



REPUBLIC OF KENYA

MINISTRY OF WATER, SANITATION  
AND IRRIGATION

# ***Annual Status Report on Water, Sanitation and Irrigation, 2023***



Water is Life  
Water is Life



Sanitation is Dignity  
Sanitation is Dignity



More Crop per Drop  
More Crop per Drop

**JUNE 2023** |



REPUBLIC OF KENYA

# Annual Status Report on Water, Sanitation and Irrigation, 2023

Prepared and Coordinated by  
**Ministry of Water, Sanitation and Irrigation**

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## FOREWORD



The Government through the Bottom-up Economic Transformation Agenda (BETA) is committed to supporting access to Clean and Adequate Water for Domestic and Agricultural Use. Food Security through irrigation is an important enabler to Agriculture, one of the key pillars of the BETA agenda. The government has pledged to build 100 dams both for domestic and irrigation use through the Public Private Partnership (PPP) model.

The Global Community through the Sustainable Development Goals (SDGs) have committed to ensuring food security, safe and affordable drinking water and access to adequate and equitable sanitation for all by 2030. In addition, the government being a member of the United

Nations is committed to ensuring achievement of the SDGs. Nationally, the Bill of Rights in our Constitution article 43(d) states that every person has a 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.

The Constitution further provides for two levels of government that are required to work in consultation and cooperation. Thus to ensure co-operation between the two levels of Government, the Ministry signed the Water Sector Inter-Governmental Consultation and Cooperation Framework (WSIGCCF). Once the framework has been operationalized, there will be seamless cooperation in project planning, operation and handing over of projects to ensure improved Water and Sanitation services. Thus the Ministry of Water, Sanitation and Irrigation is committed to ensuring realization of the Water, Sanitation and Irrigation agenda for the Country in accordance with the governing laws and regulations.

During the year under review, the National Sanitation Management Policy was approved by the Cabinet. It currently awaits Parliamentary concurrence. The Transboundary Waters Policy and the Land Reclamation Policy are in the initial phases of drafting. These Policies will lead to the drafting of the Transboundary Waters Bill and the Land Reclamation Bill. The above policies will supplement the two policies that are in operation in the Ministry. These are the National Water Policy, 2021 and the National Irrigation Policy, 2017. The Water (Amendment) Bill, 2023, aimed at operationalizing the PPP in the Water Sector, was finalized and is currently in the Senate. Further, the Water Laws (Amendment) Bill is currently undergoing stakeholder participation before forwarding to the Attorney General for further consideration. The KEWI Act, 2001 amendment Bill (KEWATRI Bill) is awaiting national validation and presentation to the Cabinet for consideration and approval.


The Hydrologist (Amendment) Bill 2023 has been developed, public participation done and



approved by the Attorney General. These Amendments are aimed at operationalizing the proposed Hydrologists' Rules and Regulations.

The Water Act 2016, requires the Cabinet Secretary to make various regulations to enforce provisions of the Act. The Ministry is currently at an advanced stage in making these Regulations, at the regional stakeholders' participation level. The Regulations include (i) The Water Resources Regulations; (ii) The Water Services Regulations; (iii) The Water Harvesting and Storage Regulations; and (iv) The Water Sector Fund Regulations.

The overall aim of this annual report is to give an annual status of the state of the national water resources strategies in Kenya as mandated in the Water Act, 2016 Section 10(4) and the Irrigation Act, 2019. The report shows the sector's achievement in the realization of the water, sanitation and Irrigation targets which are geared towards the realization of the national, regional and global goals in the sector. In addition, the report highlights the challenges and emerging issues in the water, sanitation and irrigation sectors thereby giving a holistic view of the sector achievements.



**Zachariah M. Njeru, EGH**  
**Cabinet Secretary**  
**Ministry of Water, Sanitation and Irrigation**



## PREFACE



The importance of water is recognized in the Constitution of Kenya 2010, Water Act 2016, Irrigation Act 2019, Kenya Vision 2030, Africa Agenda 2063 and Sustainable Development Goals (SDGs), specifically SDGs 6 on access to water and sanitation for all. The Constitution articulates that “every person has the right to clean and safe water in adequate quantities”.

In providing this right, the Constitution requires the government to apply the principles of equity, security, equitable access, sustainability, productive management of resources and sound conservation.

In addition, the Kenya Vision 2030 highlights the overall goal of the Environment, Water and Sanitation sector as attaining a “clean, secure and sustainable environment” by 2030 in line with SDG 6.

In discharging its mandate, the State Department is guided by key policy documents including the Constitution of Kenya 2010, the Water Act 2016, the National Water Policy of 2021 and the Bottom-Up Economic Transformation (BETA) among other subsidiary Regulatory Frameworks. These policies emphasize the need for prudent management in the utilization of water resources and efficient and effective water supply and sanitation systems to enable the government to achieve inclusive growth through universal access to water and sanitation.

