindling towards the projected years of 2030 and 2050. Table 4 below gives the projected water resources available and renewable for the years 2010, 2030 and 2050. The increase in available water resources in the six basins is attributed to the projected increased rainfall due to impacts of climate change.

Table 4: Renewable and Available Water Resources

Item	2010	2030	2050
Precipitation (P) *(BCM/y) Evapotranspiration (E) **(BCM/y) Renewable WR (P-E) (BCM/y)	400.1 358.0 42.1	441.6 397.3 44.3	471.9 425.9 46.0
Renewable SW (BCM/y)	20.6	24.9	26.7
GW Recharge (BCM/y)	21.5	19.4	19.3
Sustainable Yield of GW*** (BCM/y)	1.9	1.7	1.7
Available Water Resources (BCM/y)	22.5	26.6	28.4
Population Projected (million)	38.5	67.8	96.9
Per Capita RWR (m^3/y/capita)	1,093	653	475
Per Capita Available WR (m^3/y/capita)	586	393	293

Source: National Water Master Plan (NWMP 2030)

2.5.4 Water Demand

According to Water Master Plan,2030, The water demand projections per catchment area presented in Table 5 shows that by 2030 Water Demand is expected to reach 21 b l/y to be used by the following sub-sectors: irrigation (84%), domestic (14%), industrial (1.3%), wildlife & fisheries (0.7%). In Figure 3, water demand per sub sector has been illustrated.

Table 5: Water Demand per Region (Units in MCM/yr.)

Catchment Area	Area (sq.km)	2010	2030	2050
LVNCA	18,374	228	1,337	1,573
LVSCA	31,734	385	2,953	3,251
RVCA	130,452	357	1,494	1,689
ACA	58,639	1,145	4,586	5,202
TCA	126,026	891	8,241	8,476
ENNCA	210,226	212	2,857	2,950
Total	**575,451**	**3,218**	**21,468**	**23,141**

Source: National Water Master Plan (NWMP 2030)

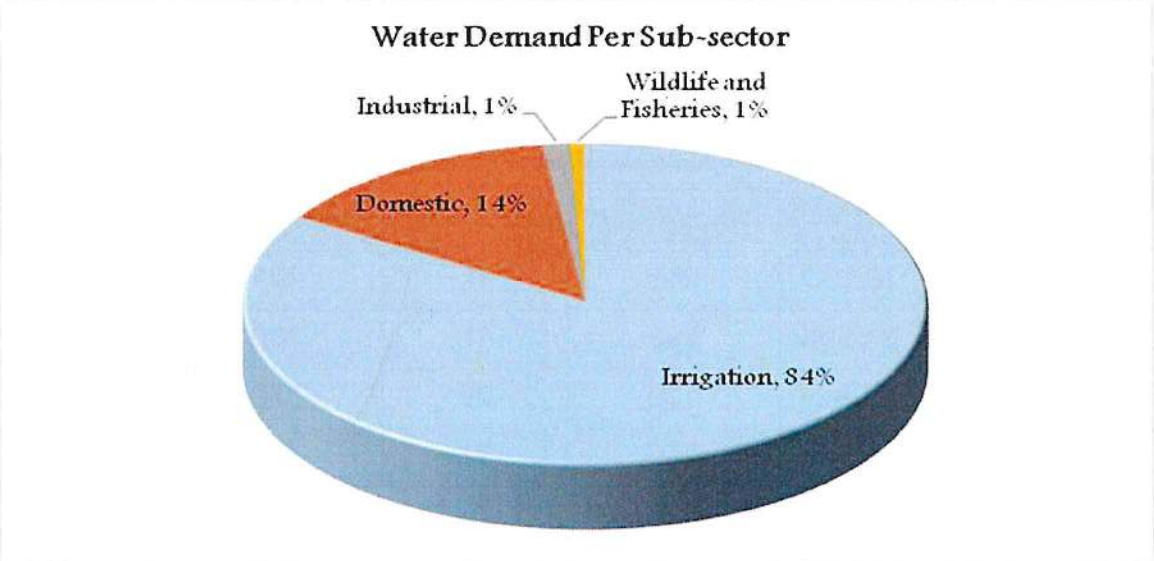

Figure 3: Water demand per sub sector; Source: National Water Master Plan (NWMP 2030)

2.5.4.1 Groundwater Potential and Exploitation

According to the National Water Master Plan 2030, the total groundwater potential of the country is 1,740 MCM/year. Exploitation of groundwater is controlled through authorization/permitting system employed by Water Resources Authority. Currently there more than 23,500 registered boreholes throughout the country, majority of which have been drilled in Nairobi Aquifer Suite (NAS). High density of boreholes is found in the areas of Karen, Langata, Embakasi and City Centre, Kiambu and Kajiado, Kitengela, Ongata Rongai and Ngong. It is worth noting that, there are additional boreholes (approximated to be more than 2,000) drilled without authorization from WRA, including those by County Governments.

The Nairobi aquifer suite (NAS) alone that straddles across several counties has over 7,000 boreholes. The counties include Nairobi City, Kajiado County, Kiambu County, Murang'a County and Machakos Counties and is classified as a strategic aquifer under the WRA Aquifer classification. It is significant as it augments the balance of the public water demand in its extent. In some parts of the Nairobi metropolitan, it is the only source of water. Table 6 shows estimates the groundwater use in each of the basins and the balance thereof.

Table 6: Summary of Groundwater Use Balance by Basin

Basin	Basin Area	Groundwater Potential	Estimated Use	Groundwater Use Balance	Area of over abstraction
	km²	MCM/year	MCM/year	MCM/year	km²
Lake Victoria North	18,500	216	11	205	7
Lake Victoria South	26,906	292	11	280	15
Rift Valley	131,423	400	29	370	2,515
Athi	66,559	559	71	488	3,147
Tana	126,208	693	15	678	484
Ewaso Ng'iro North	209,918	449	15	435	821
Total	**579,514**	**2,608**	**152**	**2,456**	**6,989**

Source: National Groundwater Balance Report, Volume IR2-4B, May 2019

Both Surface and groundwater are critical in meeting the different water needs. Surface water is the backbone of hydro-electric power generation, major irrigation schemes and water supplies. This includes the 7 forks hydropower schemes in the Tana River basin, Bura, Mwea, Kano and Perkerra irrigation schemes. The water supplies are for Nairobi, Mombasa, Kisumu, Eldoret, Nakuru and other Urban and Rural Water Supplies. Groundwater resources have also played a key role in development of domestic, agricultural, industrial, municipal and rural settlements. It is a major source of water for Mombasa, Nakuru and Nairobi. Most of the drinking water supplies especially in the rural arid areas are sourced from groundwater systems.

The reliability of the water resources for different uses is highly dependent on the ambient physical and chemical composition. Improperly planned land use changes and climate change scenarios compounded by unsatisfactory liquid and solid waste management has increasingly posed threat to the quality of limited fresh water resources. Point and non-point water pollution is a key challenge in ensuring accessibility of safe water resources in Kenya. There is need to ensure equitable access to water in the right quality and quantity for the production, environment and basic human needs. This is achieved through water allocation planning, catchment rehabilitation programs and effluent discharge. Different approaches have been employed to achieve this amongst them catchment rehabilitation programs, done in partnership with WRUAs though the implementation of Sub- Catchment Management Plans as well as groundwater recharge conservation programs for the Lamu sand dunes and Kikuyu Springs.

2.5.5 Water Use

Water Resources Authority is mandated through the Water Act 2016 as a lead Agency to regulate the management and use of the water resources as both surface and groundwater with regard to quality and quantity. All water uses are regulated through the established Permitting System to ensure sustainable use of water resources in view of growing water needs and demands. In exercising its mandate, the Authority greatly adopts the Integrated Water Resources management (IWRM) principles. The Authority employs equity and prioritizes the apportionment and allocation of the water resources. Similarly, the Authority protects and conserves the limited fresh water resources from pollution through the Waste Disposal Control Plans that include Effluent Discharge Control Plans (EDCPs).

2.5.6 Water Resources Monitoring

2.5.6.1 Surface Water

Monitoring networks in the country comprises of meteorological stations and hydromet stations. The LVSCA has a total of 47 hydromet stations, ENNCA has a total of 40 hydromet stations, RVCA region has a total of 42 hydromet stations, TCA region has 47 hydro-met stations, ACA has a total of 31 hydromet stations and LVNCA has a total of 28 hydro-met stations. The Hydrometeorological and weather monitoring stations for the country are presented in Tables 7 and 8.

Table 7: Hydro meteorological stations

Region	Category				Total
	National	MU	IMU	Special	
LVNCA	5	6	10	7	28
LVSCA	5	14	26	2	47
RVCA	7	13	21	1	42
ACA	3	4	21	3	31
TANA	1	7	21	18	47
ENNCA	1	5	33	1	40
Total	22	49	132	32	235

Source: WRA Water Situation Report 2018-2019

Table 8: Weather Monitoring Stations.

	Rainfall	No. Operational	Evaporation	No. Operational	Climate	No. Operational	
ACA	47	28	10	5	2	0	59
ENNCA	26	11	4	2	9	2	39
LVNCA	72	30	10	3	5	0	87
LVSCA	47	20	20	20	12	10	79
RVCA	23	20	44	5	4	4	34
TCA	52	30	14	11	2	0	68
Total	278	125	65	46	34	16	377

Source: WRA Water Situation Report 2018-2019

2.5.6.2 Groundwater Monitoring

The Ministry through Water Resources Authority has been undertaking groundwater resources monitoring since its establishment in 2005. This has mainly been an ad hoc arrangement with owners of production wells. However, it is crucial that a dedicated groundwater monitoring network is set up to enable monitoring of groundwater levels and quality. Towards this the Authority has rolled out 20 monitoring wells equipped with telemetric equipment in the Nairobi aquifer suite, Tiwi aquifer and the Lamu sand dunes aquifer. These wells are already giving groundwater level data. A groundwater monitoring network guidelines to the rest of country has also been developed. The design is dependent on, and builds from the following sequential activities:

- Groundwater resource assessment which has been completed.
- Aquifer delineation of known aquifers based on groundwater potential.
- Aquifer classification based on level of use and groundwater potential.
- Monitoring network design - Identification of priority areas for monitoring in Strategic, Major, Minor and Special aquifers, and monitoring guidelines for the aquifer classes).

Further, a draft National Groundwater Monitoring Network Design has been developed to guide future investment in groundwater monitoring across the country. The design is partly prescriptive (i.e. identification of aquifers or land use contexts which are known or strongly suspected to require groundwater monitoring) and partly generic (i.e. describing the processes that need to be followed to develop the monitoring network in an adaptive management approach).

2.5.7 Water quality and Pollution

Due to increased threat of pollution to the water resources, Water Resources Authority monitors water quality and pollution control, across all the catchments. The Monitoring is stations comprises of surface, Ground and effluents as shown in table 9.

Table 9: National Water Quality Monitoring Stations

Station Type / Catchment Area	SW	GW	Effluent	Total	1ST Priority Stations
LVNCA	44	19	39	102	24
LVSCA	77	29	26	132	54
RVCA	49	30	23	102	27
ACA	55	45	32	132	44
TCA	58	19	27	104	30
ENNCA	46	19	21	86	23
Grand Total	329	161	168	658	202

Source: WRA Water Situation Report 2018-2019

2.5.7.1 Water Quality and Pollution Control Strategies

Fresh water resources with surface water bodies being more susceptible to pollution has led the Ministry of water & Sanitation and Irrigation together with its Agencies to reconsider the approaches to reverse the growing trend of water pollution. The identified biggest sources of pollution are:

1. Unsatisfactory liquid waste water management in urban centres. Most of the urban centres have low sewerage coverage (approximately average of 26%) and the matter is compounded with unsatisfactory discharges of wastewater from the wastewater treatment plants to the environment;
2. Informal settlements: Most informal settlements in urban centres have poor liquid and solid waste management;
3. Encroachment to the riparian land. The encroachment has denied the riparian land the opportunity to act as a buffer zone ecological functions that would minimize pollution from non-point sources to the surface water bodies;
4. Dumpsites. It is noted with concern that majority of the solid waste dumpsites are located along the riparian lands and are unsatisfactorily managed resulting into surface and groundwater pollution through leachates.

Figure 4: Dumpsites in urban centres that pollute the water resources (Eldoret Town Solid Waste dumpsite at Huruma Estate)

5. Industrial waste. While a few entrepreneurs are complying, there are those who discharge and dispose waste at odd hours like during the night to the environment.

It against the above identified challenges that strategies have been put in place and they include:

1. Initiative on Rivers Protection and Pollution Management with a Sub-Committee in place coordinated by the Cabinet Secretary Ministry of Water & Sanitation and Irrigation and an Inter Agency Technical Committee comprising of various stakeholders including the County Governments. A Cabinet Paper with an Action Plan for Nairobi River Restoration and Protection has been developed and awaiting the Cabinet approval for implementation.
2. Conducting water quality and pollution surveys in priority hotspot [pollution areas;
3. Mapping of point and non-point sources of pollution;
4. Enhanced awareness creation prioritizing the hotspot areas of pollution in urban centres. In view of the Thwake multi-purpose dam, pollution control measures with focus to the Nairobi River Basin encompassing Nairobi, parts of Kajiado, Kiambu and Machakos Counties forming part of the entire Athi River Basin are in place (see the figure 5 below). Lake Victoria Basins (North and South) have also been prioritized due to the social-economic importance of the Lake and the water hyacinth threats.
5. Engagement and collaboration of stakeholders under the framework of Water Resource Users Associations (WRUAs) in developing and implementing Sub-Catchment Management Plans focusing on pollution controls;
6. Continue to modernize and operationalize the National, Regional Water Quality and Pollution Control Laboratories

7. Participating in multi-sectoral Inter Agency for River Protection and Pollution Management coordinated by the Ministry of Water & Sanitation and Irrigation
8. Development of Resource Quality Objectives (RQOs) that will help in classification of water resources

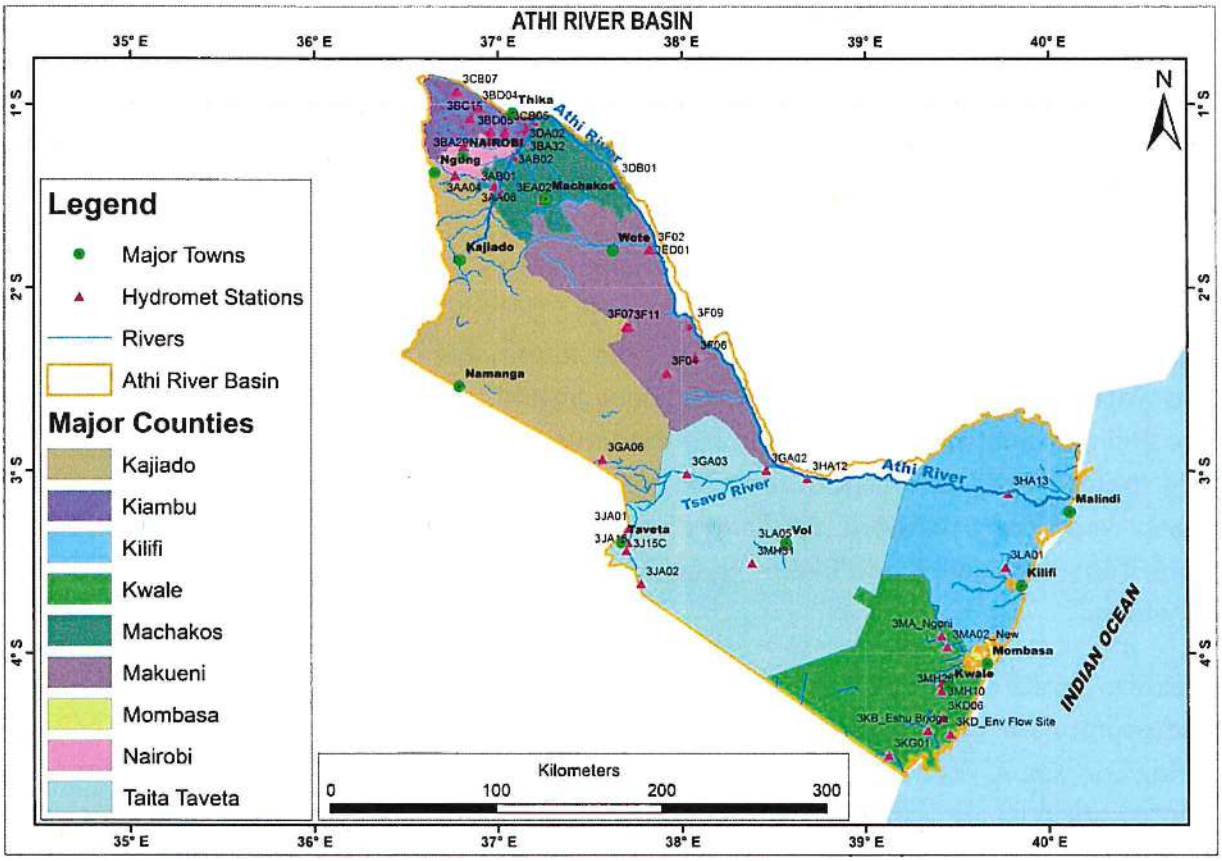

Figure 5: The Athi River Basin encompassing pollution hotspot Counties: Nairobi, Kiambu, Kajiado and Machakos.

2.5.8 Catchment Protection and Conservation

Water Resources Management is undertaken within the six catchment areas provided; Basin Management plans are therefore developed for each of the Basins to enhance catchment protection. Through the Ministry of Water and Sanitation, Kenya received financing from the World Bank toward the cost of implementing the Kenya Water Security and Climate Resilience Project Phase 1. A consultant (Implantation Support Consultancy) was brought on board to strengthen WRA's capacity in terms of tools, skills and infrastructure to deliver on its mandate for water resource management and regulation in the country. The development of six Basin Plans for the four main rivers and one Lake Basin in Kenya was one of the key set of deliverables.

Basin Plans provides a clear pathway for the sustainable utilization and development of the water resources in the basins. These Plans provide a description of the current state of the basin establishes a shared vision for the future development of the basin and identifies key strategic areas and actions for effective development and management of the basin's water resources. Therefore, Six Basin Plans for Lake Victoria North, Lake Victoria South, Athi, Tana, Rift Valley and Ewaso Nyiro North and have been developed and are at their Final Draft

Further, a total of 43 Sub Catchment Management Plans (SCMPs) have been developed in the country for the last three years. Further, implementation of some of the SCMPs are being conducted by the Water Resources Users Association (WRUAs) who have funds for conservation issues, while Water Resources Association give technical Support. Catchment protection and Conservation has been achieved through implementation of the SCMPs enumerated activities which include; riparian zone conservation -Marking and pegging of riparian land is ongoing, control of soil erosion and construction of sand dams and earth dams.

Further, a total of 50 watershed Manuals were developed to guide riparian conservation and rehabilitation, 43 sensitization workshops each 3 days held in the WRA sub regions during the development of the Sub Catchment Management Plans (SCMPs). In 2018, a total of 4 Catchment Fora was held in ENNCA, RVCA, LVSCA and LVNCA and in 2019, 6 Basin Plans workshops were held in the 6 Regions.

2.5.9 Water Resources Assessment

Water resources assessment is a deliberate effort to quantify availability of water resources both at surface and ground for utilization. The assessment of both surface and groundwater resources is continuously undertaken. The Ministry of Water & Sanitation and Irrigation

has mapped ASAL counties in Kenya including Wajir, Turkana and Marsabit to understand the groundwater potential in those areas. Equally Surface water resources are estimated at river basins using the gauging stations installed to ensure equitable allocation and use. Groundwater resource assessment resulted into provision of maps indicating groundwater recharge zones, Groundwater potential areas and water quality. A total of 26 boreholes have been drilled in Turkana, Marsabit, Isiolo, Garissa, Kajiado, Embu, Tana River and Tharaka Counties to enrich the groundwater knowledge.

2.5.10 Hydrological extreme events

The hydrological extremes experienced in the country are droughts and floods. The mapped flood prone areas include: Nyando, Migori, Budalangi, Sabwani, Isiolo, Taita Taveta, East Rachuonyo, Garrissa and Tana River amongst others. The floods caused by the heavy rains have varied impacts in different catchment areas. Floods affects downstream areas Nyando, Sondu, East Rachuonyo Tana, Nzoia, Sabwani, Sio, Yala, Gucha Migori, Perkerra and Sabaki river basins as shown in Figure 6. However, severe droughts have been experienced in arid areas of the country resulting in acute water shortages, water resources conflicts and loss of lives and livelihoods.

Figure 6: Flood events in the flood prone areas

2.5.11 Water Resources Management intervention measures

The water resources management intervention measures to improve water availability and reduce adverse effects on water resources include the following among others: Catchment areas restoration; riparian zone protection and conservation; control of soil erosion; construction of sand dams and earth dams; protection of wetlands and springs ;water harvesting and safe storage; Groundwater exploration; Installation and rehabilitation of water resources monitoring networks; Development and implementation of catchment management plans and strategies; Development and implementation of Water Allocation Plans; Pollution monitoring and control; Community sensitization programmes on water resources management; Exploring the innovative solutions for waste management through promotion of Circular Economy and Enforcement for compliance to the water resources regulations.