The State Department has completed and commissioned the Yamo Dam in Samburu County and the Karimenu II Dam in Kiambu County. The construction of the Thiba Multipurpose Dam with a dam capacity of 15.5 MCM was completed and commissioned. Construction of Thwake multipurpose dam in Kitui/Makueni Counties is at 86%. During the period under review, the State Department also constructed 24 pans/small dams with a total water storage capacity of 0.5 million cubic meters across the counties.

The Kenya Towns Sustainable Water and Sanitation Programme is a five-year program which envisions connecting 2.1 million people to clean water and 1.3 million people to sewer systems. The Program commenced in 2017 and is now reported to be at an average of 80% completion stage. A total of six (6) projects have been completed with four (4) being completed during the review period: Chogoria Water Supply, Pemba Intake Water Supply, Kabarnet Water Distribution, Kiptogot-Kolongolo Water Supply Project, Malaba Sewerage and Othaya Sewerage Project.

The interventions mentioned have seen an increase in access to water from 70% to 72%,

urban sewerage from 31% to 32%. The State Department seeks to improve access to water and sanitation going forward through the fast-tracking of various projects including Ruiru II Dam in Kiambu County, Thwake Dam in Kitui/ Makeni Counties and Water Supply Project in West Pokot, Soin-Koru Dam in Kisumu/ Kericho Counties and the Mwache Dam in Kwale/ Mombasa Counties. In an effort to mitigate water conflicts, the State Department identified and constructed three Peace Dams in the conflict-prone zones. These are the Kases Dam in West Pokot, the Forolle Dam in Marsabit and the Naku'etem Dam in Turkana County.

The State Department has embarked on the 100 Dam Initiative in line with the Bottom-Up Economic Transformative Agenda (BETA) to enhance water security for domestic, irrigation, industrial uses and hydro-power generation through Public-Private Partnership (PPP). To achieve this, feasibility and ESIA for 34 dams were completed and Expressions of Interest (EOI) from prospective bidders were received. The procurement of 33 Dams to be constructed through PPP for the design, finance, build, operate, maintain and transfer arrangements to bridge the water demand gap.

The State Department, during the review period, recognised the funding gap that is present in the sector and developed the Kenya National Water and Sanitation Investment and Financing Plan 2022-2030 (NAWASIP). The State Department will seek innovative ways to fast-track the achievement of universal access to water and sanitation. One of the proposed ways is the establishment of a Constituency Water Fund Programme in consultation with all key stakeholders. In enhancing governance and to reduce Non-Revenue Waters, the Water Police Unit was established to protect water infrastructure. Further, the development of a Digitalisation Strategy will ensure the sector adopts technology in the management of water.

Lastly, the State Department is committed to enhancing completion rates of all ongoing projects and programmes to increase water and sanitation coverage. This will be achieved through strengthening governance and management in the implementation of projects. In addition, synergies will be enhanced between the State Department and County Governments as well as other key stakeholders to fast-track projects with high impact completed within a short period.



**Julius Korir, CBS**  
**Principal Secretary**  
**Ministry of Water, Sanitation and Irrigation**  
**State Department for Water and Sanitation**

## ACKNOWLEDGEMENT



The global economy is currently facing a triple planetary crisis: climate change, pollution, and biodiversity loss. Among the three, climate change remains the most pressing one with its consequences being manifest through increased intensity and severity of droughts, changing climatic patterns, water scarcity, flooding, and declining biodiversity.


This has a ripple effect on food production systems and food security. Water is a constitutional right (Article 43 of the Kenya Constitution 2010) and the most important enabler of agriculture. Two-thirds (2/3) of Kenya's agricultural land requires irrigation, against only 4% that is irrigated.

The Bottom-Up Economic Transformation Agenda (2022-2027) outlines irrigation as the single most important game changer in agriculture. In this regard, the Ministry seeks to increase the area under irrigation from 694,000 to 1.289 million acres across the country by the year 2027 through investment in water harvesting and storage and other irrigation infrastructure. In the current year we have put additional 30,000 acres under production through community based and National Expanded irrigation programs, impacting over 45,000 farmers.

The Ministry is currently constructing the Mwache Multipurpose Dam in Kwale County, which is the first RCC dam in Kenya. Other ongoing dams are Siyoi-Muruny Dam in West Pokot County which is expected to be completed by 2024 and Soin-Koru Dam in Kisumu/Kericho Counties. The Ministry also identified and constructed three peace dams namely, Kases Dam in West Pokot County, Forolle Dam in Marsabit County and Naku'etum Dam in Turkana County. The Ministry under the Household Irrigation Water Harvesting project, constructed 5,583 household water pans and 57 community water pans with a combined volume of 11.8 MCM irrigating 11,800 acres and benefitting 2,730 farmers.

The State Department completed and commissioned Thiba Dam with a capacity of 15.6 million cubic meters which stabilized irrigation water supply for Mwea Irrigation scheme putting 30,600 acres under crop up from 20,000 acres. The dam is aimed to increase area under irrigation from 25,000 acres to 35,000 acres in a season and will increase rice production from 114,000 MT to 200,000 MT in Mwea by supporting double cropping. Bura irrigation scheme is under rehabilitation with the Korakora intake works almost complete and a 25km new main canal which will be completed by April 2024 to put 15,000 acres into production. Construction of irrigation infrastructure is also ongoing in Lower Nzoia irrigation project, consisting of a canal of 31km to put 10,000 acres into rice production. 2,500 acres is expected to be put into production by February, 2024.





The State Department completed Kiirua Buuri Irrigation Development Project irrigating 1,250 acres and supporting more than 2,500 farmers grow horticultural crops such as potatoes, tomatoes, cabbages, garden peas, and green maize with estimated average gross margins of KES 285,000.00 per acre per year thus creating jobs and improving household livelihoods. Mweru Umoja Irrigation Development Project located in South Imenti Constituency was also completed irrigating 1,000 acres and supporting more than 1,000 farmers grow bananas, tomatoes, French beans, sweet potatoes, and kales with estimated average gross margins of KES 255,000.00 per acre per year.

The Community Based Irrigation Project increased area under irrigation by 1,200 acres through construction of Murang'a Lot 3 works irrigating more than 600 acres, and construction of Kanyenyaini Irrigation project works also irrigating 600 acres of agricultural land. The Ministry also finalized design of Nyamaji, Laghale and Okundi Irrigation Schemes under the project making them ready for implementation. Under Smallholder Irrigation Program Mt. Kenya Region Phase IV construction is ongoing of 5 small-scale irrigation projects whose potential is putting 1,300 acres under irrigation benefiting more than 1,530 farmers through cost-sharing with farmers. The Micro Irrigation Programme for Schools supported drilling and equipping of boreholes to support commercial irrigation of horticultural crops and fruit/tree seedlings production using drip irrigation in greenhouses in public schools in ASAL counties. The National Expanded Irrigation Program launched nineteen (19) irrigation projects and put 7,527 acres under irrigation. On Land Reclamation programme 4,039 acres were rehabilitated and irrigated for farming.

Under the PPP financing arrangement, on Galana Kulalu production, the Ministry is expected to sign project agreement for Selu Ltd by February 2024 to commence production on 20,000 acres under irrigation. Indeed, the Private Party has finalized maize production trials in 538 acres where 40bags per acre were realized thus, the concession agreement will scale up maize production in 20,000 acres in the medium term increasing maize production by more than 60,000 tonnes. In addition, the Ministry is at advance stages of preparing development the 300MCM Galana Dam in which will put 200,000 acres into production. With regards to High Grand Falls dam, approval to proceed to project development phase was granted to GBM consortium of UK as the Private Party. The Private Party is in the PDP and is expected to sign the Project Agreement in May 2024 at the UK Africa Summit. The dam will put 400,000 acres into production and generate 1,000 megawatts of hydro-electricity.

Lastly, the Ministry team is updating studies on other proposed dams and irrigation projects in preparation to engage more private parties; Lowaat Dam, Radat Dam, Isiolo Dam, Gogo Dam, Turkwell and Thwake downstream. To address climate change effects and reduce greenhouse gas emissions, the Ministry is focusing on changing delivery of water for irrigation from using diesel pumps to gravity system and also solarizing our pump stations. The State Department is seeking to strengthen Irrigation Water Users Association (IWUA) whose Training Manuals were developed and four (4) IWUAs capacity-built on governance and water use management.



Given these milestones, I would like to express my sincere appreciation to the water, sanitation and irrigation sector players for their dedication in making this country resilient to climate change and supporting the food security agenda through irrigation infrastructure. Specifically, I wish to acknowledge the roles and contributions of all stakeholders, including our water sector institutions and technical staff in increasing the area under irrigation for uninterrupted food production for food security of this country. I urge all sector stakeholders to own this fourth 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 wish to sincerely thank the team that prepared this report. In particular, I would like to appreciate the instrumental role of the technical working group that was coordinated by the Water Secretary, with the assistance of the Irrigation Secretary, comprising Eng. Patricia Kiarie, Rolex Kirui, Peter Kinuthia, Daniel Odero, Esther Musavi, Stephen Ogelo, Francisca Leruk, Derrick Ojuku, Heads of the Departments in the Ministry and Chief Executive Officers of the State Agencies. I am indebted to the office of the Cabinet Secretary for providing leadership and direction on preparing this fourth annual status report.