2.5.12 Transboundary Water Resources

Transboundary water resources are water resources that are shared between two or more countries. Kenya *shares about 54%* of its surface and groundwater resources with neighboring countries. These shared water resources need to be sustainably managed and developed in an equitable manner. In order to achieve sustainable management and equitable development of the shared water resources, the Kenya Government together with its riparian states has developed cooperative framework agreements, regional policies and Memorandum of Understandings (MoUs) among others. The shared water resources between Kenya and other neighbouring countries are as follows:

a) Lake Victoria Basin

The Lake Victoria Basin is shared by Kenya, United Republic of Tanzania and Uganda. In Kenya Lake Victoria is drained by nine main river basins. These river basins are Sondu Miriu, Mara, Nyando, Yala, Nzoia, Sio, Malakisi, Lwakhakha and Malaba. Mara River basin is shared by Kenya at the upstream with United Republic of Tanzania at the downstream. Also, Lwakhakha, Sio, Malaba and Malakisi rivers are shared between Kenya and Uganda at the border. The surface water resources in the lake basin have been affected by increasing water demand and adverse climatic conditions such as prolonged droughts. Despite the fact that water abstractions and evaporation rates in the lake basin has been improving, water availability was projected to be increasing by approximately 1.25% annually (NWMP, 2030). In the year 2019 -2020 rainfall being recorded in the lake basin since April, 2019 to April, 2020 was high compared to previous years. This has led to flooding of the lake at the shores affecting shoreline communities.

b) Ewaso Ngiro South River Basin

The Ewaso Ngiro South River originates from Kenyan side in Narok County and flows crossing the border to Lake Natron in the United Republic of Tanzania at the downstream. The Ewaso Ng'iro South River provides water to residents of Narok and Kajiado Counties. Water availability in the river basin has been enhanced by use of groundwater and rainwater harvesting using water pans and storage tanks.

c) Lake Challa Basin

Lake Challa is a crater lake that straddles the border between Kenya and United Republic of Tanzania. The lake is east of Mount Kilimanjaro, 8 kilometres (5.0 mi) north of Taveta, Kenya, and 55 kilometres (34 mi) east of Moshi, Tanzania. The lake is surrounded by a steep crater rim with a maximum height of 170 metres (560 ft). Approximately 80 percent of the lake's inflow comes from groundwater, which is derived mostly from rainfall in the montane forest zone of Mount Kilimanjaro at an elevation of 1,800 to 2,800 metres (5,900 to 9,200 ft).

d) Lake Jipe Basin

Lake Jipe is an inter-territorial lake straddling the borders of Kenya and the United Republic of Tanzania. On the Kenyan side, it is located south of the village of Nghonji while on the Tanzanian side; it is situated within Mwanga District, in Kilimanjaro Region. The lake is fed mainly by the Lumi River, which descends from Mount Kilimanjaro and traverse Kenya in Taita-Taveta County, as well as streams from the North Pare Mountains, being on the leeward side. The lake's outlet forms the Ruvu River. Kenya's unfenced Tsavo West National Park protects part of the lake's northern shore, while on the Tanzania side Mkomazi Game Reserve is nearby. Rainfall received in Lumi River Basin is high during wet season causing flash floods at the downstream. Hence water shortage is only experienced during dry periods.

e) Lake Turkana and its river basin

The Lake Turkana, formerly known as Lake Rudolf, is a lake in the Kenyan Rift Valley, in northern Kenya, with its far northern end crossing into Ethiopia. The lake is fed by River Omo from Ethiopia and Turkwel and Kerio rivers from Kenya. The lake level in Turkana has been receding since 1975. For example, the lake level fell by 10 m (33 ft) between 1975 and 1993. The construction of 250 m high Gilgel Gibe III Dam on Omo River in Ethiopia will increase the falls in lake water levels. In 2018-2019 it was realized that the lake levels had receded by about 2 m. Also, agricultural activities taking place in the catchments of the lake has increased inflow of sediments into the lake reducing the water quality. Despite

the fact that the lake waters are saline, communities living around the lake relies on spring and boreholes water for domestic purposes.

f) Jubba-Shebelle River Basin

Jubba -Shebelle river basin is shared by Kenya, Ethiopia and Somalia. The rivers which drain the Jubba -Shebelle River Basin in Kenyan side are Daua River flowing through borders of Kenya and Ethiopia in Mandera County, River Kutulo that emanates from Mandera County during wet season, Lak Bor and Lagh Bogal originating from Marsabit County and flows through Wajir County, Ewaso Ng'iro North and Milgis flowing from Mt. Kenya and hills of Marsabit County at the upstream and flows through Wajir to Somalia as shown in Figure 7. The river basin in Kenya is characterized by aridity and hence the rivers become seasonal during dry spells. This creates water and food shortage in the northern region and leaving the residents to rely on groundwater.

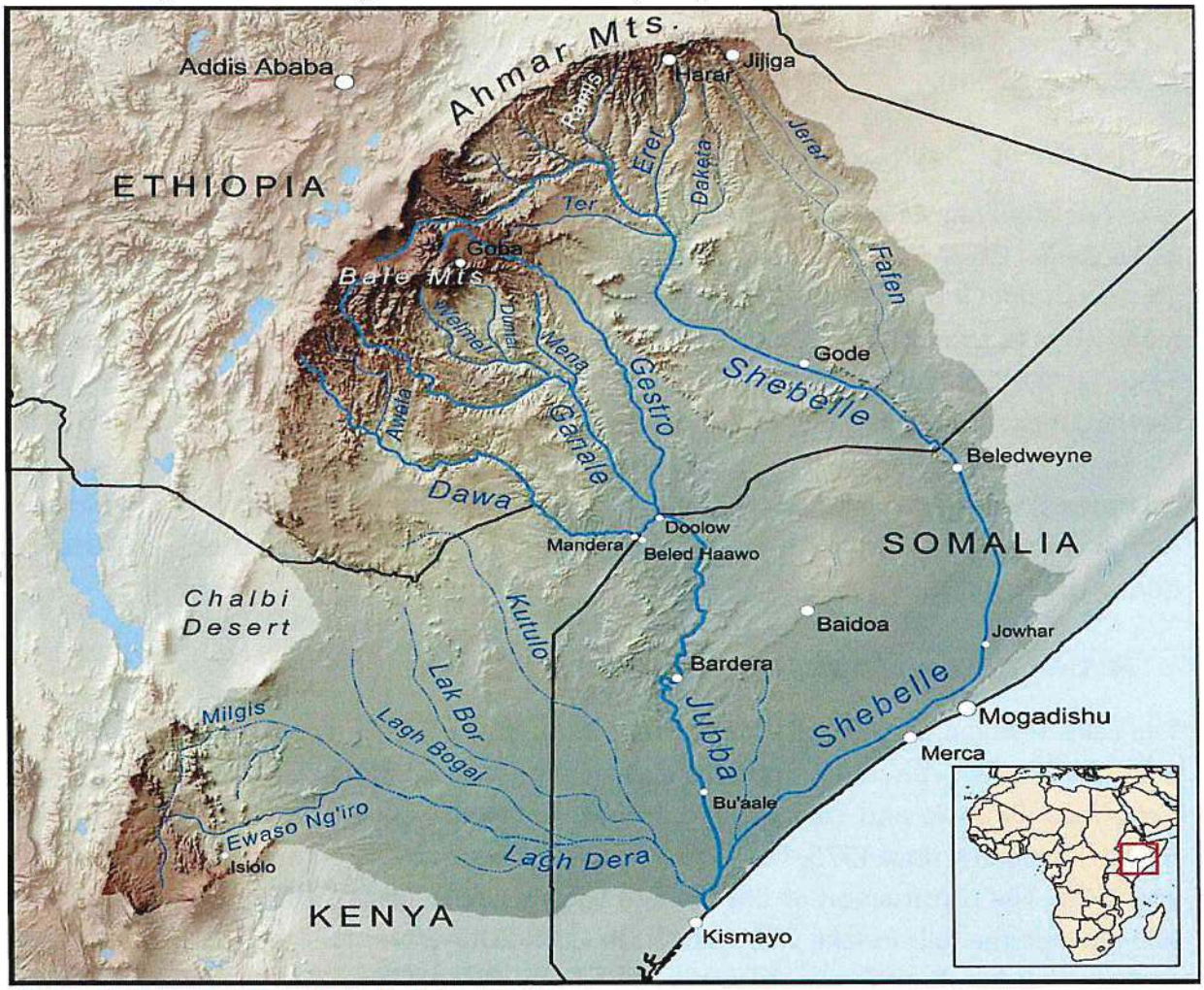

Figure 7: Map of Jubba-Shebelle River Basin

g) The Rift Valley Groundwater Aquifers

There are seven shared aquifers between Kenya and its neighbouring countries. At the northern part of the Kenya, North Rift Valley aquifer that starts from Menengai Crater in Nakuru and extends towards southern parts of Ethiopia. At the southern part of Kenya, South Rift Valley aquifers starts from Kenyan Rift valley extending towards Lake Eyasi in United Republic of Tanzania.

h) Mt. Kilimanjaro-Chyulu Hills Aquifer

Mt. Kilimanjaro-Chyulu Hills aquifer is shared between Kenya and United Republic of Tanzania. The aquifer is rich in groundwater due to continuous recharge of the aquifer by heavy rainfalls experienced in the Mt. Kilimanjaro and its slopes. The Mzima springs supplying Taita-Taveta and Mombasa Counties.

i) Kenyan Coastal Aquifers

The sand aquifer in Lamu-Kiunga is shared between Kenya and Somalia at the north coastal areas of Indian Ocean. Tiwi aquifer located in south coast of Kenya is shared by Kenya and United Republic of Tanzania. The coastal aquifer is potential sources of water to meet demands of north and south coast communities.

j) Merti -Daua aquifers

The Merti Aquifer is located in northeast Kenya and provides water to the local population as well as a growing number of refugees in the area. Although it is the most important source of fresh water in the region, relatively little is known about the extent of the aquifer, its hydrogeological parameters and groundwater recharge. The aquifer extends from Kenyan part to Somalia. The Daua aquifer is located in Mandera County and southern parts of Ethiopia. The Merti-Daua groundwater is the main source of water to the northern inhabitants. Therefore, exploitation of the groundwater in the northern aquifers should be well controlled to avoid over abstraction and conflicts among water users.

k) Sudd aquifer

The Sudd aquifer is located in north western part of Turkana County. The aquifer is shared between Kenya, South Sudan and Ethiopia. The Sudd aquifer is a potential water resource to meet water demands in Turkana County.

2.5.13 Water Resources Management Projects/Programmes

The following water resources management projects and programmes are being implemented to ensure sustainability of safe and reliable water resources in the country.

(i). Kenya groundwater mapping programme

The aim of the programme is to identify areas of high groundwater potential in order to enhance the effectiveness of managing the resource for development. This entails the mapping of the ground and surface water and its delineation. In order to enhance water resources assessment, the Ministry has collaborated with other agencies including UNESCO and United States Geological Survey (USGS) to conduct groundwater assessment in some of the counties with an aim of understanding the groundwater potential in these counties. These Counties include: - the southern parts of Turkana County and whole of Marsabit County are being assessed by USGS, while the Ministry has engaged a Consultant to assess the groundwater potential in Wajir County.

(ii).Upgrading of countrywide Hydromet stations

The Project aims at providing adequate infrastructure for hydrological observations in the country. The project objective is to upgrade river gauging stations to record and transmit data in real time for proper water resources management. The economic and social benefits of the project include efficiently managed Water resources with sufficient knowledge and enable floods and drought to be predicted thereby providing adequate mitigation measures to be taken. The total number of Hydromet stations which have been upgraded in six catchments for the last three years are 235 stations as shown in table 10. In addition, 52 Regular (River) Gauging Stations were rehabilitated while 17 of them have been upgraded to Telemetry and 5 new stations established to improve data accuracy. To Strengthen and enhance water resource monitoring, the Ministry has installed 15 telemetric stations through IGAD HYCOS project to improve hydrological observation. The river gauging stations were upgraded to record and transmit data in real time for proper water resources management. Hence the economic and social benefits of the project included efficiently managed Water resources with sufficient knowledge and enable floods and drought to be predicted thereby providing adequate mitigation measures to be taken.

(iii). Sustainable management of Lake Turkana and its river basin:

Lake Turkana is the world's largest permanent desert lake and the largest alkaline lake. More frequent and prolonged droughts in the region, together with a rapidly growing population, have caused degradation. A history of tension over competition for water and grazing areas causes large losses of livestock and regular requirements for humanitarian aid. Currently, the region is facing the worst drought in decades,

claiming many lives -both human and livestock- while escalating transboundary armed conflicts. In order to ensure sustainable management and development of the Lake Turkana and its River Basins, the Government of Kenya and Government of Ethiopia formed and operationalized steering and technical committees in 2017/2018 financial year. Due to water development projects at the upstream of the lake, the lake levels have been receding over time especially in the Kenyan side. In 2018/2019, the Government of Kenya installed 10 Hydromet monitoring stations in the Lake Turkana to monitor the lake levels. By the end of 2019/2020 financial year additional 10 Hydromet stations will be installed to ensure adequate spatial distribution of the monitoring stations. The next phase of the project is to conduct basin wide isotope analysis to determine if surface and groundwater interactions exist within the basin.

(iv). Kocholia Multipurpose water resources project:

The Kocholia multipurpose project consists of a 43 m high dam with approximate capacity of 66.9million cubic metres of water. The project aims at supplying water for irrigating 2000 hectares horticultural lands, to generate electricity and water supply to communities. The project will boost food security, water supply and enhance socio-economic development in Busia and Bungoma Counties. The estimated total cost of the project is about Kshs. 5.7 billion. The project is under preparatory stage and the dam site was identified through pre-feasibility study conducted in 2017/2018 financial year. The location of the project is in Malakisi River Basin. Also community sensitization and stakeholders' forums have been ongoing since 2018 to date. In 2018/2019 financial year, the Environmental and Social impact assessments and Resettlement Action Plans were accomplished. Catchment restoration in Malakisi River Basin was among activities to be conducted before the project implementation phase to ensure sustainable flow of the Malakisi River. By the end of this financial year 2019/2020, two Sub Catchments Management Plans for Malakisi River Basin have been developed and designs of five hydromet networks will be completed. The next phase of the project will be installation of the hydromet stations, catchment restoration and rehabilitation, detailed feasibility study and dam designs

(v). Angololo multipurpose water resources project:

Angololo multipurpose water resources project is a shared project between Kenya and Uganda. The Angololo project will contribute towards increased irrigated agriculture. It is targeting to irrigate 3,300 ha of land (1,180 ha in Kenya and 2,120 ha in Uganda) when fully developed, supply water to 20,000 people and generate 1.75MW of hydro power. The project also includes an upstream integrated watershed management of about 430 km^2. The project is expected to benefit at least 127,300 people from Tororo, Manafwa,

and Namisindwa districts in Eastern Uganda and Busia and Bungoma Counties in Kenya through employment creation, irrigated agriculture, piped water supply, hydro power generation, and livestock and fisheries production. The estimated cost of the project is USD 1.65 million and it is being implemented by the two countries with the help of Nile Equatorial Lakes Subsidiary Action Plans. So far prefeasibility study has been done and currently conducting feasibility studies.

(vi). The Nile Basin Initiative (NBI):

The Ministry held the 27th Nile Council of Ministers (NileCOM) meeting on 29th November, 2019 in Nairobi. During the NileCOM meeting USD 5.5 million Nile Basin Regional Hydromet Project was launched and currently under implementation. NBI is governed by a Council of 10 Ministers in charge of Water Affairs in the Nile Member States, the Nile-COM. This is the highest decision and policy-making body. The ten Ministers meet annually to deliberate on the status of the Nile cooperation, review progress made in project implementation, consider work plans and budgets for the coming year and provide overall strategic guidance, on the NBI agenda. The leadership of the NBI Governance is held on a rotational basis following the alphabetical order of the Country names. Kenya assumed the leadership of the NBI Governance.

2.6 Status of Water Supply and Sewerage

2.6.1 Introduction

Water and Sewerage services were being offered by county councils across the country. The services were disproportionate and poor for most urban areas. The Ministry formulated and enacted Water Act 2002 with the sole purpose of reforming the sector. The Water Act 2002 created several Water Sector Institutions that were charged with different mandated in water supply and sanitation development and services provision. These Institutions included;

- **Water Services Regulatory Board (WASREB)** – Was in charge of Regulation and monitoring of service provision (Water Services Boards and Providers); Issuing of licenses to Water Services Boards; Setting standards for provision of water services; Developing guidelines
- **Water Services Boards (WSBs)** – Was in charge of Developing water and sewer facilities, investment planning and implementation; Rehabilitation and replacement of infrastructure; Procuring and leasing water and sewerage facilities; Contracting Water Service Providers (WSPs)

- **Water Services Providers (WSPs)** – Under Water Services Board in charge of Provision of water and sanitation services, ensuring good customer relation and sensitization; and adequate maintenance of assets.
- **Water Services Trust Fund (WSTF)** – Was in charge of financing provision of water and sanitation to disadvantaged groups (pro-poor) as water poverty fund.
- **The Water Appeals Board (WAB)** – Was in charge of Arbitration of water related disputes and conflicts between institutions and organizations.
- **National Water Conservation and Pipeline Corporation (NWCPC)** – Was in charge of Construction of dams and drilling of boreholes.

After the promulgation of the Constitution of Kenya, 2010, devolved units were introduced i.e. Counties. Parts of the National Government functions were transferred to the County Governments. Some of these functions included the water and sanitation services provision thereby transferring Water Services Providers to the County Governments.

As a result, it became apparent that there was need to review the Water Act 2002 to accommodate these changes. The Water Act 2016 was developed in consultation with County Government and enacted in 2016. This Act caused transition of Water Sector Institutions and expanded their mandates as follows;

- **Water Services Regulatory Board (WASREB)** – is established under the Water Act, 2016 to regulate water and sewerage services provision, including issuing of licenses, setting service standards and guidelines for tariff and prices.
- **Regional Water Works Development Agencies (WWDAs)** - are established by Section 68 of the Water Act 2016 to undertake the development, maintenance and management of the national public water works within its area of jurisdiction; operate the waterworks and provide water services as a water service provider in certain circumstances; provide reserve capacity for purposes of providing water services during transfer of water services functions from a defaulting water services provider; provide technical services and capacity building to such county governments and water services providers within its area as may be requested; and provide to the Cabinet Secretary technical support in the discharge of his or her functions under the Constitution and this Act. They took are the successors of the Water Services Boards.
- **Water Sector Trust Fund (WSTF)** - is established under the Water Act, 2016 to provide conditional and unconditional grants to Counties, in addition to the Equalization Fund and to assist in financing the development and management of water services in marginalized and underserved areas. This includes community level initiatives for the sustainable management of water resources, development of water services in under-served rural areas, development of water services in the under-served poor urban areas,

and research activities in the area of water resources management, water services, sewerage and sanitation. It took over from the former Water Services Trust Fund.

- **Water Tribunal (WT)** - is established under Section 119 of the Water Act 2016 to hear and determine any dispute concerning water resources or water services where there is a business contract, unless the parties have otherwise agreed to an alternative dispute resolution mechanism. However, the WT has not been operationalized due to problem with the law where the Act gave the WT a Chairman but no members of the Board. It is proposed that this be corrected through amendment of the Act. It is set to take over from Water Appeals Board.
- **National Water Harvesting and Storage Authority (NWHSA)** - is established under the Section 30 of the Water Act, 2016 with a countrywide mandate to undertake the development of national public water works for water resources storage and flood control on behalf of the national government; and maintain and manage national public water works infrastructure for water resources storage; collect and provide information for the formulation of the national water resources storage and flood control strategies; develop a water harvesting policy and enforce water harvesting strategies; undertake on behalf of the national government strategic water emergency interventions during drought; and, advise the Cabinet Secretary on any matter concerning national public water works for water storage and flood control. It took over from National Water Conservation and Pipeline Corporation

All the Institutions which were to be established under the Water Act 2016 have been established except Water Tribunal.

2.6.2 Analysis of Water Supply and Sanitation Projects in the Ministry

Over the last five years, the Ministry has been able to complete a total of 91 water and sanitation projects worth KShs. 50 Billion. This has led to an increase of population with access to safe water by 3.2 Million.

The Ministry is currently implementing a further 80 water and sanitation projects valued at KShs 289 Billion. These projects are at different completion levels with 29 of them being more than 50% complete and are targeted to be complete by 2022.

The Ministry has planned to undertake 57 dams across the country in order to increase the water storage capacity by 2,250 Million Cubic Meters. Out of these, four dams have been completed including Kiserian, Maruba, Theta and Chemususu dams with a cumulative capacity of 37.8 Million Cubic Meters. Eleven (11) of the Dams are under construction valued at KShs. 230 Billion with a cumulative storage of 731 Million Cubic Meters. Three

of them are more than 30% including Thwake, Siyoi Muruny and Yamo Dams while three have stalled (Itare, Umaa and Badasa dams). Details of dams are attached in Annex IV

2.6.3 Projects under the Big Four

The Government of Kenya has formulated and is implementing the Vision 2030 development blueprint aiming to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030. During its implementation, there were key areas that were identified as having challenges in implementation, which when unlocked would ensure that the other parts of vision would be realized faster. These areas were formulated into the Big "Four" Agenda in order to fast track their implementation.

The Ministry has been identified key enabler of the Big Four Agenda. The drivers for the Agenda have identified the projects that will be implemented as well as the budgets and timelines for implementation. The projects that are key to achievement of the priority objectives are outlined for each of the four groups.

Manufacturing

The projects that will support Manufacturing have been identified by the driver and will mainly be in Nairobi, Mombasa and Machakos Counties. Constituency Industrial Development Centres will however be spread across the country. These projects include supply of water to Naivasha Industrial Park; Kenanie Leather Industrial Park; Dongo Kundu SEZ; and Konza Technopolis Complex

The cumulative cost of the projects is Kshs. 4.1Billion. A total of Kshs. 820Million has been utilized so far and KShs. 520Million allocated for the current financial year for the Naivasha and Dongo Kundu projects, while Kshs. 264Million has been allocated for the other projects in the FY 2020/21. The Projects are tabulated in Annex I

Food Security and Nutrition;

Irrigation is considered a key enabler to Food Security and Nutrition and therefore a bulk of the Irrigation projects are part of the Big Four Agenda. The Projects under irrigation include National expanded irrigation Programme; Mwea Irrigation Development project (Thiba Dam and Irrigation Area), Rwabura Irrigation Development Project; Bura Irrigation Scheme; Community Based Irrigation Projects; Small Holder Irrigation Programme; Turkana Irrigation Development Project; Lower Kuja Irrigation Scheme, among others

The water projects that will support Food Security and Nutrition include connection of water supply to fish landing sites and fish markets at the coast and supply of water to livestock holding grounds located in various counties across the country.