**Ephantus Kimotho**  
**Principal Secretary**  
**State Department for Irrigation**  
**Ministry of Water, Sanitation and Irrigation**

## REMARKS - WATER AND SANITATION DIRECTORATE



The State Department's objective as rooted in Article 43 of the Constitution, is to ensure gradual realization of access to clean and safe water in adequate quantities and dignified standards of sanitation. Water is an important natural resource to all forms of life and their existence, and therefore, is an essential prerequisite for sustainable and inclusive economic growth and poverty reduction.

The Directorate of Water and Sanitation has made remarkable achievements towards achieving universal access to water and sanitation.

Water coverage has increased by 12.1% from 59.9% in 2017 to 72.0% in 2023, while sewerage coverage in urban areas increased by 6% from 26.1% in 2017 to 32% in 2023 through the implementation of various initiatives.

Kenya Towns Water and Sanitation Sustainable Programme targeting 28 towns across the Country is a programme jointly funded by the Government and the African Development Bank (ADB). The program is currently at 80% completion and will connect 2.1 million people to clean water and 1.3 million to sewer systems on its completion. During the review period, the following projects were completed: Isiolo Water Supply, Narok Sewerage Project, Chepararia Sewerage Project, Oyugis Water Supply and Sewerage Project, Siaya and Bondo Towns Water Supply Connectivity and Sewerage Project, Kiptogot-Kolongolo Water Supply project, Chogoria and Kerugoya Water and Sanitation projects.

The State Department launched the Non-Revenue Water Management Standards to be operationalized by all Water Service Providers (WSPs) across the country joining the list of a few countries in Africa to have the standards. The Water Services Regulatory Board (WASREB) will ensure the implementation of the standards and come up with a working mechanism for reducing NRW to the acceptable level of less than 20%. The State Department in collaboration with the Ministry of Interior launched in January 2023, a Water Infrastructure Police Unit under the initiative "*Linda Maji Lipa Maji*" aimed at the protection of critical water assets and prevention of water theft across the country.

The Government of Kenya has embarked on an ambitious programme to enhance water security for irrigation, domestic, industrial uses and hydro-power generation through Public Private Partnership (PPP). The 100 Dams Initiative, seeks private sector capital and technology through Design, Finance, Build, Operate, Maintain and Transfer model. The dams will harvest and store 8.16 BCM to provide domestic water to 19 million people, provide irrigation water for 890,000 acres of land and support the generation of 1,000 MW

of power. Currently, the State Department is evaluating Expressions of Interest (EoI) floated for 33 dams across the country. The overall PPP initiative is estimated at Kshs 829 billion for 55 viable dams.

To address the immediate water needs in the country, a result-oriented development programme of high-impact low-cost interventions, a footprint of the Bottom-up Economic Transformation Agenda (BETA), termed the 'Water 10,000 programme' will be rolled out for 5 years. Financing from the government and other development partners is gearing up to cater for interventions that include; Boreholes, Water pans, Small Dams, Roof Catchment, Spring Protection, Desilting, Pipeline Extensions, Sand Dams, Combined Sanitation, Decentralized Treatment Facilities, Septic Tanks and Last Mile Connectivity in all Constituencies.

The Water and Sanitation Development Project (WSDP), which is at 56% completion, will improve access to water and sanitation services by rehabilitating and expanding urban water supply and sanitation services in the Coastal Region and marginalized North-Eastern Counties of Kenya. The Project gave gap financing required for the Mwache Dam. Key projects completed include three replacement boreholes at Baricho wells; Baricho immediate works - Lot 3; Low-income areas pipeline, 9.85km Distribution Pipeline and 30 no. Communal Water Points.

In actualizing the NAWASIP, the State Department secured support worth USD 450 million from the World Bank for Rural Water Supply and Sanitation. This is a component of NAWASIP named K-WASH Program targeting 3 million beneficiaries in 19 selected Counties. The State Department is preparing a Coordinated Expenditure Framework which will lead to the signing of the Financing Agreement in the year 2024.



**Eng. SAO Alima, EBS**  
**Water Secretary**  
**State Department for Water and Sanitation**  
**Ministry of Water, Sanitation and Irrigation**

## REMARKS - IRRIGATION DIRECTORATE



Developing resilient food production systems is key to achieving food security, as articulated in the Kenya Vision 2030 and the Bottom-Up Economic Transformation Agenda (BETA). Irrigation is a key Enabler of Agricultural Production and Productivity. Climate change poses challenges to production while Irrigated Agriculture presents the best opportunity to realize climate-resilient production systems.