The cumulative cost of the projects is Kshs. 202.2Billion. A total of Kshs. 46.8Billion has been utilized so far and KShs. 8.7Billion allocated for the current FY for Irrigation projects, while Kshs. 9.2Billion has been allocated for the other projects in the FY 2020/21. The Projects are tabulated in Annex II.

Affordable Housing:

The Driver has identified Housing Projects that will be implemented mainly in Nairobi and Machakos Counties. These projects will however require to be supplied water from Key Projects that have not been outlined by the driver as part of the Affordable Housing. Projects identified to support Affordable Housing include water and reticulation for Park Road, Starehe, Shauri Moyo, Utawala, Mihango, Ruai, Githunguri, Kibera B, Mariguini and East Africa Portland Housing Projects. Others include Mavoko water supply and sewerage projects.

The cumulative cost of the projects is Kshs. 15.3Billion. A total of Kshs. 1.95Billion has been utilized so far and KShs. 755Million allocated for the current FY for Mavoko Drinking Water Supply Project, while Kshs. 1.2Billion has been allocated for all projects in the FY 2020/21. The project details are provided in Annex III.

Universal Health Coverage:

The driver has identified 56 level 4 hospitals, 435 level 3 hospitals and 2576 level 2 hospitals that require to be supplied with reliable water supply. These hospitals will either be connected to existing water supplies or have individual projects developed for their water supply. The projects are located in all the counties countrywide.

The cumulative cost of the projects is Kshs. 25.9Billion. A total Kshs. 759Million has been allocated for all projects in the FY 2020/21. Project details are in Annex IV.

Other Key priority projects supporting the Big Four Agenda:

The Ministry is implementing other Key Projects that will supply water to the sites where the Big Four Projects are being implemented. These projects are considered as the drivers to the Big Four Agenda. These projects include Aberdare Bulk Water Project; Thwake Multipurpose Water Development Programme Phase I; Mwache Dam and Water Supply Project; Mzima II Pipeline; Northern Collector Tunnel; Ruiru II dam; Karimenu II dam;

Ndarugu I Dam and Water Supply; Maragua IV Dam and Water Supply; and Kenya Towns Sustainable Water Supply and Sanitation Programme.

The cumulative cost of the projects is Kshs. 301.3Billion. A total of Kshs. 36Billion has been utilized so far and KShs. 27.3Billion allocated for the current FY for Mavoko Drinking Water Supply Project, while Kshs. 21.2Billion has been allocated for all projects in the FY 2020/21. These Key Projects are listed in Annex V.

2.6.4 Trend in Water Coverage;

The Ministry has been undertaking monitoring of provision of water services nationally on an annual basis. This is in order to track the impact of the investment that the Government has been putting on increasing access to safe water.

The data obtained is mainly from WWDAs and WSTF who are the major implementers of water supply and sanitation bulk projects. It is important to note that the impact of each project is only realized once the project is completed and has started operating.

Over the last five years, the water coverage by population increased from 55.9% in FY 2014/15 to 62.9% in FY 2018/19. This is distributed in different Water Works Development Agencies as shown in table 10.

Table 10: Population and percentage coverage for WWDAs for the last 5 years

WWDA		LVS	R. Valley	LVN	Tanathi	Northern	Tana	Coast	Athi	Totals
2014/15	Pop. Within WWDA	7,376,215	7,616,855	6,322,863	4,274,837	3,234,065	3,590,525	3,968,554	7,215,257	**43,599,171**
	Pop. Served	3,149,850	4,782,227	3,609,946	1,658,377	1,961,512	2,378,411	2,062,902	5,106,183	**24,351,787**
	%age Pop. Served	42.7%	62.8%	57.1%	38.8%	60.7%	66.2%	52.0%	70.8%	**55.9%**
2015/16	Pop. Within WWDA	7,538,489	7,784,423	6,461,963	4,368,882	3,305,213	3,669,515	4,055,860	7,373,989	**44,558,334**
	Pop. Served	3,314,139	5,162,144	3,797,078	1,785,614	2,037,622	2,543,329	2,140,208	5,503,529	**25,832,883**
	%age Pop. Served	44.0%	66.3%	58.8%	40.9%	61.6%	69.3%	52.8%	74.6%	**58.0%**
2016/17	Pop. Within WWDA	7,704,332	7,955,677	6,604,123	4,464,995	3,377,926	3,750,243	4,145,088	7,536,214	**45,538,598**
	National Pop. served	3,513,176	5,398,266	4,041,726	1,887,714	2,174,136	2,700,174	2,257,940	5,751,047	**27,290,543**
	%age Pop served	45.60%	67.85%	61.20%	42.28%	64.36%	72.00%	54.47%	76.31%	**59.93%**
2017/18	Pop. Within WWDA	7,873,824	8,130,698	6,749,411	4,563,223	3,452,239	3,832,746	4,236,278	7,702,007	**46,540,427**
	Pop. Served	3,566,433	5,731,048	4,163,852	2,025,987	2,408,140	2,682,575	2,800,701	6,009,646	**28,854,561**
	%age Pop. Served	45.29%	70.49%	61.69%	44.40%	69.76%	69.99%	66.11%	78.03%	**62.00%**

2018/19	Pop. Within WWDA	8,047,045	8,309,570	6,897,895	4,663,612	3,528,187	3,917,065	4,329,474	7,871,448	**47,564,296**
	Pop. Served	3,607,829	5,966,992	4,269,405	2,107,548	2,500,941	2,750,262	3,140,264	6,136,571	**29,904,258**
	%age Pop. Served	44.83%	71.81%	61.89%	45.19%	70.88%	70.21%	72.53%	77.96%	**62.87%**
Additional People Served (5yrs)		457,979	1,184,765	659,459	449,171	539,429	371,851	1,077,362	1,030,388	**3,229,500**
Additional Pop. Growth (5yrs)		670,830	692,715	575,032	388,775	294,122	326,540	360,920	656,191	**2,904,386**
%age Additional Pop. Served		2.13%	9.02%	4.80%	6.40%	10.23%	3.97%	20.55%	7.19%	**7.02%**

Table 10 shows the data that was used to compute percentage coverage by population for each of the WWDAs. The trend of growth in coverage is presented in Figure 8.

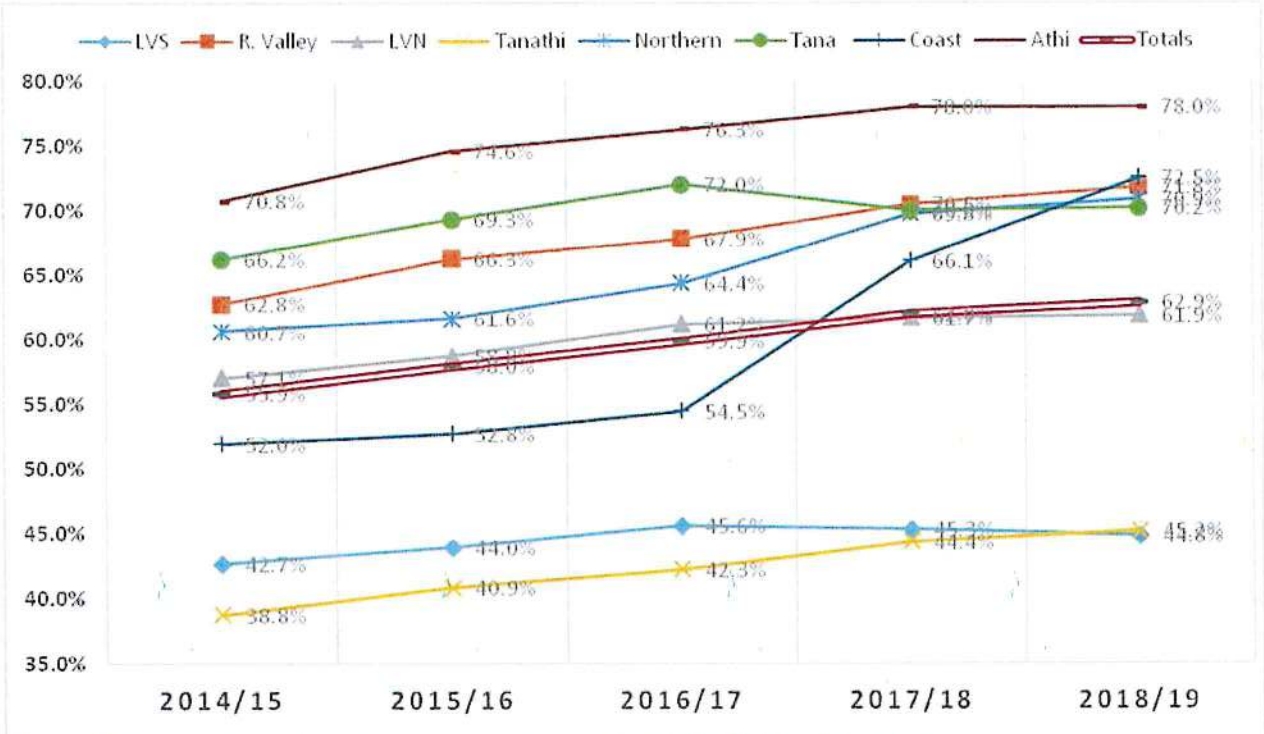

Figure 8: Comparison of water coverage by various WWDAs for the last 5 years

As shown in Figure 8, different WWDAs have achieved different results in the last five years. This is attributed to number of projects that have been completed in each over the duration. Athi WWDA has the highest coverage of 78% influenced mostly by better coverage in Nairobi. Tanathi and Lake Victoria North WWDAs have the lowest coverage at 45.3% and 44.8% respectively. This can be attributed to project completion rates. Some of the key projects completed in each Agency area are as follows:

a) Athi WWDA: Ruiru Juja Water Supply Project , Kikuyu Urban Water Supply Project, Kiambu Urban Water Supply Project and Theta Dam Treatment Works and Distribution Water Project

b) Lake Victoria South WWDA: Isebania Water Supply Project, Keroka Water Supply Project Siaya - Bondo Water and Sanitation Project and Rangwe Water Supply Project phase I (Kosiga Dam)

c) Rift Valley WWDA: Lotikip Well Field Development Project Iten Tambach Sabor Water Supply Project Phase I and II, Sengwer Community Water Supply Projects, Construction of Ellegirini Pipeline and Expansion of Kapsoya Treatment Works and Marakwet West/Kapcherop Phase II Water Supply

d) Lake Victoria North WWDA: Chesikaki - Cheptais - Sirisia Water Supply, Construction Chwele Water Supply Project, Rehabilitation Sotik - Water Supply System and Kericho Sewerage Improvement Project

e) Coast WWDA: Baricho Works Expansion & New Pipelines to Kilifi & Gongoni, Expansion of Taveta Lumi Supply, Mombasa Network Rehabilitation and Mkanda Dam Rehabilitation Project

f) Northern WWDA: Masalani Water & Sanitation Project, Drilling and Equipping of 30 Boreholes, Eldas Enole Water Supply, Kursin Water Supply, Isiolo Water and Sanitation Project and Moyale Water Supply

g) Tana WWDA: Mukurwe-ini water Project, Maua Water Project II and Sewerage/ Drainage Project and Thangatha Dam.

h) Tanathi WWDA: Wote Water Supply & Sanitation Project, Masinga - Kitui Water Supply Project and Migwani Water Supply Project

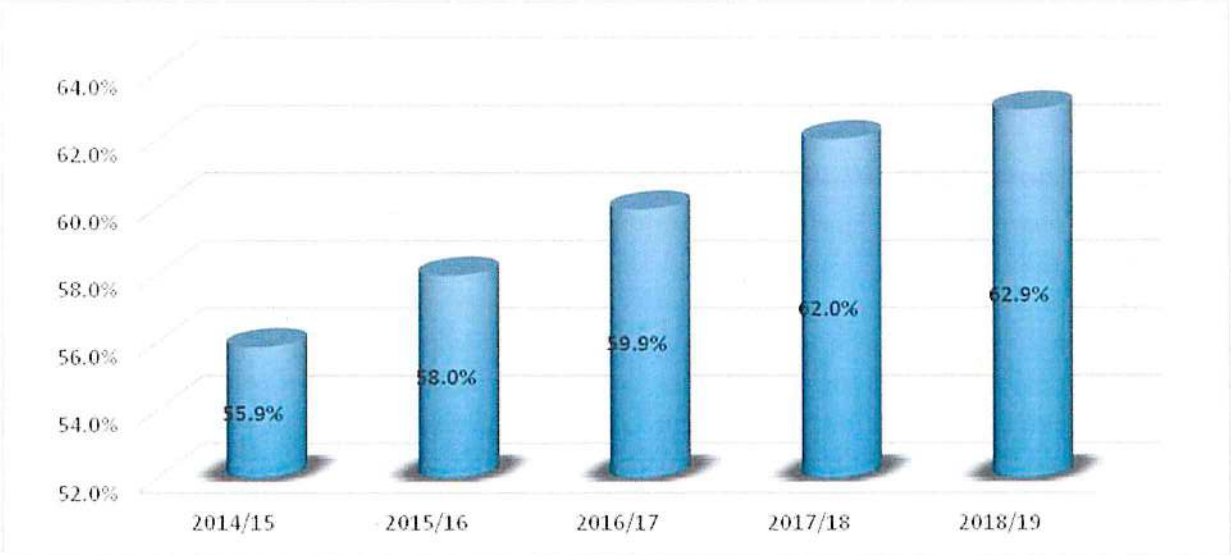

Figure 9: Trend of national water coverage for the last 5 years

As shown in Fig 9, the overall water coverage however has been on a steady rise from 55.9% in FY 2014/15 to 62.9% in FY 2018/19. The WWDA that has contributed most in this rise is Coast which has had a lot of intervention in major projects as shown in Annex I.

The Water Sector Trust Fund has been implementing various projects both in the Urban Poor and Rural Marginalized areas. This has been having impact in these areas. In the last 5 years, WSTF has been able to increase the population with access to safe water by 1.39Miilion through implementation of projects by water user associations and water utilities. This is shown in table 11.

Table 11: Population and percentage Water coverage by WSTF Rural Marginalized/ Underserved and Urban Poor in the last 5 years

	2014/15	2015/2016	2016/2017	2017/2018	2018/2019	Totals
National Population	44,102,325	46,352,197	47,691,063	49,121,795	50,595,449	50,595,449
Rural Marginalized/ Underserved and Urban Poor Pop Served	351,798	138,726	319,536	248,160	336,496	1,394,716
% of Pop Served	0.8%	0.3%	0.7%	0.5%	0.7%	2.8%

2.6.5 Trend in Sewerage Coverage;

For the last 5 years, the sewerage coverage has increased from 20.1% in 2014/15 to the current 25.3%. There was however a period where the population grew at a higher rate than the number of connections that were done indicating a slight reduction in the urban sewerage coverage.

2.6.6 Recovery of Grabbed Land

The Government has finalized preparation of the Nairobi city sanitation development master plan for up to 2040. The master plan proposes for modernization and expansion of the waste water treatment plant to increase its efficiency in waste water treatment. This will require utilization of land as earlier planned.

The Ministry is responsible for land that had been set aside for development of water supply and sewerage infrastructure. In Nairobi, the main sewerage treatment plants are in Kariobangi and Dandora. All the sewage generated from the Nairobi CBD and the old estates including Eastleigh, Ngara, industrial areas and Jogoo Road Corridor, etc. is treated at Kariobangi while the rest is treated at Ruai (Dandora). Since the breakdown of the Kariobangi waste water treatment plant, the untreated sewage has been overflowing into the Nairobi Rivers.

Athi Water Works development Agency (AWWDA) is undertaking rehabilitation works to restore operations at Kariobangi WWTP to full operational capacity of 32,000m³/day. The rehabilitation works are financed by GoK and AfDB at a cost of Ksh. 870 million.

Works are substantially completed, but testing and commissioning services cannot be undertaken due to encroachment by squatters.

The bypass for the sewage which conveys excess sewage to Ruai sewage treatment plant is currently encroached making it impossible to operate the plant.

The land set aside in Kariobangi was originally 30.23 Ha (75 acres) which has been reduced through illegal acquisition to 16.592Ha (41 acres). That is about 45% of the land grabbed.

The grabbed land need to be recovered so as to;

- Expand the sewerage system to treat more waste water.
- Expand the system to include faecal sludge management
- Introduce harnessing of methane gas so to produce electricity for the system to reduce operation cost.

The Ministry in collaboration with Ministry of Interior and Coordination of National Government has instituted plans and is currently undertaking recovery of this land.

2.6.7 Projected Water and Sewerage Coverage

The management of water services is a shared responsibility between the National Government and County Governments. The National Government through the Ministry majorly develops water supply infrastructure while each of the County Governments are charged with the responsibility of service provision including development distribution networks and actual services connections.

The Ministry is targeting to ensure universal coverage to water and sanitation services by 2030. The short term targets to be achieved by 2022 are;

- Achieve a national coverage of 80% for water services by 2022 from 60% in 2017
- Achieve a national coverage of 80% for Sanitation services by 2022 from 67.2% in 2017
- Achieve a 40% coverage of Sewerage services in Urban areas by 2022 from 25% in 2017

The Ministry has adopted the following strategies to ensure achievement of the targets for water coverage;

1. Complete all the 91 ongoing projects by 2022 at an average cost of KShs. 49Billion annually.
2. Mobilize resources for the construction of 51 projects proposed at an average cost of KShs. 23Billion annually.
3. Reduce Non-Revenue Water from the current 41% to 35% by 2022

2.6.7.1 Projected Water Coverage

The water coverage will be achieved by actively carrying out last mile water connectivity to about 200,000 households per year. This will only be possible with close collaboration between the National Government (constructing major infrastructure) and County Governments (carrying out Service Provision and last mile water connectivity)

Based on the water coverage of 60% in 2017, projects were identified (Annex II) that will be completed on or before the year 2022. Their impact was assessed at projected water coverage was carried out as shown in figure 10.

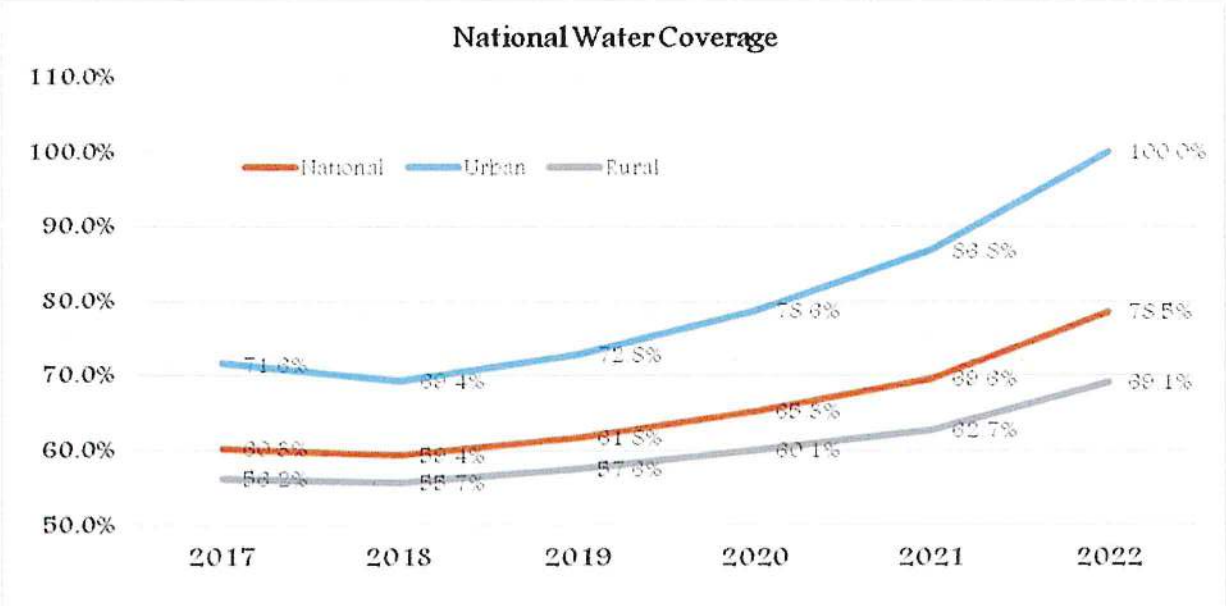

Figure 10: Projected Water coverage to be achieved on or before year 2022

The graph shows that there will be a slow growth in coverage owing to the small number of projects being completed in 2019 and 2020. The high growth rate of coverage in 2021 and 2022 is expected as most of the high impact projects will be complete and connected during that period.

It is important to note that the water that will be recovered from Non-Revenue Water when the dilapidated distribution systems of Water Services Providers are improved has not been factored in the above projections.

2.6.7.2 Projected Sewerage Coverage

Sewerage coverage in the country is targeted on urban areas where there is a higher density of population. Currently, about 27% of Kenyans live in urban areas, a proportion which is growing.

In order to achieve 37% sewerage coverage by 2022, the last mile sewerage connectivity will have to be done for 350,000 households annually. There is therefore need for National Government (which undertakes constructing major infrastructure) to closely collaborate with and County Governments (which is tasked with carrying out Service Provision and last mile water connectivity)

Based on the urban sewerage coverage of 26.1% in 2017, projects were identified (annexed) that will be completed on or before the year 2022. Their impact was assessed and projected sewerage coverage was carried out as shown in figure 11.

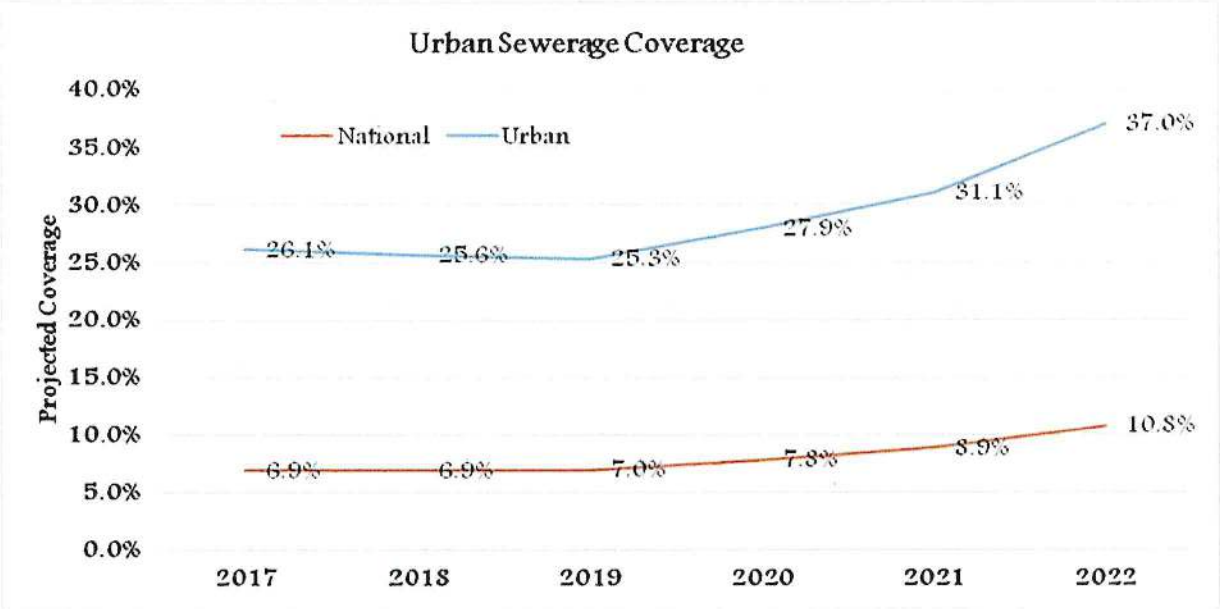

Figure 11: Projected Sewerage coverage to be achieved on or before 2022

Fig. 11 above shows a reduction in sewerage coverage in 2018 and 2019 then a gradual increase up to 2022. Even though there are projects that were completed in the period between 2018 and 2019, the population grew faster than the additional number of people that were served with sewerage services (average population growth rate of 2.6% per annum). The number of people to be connected in 2020 to 2022 will be much higher that the growth rate owing to the number of sewerage projects that will be completed by then.

These statistics was based on the following assumptions;

1. That when a project is completed, connections will be progressively made over three years after completion
2. The project designs are usually at an ultimate time in future, so even if all connections were made, they would not amount to the people served at ultimate design
3. That no person is served before the projects are completed

The risks identified that can make the above targets not be achieved are;

1. Most projects have a completion date of 2022 including those which have not been designed. Projects that are likely to delay will impact on the overall coverage.
2. Achievement of the coverage heavily relies on the number of connections made after project completion. Last Mile Water Connectivity must be mainstreamed.
3. Any delay in project implementation has a direct impact on achievement of the targets.

4. It is imperative that the budget and cash flow projections for these projects be increased to ensure that they are completed in time.

2.7 Status of Sanitation

To strengthen the coordination of Sanitation, the Ministry has created a fully-fledged Sanitation Department and it will continuously staff it with the required human resources.

2.7.1 Sanitation conference

To enhance visibility of sanitation the Ministry organized a sanitation conference at end of October 2019 with a theme *"Sanitation for all"*. The main aim of the conference was to provide a forum for exploring practical, sustainable and innovative solutions towards containment, collection, transportation, treatment, disposal, resource recovery and reuse of wastewater in both rural and urban contexts. The conference was of its kind in recent years as it attracted over 1,000 local delegates, 62 international delegates, and 54 exhibitors and over 100 papers presented on various thematic areas. Critical policy gaps were indentified which will be acted upon both at National and County levels in order to create an enabling environment for investment in sanitation without leaving no one behind.

2.7.2 Sanitation in Rural marginalized/underserved and urban poor

The Ministry through Water Sector Trust Fund (WSTF) has been implementing various projects both in the Urban Poor and Rural Marginalized areas. This has been having impact in these areas. In the last 5 years, WSTF has been able to increase the population with access to safe water by 485,985 through implementation of projects by water user associations and water utilities. This is shown in table 12.

Table 12: Population reached with sanitation services by WSTF in rural marginalized/underserved areas and urban poor

	2014/15	2015/2016	2016/2017	2017/2018	2018/2019	Totals
National Population	44,102,325	46,352,197	47,691,063	49,121,795	50,595,449	50,595,449
Rural Marginalized/ Underserved and Urban Poor Population Served	51,924	56,867	125,850	129,360	121,984	485,985
% of Population Served	0.1%	0.1%	0.3%	0.3%	0.2%	1.0%

2.8 Status of Irrigation and Land Reclamation

2.8.1 Irrigation

The irrigation potential is estimated at 1.913million acres (765,575 ha) as per the National Water Master Plan 2030 without water storage and can go up to 3 million acres (1.2 million ha). Out of this total potential only 504,880 acres has been developed accounting for 16% coverage while out of the country's total arable land only 5.8% is equipped with irrigation infrastructure. It calls for concerted efforts towards increasing access to agricultural water in a bid to increase yield to support food and nutrition security efforts and support growth in manufacturing vide agro-processing of surplus produce and value addition. The opportunities for irrigation investments may be unpacked as in figure 12:

Figure 12: Opportunities for irrigation investments

2.8.1.1 Expanded Irrigation Programme

With the success of the Economic Stimulus Programme (2009-2011) directly and indirectly benefiting estimated 1.2million households, the government initiated the National Expanded Irrigation Programme. In the Budget Statement to Parliament for Financial Year 2011-2012, the Minister for Finance allocated KSh 8.5 billion for initiating a comprehensive country-wide Irrigation Expansion Programme.

The programme involves provision of irrigation infrastructure for abstraction, conveyance, distribution and application of irrigation water for the various irrigation projects. The project targeted interventions in 610 projects across the country to bring an additional 531,574 acres. For sustainability and reliability of irrigation water, the sector also embarked

on providing water storage for irrigation. In arid areas, development initiatives focused on provision of water storage reservoirs and installation of greenhouses. The water pans provide water for domestic and animal consumption while greenhouses supplement local community's nutritional needs and provide a source of income for women and youth groups.

Since 2011, the achievements under the National Expanded Irrigation Programme can be summarized as follows: -

- Rehabilitation, expansion and modernization of public irrigation schemes that has seen the irrigation area increase from 23,055 acres to 48,842 acres.
- Construction of over 159 irrigation projects across all the 47 Counties mainly under the Expanded National Irrigation Programme (ENIP) with cumulative total of 127,969 acres directly benefiting over 88,000 farmers at a cost of Kshs 22.42 billion translating to Kshs 175,000 per acre.
- Completed feasibility studies and detailed designs for over 30 projects covering 430,000 acres.

In addition, to increase reliability of irrigation water, water-harvesting initiatives have also been carried out under the programme that includes: -

- Completed feasibility studies and detailed designs for 9 water storage reservoirs with a cumulative total of 1.3billion m^3
- Construction of 47 no water pans with a combined volume of 2,600,000m^3 in arid areas for domestic, animal consumption and irrigation in greenhouses.

2.8.1.2 Micro-Irrigation for Schools

This is an intervention to build capacity of young Kenyans in schools to appreciate and actively participate in agriculture. The former 4K Clubs in schools created a mentality that agriculture and other farming investment is futile as it gave poor returns. This nearly led to less interest in agriculture in our learning institutions. Micro-irrigation programme for schools in intended to reverse this. Water sources from boreholes and water and small dams supply water to institutions and pilot commercial agriculture with intensive irrigation with greenhouses. With secured income and sustainable water availability the intervention has attracted a lot of interest. The Ministry has drilled 68 boreholes and installed 120 green houses with regular water supply.

2.8.1.3 Ongoing Irrigation projects

To extend these achievements, the sector is currently undertaking several irrigation development initiatives that include: -

i. Construction of 15million cubic meters Thiba dam and irrigation infrastructure under Mwea irrigation development project that will see the area increase to 35,000 acres and support production of a second crop,
ii. Construction of intake and gravity canal for Bura Irrigation Rehabilitation project financed by BADEA, Kuwait Fund and Ofid and a sizable component of GoK counterpart funding to convert the system from pump fed to gravity fed irrigation system and increase area from 6000 acres to 15,000 acres.
iii. National Expanded Irrigation Programme targets to bring an additional 531,574 acres under irrigation through construction of 610 projects countrywide.
iv. Implementation of the 10,000 acres model farm for Galana Kulalu Food Security Project.
v. Construction of the 1500 acres Rwabura Irrigation Development Project financed by the government of Kingdom of Spain.
vi. Construction of 10,000 acres Lower Nzoia irrigation project under the lower Nzoia Irrigation Project under the Kenya Water Security Project financed by the World Bank and KFW.
vii. Construction of the 19,290 acres Lower Kuja Irrigation Scheme in phases where 4,000 acres has been achieved.
viii. Construction of the 1500 acres Lower Sabor Irrigation Development Project under gravity-fed sprinkler irrigation system.
ix. Construction of the 30,000 acres Turkana Irrigation Development Programme in Naipa, through groundwater in Lotikipi aquifer where 2000 acres has been achieved.
x. Operation of public irrigation schemes to optimize production.
xi. Community based smallholder irrigation to develop 270 schemes with a total area of 30,000 acres spread across the country

In addition to this, the sector has purposed to invest in water storage facilities that will increase reliability of irrigation water and build resilience for communities against effects of climate change. Some of the key water harvesting programmes include.

i. Thiba dam as mentioned earlier
ii. Construction of water harvesting infrastructure for households with an aim of providing 125,000 households with localized reservoirs to supplement their irrigation needs.
iii. Rehabilitation of existing small dams and water pans to increase their capacity to meet irrigation demand for neighbouring communities. Project aims at rehabilitating over 4,000 water pans with a capacity of 400 million cubic meters across the country.

iv. Implementation of four large dams for irrigation namely Thuchi, New Gogo, Kwa Kivyai, Rwabura and Thirirka

The details of ongoing projects are included in *Annex IV.* As detailed, there are opportunities of extending the ongoing programmes for quick wins.

From the past trends and current initiatives, it is clear that the government and development partners have contributed immensely towards irrigation development. As a result, the irrigation area has increased from 354,831 acres in 2010 (NWMP, 2030) to 504,880 acres. This developed irrigation potential presents an opportunity for focused and enhanced agricultural production for strategic crops. This however requires an elaborate framework of engaging farmers to take up the production

2.8.1.4 Irrigation Development Opportunities

There is a lot be done to develop the unexploited irrigation potential of 1.408 million acres. In this regard, the completed feasibility studies and detailed designs for projects provide the next frontier in irrigation development and will be the focus of the future plans. The sector is putting efforts towards development of extensive irrigation projects accompanied by irrigation water harvesting and storage initiatives. Some of the earmarked different categories of projects whose feasibility studies and detailed investigations and designs have been carried out include: -

a) Irrigation projects

i. Large scale irrigation projects

The Irrigation Act defines large-scale irrigation scheme as schemes whose area is above 3,000 acres. Towards this end, the sector has seen successful operation of the largest irrigation scheme in the name of Mwea irrigation scheme. Further to this, there are also good indications that all the large-scale projects are back in operation. Learning from this, the sector has in addition identified more large-scale projects for implementation. These projects eventually translate to strategic irrigation projects that will be the key food security projects in respective counties. These projects have been conceptualized around the available water resources to meet crop water requirements for projects covering a large area.

Feasibility studies and detailed designs for 22 projects have been carried out and are ready for implementation as detailed in *Annex V.* These projects will bring a total combined area of 398,731 acres and is estimated to cost Kshs 83.7billion. This will have huge impact in the food and nutrition pillar of the big four through projected annual production of 1,068,350 bags of rice paddy, 8,502,760 bags of maize, 52,100 MT of cotton and Kshs 75

billion worth of horticultural crops that includes irish potatoes. Further to this, the projects are projected to generate revenue amounting to Kshs 114 billion and create 1.9 million jobs both directly and indirectly.

Studies in irrigation development have identified some projects that would depend on transboundary waters. These projects include Daua in Mandera that will use Daua river that is shared between Kenya, Ethiopia and Somali, Umba valley project whose water source is Umba river shared between Kenya and Tanzania, expansion of Challa irrigation project through the use of lake Challa which is shared between Kenya and Tanzania, Kocholia-Amagoro-Amoni using river Sio that is shared between Kenya and Uganda. There is need to purpose to conclude the memorandums of understanding with the neighboring counties to enable progress in the projects.

ii. Small holder/community managed irrigation projects.

These are schemes that are owned and managed by the communities with an aim of boosting their agricultural production. Smallholder Irrigation Schemes are either initiated by the government, development partners or farmers themselves. In line with the Irrigation Act, the sector at the national government level, is responsible for smallholder irrigation schemes with acreage range from 100 to 3000 acres with. The projects are quick wins in irrigation development because the implementation cycle is short from identification, design and construction. The structures are fairly small making them easy to build, operate and maintain. They can also be implemented in regions with fairly limited water resource and can use different water sources including major rivers, streams, and boreholes.

These projects are well distributed in various counties across the country. The sector has earmarked 610 projects with a total area of 531,574 acres. Currently, NIA has been implementing this cluster of projects under the National Expanded Irrigation Programme and the ministry under the Community Based Programme. As detailed in annex III, 228 projects have been identified that are at different levels of implementation. On implementation, 174,690 acres will be developed at a cost of Kshs 42.9 billion to benefit 219,539 farmers. This has the potential of increasing maize production to 2,600,000 bags and horticultural crops valued at Kshs 43.7 billion with proper capacity building and incentive for farmers.

iii. Expansion of Public Irrigation Schemes

To realize more acreage towards achieving food security proposed expansion and modernization of public irrigation schemes will see the irrigation area increase by an additional 12,500 acres from the current 48,842acres. The areas targeted for expansion

will utilize the same water resources abstracted and conveyed by the existing infrastructure as detailed in annex IV. The estimated cost for this expansion is Kshs 1.025billion.

b) Water harvesting for irrigation projects

In recent years the water resources have been shrinking, a factor that has been attributed to climate change and other human activities hence less water is available for irrigation. To increase reliability and stabilize irrigation water, it is important to develop water storage reservoirs to store excess floodwaters for use during the dry spells.

i. Large dams for large irrigation projects

The sector has initiated studies for a number of dams for various irrigation projects and proposes to undertake more studies in a bid to have a dam for each irrigation project. Currently, the sector is executing construction of Thiba dam for Mwea irrigation scheme and will leverage on the construction of Thwake dam to irrigate the area downstream.

The sector in the medium term proposes to undertake 7 water harvesting and storage projects, construction of new water pans and small dams in areas that do not have perennial rivers and rehabilitation of existing water pans and small dams to increase water storage capacity by 1.14 Billion cubic meters and irrigate an additional 408,400 acres at an estimated cost of Kshs 135 billion as detailed in annex V.

ii. Household Water harvesting for Irrigation

The objective of the project is to provide localized water access through construction of water harvesting and storage reservoirs for irrigation purposes at the household level by harnessing surface water (runoff) resulting from rainfall received in the reservoir areas in the arid counties. Project will be implemented across the arid areas where landowners are willing to freely cede land for excavation of the reservoir. The target is to construct household water pans with a cumulative volume of 125 Million cubic meters to irrigate 125,000 acres at an estimated cost of Kshs 16.25 billion for excavation as detailed in annex VI. As at January 2020, a total of 10,404 household water pans with a volume of 14,363,460m^3 that can irrigate 14,000 acres have been achieved.

iii. Rehabilitation and construction of community small dams and water pans.

Over the years, spanning from the colonial times, there has been numerous interventions of increasing access to water through harvesting and storage. It is estimated that there are over 6000 water pans and small dams spread across the country both on public and private land. These reservoirs have been a sole source of water for diverse communities. However, over time, the reservoir have silted up or breached thus reducing their capacity to hold water. The objective of this project therefore is to rehabilitate the reservoirs and increase their capacity if possible to be utilized again. The primary advantage of this is that land is

already available eliminating the complication of land acquisition. The target is to intervene in 3,945 pans with a combined volume of m^3 to irrigate 394,500,000acres at an estimated cost of Kshs 59.2 billion as detailed in annex VI.

iv. North Eastern

The Arid counties of Marsabit, Wajir, Mandera, Garissa, Samburu and Isiolo fall in the Ewaso Ng'iro North Catchment Area (ENNCA) classified as an arid land with an average mean annual rainfall is 510 mm. By hydrology, the catchment has numerous ephemeral streams that only storm water in direct response to precipitation with water flowing only during and shortly after large precipitation events. The only opportunity there is of reliably using these water resources for livestock watering and agricultural production is through provision of water harvesting and storage structures. Construction of small dams across the lagas accompanied by water pans and provision of efficient irrigation system preferably drip in greenhouses and solar powered pumps is envisaged to transform these counties to be food sufficient.

It is proposed that along the ephemeral streams, a cascade of water pans with a combined volume of 10,000,000 m^3 is constructed to increase area under irrigation to 10,000 acres in each county as detailed in *annex VII*. The investment will increase the area under irrigation by 60,000 acres irrigated through 600 water pans with an accumulated volume of 60 million cubic meters. Upon development, the counties in the catchment will have the potential to provide water for 108,000 sheep and goats, produce 1.5 million bags of maize and horticultural crops valued approximately at Kshs. 15 billion annually and become food self-sufficient, build resilience against climate change and become economically empowered.

c) Groundwater for irrigation

This is a relatively new area for the sector and has shown potential in enhancing food security for communities with limited surface water resources. A good example is Turkana County that has immense groundwater resources provides a unique opportunity for cotton production at large scale under irrigation. The Lotikipi aquifer alone has renewable water (slightly saline) amounting to 3.224BCM/year and can irrigate approximately 170,000 ha of cotton particularly because it also does well in saline conditions. It is proposed groundwater mapping mainly for areas with limited surface water resources be carried out followed by investing in boreholes combined with efficient irrigation technologies such as drip irrigation and centre pivots. As a pilot sector proposes to develop 23,000 acres in the arid counties using solar driven boreholes complete efficient irrigation systems at an estimated cost of Kshs 7 billion.

d) Galana Kulalu Food Security Project

The Project involves development of infrastructure for viable and economic utilization of the Galana and Kulalu Ranches through among others irrigated agriculture. The implementation plan of the project is phased comprising of 10,000-acre model farm as phase I, followed by 170,000acre pilot farm as phase II.

The implementation of the model farm is at 85% interms of infrastructure development that include installation of 20 center pivots covering 3300 acres, pipes for drip irrigation covering 1800 acres installed and construction of the 2 pumping stations and one sedimentation basin. Notably, all pipe networks to distribute water in the entire 10,000 acres farm have been installed.

To complete the 10,000 acres model farm, NIA will conclude disengagement with Green Arava, the Israeli Contractor who defaulted and abandoned site, and source for Ksh 600 million which is required to complete installation of the remaining on farm infrastructure. Upon completion, the 10,000-acre farm will be availed to growers in the private sector for production as per agreed terms. In addition, hydrological studies indicated that the available water could irrigate an additional 10,000 acres without storage at an estimated Kshs 3 billion.

In summary, the proposed interventions as detailed in tables 13, 14, and 15 below will cover all regions through implementation of 5,715 projects. This is expected to increase the area under irrigation by **1,519,913** acres, provide water storage capacity of 1.5 billion cubic meters at a cost of Kshs 330 billion to generate annual revenue of Kshs 335 billion and create employment for over 5 million directly and indirectly.

Table 13: Summary for irrigation Projects

	No of Counties	No of projects	Area (acres)	Cost Kshs	Value of produce annually
Large scale irrigation projects	20	22	398,731	83,733,615,000	113,999,984,017
Community managed Irrigation projects	39	228	171,536	42,204,847,582	43,671,600,000
Expansion of Public Irrigation Schemes	6	9	12,500	1,025,000,000	3,573,837,500
Groundwater for irrigation	23	23	23,000	8,050,000,000	6,575,861,000
		282	**605,767**	**135,013,462,582**	**167,821,282,517**

Table 14: Summary for Water Harvesting Projects

	No of Counties	No of projects	Area (acres)	Volume CM	Cost Kshs	Value of produce annually
Water harvesting for irrigation projects - Large dams	5	7	408,400	1,021,000,000	111,680,000,000	27,161,165,000
Water harvesting for irrigation projects - Rehabilitation of existing small dams and pans	42	3,945	328,000	394,500,000	59,200,000,000	93,777,496,000
Water harvesting for irrigation projects - Water for Household	42	881	114,596	114,596,000	14,900,000,000	32,763,798,572
Water harvesting for irrigation projects - Large pans on Ewaso Ng'iro North	6	600	60,000	60,000,000	9,600,000,000	15,000,000,000
Total		5,433	910,996	1,590,096,000	195,380,000,000	168,702,459,572

Table 15: Summary for irrigation and water harvesting projects

	No of projects	Area (acres)	Cost Kshs	Value of produce annually
Irrigation Projects	282	608,917	135,013,462,582	167,033,782,517
Water harvesting Projects	5,433	910,996	195,380,000,000	168,702,459,572
Total Combined.	5,715	1,519,913	330,393,462,582	335,736,242,089

2.8.2 Land Reclamation

Land degradation is the reduction in land quality due to natural or human activities. It is a global problem which leads to increasing aridity and desertification of marginal, semi-arid and dry sub-humid lands. The long-term effect of land degradation is the losses of both ecosystems function and land productivity from which the land cannot recover unaided. Such lands are restored with reclamation and rehabilitation.