The State Department Seeks to increase the area under irrigation by 1.2 million acres across the country by the year 2030. In 2022/23 the government allocated Kes 14.470 billion towards irrigation, land reclamation; and Water harvesting and storage for irrigation.

During the year under review, the Directorate of Irrigation, under the guidance and support of the Cabinet Secretary and Principal Secretary, made remarkable achievements. These included the completion and commissioning of the Thiba dam to store 15.6 million m<sup>3</sup> of water, increasing the area under irrigation from 25,000 to 35,000 acres thus increasing the production of rice in public schemes to 128,000 tons; Commissioning the construction of Mwache Dam in Kwale/Mombasa Counties; Community Based Irrigation Projects (1,200 acres), Water Harvesting for Supplemental Irrigation using harvested water (10,437.95 acres), Turkana Irrigation Development Project (1,864.25 acres), National Expanded Irrigation Programme (6,957.28 acres), Lower Kuja Irrigation Development Project (1,450 acres), Galana Kulalu Food Security Irrigation Project (5,000 acres) and Ground Water Exploration (2,964 acres). These projects have benefitted **27,456** households earning them a gross income of approximately **Ksh.7.452 billion** annually from irrigation; Construction of Waga Machame and Anyiko Irrigation Projects progressed to 25% and will put an additional 1750 acres under irrigation when complete.

The State Department under the Household Irrigation Water Harvesting project, constructed 5,583 household water pans with a cumulative volume of 7,707,845m<sup>3</sup> benefitting 5,583 citizens. Additionally, 57 community water pans were constructed across the country with a cumulative volume of 4,094,920m<sup>3</sup> benefitting 2,730 farmers. In addition, 4 boreholes were drilled to supply water to 4 public schools for horticultural crops and fruit/tree seedlings production using drip irrigation in greenhouses. The total area under irrigation due to the above interventions increased from 664,000 acres in 2021/22 to 694,000 acres in 2022/23.

Seven (7) Irrigation Water Users Association (IWUA) Training Manuals were developed and four (4) IWUAs capacity-built on governance and water use management; Preliminary mapping of irrigation projects/schemes in three pilot counties of Kisumu, Baringo and Kirinyaga for quality irrigation data and information management, development of a Draft



Quality Management System Toolkit and User Manual for Small-Scale Irrigation Projects under the FAO-WAPOR project for efficient field water management practices.

To inform land reclamation interventions and attain land degradation neutrality the directorate finalized and disseminated two basin-based Land Degradation Assessments for Upper Kerio Valley and Upper Ewaso Nyiro North basins. Further, the identification of three sub-basins (Middle Tana, Sondu Miriu and Mara) for Land Degradation Assessment was done.

During the reporting period, the Development of the Kenya National Irrigation Investment Plan 2023-2030 (NISIP) commenced, as a key tool for resource mobilization in the sector. The State Department developed Regulations and Strategies to create an enabling policy and regulatory environment for irrigation development and the ultimate realization of food security in the country. These included; the launch of the National Irrigation Service Strategy (NISS) 2022-2026 and the development of draft Land Reclamation Policy and Bill. Several other reforms were undertaken by the directorate such as the Finalization of the framework for the establishment of County Irrigation Development Units (CIDUs) that was approved by the Council of Governors and the draft legal notice for the establishment of the Irrigation Research, Innovation and Training Institute.



**Eng. Vincent Kabuti, OGW**  
**Ag. Irrigation Secretary**  
**State Department for Irrigation**  
**Ministry of Water, Sanitation and Irrigation**

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## List of Acronyms

|         |  |
|---------|--|
| 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                      |
| CEO     | Chief Executive Officer                            |
| CBO     | Community-Based Organization                       |
| 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 Meters                               |
| MoUs    | Memorandum of Understandings                       |
| MW      | Mega Watts   |
| NAS     | Nairobi Aquifer Suite                              |

|           |   |
|-----------|---|
| NBI       | Nile Basin Initiative   |
| NDICCC    | National Development Implementation and Communication Cabinet Committee |
| NIA       | National Irrigation Authority   |
| NMS       | Nairobi Metropolitan Services   |
| NRW       | Non-Revenue Water   |
| NRWWDA    | North Rift Water Works Development Agency                               |
| NWCPC     | National Water Conservation and Pipeline Corporation                    |
| NWHSA     | National Water Harvesting and Storage Authority                         |
| NWMP2030  | National Water Master Plan 2030   |
| NWRS      | National Water Resources Strategy                                       |
| PSC       | Public Service Commission   |
| 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                                       |
| SDGs      | Sustainable Development Goals   |
| SCMPs     | Sub catchment Management Plans  |
| SEZ       | Special Economic Zone   |
| 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   |
| WRA       | Water Resources Authority   |
| WRUAs     | Water Resource Users Associations                                       |
| WSB       | Water Services Board  |
| WSPs      | Water Service Providers   |
| Waterfund | Water Sector Trust Fund   |
| WT        | Water Tribunal  |
| WWDAs     | Water Works Development Agencies  |
| WSIGCCF   | Water Sector Inter-Governmental Consultation and Co-operation Framework |

## EXECUTIVE SUMMARY

The Water Act 2016 Section 10 (4) and Irrigation Act 2019 Section 6(2h) states that the Cabinet Secretary shall prepare and issue an annual report on the state of national water resource strategies and needs for Irrigation development and management in Kenya. This report is made in fulfillment of the above provisions for the Financial Year 2022/2023 and it is the Fourth Annual Status Report.