Land Degradation Assessment Report (LADA- 2012) indicates that 22.1% of Kenya's land mass is moderately severe to severely degraded and affects over 12million people. Land degradation negatively impacts environmental water conservation, lead to high surface water runoff, silting of dams and is the main cause food and water insecurity. It covers the whole country with varying levels of severity but whether natural or is the result of human activity and has aggravated resilience of ecosystems and the sustainability of livelihoods and is the major driver of the commonly occurring landslides and loss of lives and livelihoods. The primary driving forces of land degradation in Kenya are inadequate Policy environment; failure to recognize land waste as a serious national problem and weak and unsustainable interventions. It is aggravated by subdivision of land into uneconomic land parcels and weak interrelationships and thresholds between the technical, institutional and policy factors at different levels in the country. The Ministry in collaboration with partners undertook the 1st national Land Degradation Assessment (LADA) covering the years 1990 t0 2012 and results indicate about 25.3% of Kenya's land mass is moderately severe to severely degraded and is increasing as shown in figure 13 and 14 below.

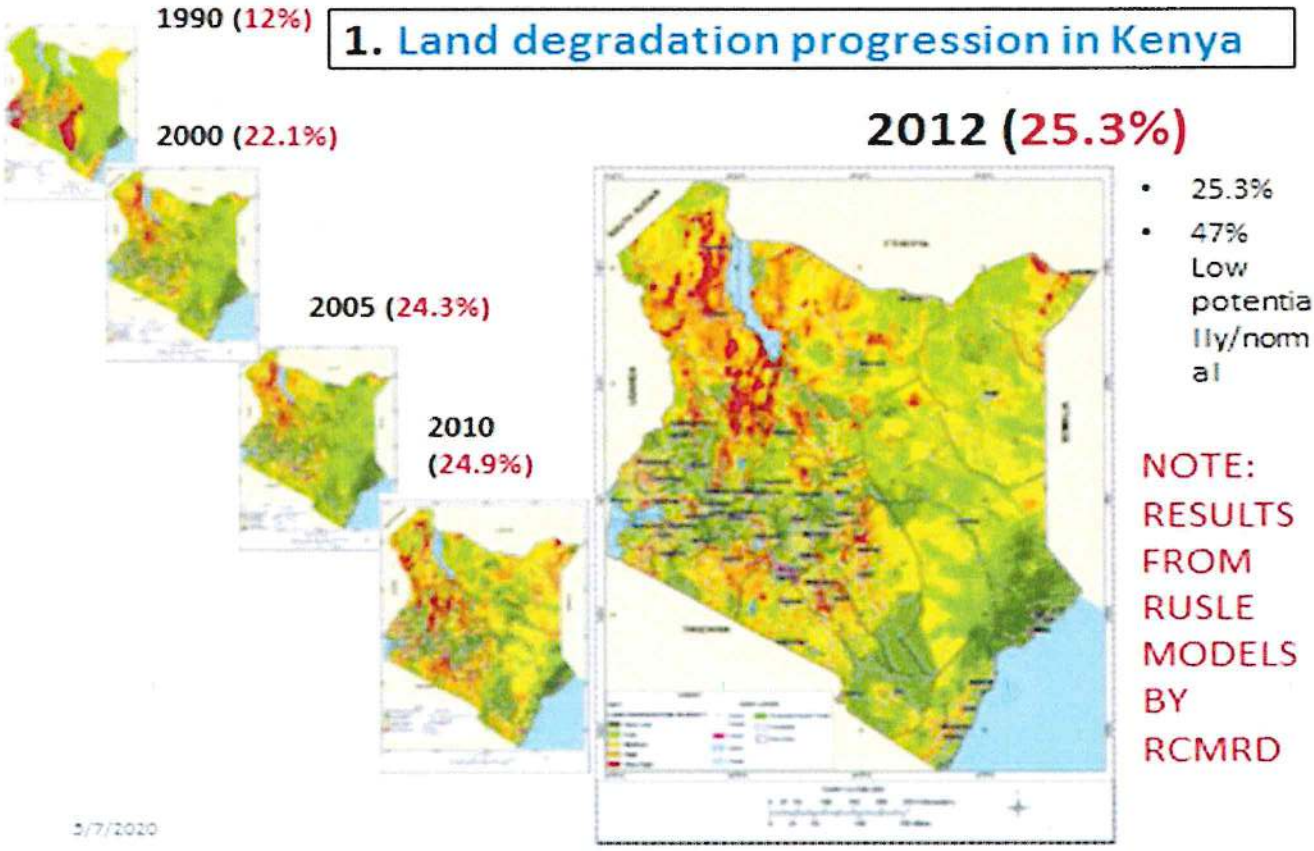

Figure 13: Land Degradation Assessment {LADA}; Kenya -2012 (Source- RCMRD, UNEP and Ministry of Water and Irrigation)

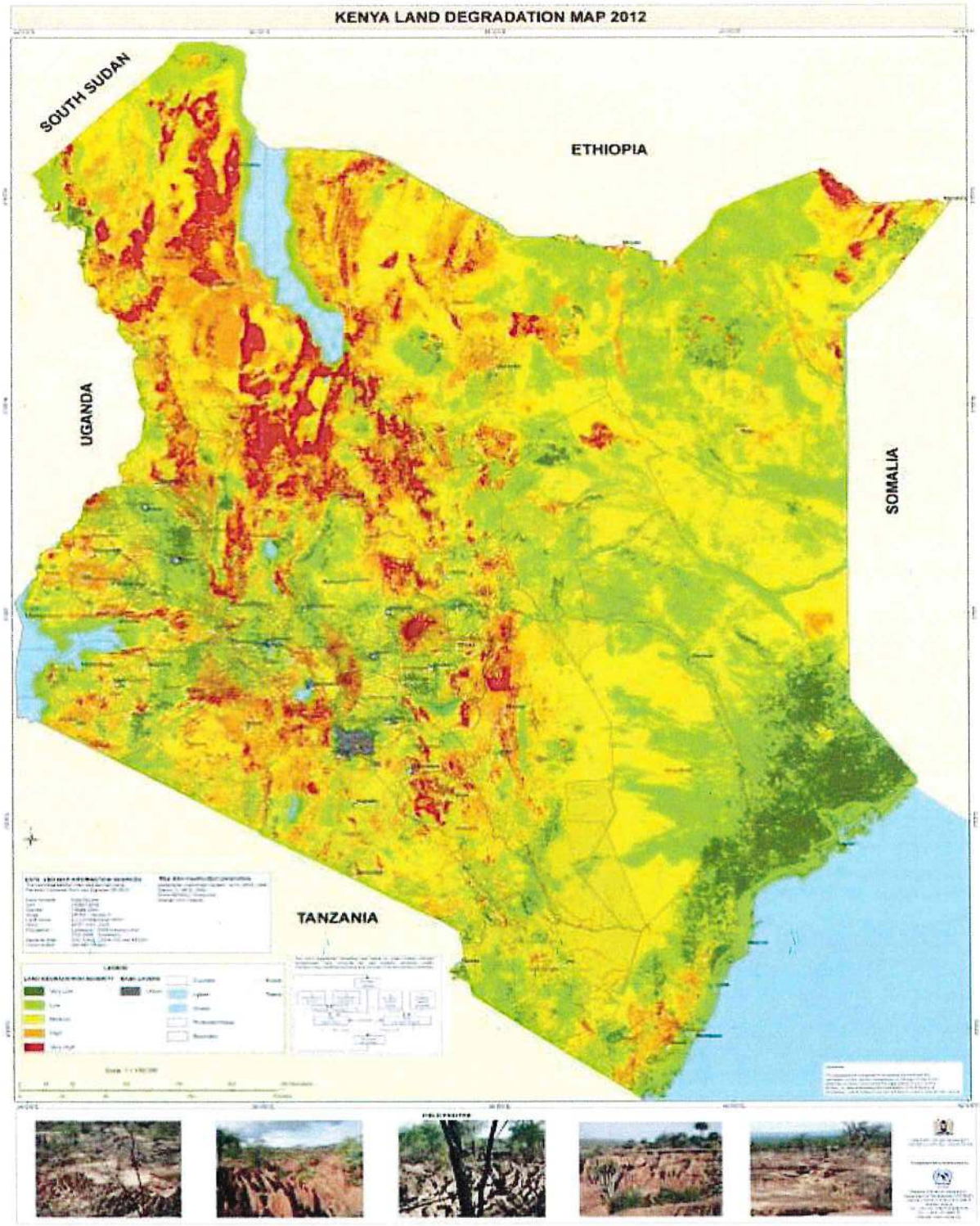

Figure 14: Land Degradation Assessment {LADA}; Kenya -2012 (Source- RCMRD, UNEP and Ministry of Water and Irrigation)

The figures 15, 16, 17 and 18 below shows the impacts of land degradation in various regions in the country.

Figure 15: Impact of poor water management: Severely degraded lands in RVWWDA region

Figure 16: Impact of poor water management; severely degraded land in LVSWWDA region

Figure 17: Impact of poor water management. severely land degradation in TWWDA & TAWWDA Region

Figure 18: Impact of poor water management;severely land degradation in CWWDA Region

2.8.2.1 Land Reclamation and Rehabilitation Program

In addressing increasing challenges of land degradation and waste, the Ministry has developed and implemented various tools including more detailed Land Degradation Assessments (LADA) that have become very useful tools for capacity building and achieving change among land owners, technical and policy makers. LADA for Lake Magadi, Upper Kerio River and Upper Ewaso Nyiro North river watersheds which are most severely

degraded in the country have been completed. 13 outstanding watersheds shall be assessed at high resolution levels soon. To date rehabilitation and reclamation of 400ha is ongoing and more land owners are engaged to reverse the trends and to achieve LDN on all land use activities.

2.8.2.2 National Water Harvesting and Groundwater Exploitation

To enhance environmental water storage, the Ministry has developed 159 water pans, sand dams and small dams in various parts of the country achieving over 12.5million m^3 surface water storage. These interventions often serve as models where land owners are encouraged to replicate and with proper water management, land rehabilitation and reclamation is achieved with irrigation, re-vegetation, and land healing conservation.

3.0 CHALLENGES AND LESSONS LEARNT

Lessons learnt during implementation of Water Act 2016 and Irrigation Act 2019 includes: Having in place an operational water sector inter-governmental collaborative framework between the Ministry and County governments is essential for ensuring sustainable water resource, sanitation and irrigation management.

Use of Regional blocks like EAC (Lake Victoria Basin Commission), IGAD, African Ministers' Council on Water (AMCOW), Nile Basin Initiative (NBI) and others such UNEP to handle trans-boundary conservation issues by creating inter-countries conservation areas and programs is key in attracting funding from development partners and fast tracking the implementation of transboundary projects and programmes.

Despite the progress, there are still a number of challenges facing the ministry which will be used to inform policy direction going forward. These include;

1) Delays in project implementation due to inadequate funds to compensate project affected persons(PAPs) who have to be compensated for both land and disturbance
2) Liquidity challenges due to delayed disbursements and inadequate funding, some financing agreements do not include taxes as eligible expenditures, this results to noncompliance with withholding taxes, non-recovery of loans for infrastructures developed using donor funds
3) Delayed approval of master lists for tax exemption by the National Treasury has negatively impacted on the implementation of some projects.
4) Forest moratorium has delayed projects' implementation because of the long process which it takes to be granted right to access some of the project sites which are located in public forests by the Kenya Forest Service (KFS).
5) The inconsistencies and deficiencies/lacuna in the Water Act 2016 has affected its implementation.
6) The lengthy process of consultations with large number of stakeholders coupled with inadequate financial resources has delayed the finalization of strategies, policies and regulations as required by the Water Act 2016, Irrigation Act 2019 and other legal frameworks.
7) Inadequate existing mechanism to address transboundary water management and development has affected the implementations of planned projects.
8) The Water monitoring network is based on limited stations which are not representative of the varied catchment conditions. In addition, the monitoring network frequently experiences losses due to flooding, ageing and vandalism.

9) The ministry has an aged workforce that is likely to affect service delivery when staff exits. Freeze on recruitment has affected succession management in critical areas of the Ministry.
10) There still exist weak effluent discharge management systems due to weak enforcement, disjointed regulations for affluent discharge permit and lack of harmonized framework for implementation of the polluter pay principle. This coupled with uncontrolled water flow alterations through illegal abstractions and the demand for large water storage dams which will require high return flows especially in urban areas. There is also inadequate framework for gazettement and repossession of wetlands, water ecosystems and other key water and sewerage installations which are under threat from encroachment.
11) The effects of climate change and associated extreme weather events threaten sustainable development and impacts negatively on the sector. Flooding and droughts affect environment, forestry, water, wildlife and mineral resources exploitation. The frequency of drought occurrences has increased out breaks of wild fires occurrences in water catchment areas and water towers.
12) Low Capacity of farmers in irrigation farming and overall governance/management of irrigation schemes, aging farmers, volatile markets for agricultural produce, uncoordinated irrigation initiatives and human resource capacity gaps.

4.0 EMERGING ISSUES

The sector planned projects and programmes have been greatly impacted by COVID- 19 pandemic. The pandemic has affected the ministry through disruption of various activities. All the funds that were meant to implement programmes related to water, sanitation and irrigation has been directed to activities to combat the disease thereby affecting the implementation of SDG 6 "Ensure Availability and Sustainable Management of Water and Sanitation for All". In response to COVID-19 pandemic, the Ministry in collaboration with other Government Agencies stakeholders has put in place a robust approach to address the COVID-19 threat by installing a total of 5,333 public hand washing points especially in major urban centres. The pandemic has posed a challenge because of required provision of additional water supply.

The emergence of the blue economy has provided an opportunity to invest in marine, rivers and lakes ecosystems and natural/water resources management.

5.0 CONCLUSION AND RECOMMENDATIONS

The Ministry of Water & Sanitation and Irrigation has enacted and is in the process of operationalizing Water Act 2016 and Irrigation Act 2019. This has necessitated development of various strategies including National Water Services and Sanitation Strategy, National Water Resources Management Strategy, National Water Harvesting and Storage Strategy and integrated Irrigation Development. The drafts of these and amendments to the Irrigation Act 2019 are in different stages of development and are expected to be finalized by June 2020. The available water resources are about 23 billion cubic metres per year. The country water storage is about 103 cubic meters per capita. This is very low since by 2025, demand in some basins will have already outstripped supply. A lot of effort therefore has to be put to increase water storage capacity (dams) in order to have enough water for domestic, industrial and irrigation needs.

There has been a steady increase in proportion of population with access to safe water, with an increase of 7% in five years from 55.9% to 62.9%. This, though still low is attributed to investment that the government has been making in the water sector. The various WWDAs achieved different results during this period. In order to achieve coverage of 80% by the year 2022, there is need for strategic investments in key projects and accelerated completion rate of projects. Allocation of resources should also be done such that the projects that are nearing completion are allocated more than the newly established ones.

Irrigation combined with water storage is in essence the foundation for meeting the country's food needs and raw materials for agro-processing consequently creating employment creation and spurring economic growth and development as investment in irrigation increases the opportunities in development of value chain for irrigated crops. The capital outlay for the large-scale irrigation projects and large dams is huge and will thus take more than ten years to complete. In the next ten years, the Ministry plans to develop 1,200,206 acres under irrigation to create employment and support growth of agro-processing industries and agricultural trade services.

To address the inadequate financial resources, the Ministry will rationalize its activities to match the expected liquidity flow. In addition, the Ministry will continuously engage the National treasury and Parliament with a view to enhance allocation for the projects, ensure prompt disbursement and provide funds for implementation of resettlement action plans in time. Continuous engagement of the National Treasury to enhance communication with project implementation agencies and grant exemption from remission of duty and taxes; resource mobilization for construction and rehabilitation of major water, Sanitation and Irrigation projects; mobilize resources to enhance human resources, bridge the skills

gap and put in place a robust succession management strategy; and enhance regulatory frameworks that govern management of inter-county water resources use to minimize conflicts.

ANNEXES:

Annex I: Projects Completed in the Last Three Years in WWDAs

S/N	Project Name	Cost (KShs)	Population/ Treatment Capacity	Start	Completion
	ATHI WWDA				
1	Ruiru Juja Water Supply Project	968,000,000	Target Population: 110,000 Treatment Capacity: 20,000 m3/day	Nov-10	Apr-16
2	Kikuyu Urban Water Supply Project	65,000,000	Target Population: 15,000 Treatment Capacity: 1,500 m3/day	Aug-14	Feb-16
3	Gatanga Community water project	264,000,000	Target Population: 70,000 Treatment Capacity: 6,000m3/day	Apr-17	Jul-17
4	Gigiri Kabete Water Supply	800,000,000	Target Population: 300,000	Nov-11	Jan-16
5	Kiambu Urban Water Supply Project	540,000,000	Target Population: 40,000 Treatment Capacity: 4,000 m3/day	Aug-14	Dec-16
6	Komothai Water Augmentation Project	300,000,000	Target Population: 70,000 Treatment Capacity: additional 3,000m3/day	Feb-15	Jun-17
7	Theta Dam Treatment Works and Distribution Water Project	291,000,000	Target Population: 60,000 Treatment Capacity: 4,000 m3/day	Mar-14	Sep-16
8	Construction of Kangundo Road, Kibera, Upperhill and Kirichwa Ndogo Trunk Sewers	650,000,000	Target Population: 60,000	Aug-12	Aug-16
	LAKE VICTORIA SOUTH WWDA				
1	Isebania Water Supply Project	440,000,000	Target Population: 60,000	Jan-14	May-17
2	Keroka Water Supply Project	1,890,000,000	Target Population: 56,000 Treatment Capacity: 3,000m3/day	Jan-14	Dec-16
3	Rangwe Water Supply Project phase I (Kosiga Dam)	45,000,000	Target Population: 15,000	Feb-15	Aug-16
4	Siaya - Bondo Water and Sanitation Project	2,200,000,000	Target Population:200,000	Nov-12	Jan-17
	RIFT VALLEY WWDA				

S/N	Project Name	Cost (KShs)	Population/ Treatment Capacity	Start	Completion
1	Lotikip Well Field Development Project	500,000,000	Target Population: No estimate yet	Jul-15	Jun-18
2	Baringo Rural Water Project	1,200,000,000	Target Population: 150,000; No.of Boreholes:70 Boreholes	Jan-14	May-16
3	Iten Tambach Sabor Water Supply Project Phase II	1,000,000,000	Target Population: 184,000	Jun-17	Jun-18
4	Iten Tambach Sabor Water Supply Project Phase I	1,580,000,000	Target Population: 64,000; Over 50 km gravity water system, Treatment Capacity: 5,500 m3/day and a water storage tank with 2,000 cubic meters storage capacity.	Oct-14	Feb-17
5	Marakwet West/Kapcherop Phase II Water Supply	120,000,000	Target Population: 20,000 Treatment Capacity: 600m3/day	Aug-15	Dec-16
6	18 Boreholes under drought mitigation	30,000,000	Target population, 100,000	Mar-16	Jul-17
7	Narok Water Supply Project	1,500,000,000	Target Population:50,000; Treatment Capacity: 5,000 m3/day	Nov-13	Jun-16
8	Sengwer Community Water Supply Projects	36,000,000	Target Population: 3,000	Jun-15	Jun-16
9	Kapindaram Water Supply Project	60,000,000	Target Population: 4,000	Jul-16	Jun-17
10	Construction of Ellegirini Pipeline and Expansion of Kapsoya Treatment Works	625,000,000	Target Population: 24,000	May-16	Jan-18
11	Pusol Water Project	40,000,000	Target Population: 6,000; Treatment Capacity in m3/day:500	May-16	Mar-17
	LAKE VICTORIA NORTH WWDA				
1	Construction Water Supply Project in Chwele Area	300,000,000	Target Population: 92,000; Treatment Capacity: 2,000m3/day	Jun-16	Feb-18
2	Chesikaki - Cheptais - Sirisia Water Supply Augmentation Project	130,000,000	Target Population: 15,000; Treatment Capacity: 4,000m3/day	Jul-15	Dec-16
3	Drilling and Equipping of 18No. Boreholes	30,000,000	Target population, 100,000	Mar-16	Jan-17

S/N	Project Name	Cost (KShs)	Population/ Treatment Capacity	Start	Completion
4	Rehabilitation Sotik - Water Supply System	32,500,000	Target population 60,000	Nov-16	Aug-17
5	Rehabilitation of Litein Water Supply System	29,700,000	Target Population: 60,000	Nov-16	Aug-17
6	Kericho Sewerage Improvement Project	335,000,000	Target Population: 80,000	Dec-13	Dec-17
	COAST WWDA				
1	Construction of Water Supplies in Drought Areas, Lot 3: Construction of elevated steel tanks at existing boreholes	75,000,000	Target Population: 75,000	Jul-14	Jan-17
2	Immediate Baricho Works Expansion & New Pipelines to Kilifi & Gongoni (Lot 3)	2,314,000,000	Target Population: 316,700	Sep-16	Nov-18
3	Construction of Water Supplies in Drought Areas, Lot 1: Equipping of Existing Boreholes for CWSB Region	58,000,000	Target Population: 70,000	Jul-14	Jan-16
4	Expansion of Taveta Lumi Supply	84,000,000	Target Population: 60,000	Jan-16	Aug-16
5	Nyalani Water Supply Project	84,000,000	Target Population: 12,000	Jan-17	Apr-17
6	Mombasa Network Rehabilitation - Lot 2	1,000,000,000	Target Population: 20,000	Mar-15	Aug-17
7	Mkanda-Mwabandari rising main	32,597,212	Target Population: 3,000	Oct-16	Dec-17
8	Immediate Baricho Works Electromechanical Works (Lot 1)	911,000,000	Target Population: 220,000: Treatment Capacity: additional 22,000m3/day	Jul-16	May-18
9	Extend Services to Informal Settlements - Lot 2	121,000,000	Target Population: 4,500	Feb-15	Feb-17
10	Mkanda Dam Rehabilitation Project	200,000,000	Target Population: 30,000	Oct-15	Aug-16
11	Malindi Informal Settlement (Lot 2)	75,000,000	Target Population: 1,500	May-15	May-17