The Water (Amendment) Bill, 2023, aimed at operationalising PPP in the Water Sector has been finalised and is at the Parliamentary level. A number of Bills and Regulations including the Water Laws (Amendment) Bill, the KEWI Act, 2001 amendment Bill (KEWATRI Bill), the Hydrologist (Amendment) Bill 2023, the Water Resources Regulations, the Water Services Regulations, the Water Harvesting and Storage Regulations, the Water Sector Fund Regulations and the Hydrologists Regulations, 2023 are at various levels of completion including stakeholders participation and national validation stage. The National Sanitation Management Policy has been approved by Cabinet and the Water Sector Inter-Governmental Consultation and Co-operation Framework (WSIGCCF) has already been signed.

The Ministry, through the implementation of various projects, has been able to increase water coverage by 12.1% and urban sewerage coverage by 6% from 2017 to the current reported 72% and 32% respectively. During the review period, the land under irrigation increased by 29,873.43 acres.

Water Resources Management has enabled enhanced data and information collection through the upgrading of various river gauging and weather monitoring stations. Sustainable management has seen the gazetting of critical catchment areas and their Sub-Catchment Management Plans for the areas developed. Sustainable management of transboundary water resources under Joint Framework Agreements has resulted in the development and implementation of joint water projects with riparian states.

Water Infrastructure Development undertaken includes the Kenya Towns Sustainable Water and Sanitation Program which is geared towards ensuring access to water and sewerage in 28 towns across the Country and the Water and Sanitation Development (WSDP) aimed to improve access to water services and expanding urban water supply and sanitation services in the coastal region and marginalized Northeastern Counties of Kenya. In addition, it will establish a performance-based financing mechanism at the national level to support water and sanitation infrastructure investments and services. The Ministry has completed the following dams: Karimenu Dam, Thiba Dam and Yamo Dam. It is also fast-tracking the completion of several Dams that will increase the amount of water harvested and available for the public

The Ministry has embarked on an ambitious programme in line with the Bottom-Up Economic Transformative Agenda (BETA) to enhance water security for irrigation, domestic, and industrial uses and hydro-power generation through Public-Private Partnership (PPP). The 100 PPP Dams initiative, seeks private sector capital and technology through a Design, Finance, Build, Operate, Maintain and Transfer Model. Currently evaluation

of EOIs submitted by investors for advertised 34 No. Proposed dams spread across the country are ongoing. Further, the Water 10,000 Program has been proposed. This is a 5-year (2023-2027) result-oriented development programme that will deliver high-impact low-cost interventions in terms of water service delivery and enhancing implementation capacity in the short term.

The Kenya National Water and Sanitation Investment and Financing Plan (NAWASIP) 2022-2030 was signed and launched for implementation in March 2023. NAWASIP is an investment plan of KSh.995 billion jointly approved by the National government and County Governments for achieving universal access to Water and Sanitation in all 47 Counties. The Ministry launched the Non-Revenue Water Management Standards to be operationalised in all the Water Service Providers across the Country joining the list of a few countries in Africa to have the standards. WASREB is to take charge and ensure implementation of the standards in the next few months as well as coming up with a working mechanism of reducing Non-Revenue water to acceptable levels of 20%. In addition, KEWI is to provide training to certified staff to be engaged in the 88 registered WSPs. The Water Infrastructure Police Unit was also launched in January 2023, an initiative named “Linda Maji Lipa Maji” meant to curb vandalism of critical water assets and curb Non-Revenue Water across the country.

Projects under Irrigation include Household Irrigation Water Harvesting project, Community-Based Irrigation Projects, Supplemental Irrigation using harvested water, Turkana Irrigation Development Project, National Expanded Irrigation Programme, Lower Kuja Irrigation Development Project, Smallholder Irrigation Programme, Galana Kulalu Food Security Irrigation Project and Ground Water Exploration. Seven Irrigation Water Users Association (IWUA) Training Manuals have been developed, which will ensure the capacity of these Associations is well-built.

The Ministry concluded River Basin-Based Land Degradation Assessments for the Upper Kerio Valley and Upper Ewaso Nyiro North basins by disseminating the two LADA reports virtually. In addition, the Ministry identified three sub-basins (Middle Tana, Sondu Miriu and Mara) for Land Degradation Assessment. In total 3 LADAs have been completed, including an assessment for Lake Magadi.

On Performance Contracting, aimed at improving efficiency and effectiveness in the management of the Public Service, the Ministry of Water, Sanitation and Irrigation in the FY 2020/21 had a composite score of 3.2454 and ranked No. 6 out of 24 Ministries/Offices/Departments by the Ministry of Public and Gender.

# 1. INTRODUCTION

The Ministry of Water, Sanitation and Irrigation was formed by Executive Order No. 1 of 2022 (12th October 2022) and amended by Executive Order No. 1, 2023 (6th January 2023). The Ministry of Water, Sanitation and Irrigation was divided into two State Departments (the State Department for Water and Sanitation and the State Department for Irrigation). The Order enhanced the execution of the mandates of the Ministry by reorganising the functions across the two State Departments.

In the exercise of its functions, the Ministry's mandate is guided by key laws and policies as provided by the Constitution of Kenya 2010, Water Act 2016, Irrigation Act 2019, Kenya Water Institute (KEWI) Act 2001, Legal Notice number 252 of 2015, Agenda 2063, SDGs No. 2, 6, and 15, Kenya Vision 2030, MTP IV (2023-2027), and the Bottom Up Economic Transformation Agenda (BETA).

The Ministry's mandate is undertaken in the realisation of universal access to water and sanitation and food security in accordance with Articles 43 (b),(c), and (d) of the Constitution and realisation of SDG Goals No. 2 and 6. Each State Department has been given functions, through the Executive Order as follows:

## (i) State Department for Water and Sanitation

- Water Resources Management Policy and Standards;
- Water Catchment Area Conservation, Control and Protection;
- Water and Sewerage Services Management Policy;
- Waste Water Treatment and Disposal Policy;
- Water Quality and Pollution Control;
- Sanitation Management;
- Management of Public Water Schemes and Community Water Projects; and
- Water Harvesting and Storage for Domestic and Industrial Use.

## (ii) State Department for Irrigation

- National Irrigation Policy and Management;
- Water Harvesting and Storage for Irrigation;
- Management of Irrigation Schemes;
- Water Storage and Flood Control Management;
- Mapping, Designating and Developing Areas ideal for Irrigation Schemes;
- Development of irrigation infrastructure; and
- Land Reclamation.

These mandates are guided by laws and policies which emphasize the need for efficiency and better management in the utilization of natural resources to enable the government to achieve its strategic goals of economic growth, poverty reduction and social stability. In executing its mandates, the Ministry faces a number of global, regional and national challenges that include: climate change, rapid technological advancement, COVID-19 global pandemics, transboundary water resource issues, population growth, human settlements, poverty, pollution, acquisition of land to implement projects and degradation of catchment areas.

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. Sustainable use and management of water resources is key to the successful implementation of the Country's Development Agenda and achieving Sustainable Development Goals. Water is thus an enabler to all other sectors.

Kenya is classified as a water-scarce Country. In recognising the key role that water plays, as a driver to all key sectors in the economy, sustainable water resources use and management is key to the successful implementation of the National Development Agenda. However, the allocation of enough resources for the Water Resources Sector has been a challenge.

The provision of adequate resources to the water sector will ensure that the Country realises its development goals as laid out in BETA, MTP IV and Kenya Vision 2030 which include universal access to water by 2030 and food security.

The sector seeks to attain universal access to water and sewerage by 2030. The current coverage for water and sanitation is 72% and 32 % respectively. This is an improvement of 12.1% and 6% respectively from 2017. Further, in achieving food security, more land seeks to be brought under irrigation through various schemes and water storage and harvesting geared towards large-scale irrigation. These will see that the Country shall achieve SDGs 2 and 6. In the period under review, 29,873.43 acres of land was brought under irrigation against an annual target of 26,800 acres.

The Ministry, aware that water does not come from the tap but from the catchment, ensured Water Resources Management by upgrading 8 river gauging stations and 45 weather stations and the ongoing groundwater mapping in Mandera County and Athi and Tana Basins. In an attempt to protect the water resources, a number of critical catchment areas were identified and gazetted including the Dik-Dik Wetland, Lamu Sand Dunes and the Kikuyu Groundwater Conservation Area. Sustainable management of transboundary water resources under joint framework agreements has resulted in the development and implementation of joint water projects with riparian states including the Angololo Multipurpose Dam in the Sio-Malaba-Malakisi River along the border of Kenya and Uganda.