S/N	Project Name	Cost (KShs)	Population/ Treatment Capacity	Start	Completion
	NORTHERN WWDA				
1	Masalani Water & Sanitation Project	84,000,000	Target Population: 10,000	Dec-15	Dec-16
2	Expansion of Butiye, Manyatta and Heilu water Supply	90,000,000	Target Population: 23,000 people, 48,000 cattle and 120,000 goats	Mar-17	Mar-18
3	Kursin Water Supply	90,000,000	Target Population: 4,000	Nov-17	May-18
4	Wajir -Bor Water Piping & Supply	95,000,000	Target Population: 5,000	Nov-17	May-18
5	Eldas Enole Water Supply	100,000,000	Target Population: 50,000	Sep-16	Feb-17
6	Habaswein Water Supply (Wajir)	52,000,000	Target Population: 25,000	Feb-15	Nov-16
7	Drilling and Equipping of 30 Boreholes	71,000,000	Target population: 150,000	Jan-16	Jun-17
8	Libale Water Pan	60,000,000	Target Population:5,000	Jul-16	Jan-17
9	Rumuruti Water Supply Project	45,000,000	Target Population: 40,000	Dec-15	Mar-17
10	Moyale Water Supply	50,000,000	Target Population: 35,000	Dec-15	Mar-17
11	Isiolo Water and Sanitation Project	89,000,000	Target Population: 60,000	Jul-15	Oct-16
	TANA WWDA				
1	Mukurwe-ini water Project	720,000,000	Target Population: 10,000	May-17	Dec-17
2	Kabiru-ini Water Supply	65,000,000	Target Population: 3,500 Treatment Capacity: 1,500 m3/day	May-17	Dec-17
3	Thangatha Dam	40,000,000	Target Population: 10,000	Apr-17	Jun-19
4	Ura Dam 4	30,000,000	Target Population: 9,000	Apr-17	Jun-19
5	Maua Water Project II and Sewerage/ Drainage Project	900,000,000	Target Population:100,000	Apr-17	Jun-19
	TANATHI WWDA				
1	Wote Water Supply & Sanitation Project	500,000,000	Target Population: 12,000	Aug-16	Sep-18
2	Wote Rehabilitation and Expansion of Water Supply Systems	15,000,000	Target Population: 2,000	Aug-16	Nov-18

S/N	Project Name	Cost (KShs)	Population/ Treatment Capacity	Start	Completion
3	Masinga - Kitui Water Supply Project	2,200,000,000	Target Population: 180,000 Treatment Capacity: 18,000 m3/day	Jun-12	Jun-16
4	Yatta Canal Rehabilitation	2,200,000,000	Target Population: 70,000 and 1,500 Farmers	Aug-14	Feb-17
5	Equipping of Kajiado Boreholes	72,400,000	Target Population: 100,000; 10 No. Boreholes with Capacity: 15,000 m3/day	Dec-16	Jun-17
6	Migwani Water Supply Project	100,000,000	Target Population: 15,000	Jul-15	Mar-17
	WATER SECTOR TRUST FUND				
1	Up-scaling of Basic Sanitation for the Urban Poor (UBSUP)	1,013	Target Population: 600,000	Jul-11	Dec-21
2	Water Sector Development (Support WSTF)	1,656	Target Population: 250,000	Dec-14	Jun-21
3	Kenya Urban Water And Sanitation OutPut Based Aid Project (OBA)	1,385	Target Population 120,000	Dec-14	Jun-22
4	Support to Equitable Access to Quality Water, Basic Sanitation and Enhanced Water Resources Management in Rural Kenya	2,325	Target Population 200,000	Oct-14	Jun-21
5	Green growth and employment creation-Access to and management of of water resources in the Arid and Semi-Arid Lands	2,222	Target Population 200,000	Jul-16	Jun-22
6	Water Supply and Sanitation for the Urban Poor -KfW	800	Target Population 150,000	June 16	Dec-24
7	Ending drought Emergencies Support to drought Risk Management	2,653	Target Population 360,000	Jul-16	Jun-24

S/N	Project Name	Cost (KShs)	Population/ Treatment Capacity	Start	Completion
8	The Saudi Programme for Drilling of Wells and Rural Developent in Africa	600	Target Population 25,000	Jul.-17	Jun-20

Annex II: Projects Projected to Be Completed by 2022

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
	ATHI WWDA									
1	Kiambu	Ruiru and Juja	Ruiru Juja Water Supply Project	968,000,000	Target Population: 110,000 Treatment Capacity: 20,000 m3/day	01-Nov-10	01-Apr-16	50,000	40,000	20,000
3	Kiambu	Kikuyu and Kabete	Kikuyu Urban Water Supply Project	65,000,000	Target Population: 15,000 Treatment Capacity: 1,500 m3/day	01-Aug-14	01-Feb-16	15,000		
20	Murang a	Gatanga	Gatanga Community water project	264,000,000	Target Population: 70,000 Treatment Capacity: 6,000m3/day	14-04-17	31-07-17		40,000	30,000
41	Nairobi	Westlands, Dagoreti North/South, Kibra, Langata, Starehe	Gigiri Kabete Water Supply	800,000,000	Target Population: 300,000	01-Nov-11	29-Jan-16	150,000	100,000	50,000
46	Kiambu	Kiambu	Kiambu Urban Water Supply Project	540,000,000	Target Population: 40,000 Treatment Capacity: 4,000 m3/day	01-Aug-14	30-Dec-16	40,000		
54	Kiambu	Lari, Githunguri	Komothai Water Augmentation Project	300,000,000	Target Population: 70,000 Treatment	01-Feb-15	30-Jun-17		40,000	30,000

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
					Capacity: additional 3,000m3/day					
60	Kiambu	Gatundu South	Theta Dam Treatment Works and Distribution Water Project	291,000,000	Target Population: 60,000 Treatment Capacity: 4,000 m3/day	01-Mar-14	30-Sep-16	30,000	20,000	10,000
43	Nairobi	Kibra, Langata, Dagoreti North, Embakasi Central and Kasarani	Construction of Kangundo Road, Kibera, Upperhill and Kirichwa Ndogo Trunk Sewers	650,000,000	Target Population: 60,000	01-Aug-12	30-Aug-16	30,000	20,000	10,000
								315,000	260,000	150,000
LAKE VICTORIA SOUTH WWDA										
6	Migori	Isebania	Isebania Water Supply Project	440,000,000	Target Population: 60,000	01-Jan-14	01-May-17	40,000	15,000	5,000
40	Sony Sugar	Migori and Uriri	2 boreholes	10,000,000	Target population, 28,000	10-Oct-16	28-Jun-17		15,000	13,000
47	Nyamira	Keroka	Keroka Water Supply Project	1,890,000,000	Target Population: 56,000 Treatment Capacity: 3,000m3/day	01-Jan-14	30-Dec-16	25,000	16,000	15,000
61	Homa bay	Rangwe	Rangwe Water Supply Project phase 1 (Kosiga Dam)	45,000,000	Target Population: 15,000	01-Feb-15	31-Aug-16	15,000		

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
69	Siaya	Bondo, Gem, Alego Usonga	Siaya - Bondo Water and Sanitation Project	2,200,000,000	Target Population:200,000	01-Nov-12	31-Jan-17	100,000	50,000	50,000
								180,000	96,000	83,000
	RIFT VALLEY WWDA									
4	Turkana	Turkana West	Lotikip Well Field Development Project	500,000,000	Target Population: No estimate yet	01-Jul-15	01-Jun-18			20,000
5	Baringo	Baringo North, South and Central	Baringo Rural Water Project	1,200,000,000	Target Population: 150,000; No.of Boreholes:70 Boreholes	01-Jan-14	01-May-16	30,000	120,000	
29	Elgeyo Marakwet	Keiyo North, Keiyo South	Iten Tambach Sabor Water Supply Project Phase II	1,000,000,000	Target Population: 184,000	01-06-17	30-06-18			184,000
36	Elgeyo Marakwet	Keiyo North, Keiyo South	Iten Tambach Sabor Water Supply Project Phase I	1,580,000,000	Target Population: 64,000; Over 50 km gravity water system, Treatment Capacity: 5,500 m3/day and a water storage tank with 2,000 cubic meters storage capacity.	01-Oct-14	28-Feb-17	14,000	50,000	

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
45	Elgeyo Marakwet	Marakwet West	Marakwet West/Kapcherop Phase II Water Supply	120,000,000	Target Population: 20,000 Treatment Capacity: 600m3/day	20-Aug-15	30-Dec-16	20,000		
49	Uasin Gishu	Moiben, Soy, Eldoret North	18 Boreholes under drought mitigation	30,000,000	Target population, 100,000	15-Mar-16	30-Jul-17		100,000	
50	Narok	Narok North	Narok Water Supply Project	1,500,000,000	Target Population:50,000; Treatment Capacity: 5,000 m3/day	01-Nov-13	30-Jun-16	50,000		
51	Trans Nzoia	Cherangani	Sengwer Community Water Supply Projects	36,000,000	Target Population: 3,000	01-Jun-15	30-Jun-16	3,000		
52	Baringo	Mogotio	Kapindaram Water Supply Project	60,000,000	Target Population: 4,000	01-Jul-16	30-Jun-17		4,000	
70	Uasin Gishu	Anaibkoi	Construction of Ellegirini Pipeline and Expansion of Kapsoya Treatment Works	625,000,000	Target Population: 24,000	30-May-16	31-Jan-18		10,000	14,000
74	West Pokot		Pusol Water Project	40,000,000	Target Population: 6,000; Treatment Capacity in m3/day:500	01-May-16	31-Mar-17	1,000	5,000	

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
								118,000	289,000	218,000
	LAKE VICTORIA NORTH WWDA									
8	Bungoma	Mount Elgon and Kabuchai	Construction Water Supply Project in Chwele Area	300,000,000	Target Population: 92,000; Treatment Capacity: 2,000m3/day	20-Jun-16	19-Feb-18		20,000	82,000
44	Bungoma	Mount Elgon and Sirisia	Chesikaki - Cheptais - Sirisia Water Supply Augmentation Project	130,000,000	Target Population: 15,000; Treatment Capacity: 4,000m3/day	10-Jul-15	30-Dec-16	15,000		
11	Uasin Gishu	Moiben, Soy, Eldoret North	Drilling and Equipping of 18No. Boreholes	30,000,000	Target population, 100,000	01-Mar-16	20-Jan-17	40,000	40,000	20,000
64	Bomet	Sotik	Rehabilitation Sotik - Water Supply System	32,500,000	Target population 60,000	02-Nov-16	31-Aug-17		40,000	20,000
65	Kericho	Belgut and Burret	Rehabilitation of Litein Water Supply System	29,700,000	Target Population: 60,000	02-Nov-16	31-Aug-17		40,000	20,000
67	Kericho	Ainamoi	Kericho Sewerage Improvement Project	335,000,000	Target Population: 80,000	01-Dec-13	31-Dec-17		50,000	30,000
								55,000	190,000	172,000
	COAST WWDA									
9	Kwale	Msambweni, Kinango,Mar	Construction of Water Supplies in	75,000,000	Target Population: 75,000	24-Jul-14	20-Jan-17	25,000	50,000	

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
		afa,Tana Delta,Taveta, Mwatate	Drought Areas, Lot 3: Construction of elevated steel tanks at existing boreholes							
10	Kwale	Kinango,Kaloleni,Mwatate	Construction of surface modular pressed steel water tanks for CWSB		Target Population: 200,000	06-Jul-05	20-Jan-17	50,000	75,000	75,000
7	Kilifi	Malindi	Immediate Baricho Works Expansion & New Pipelines to Kilifi & Gongoni (Lot 3)	2,314,000,000	Target Population: 316,700	12-Sep-16	01-Nov-18			200,000
12	Taita Taveta	Kinango, Marafa, Wundanyi, Mwatate, Tana South	Construction of Water Supplies in Drought Areas, Lot 1: Equipping of Existing Boreholes for CWSB Region	58,000,000	Target Population: 70,000	24-07-14	20-01-16	60,000	10,000	
14	Taita Taveta	Taveta	Expansion of Taveta Lumi Supply	84,000,000	Target Population: 60,000	01-01-16	31-08-16		60,000	

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
16	Tana River	Kwale, Kilifi, Lamu, Tana River and Taita Taveta	Installation of plastic tanks, gutters and fittings in CWSB areas	50,000,000	Target Population: 225,000	01-07-15	31-03-17	75,000	150,000	
17	Kwale	Kinango	Nyalani Water Supply Project	84,000,000	Target Population: 12,000	01-Jan-17	27-04-17	5,000	7,000	
18	Kwale	Msambweni, Marafa,Tavet a,Mwatate	Construction of Water Supplies in Drought Areas, Lot 2: Development of water sources & Equipping with submersible pump sets, solar panels & Gensets	47,000,000	Target population, 80,000	24-Aug-16	30-06-17		80,000	
21	Mombas a	Kisauni, Bamburi, Nyali, Changamwe and Mvita	Mombasa Network Rehabilitation - Lot 2	1,000,000 ,000	Target Population: 20,000	01-Mar-15	30-08-17		20,000	
22	Kwale	Lungalunga/ Msambweni	Mkanda-Mwabandari rising main	32,597,21 2	Target Population: 3,000	25-Oct-16	30-12-17		3,000	
26	Kilifi	Malindi	Immediate Baricho Works	911,000,0 00	Target Population: 220,000: Treatment	01-Jul-16	31-05-18		120,000	100,000

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
			Electromechanical Works (Lot 1)		Capacity: additional 22,000m3/day					
38	Mombasa	Nyali	Extend Services to Informal Settlements - Lot 2	121,000,000	Target Population: 4,500	01-Feb-15	28-Feb-17	4,000	500	
62	Kwale	Msambweni	Mkanda Dam Rehabilitation Project	200,000,000	Target Population: 30,000	01-Oct-15	31-Aug-16	30,000		
63	Taita Taveta	Taveta	Expansion of Taveta Lumi Supply	84,000,000	Target Population: 60,000	01-Jan-16	31-Aug-16	60,000		
75	Kilifi	Malindi	Malindi Informal Settlement (Lot 2)	75,000,000	Target Population: 1,500	01-May-15	31-May-17		1,500	
								309,000	577,000	375,000
	NORTHERN WWDA									
15	Garissa	Ijara	Masalani Water & Sanitation Project	84,000,000	Target Population: 10,000	01-12-15	31-12-16	10,000		
19	Turkana	Turkana North and Turkana South	Drilling and Equipping of 30 Boreholes	71,000,000	Target population: 150,000	01-06-16	30-06-17		100,000	50,000
25	Marsabit	Moyale	Expansion of Butiye, Manyatta and Heilu water Supply	90,000,000	Target Population: 23,000 people, 48,000 cattle and 120,000 goats	01-03-17	01-03-18		13,000	10,000

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
27	Wajir	Wajir East	Kursin Water Supply	90,000,000	Target Population: 4,000	01-11-17	31-05-18			4,000
28	Wajir	Wajir South	Wajir -Bor Water Piping & Supply	95,000,000	Target Population: 5,000	01-11-17	31-05-18			5,000
39	Wajir	Eldas	Eldas Enole Water Supply	100,000,000	Target Population: 50,000	01-Sep-16	28-Feb-17	20,000	20,000	10,000
59	Wajir	Wajir South	Habaswein Water Supply (Wajir)	52,000,000	Target Population: 25,000	01-Feb-15	30-Nov-16	25,000		
55	Turkana	Turkana North and Turkana South	Drilling and Equipping of 30 Boreholes	71,000,000	Target population: 150,000	01-Jan-16	30-Jun-17		100,000	50,000
68	Garissa	Fafi	Libale Water Pan	60,000,000	Target Population:5,000	01-Jul-16	31-Jan-17	5,000		
72	Laikipia	Laikipia West	Rumuruti Water Supply Project	45,000,000	Target Population: 40,000	01-Dec-15	31-Mar-17	10,000	30,000	
73	Marsabit	Moyale	Moyale Water Supply	50,000,000	Target Population: 35,000	01-Dec-15	31-Mar-17	10,000	25,000	
76	Isiolo	Isiolo North	Isiolo Water and Sanitation Project	89,000,000	Target Population: 60,000	01-Jul-15	31-Oct-16	60,000		
								140,000	288,000	129,000
	TANA WWDA									
23	Nyeri	Mukurweini	Mukurwe-ini water Project	720,000,000	Target Population: 1,000	20-05-17	31-12-17		1,000	
24	Nyeri	Mathira	Kabiru-ini Water Supply	65,000,000	Target Population: 3,500 Treatment	01-05-17	31-12-17		3,500	

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
					Capacity: 1,500 m3/day					
56	Meru	Tigania East	Thangatha Dam	40,000,000	Target Population: 10,000	03-Apr-17	30-Jun-19			10,000
57	Meru	Igembe Central	Ura Dam 4	30,000,000	Target Population: 9,000	03-Apr-17	30-Jun-19			9,000
58	Meru	Igembe South	Maua Water Project II and Sewerage/ Drainage Project	900,000,000	Target Population:100,000	03-Apr-17	30-Jun-19			100,000
								-	4,500	119,000
	TANATHI WWDA									
30	Makueni	Makueni	Wote Water Supply & Sanitation Project	500,000,000	Target Population: 12,000	01-08-16	30-09-18			12,000
31	Makueni	Makueni	Wote Rehabilitation and Expansion of Water Supply Systems	15,000,000	Target Population: 2,000	01-Aug-16	30-11-18			2,000
34	Kitui	Masinga, Kitui Central, Kitui West and Kitui Rural	Masinga - Kitui Water Supply Project	2,200,000,000	Target Population: 180,000 Treatment Capacity: 18,000 m3/day	23-Jun-12	23-Jun-16	100,000	60,000	20,000

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
37	Machakos	Yatta	Yatta Canal Rehabilitation	2,200,000,000	Target Population: 70,000 and 1,500 Farmers	01-Aug-14	28-Feb-17	15,000	30,000	25,000
48	Nartional Housing Corporation	Nairobi, machakos and Kisumu	3 Boreholes	65,000,000	Target population, 15,000	02-Aug-16	30-Jul-17		15,000	
53	Kajiado	Kajiado south, Kajiado central, Kajiado north, Kajiado East,	Equipping of Kajiado Boreholes	72,400,000	Target Population: 100,000; 10 No. Boreholes with Capacity: 15,000 m3/day	01-Dec-16	30-Jun-17		50,000	50,000
71	Kitui	Mwingi central	Migwani Water Supply Project	100,000,000	Target Population: 15,000	01-Jul-15	31-Mar-17		15,000	
								115,000	170,000	109,000
WATER SECTOR TRUST FUND										

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
1	Tharaka Nithi Nandi Kisumu Uasin Gishu West Pokot Mombasa Taita Taveta Kilifi Kwale Kakamega Busia	Maara Homa Bay Town Kapenguria Changamwe Mwatate Kilifi North Msambweni Nandi Central Kisumu Central Eldoret North Mumias West Budalangi	Up-scaling of Basic Sanitation for the Urban Poor (UBSUP)	1,013	Target Population: 600,000	Jul-11	Dec-21	146,000	208,000	67,000
2	Kitui Murang'a Kirinyaga Home Bay Nyeri Lamu Vihiga	Kitui Central Maragua Mwea Homa Bay Town Naivasha Ndaragwa Lamu West Bomet Central	Water Sector Development (Support WSTF)	1,656	Target Population: 250,000	Dec-14	Jun-21	86,000	56,000	48,000

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
	Meru Laikipia Garissa Nakuru Nyandarua Bomet	Mukurweini Imenti South Buuri Nyeri Central Vihiga Laikipia West Ijara								
3	Nakuru Murang'a Kisumu Nyeri Embu	Nyeri Town Embu west Kandara Kisumu East Naivasha Mathira	Kenya Urban Water And Sanitation OutPut Based Aid Project (OBA)	1,385	Target Population 120,000	Dec-14	Jun-22		47,000	34,000
4	Laikipia Tharaka Nithi Narok Kwale Nandi Migori	Laikipia East Tharaka Chuka Igambangombe Narok South Suna East Nyatike Suna East Laikipia Esat Mosop Chesumei Tindiret Matuga	Support to Equitable Access to Quality Water, Basic Sanitation and Enhanced Water Resources Management in Rural Kenya	2,325	Target Population 200,000	Oct-14	Jun-21		67,000	46,000

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
		Kilgoris Narok East Kinango Matuga Chuka Igambangombe Laikipia East Lungalunga Maara								
5	Garissa Tana River Wajir Turkana Mandera Isiolo Lamu Marsabit	Lamu West Lamu East Bura Tana Isiolo North Isiolo South Ijara Fafi Balambala Garissa Township Galole Garsen Wajir North Wajir South Wajir West Wajir East Turkana East	Green growth and employment creation-Access to and management of of water resources in the Arid and Semi-Arid Lands	2,222	Target Population 200,000	Jul-16	Jun-22		35,000	67,000

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
		Turkana Central Mandera West Mandera North Laisamis Saku								
6	Meru Makueni Kirinyaga Machakos	Kibwezi East Machakos Town Buuri Ndia	Water Supply and Sanitation for the Urban Poor -KfW	800	Target Population 150,000	June 16	Dec-22			24,000
7	Baringo Kajiado Kilifi Taita Taveta Mandera West Pokot Samburu Kitui	Kitui East Kitui West Ganze Kajiado East Mwatate Mandera East Pokot South Samburu West Samburu East Baringo South	Ending drought Emergencies Support to drought Risk Management	2,653	Target Population 360,000	Jul-16	Jun-22			

S/N	County	Constituency	Project Name	Cost (KShs)	Population	Start	Completion	Additional Population Served		
								2016/2017	2017/2018	2018/2019
8	Wajir Mandera Garissa	To be determined	The Saudi Programme for Drilling of Wells and Rural Developent in Africa	600	Target Population 25,000	Jul.-17	Jun-20			
							Totals	232,000	413,000	286,000
						Grand Totals		1,464,000	2,387,500	1,641,000

Annex III: Details of Dams

S/N	Name of Dam	County	Capacity (million m^3)	Beneficiaries (persons)	Approx. Cost (KSh million)	Contracting Authority	Project Status/Challenges
Design, Build and Finance Dams							
Under Construction Phase							
1.	Itare Dam	Nakuru	28	800,000	29,000	RVWSB	Construction Works at 30%. Project Contractor faced financial challenges with head office in Italy. The contractor temporarily stopped work since October 2018 and work is expected to resume next month. Addendum to ring-fence the operation of the project is being formulated.
Sub- Total			*28*		*29,000*		
Under Design Phase							
2.	Bonyunyu Dam	Nyamira	40	400,000	5,838	LVSWSB	Detailed Design Completed. Works to start once Resettlement of Project Affected Persons and Loan negotiation are finalized.

S/N	Name of Dam	County	Capacity (million m^3)	Beneficiaries (persons)	Approx. Cost (KSh million)	Contracting Authority	Project Status/Challenges
Design, Build and Finance Dams							
3.	Karimenu II Dam	Kiambu	19	580,000	23,000	AWSB	Detailed Design Completed. Contractor has mobilized. Works to commence once Resettlement of Project Affected Persons is finalized and will be done in two phases.
4.	Ruiru II Dam/Water Supply	Kiambu	36	400,000	21,000	AWSB	Detailed Design Completed. Contractor mobilization affected due to delay in amendment of the Financing Agreement.
Sub- Total			*95.0*		*49,838*		
Under Procurement Stage							
5.	Kamumu Dam	Embu	31	100,000	6,000	TWSB	RFP Finalized awaiting treasury clearance of financing proposal subject to availability of land, due diligence and Environmental Impact assessment.
6.	Rupingazi Dam	Embu	28	120,000	5,500	TWSB	RFP Finalized awaiting treasury clearance of financing proposal subject to availability of land, due diligence and Environmental Impact assessment.
7.	Thambana Dam	Embu	12	100,000	5,000	TWSB	RFP Finalized awaiting treasury clearance of financing proposal subject to availability of land, due diligence and Environmental Impact assessment.
8.	Kithino Dam	Meru	103	205,000	10,200	TWSB	RFP Finalized awaiting treasury clearance of financing proposal subject to availability of land, due diligence and Environmental Impact assessment.
9.	Maara Dam	Tharaka-Nithi	27	50,000	4,136	TWSB	RFP Finalized awaiting treasury clearance of financing proposal subject to availability of land, due diligence and Environmental Impact assessment.
10.	Thingithu Dam	Meru	3	210,000	600	TWSB	RFP Finalized awaiting treasury clearance of financing proposal subject to availability of land, due diligence and Environmental Impact assessment.
11.	Kahurura Dam	Laikipia	2	217,000	3,000	NWSB	Proposal to prioritize design of the dam, water supply and sewerage infrastructure to be financed by AfDB to guide in sourcing of funds for the works under either PPP or EPCF
12.	Pesi Dam	Nyandarua	16	80,000	3,000	NWHSA	Project at Feasibility. Lack of funds to carry out detailed design.

S/N	Name of Dam	County	Capacity (million m^3)	Beneficiaries (persons)	Approx. Cost (KSh million)	Contracting Authority	Project Status/Challenges
Design, Build and Finance Dams							
13.	Kinja Dam	Nyandarua	1.6	158,000	2,000	NWHSA	Project at Feasibility. Lack of funds to carry out detailed design.
14.	Wiyumiririe Dam	Laikipia	1.5	50,000	3,000	NWHSA	Project at Feasibility. Lack of funds to carry out detailed design.
15.	Karemeno Dam	Nyeri	12.3	1,375	8,000	AWSB	Preliminary Design
16.	Londiani	Kericho	1	115,000	4,685	NWHSA	At detailed design. NWHSA requires a total of Kshs. 60.8Million to pay the consultant to complete project studies/documentation.
17.	Maragua IV B	Muranga		230,000	749	AWSB	Evaluation of Expression of Interest finalized and Request For Proposal issued
18.	Bute Dam	Wajir	21	77,000	7,000	NWSB	RFP Finalized awaiting treasury clearance of financing proposal subject to availability of land, due diligence and Environmental Impact assessment
19.	Bosto Dam	Bomet	70	800,000	19,900	NWHSA	Commercial and Financing Agreement Signed. Contractor to mobilize once access to site is granted. Affected by the Moratorium and the Joint Ministerial Technical Committee to present a report on their findings and recommendations to the CSs on the proposed site before variation of the moratorium can be granted.
20.	Gatei dam	Kiambu	16		15	AWSB	Evaluation of Expression of Interest finalized. RFP to be issued
21.	Keben/Lessos Dam	Nandi	5.4	3,750	4,200	LVNWSB	Commercial contract signed seeking clearance from The National Treasury subject to availability of land, due diligence and Environmental Impact assessment
22.	Isiolo Dam/Crocodile Jaw	Laikipia	215	950,000	10,000	NWHSA	Project final designs have been completed but Environmental Impact Assessment has not been completed as some of the communities on the downstream of the dam have not accepted the project.
23.	Ndarugo I dam	Kiambu	11	1,000,000	15,000	AWSB	RFP Finalized awaiting treasury clearance of financing proposal. Due diligence planned for February, 2019.
Sub- Total			*576.8*		*101,785*		
Completed							

S/N	Name of Dam	County	Capacity (million m^3)	Beneficiaries (persons)	Approx. Cost (KSh million)	Contracting Authority	Project Status/Challenges
Design, Build and Finance Dams							
24.	Chemususu Dam	Baringo	35	300,000	4,800	RVWSB	Completed in 2011
25.	Theta	Kiambu	0.4	50,000	741	AWSB	Completed in 2015
26.	Kiserian Dam	Kajiado	1.8	253,000	1,000	NWHSA	Completed 2013
27.	Maruba dam	Machakos	0.6	200,000	500	NWHSA	Completed 2010
Sub- Total			*37.8*		*7,041*		
Under Construction							
28.	Thwake Dam	Makueni	681	1,300,000	37,000	MoWS	Construction works started in March, 2018 and the project is at 7.2%.
29.	Siyoi/Muruny	West-Pokot	9.9	200,000	9,000	NWHSA	Physical project progress at 50%
30.	Badasa	Marsabit	5	100,000	846	NWSHA	Consultant procured to review the pending works. Lack of funds to pay the consultant
31.	Umaa Dam	Kitui	0.9	75,000	879	NWHSA	Consultant procured to review the pending works. Lack of funds to pay the consultant.
32.	Yamo Dam	Samburu	6	1,500	1,200	NWSB	Physical Project progress at 8%.
33.	Thangatha Dam	Meru	0.25	165,000	100	TWSB	Physical Project progress at 50%.
34.	Ura Dam	Meru	0.1	50,000	100	TWSB	Physical Project progress at 40%.
35.	Kianjuri Dam	Meru	0.25	90,000	90	TWSB	Physical Project progress at 15%.
36.	Wamba Dam	Samburu	0.15	3,100	106	NWSB	Physical Project Progress at 90%
Sub- Total			*703.6*		*49,321*		
Under Planning and Design							
37.	Malewa Dam	Nyandarua		2,500	20,000	MoWS	Feasibility to be completed by April, 2019
38.	Irati Dam	Muranga		5,000		AWSB	Pre-Feasibility completed.
39.	Dam 42A	Busia	170		15,000	LVNWSB	Detailed design
40.	Dam 40A	Kakamega	100		4,000	LVNWSB	Preliminary Design
41.	Dam 33B	Bungoma	100		5,000	LVNWSB	Preliminary Design
42.	Malakisi Dam	Bungoma	36.3	23,500	8,000	LVNWSB	Feasibility Study
43	Tisi Dam	Bungoma	21		6,000	LVNWSB	Feasibility Study
44.	Maragua IVB Dam	Muranga	33		7,000	AWSB	Pre-Feasibility completed.

S/N	Name of Dam	County	Capacity (million m^3)	Beneficiaries (persons)	Approx. Cost (KSh million)	Contracting Authority	Project Status/Challenges
Design, Build and Finance Dams							
45.	Soin/Koru Dam	Kericho/ Kisumu	86.6	1,710,000	19,200	NWHSA	Detailed Design complete. Land acquisition has not been done. A court case is ongoing. Direction given by the Court is that more consultations between NWHSA and the stakeholders be done in order to resolve the contentious matters surrounding the project facing rejection by some stakeholders
46.	Two Rivers Dam	Uasin Gishu	12.8	400,000	4,000	LVNWSB	Pre-Feasibility completed.
47.	Beregei Dam	Baringo	20		2,300	RVWSB	Feasibility Study
48.	Nyangores Dam	Bomet		1,000		RVWSB	Feasibility Study
49.	Bisanadi Dam	Isiolo	0.04	2,150		NWSB	Interim Study
50.	Kathita II Dam	Meru	0.25	15,000	0.75	TWSB	Design on going
51.	Kathita Mega	Meru	7			TWSB	Preliminary Design
52.	Rare Dam	Kilifi	80	500,000	29,000	NWHSA	Detailed Design ongoing. The project requires Kshs. 54Million to complete the project documentation before construction can be planned for.
Sub- Total			*666.9*		*119,501*		
Under Procurement							
53.	Mwache Dam	Kwale	118	2,000,000	15,000	MoWS	Evaluation of Shortlisted Contractors done and report forwarded to World Bank. Award pending awaiting resettlement of Project Affected Persons.
54.	Kiandongoro/Chania Dam	Nyeri	24	20,000	12,000	TWSB	Feasibility
Sub- Total			*142*		*27,000*		

ANNEX IV: Projects under the Big 'Four" Agenda

Key ongoing water and sewerage projects to support Manufacturing pillar

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
1.	Naivasha Industrial Park Water Supply	Naivasha	1,200	-	Drilling and equipping boreholes to supply 9,000m3/day of water to the Park and development of a sewerage system to treat effluent from the Industrial Park and adjacent developments. The long term water supply will be supplied by Aberdare Bulk Water Project.	Drilled and equipped 9 Boreholes in Naivasha. A contractor identified to lay pipeline to the Industrial Park in the short term. The project has been fully funded by GoK
2.	Dongo Kundu Water Supply	Mombasa SEZ	500	-	3No. Boreholes were drilled with a yield of 2,500m3/day. The project involves extension of pipeline to supply 1,000m3/day of water as a short term measure to the Dongo Kundu SEZ in Mombasa. The long term water supply will be supplied using Mwache Dam	Pipeline extension from the line from Tiwi Boreholes to the SEZ as a short term plan
3.	Water Supply to Kenanie Leather Industrial Park	Athi River	300	150	To ensure the Kenanie Leather Industrial Park facilities are connected to reliable water supply to enable its development and running	Proposed to get water from Mavoko Water Supply system
4.	Supply water to Constituency Industrial Development Centres -ESP	44 Counties	44	44	Connect water supply to 88 Constituency Industrial Development facilities distributed across the country	Proposed to be connected to the existing water supplies managed by the Water Service Providers
5.	Immediate Water Supply Konza Technopolis Complex	Konza City	70	70	7No. boreholes have been drilled and equipped to supply 1,000m3/day. Extension of Pipeline from Nol Turesh Water Supply serve the Konza City facilities will provide an additional 2,000m3/day as a short term water supply to enable development and running of the city. Medium term (10,000m3/day) and Long term water supply of 30,000m3/day will be from Thwake Dam.	Currently being serviced by 7No. strategic boreholes with a yield of 1,000m³/day. Extension of pipeline has been planned for FY 2020/21

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
6.	Naivasha Industrial Park Sewerage Project	Naivasha	2,000	0	Proposed Sewerage Project is expected to serve the Industrial Park that is under development and the adjacent developments.	At Conception Stage, project site being identified. Project is GoK funded. Funding is yet to be allocated.
	Total		4,114	264		

Key projects to support Food Security and Nutrition

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
1.	Development of Blue Economy Initiatives - Connection of potable water to fish landing sites at the Coast	Mombasa	165	85	Connection of fish landing site facilities at Kichwa Cha Kati, Gazi, Vanga, Ngomeni, Kibuyuni with reliable water supply	Proposed to get water by pipeline extension from the Baricho Works Pipeline
2.	Connection of potable water to two fish markets at the Coast at Malindi and Likoni	Malindi and Likoni	30	30	Connection of two fish market facilities at Malindi and Likoni with reliable water supply	Proposed to get water by pipeline extension from the Malindi and Likoni water supplies
3.	Supply of water to livestock holding grounds	13 Counties	300	150	Drilling and Equipping of boreholes to supply 15 livestock holding grounds facilities with reliable water supply	Proposed to drill and equip boreholes, and construct water tanks for each of the sites
4.	Small Holder Irrigation Programme	Embu, Kirinyaga and Tharaka Nithi	630	270	The project aims to construct 6 schemes namely: - Gatene (Embu); Miuka and Kandeki (Kirinyaga); Mutino, Magati and Karuma Marimanti (Tharaka Nithi); On completion 1,500 acres would be put under irrigation.	ESIA ongoing and tender evaluation for detail design consultants being finalized
5.	Bura Irrigation Scheme	Tana River	9,532	750	The Project aims at installation of gravity water abstraction system to lower the cost of production and increase the area under irrigation in Bura to 15,000 acres from the current 6,000 acres.	31% progress Started in 2013 to be completed in 2022

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
6.	Community Based Irrigation Projects	Country wide	12,682	900	To construct/rehabilitate community based smallholder irrigation projects which will put 30,000 acres under irrigation and benefit 32,000 farmers. The project will involve construction of intake structures, main canals and infield structures in the various schemes that are yet to be completed.	6 projects have been completed since 2016-2017 putting 2,050 acres under irrigation. 3 irrigation projects to be implemented in 2019/20
7.	Galana Kulalu Food Security Project	Kilifi and Tana River Counties	8,681	10	The aim of the project is to develop 10,000 acres model farm project consisting of centre pivot and drip irrigation system as a pilot. Expansion of the project to 400,000 acres ultimately under PPP to explore the potential of irrigation in the area will be undertaken in future phases	85% complete; NIB has taken over production
8.	National Expanded Irrigation Programme	Country wide	114,000	2,330	Provision of irrigation infrastructure for abstraction, conveyance, distribution and application of irrigation water for 572 identified irrigation projects across the country	27% completion status with construction of over 156 irrigation projects with cumulative total of 127,969 acres directly benefiting 88,010 farmers.
9.	Mwea Irrigation Development Project (Thiba Dam and Irrigation Area)	Kirinyaga County	19,967	2,151	The project aims to increase water storage by 15.4 Million M3 by construction of Thiba dam to facilitate double cropping in Mwea Scheme from 19,500 acres to 50,000 acres and expansion of the scheme by 10,000 acres. 20,000 people are expected to benefit	ICB Package I and ICB Package II are approximately 25% and 40% complete, respectively. Land acquisition is 99.9%.
10.	Rwabura Irrigation Development Project	Kiambu County	880	197	The project aims as providing irrigation infrastructure for 1500 acres that will support production of horticultural	3% Complete. Design review completed awaiting RAP

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
					crops and fruits valued at Kshs 390 million by 2022.	
11.	Turkana Irrigation Development Project	Turkana County	9,197	335	The project aims at construction of intake, conveyance canals for 5000 acres in Naipa, expansion of Katilu clusters by 4000 acres, groundwater for irrigation targeting 3000 acres. These and others are expected to increase the area under irrigation in Turkana from the current 22,000 acres to 53,000 acres within five years.	Completed rehabilitation of 16 projects with 13,190 acres.
12.	Lower Kuja Irrigation Scheme	Migori County	4,694	250	Construction of intake, canal network and water control structures for 19,290 acres to benefit 3,000 farmers directly.	100 acres completed and under production. Ongoing contract for 2000 acres at 60%.
13.	Lower Sabor Irrigation Project	Uasin Gishu County	400	20	Supply, laying of pipelines. Supply, and installation of drip kits and in-field sprinkler irrigation systems for 2000 acres to benefit 4,500 people directly and indirectly	Construction of on-farm infrastructure for 2000 acres ongoing at 60%.
14.	Household Irrigation Water Harvesting Project	Country wide	7,680	1,548	The programme involves increasing water storage capacity by 4.4 billion cubic metres through enhancing reliable and adequate water harvesting and storage to meet domestic, irrigation and industrial water needs as well as environmental storage through the construction of medium size and multipurpose dams.	To date 7,464 water pans have been constructed across 23 counties. This translates to 10,450,359 m3 of storage to irrigate about 10,000 acres.
15.	Land Reclamation (Land Degradation Assessment Program)	394	394	20	The project aims at using integrated GIS/Remote sensing supported Land Degradation Assessment (LADA) Program at watershed level to develop recommendations to halt and reverse degradation and	National land degradation assessment at low resolution and Assessment on Lake Magadi completed.

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
					provide solutions for reclamation.	LADA for 14 watersheds yet to be done.
16.	National Water Harvesting and Groundwater Exploitation	11,000	11,000	0	The project involves construction of water pans and small dams ranging from 10,000m³ – 50,000m³ by 2021 to harvest and store about 18 million m³ of water from the surface run-off. This will enable about 180,000 Hectares to be reclaimed to be put under production.	Projects initiated in 2014. To date, 941 water pans/small dams constructed harvesting over 14.3 million m³ of water; Implementation of 5 water pans and 13 boreholes ongoing
17.	Micro Irrigation Programme for Schools	Country wide	2,030	150	The project involves constructing micro irrigation facilities in 2000 schools. This will enable about 2,000 acres in schools to be put under production. Drill boreholes to benefit 2000 schools with water across the country annually.	Projects initiated in 2016. 94 boreholes have since been drilled & equipped and 60 pilot greenhouses done in 72 schools.
	Total		202,262	9,196		

Water Projects Supporting Affordable Housing

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
1.	Water & Sewer Reticulation for Park Road, Starehe & Shauri Moyo Housing Projects	Nairobi	3,307	300	Development of 40km reticulation water pipelines; Development of 15km sewers and sewer outfall; Development of water storage tanks capacity 12,500m³	Proposed to get water from Nairobi City Water Supply system
2.	Water & Sewer Reticulation - Combined Ruai (Utawala, Mihango,Ruai and Githunguri)	Nairobi	6,400	300	Activated Sludge Conventional Sewage Treatment Plant, capacity 70,000m³/day including wastewater reuse technology; Development of 12km water pipeline; Development of 8km sewers and sewer outfall; Development of water storage tanks, capacity 5,000m³	Proposed to get water from Nairobi City Water Supply system

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
3.	Mavoko Drinking water supply Project	Mavoko	2,800	94	Construction of intake and treatment works of 30,000m³/day; Distribution pipeline of over 150km and water tanks; Rehabilitation and augmentation of Mavoko, Athi River and Mlolongo towns sewerage system	Ongoing at 75%. Expected to be completed in August 2020
4.	Mavoko Water & Sewerage Interventions - Extension of Pipeline	Mavoko	585	125	Development of 15km water pipeline; Drilling & Equipping of 5no. Boreholes to cater for construction works; Development of 15km sewers and sewer outfall; Development of 2,000m3 water storage tank and 250m3 steel elevated tank; Development of sewerage pre-treatment facility (DTF); Development of 1.5km sewer for NHC housing	Independent water supply from boreholes
5.	Water & Sewer Reticulation - Kibera B Housing Project	Nairobi	450	125	Pipeline extension to Kibera B Housing Projects facilities	Proposed to get water from Nairobi City Water Supply system
6.	Water & Sewer Reticulation - Mariguini Housing Project	Nairobi	370	125	Pipeline extension to Mariguini Housing Projects facilities	Proposed to get water from Nairobi City Water Supply system
7.	Water & Sewer Reticulation - East Africa Portland Housing Project	Athi River	1,400	125	Development of 25km water pipeline; Development of 30km sewers and sewer outfall; Development of 5,000m³ water storage tank and 350m³ of steel elevated tank; Development of sewerage pre-treatment facility (DTF) Prioritization of Mavoko Dam Water Supply Project under Belgian Funding	Proposed to get water from Mavoko Water Supply system
	Total		15,312	1,194		

Projects Supporting Universal Health Coverage

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description re	Status
1.	Connect 56 level 4 health facilities to a safe and reliable Water supply	Countrywide	359	359	Pipeline extension to the health facility or drilling and equipping of boreholes, construction of water tank and pipeline extension	Proposed to be connected to the existing water supplies
2.	Connect 435 level 3 health facilities to a safe and reliable Water supply	Countrywide	3,812	300	Pipeline extension to the health facility or drilling and equipping of boreholes, construction of water tank and pipeline extension	Proposed to be connected to the existing water supplies
3.	Connect 2576 level 2 health facilities to a safe and reliable Water supply	Countrywide	21,787	100	Pipeline extension to the health facility or drilling and equipping of boreholes, construction of water tank and pipeline extension	Proposed to be connected to the existing water supplies
	Total		25,958	759		

Key Projects Supporting the Big Four Agenda Projects

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
1.	Aberdare Bulk Water Project	Nyandarua and Naivasha	25,000	50	Proposed Multi-Purpose Dam and 20,000m³/day Water Supply and pipelines to serve Naivasha Industrial Park, Ol Kalou in Nyandarua County, Naivasha and Gilgil Towns in Nakuru County. Project expected to serve a population of 200,000, adequate up to 2035	Feasibility Study Done. Malewa Dam Project needs to be packaged to include Kinja and Pesi Dam
2.	Thwake Multipurpose Water Development Programme Phase 1	Makueni and Kitui	42,365	6,640	Comprises of construction of Thwake dam with a storage capacity of 688 million cubic meters of water, development of 40,000 hectares of irrigation, development 20 megawatts of hydropower and development of water supply system to provide clean water to 1.3 million people	The Project implementation is ongoing at 31%.
3.	Mwache Dam and Water Supply Project	Mombasa	25,000	700	Proposed Multi-Purpose Dam and Water Supply to produce 186,000 m³/ day and pipelines to serve Mombasa Industrial Park (Dongo Kundu), Mombasa, parts of Kilifi and Kwale counties. Project expected to serve a population of 1,500,000 up to 2030 people	Contract signed and currently the Ministry is fact-tracking implementation of RAP

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
4.	Mzima II Pipeline	Mombasa	35,000	0	Construction of 220km of 1.2m diameter pipeline from Mzima Springs to Mombasa to serve Mombasa Industrial Park (Dongo Kundu), Taita Taveta, Kwale, Kilifi and Mombasa Counties to serve a population of 1,050,000 people adequate up to 2030.	Loan application done to China Exim bank, Cabinet Memo prepared and Submitted to NT & AG.
5.	Northern Collector Tunnel	Nairobi	15,000	1,300	Construction of a 11.7km long tunnel with 3.2m diameter from Maragua, Gikigie and Irati Rivers to Thika Dam Reservoir to and 40km bulk pipeline serve Nairobi City with 140,000m³/day. Project expected to serve a population of 1,200,000 people, adequate up to 2030	Project implementation is ongoing at 75%. Excavation of the tunnel has been completed.
6.	Ruiru II dam	Nairobi	22,000	1,032	Proposed Multi-Purpose Dam and Water Supply to produce an additional 50,000m3/day to serve Karuri, Kiambu and Githunguri. Project will serve a population of 300,000 people	All conditions precedent for implementation of the project have been achieved. The Ministry has sought waiver from HoPS for approval. Cabinet Memo has been prepared
7.	Karimenu II dam	Nairobi	24,000	1,700	Proposed Multi-Purpose Dam and Water Supply to produce an additional 47,000m3/day to serve Ruiru, Juja and Thika. Project will serve a population of 300,000 people	Project implementation is ongoing at 10% Diversion Tunnel complete, Dam embankment started
8.	Ndarugu I Dam and Water Supply	Machakos and Nairobi	35,600	0	The project entails construction of a 35m high concrete dam to impound 225 Million Cubic Metres of water with a treatment works with a capacity of 173,000m3/d and a transmission network of approximately 100km. The primary objective of the project is to meet the medium and long term water demand for Eastern parts of Nairobi, Juja, Ruiru, Ruai, Syokimau and Kitengela with a population of 1.5 Million	Draft commercial contract has been prepared and submitted to the AG's office and the National Treasury, Cabinet Memo has been prepared to seek approval from the Cabinet

S/No	Project Name	Service Area	Cost (KShs. M)	Allocation FY 2020/21 (KShs. M)	Description	Status
9.	Maragua IV Dam and Water Supply	Maragwa	37,400	0	The project entails construction of a 70m high Dam capable of storing 60 million cubic metres of water, Water treatment plant of capacity 140,000m3/d to supply Nairobi, Thika and Muranga. Construction of over 140km of transmission and distribution pipelines. Terminal storage tanks in Nairobi and Thika. The project will serve 1.2 million people in Nairobi, Muranga and Thika	EPCF&F advertised and is being evaluated by the implementation Agency.
10.	Kenya Towns Sustainable Water Supply and Sanitation Programme	In 28 Towns across the Country	39,959	9,841	Development of Water, Sewerage and Sanitation Projects for 28 Medium sized towns across the country. Details of this project are provided in Annex II.	Ongoing at 15%. Experiencing tax exemptions and master list approval challenges
	Total in Ksh. Millions		301,324	21,263		

Annex V: Proposed Large Scale and Strategic Irrigation Projects

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
Lower Nzoia Phase II	• Location - Budalangi • Siaya and Busia Counties • Water source – Lower Nzoia • Intake works and intake headrace construction ongoing under Lower Nzoia Phase I project • A major irrigation scheme with a total area of 9,490 acres. • Canal irrigation system with option for lining and closed conduits in some sections **Feasibility study and detailed designs completed. RAP carried out – land compensation not yet.**	9,490	1,992,900,000.00	• Increase food production o 118,625 bags of maize annually o 11,388 MT of paddy rice o Various horticulture and high value crops worth Kshs 2billion • Create direct and indirect employment for 47450 • Add GDP value of Kshs 3.6 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being	• Construction	• World Bank/KfW had shown interest
Lower Kuja Irrigation development Project, Lot 2 to 6	Location - Nyatike District Kisii, Migori Counties Water source - Kuja River Major irrigation scheme at a 19,290 acres net command area. Intake weir and conveyance canals have been constructed.	19,290	4,050,900,000.00	Increase food production 241,100 bags of maize annually 23,151 MT of paddy rice Various horticulture and high value crops worth Kshs 4billion Create direct and indirect employment for 96,000 Add GDP value of Kshs 7.4 billion annually from value of produce.	Construction works	Gok financed construction of the intake weir and conveyance canals under lot 1 JICA had shown interest

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	Total length of Branch canal offtaking from the main canal is 26 km. Feasibility study and detailed designs completed and land acquisition for primary infrastructure partially completed			Improve agricultural productivity through irrigation water management Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. KImproved the income levels of the local population by at least 40% thereby improving their socio- economic well being		and Rice Production intensification programme

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
Perkerra Irrigation scheme	Location - Marigat Baringo County Water Source - Perkerra river 800 ha of gazetted land as National Scheme Scheme targeted for expansion to 5,050 acres Components Modernizing the irrigation system through lining of canals. Improve water management modern irrigation system of drip or sprinkler combined with solar power. 10 No. night storage dams to supply the 15 No. units with water Flood protection dykes and access roads Feasibility study and detailed designs completed	5,050	1,060,500,000.00	Increase food production 126,250 bags of maize annually Various horticulture and high value crops worth Kshs 1billion Create direct and indirect employment for 25,000 Add GDP value of Kshs 2 billion annually from value of produce. Improve agricultural productivity through irrigation water management Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being	Construction of modern irrigation infrastructure	Be financed through GoK expenditure Project suitable for climate funding
Lower Muranga irrigation development project	• Location - Murang'a County • Water Source – R. Maragua, R. Thika, R.Sagana • A major irrigation scheme at a 19890 acres by gravity flow net command area. • Conveyance pipeline system, Sub-mains	19,890	4,176,900,000.00	• Increase food production o 497,000 bags of maize annually o Various horticulture and high value crops worth Kshs 4.2 billion • Create direct and indirect employment for 99,000	• Construction of Irrigation infrastructure • Value chain development and support	• The Spanish government had shown interest in financing the project

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	• Distribution network (feeder lines), 89.0 Km • Infield system for sprinkler and drip hectares communal land) **Feasibility study and detailed designs completed**			• Add GDP value of Kshs 5.3 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being		
Hola Irrigation Development Project	• Location - Hola • Tana river County • Water Source - Tana river • 13,000 acres gazetted land however only 5000 acres has been developed. • Objective is to provide a gravity water abstraction system and increase area under irrigation to 13,000 acres. Components • 1 Headworks at Aratolo Intake on Tana River; • 3 No. Sedimentation Basins; • 1 Main canal from the Aratolo headworks;	13,000	2,730,000,000.00	• Increase food production o 325,000 bags of maize annually o 13,000MT of cotton • Create direct and indirect employment for 65,000 • Add GDP value of Kshs 5.4billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least	• Construction of Irrigation infrastructure	• BADEA had shown interest in funding the project

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	• 2 Branch canals from the Aratolo Main canal; • 6 Sub-branch canals and 6 No.Sub-Main Pipelines • Tertiary Pipelines/Canals • Access Roads • Infield system including:- commercial farmers through center pivot and furrow system for local farmers **Feasibility study and detailed designs completed and land is government land thus minimal land acquisition requirements.**			40% thereby improving their socio- economic well being		
Usueni – Wikithuki irrigation development project	• Location - Tana river • Kitui County • A major irrigation scheme at a 14280 acres by gravity flow net command area. • Head works (at Makwenje across Tana river) • Conveyance system (18.87km both twin 1 and 2); • Mainline (22.53 km twin 1 and 18.95km twin 2); • Sub-mains(23 lines ;40.52 km network) • Distribution network (feeder lines)	14,280	2,998,800,000.00	• Increase food production o 357,000 bags of maize annually o 7100 MT of cotton o Various horticulture and high value crops worth Kshs 1.5 billion • Create direct and indirect employment for 71,000 • Add GDP value of Kshs 5.9 billion annually from value of produce. • Improve agricultural productivity through irrigation water management	• Construction of Irrigation infrastructure	• The Indian Exim bank had shown interest to finance the project

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	• Infield system (2000 hectares; 2507 individual connections and 795 hectares communal land) **Feasibility study and detailed designs completed**			• Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being		
Ahero West Kano Irrigation Project	• Location - Nyando River and L. Victoria • Kisumu County • Objective is to provide a gravity water abstraction system and increase area under irrigation to 5,130ha. • Components include Intake structure (side weir) for gravity system • Conveyance and distribution network **Feasibility study and detailed designs completed**	12,825	2,693,250,000.00	• Increase food production o 30,780 MT of paddy rice o Various horticulture and high value crops worth Kshs 2.7 billion • Create direct and indirect employment for 64,000 • Add GDP value of Kshs 7.12 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being	• Construction works for irrigation infrastructure	• JICA had shown interest and Rice Production intensification programme
Nyabomite irrigation development project	• Location - Charachani • Nyamira County • Water Source – R. Charachani, R. Eaka	5,000	1,050,000,000.00	• Increase food production o 192,750 bags of maize annually	• Construction of Irrigation infrastructure	• The Spanish government had shown interest in

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	• A major irrigation scheme at a 2000ha by gravity flow net command area. • Head works:- 2 No. Chacharani and 1 no. bombo- Bokimori • Conveyance pipeline system 23.05Km • Sub-mains 22.1 Km • Distribution network (feeder lines), 89.0 Km • Infield system for sprinkler and drip hectares communal land) **Feasibility study and detailed designs completed.**			o Various horticulture and high value crops worth Kshs 1.6 billion • Create direct and indirect employment for 38,000 • Add GDP value of Kshs 4.28 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being	• Value chain development and support	financing the project
Lumi Irrigation development project	• Location - Lumi River • Taveta County • A major irrigation scheme at a 14,100 acres by gravity flow net command area. • Head works (weir, retaining walls, intake, protection works); • Canals (main, branch, sub-branch and tertiary); • Drains (mains and tertiary); • Canal and drain structures (drops, culverts, turnouts,	14,100	2,961,000,000.00	• Increase food production o 173,300 bags of maize annually o 16,929 MT of paddy rice annually o Various horticulture and high value crops worth Kshs 3billion • Create direct and indirect employment for 70500 • Add GDP value of Kshs 5.4 billion annually from value of produce.	• Construction of Irrigation infrastructure • Value chain development and support	• GoK funding • Suitable for funding under climate resilience

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	division boxes, cross drainage structures, flumes, etc); • Access and farm roads; **Feasibility study and detailed designs completed**			• Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being		
Soy Irrigation Development Project	• Location - Soy • Water Source - Little Nzoia River on Ziwa dam 2 • Kakamega and Uasin gishu Counties • A major irrigation scheme at a 3750 acres by gravity flow net command area. • Head works (Intake chamber) • Conveyance pipeline using Upv and GI • 2 No storage dams with capacity of 2,432M m^3 • Infield system for sprinkler system **Feasibility study and detailed designs completed**	3,750	787,500,000.00	• Increase food production o 93,750 bags of maize annually o Various horticulture and high value crops worth Kshs 787 million • Create direct and indirect employment for 18,750 • Add GDP value of Kshs 1 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being	• Construction of Irrigation infrastructure • Value chain development and support	• The Spanish government had shown interest in financing the project

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
Upper Nzoia Irrigation Development Project	• Location - Kuywa, Lunyu, Tongaren and Webuye • Bungoma County • Water source – R. Nzoia, R. Kuywa, R. Kibisi • A major irrigation scheme at 21250 acres by gravity flow net command area. • 4 Head works (Intake chamber) • Conveyance pipeline using Upv and GI • Infield system for sprinkler system **Feasibility study and detailed designs completed, land acquisition not done**	21,250	4,462,500,000.00	• Increase food production o 531,250 bags of maize annually o Various horticulture and high value crops worth Kshs 4.46 billion annually • Create direct and indirect employment for 106250 • Add GDP value of Kshs 5.7 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being	• Review of design • Construction of Irrigation infrastructure • Value chain development and support	• Funding proposal from Turkish exim bank presented to National Treasury
Thwake irrigation Area I and II	• Makueni and Kitui Counties • Water Source – Thwake dam-Athi river • Total area 40075 ha (Area 1 – 3172ha and Area II 36,900ha) • Draw down tower – in the dam and conveyance system for area 1, intake on R. Athi and	100,187.5	21,039,375,000.00	• Increase food production o 3,100,000 bags of maize annually o 32,000MT of cotton – targeting 20,000 acres o Various horticulture and high value crops worth Kshs 25 billion annually. • Create direct and indirect employment for 300,000	• Dam is under construction. • Detailed designs • Construction of Irrigation infrastructure • Value chain development and support	• AfDB has show interest in funding irrigation as a fit for purpose use for Thwake dam.

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	conveyance canals for area II. • Infield sprinkler irrigation system **Feasibility study as part of Thwake dam carried out. Detailed design not carried out. Thwake dam is under construction.**			• Add GDP value of Kshs 32.13 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being		
Kavunyalalo	• Malindi Sub-county, Kilifi County • Water source, Sabaki river • 2,170 ha • Intake weir, canals and distribution system **Feasibility study and detailed design carried out.**	5,425	1,139,250,000.00	• Increase food production o 162,750 bags of maize annually o Various horticulture and high value crops worth Kshs 1.36 billion • Create direct and indirect employment for 27,000 • Add GDP value of Kshs 1.74 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.	• Review of design • Construction of Irrigation infrastructure • Value chain development and support	• Funding required for implementation.

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
				• Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being		
Greater Bura	• Location - Tana River Basin • Kitui, Garissa and Tana River Counties • Water source – Tana River • Construction of HGF Dam • Saka-Garissa Conveyor • Nanigi Barrage • Masalani Conveyor **Feasibility study and detailed designs completed. RAP and Compensation not yet done**	50,000 acres	10,500,000,000.00	• Increase food production • Pasture for livestock • Create direct and indirect employment • The project will allow for the possibility of multiple-cropping, and will therefore lead to an increase in annual output; • Improve agricultural productivity through irrigation water management • The facility will also contribute to the generation of electricity and thus enhance governments' effort towards rural electrification and economic development; • Enhanced cross-cultural relations by attracting people from other cultures.	• Construction of HGF Dam • Construction of Irrigation infrastructure • Value chain development and support	• Funding required for implementation.
Turkwel and Kerio	• Location - Turkana • Turkana County • Water source – Turkwel and Kerio Rivers • Pre-feasibility study for the middle and lower Turkwell and Kerio River Basins	60,000 acres	12,600,000,000.00	• The project will improve yields through reduced crop loss due to erratic, unreliable or insufficient rainwater supply; • 1.2 Million Bags of Maize • The project will allow for the possibility of multiple-cropping, and will therefore	• Construction of Lowaat Dam to regulate flow on Kerio River • Construction of Irrigation infrastructure	• Funding required for implementation.

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	• Detailed Feasibility indicating feasibility Study option or options with a net irrigable area of up to 30,000ha preferably in one location/basin • Detailed design of Intake, supply, Distribution and on-firm infrastructure **Feasibility study and detailed designs completed. Lowaat Dam designs completed**			lead to an increase in annual output; • It will allow a greater area of land to be used for crops in areas where rain fed production is impossible and is therefore likely to boost output and income levels; • The facility will also contribute to the generation of electricity and thus enhance governments' effort towards rural electrification and economic development;		
Rahole	• Location - Mbalambala • Garissa County • Water source – R. Tana • Construction of 2km farm access roads within farm • Construction of 4.5 km secondary canal network within the farm • Construction of farm infield structures i.e division structures(6 major and 25 small) • Completion of 4.5 km drains and 2km dyke • Completion of solar fence	7500 acres	235,537,830	• Increase food production • Pasture for livestock • Create direct and indirect employment • The project will allow for the possibility of multiple-cropping, and will therefore lead to an increase in annual output; • Improve agricultural productivity through irrigation water management • The facility will also contribute to the generation of electricity and thus enhance governments' effort towards rural electrification and economic development;	Completion of water conveyance and distribution works	• Funding required for implementation.

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
				• Enhanced cross-cultural relations by attracting people from other cultures.		
Kayatta	• Location: Matungulu and Mwala • Machakos County • Benefit over 12,500 farmers each irrigating a proposed area of 0.4 Ha • Munyu Dam – Embankment Dam 35m High and 700m long Dam Crest • Head Works • Sedimentation Basin • Break Pressure Tank • Conveyance Pipeline • Main Pipeline • Distribution Pipeline • Infield system **Feasibility study and detailed designs completed. RAP and Compensation not yet done**	10,000 acres	2,100,000,000.00	• It is estimated that net production will increase from 55 million to 1.7 Billion without and with project respectively • Sustainably supply water for irrigation thorough development of irrigation infrastructure for 5,000 ha. • Improve food self-sufficiency and security in the project area through promotion of irrigated agriculture. • Create gainful employment opportunities • Improve income per capita hence wealth creation.	• Design Dam • Review of design • Construction of Irrigation infrastructure • Value chain development and support	• Funding required for implementation.
Suba	• Homabay County • Water Sources: Lake Victoria • Project comprises of five projects/clusters namely:- 1. Rang'wena; 2. Nyagidha; 3. Olambwe;	5,250 acres	1,102,500,000.00	• 315,000 Bags of Rice annually • Create direct and indirect employment for 200,000 • Add GDP value of Kshs 1.8 billion annually from value of produce. • Improve agricultural productivity through irrigation water management	• Review of design • Construction of Irrigation infrastructure • Value chain development and support	• Funding required for implementation.

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	4. Sindo and 5. Konyango • Head Works • Sedimentation Basin • Break Pressure Tank • Conveyance Pipeline • Main Pipeline • Distribution Pipeline • Infield system • Drainage works **Feasibility study and detailed designs completed. RAP and Compensation not yet done**			• Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 45% thereby improving their socio- economic well being		
Kisumu	• Kisumu County • Seme • Chiga • Awach Kano • Ombeyi • Construction of intakes • Canals • Drainage works **Feasibility study and detailed designs completed. RAP and Compensation not yet done**	9,375 acres	1,968,750,000.00	• 221,250 Bags of Rice • Create direct and indirect employment for 106250 • Add GDP value of Kshs 2.7 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 40% thereby improving their socio- economic well being	• Review of design • Construction of Irrigation infrastructure • Value chain development and support	• Funding required for implementation.
Bondo	• Bondo • Siaya County	8,000 acres	1,680,000,000.00	• 480,000 Bags of Rice annually • Create direct and indirect employment for 200,000	• Review of design	• Funding required for

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	• Water source: River Yala and Lake Victoria • Head works (weir and intake) • Sedimentation basin; • Pump intake; • Delivery pools; • Irrigation Canals (Main, branch, sub-branch, tertiary and field); • Pipeline; • Drainage Canals (mains, collector and field)); • Related canal and drain structures; • Roads (inspection and farm roads); • Flood protection dyke; **Feasibility study and detailed designs completed. RAP and Compensation not yet done**			• Add GDP value of Kshs 1.8 billion annually from value of produce. • Improve agricultural productivity through irrigation water management • Promote growth of agro-based industries by providing a reliable and steady supply of raw materials. • Improved the income levels of the local population by at least 45% thereby improving their socio- economic well being	• Construction of Irrigation infrastructure • Value chain development and support	implementation.
Burangi	• Magarini sub-county, Magarini location, Marikebuni and Pokea Mwana Sub-locatrions • Kilifi County • Water source - Sabaki River] • Sedimentation Basin • Break Pressure Tank • Conveyance Pipeline • Main Pipeline	1,169 acres	245,490,000.00	• Ensure food security at the local and national level with approx. 46,760 bags of Maize • Creation of employment and income generation of the locals approx. 3,000 people • Sustainable supply of raw materials for agro-based industries	• Review of design • Construction of Irrigation infrastructure • Value chain development and support	• Funding required for implementation.

Project Name	Project Features	Irrigation Area acres	Project cost kshs	Contribution to Big four (Results/Project Benefits)	Action Required	Financing options
	• Distribution Pipeline • Infield system			• Foreign exchange generation through export of surplus food and cash crops.		
Mwangea	• Ganze Subcounty • Kilifi County	3,900 acres	819,000,000.00	• Project will go a long way in improving the social, economic and cultural lives of the people in the project area in many ways including: • Increased farm output approximately 156,000 bags of maize • Increased family income • Improved access to social amenities e.g. hospitals and schools • Improved infrastructure	• Review of design • Construction of Irrigation infrastructure • Value chain development and support	• Funding required for implementation.

398,731	83,733,615,000.00	Summary of contribution to Big 4 annually		
		Rice paddy in MT	368,748 MT	
		Maize 90kg Bags	8,502,760	
		Rice 75Kg Bags	1,068,350	
		Value of horticultural crops	Kshs 75 B	
		Jobs created	1,993,655	
		Contribution to GDP	Kshs 114 B	