In matters of resource mobilization, the Ministry, working with Global Water Partnership East Africa (GWPEA) came up with an Investment Plan, which would see the private sector funding specific interventions in Integrated Water Resources Management (IWRM) in Upper Athi. The Ministry has embarked on an ambitious programme in line with the Bottom-Up Economic Transformative Agenda (BETA) to enhance water security for irrigation, domestic, and industrial uses and hydro-power generation through Public-Private Partnership (PPP) through the 100 PPP Dams initiative. The Kenya National Water and Sanitation Investment and Financing Plan (NAWASIP) 2022-2030 was signed and launched for implementation in March 2023. NAWASIP is an investment plan of KSh.995 billion jointly approved by the National and County Governments for achieving universal access to Water and Sanitation in all 47 Counties.

The Ministry launched the Non-Revenue Water Management Standards to be operationalised in all the Water Service Providers across the Country. The Water Infrastructure Police Unit

was also launched in January 2023, an initiative named “Linda Maji Lipa Maji” meant to curb vandalism of critical water assets and curb Non-Revenue Water across the country.

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 causes an estimated annual economic loss of about 3% to the national GDP or about USD 390 million annually (MTP 2008-2012). Land waste leads to dam siltation which is the norm in Kenya. GIS and remote sensing data (2012) obtained over 20 years indicate, that 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. In the period under review, land degradation assessments were done at the upper Kerio Valley and Upper Ewaso Nyiro North Basins to inform Land reclamation interventions.

Irrigation is a major contributor to the achievement of food security for Kenya as well as improving peoples’ livelihoods and economic welfare. The irrigation potential is estimated at 1.913 million 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). The total area under irrigation increased from 664,000 acres in 2021/22 to 694,000 acres in 2022/23 accounting for 36.3% coverage while out of the country’s total arable land, only 6% 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.

Under the Household Irrigation Water Harvesting project, the Ministry constructed 5,583 household water pans with a cumulative volume of 7,707,845m<sup>3</sup> benefitting 5,583 citizens. In addition, the 57 community water pans were constructed across the country with a cumulative volume of 4,094,920m<sup>3</sup> benefitting 2,730 farmers.

## 2. SITUATIONAL ANALYSIS

The Ministry implemented five programmes during the period under review:

- General Administration, Planning and Support Services;
- Water Resources Management;
- Water and Sewerage Infrastructure Development;
- Irrigation and Land Reclamation; and
- Water Harvesting and Storage

### 2.1 Highlights of Significant Achievements

The following are the achievements for the last one year:

#### 2.1.1 Policy and Legal Framework

The Water (Amendment) Bill, 2023, aimed at operationalising PPP in the Water Sector, was finalised and is currently on the floor of the Senate. Further, the Water Laws (Amendment) Bill is currently undergoing stakeholder participation before forwarding to the Attorney General for further consideration.

The Bill provides for amendments and modifications to the national water legal framework; to augment the mandate of the regulatory body responsible for water resources; the role of Counties in the implementation of National Government Policies on soil and water conservation; 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.

The KEWI Act, 2001 amendment Bill (KEWATRI Bill) is awaiting national validation and presentation to the Cabinet for consideration and approval.

The Hydrologist (Amendment) Bill 2023 has been developed, public participation done and approved by the Attorney General. These Amendments are aimed at operationalising the proposed Hydrologists' Rules and Regulations. The Amendments are awaiting the Cabinet Secretary's approval and forwarding to the Cabinet for consideration and approval.

The Ministry currently has two policies in operation, the National Water Policy 2021 and the National Irrigation Policy, 2017. A third policy, the National Sanitation Management Policy was presented to the Cabinet and approved. It awaits Parliamentary concurrence before further action can be taken in its implementation. The Transboundary Waters Policy and the Land Reclamation Policy are in the initial phases of drafting. These Policies will lead to the drafting of the Transboundary Waters Bill and the Land Reclamation Bill.

The Water Act 2016, requires the Cabinet Secretary to make various regulations to enforce provisions of the Act. The Ministry is currently at an advanced stage in making these Regulations, at the regional stakeholders' participation level. The Regulations include (i) The Water Resources Regulations; (ii) The Water Services Regulations; (iii) The Water Harvesting and Storage Regulations; and (iv) The Water Sector Fund Regulations.

The Hydrologists Regulations, 2023 has been drafted, public participation done and

stakeholder's comments incorporated into the draft Regulations and submitted to the Attorney General for final review.

A consultative workshop was held to sensitize personnel on the National Irrigation Policy 2017, the Irrigation Act, 2019, the Irrigation (General) Regulations 2021 and the Irrigation Guidelines.

The National Irrigation Services Strategy (NISS) 2022-2026 was launched during the year. The draft framework for the establishment of County Irrigation Development Units (CIDUs) was finalized and approved by the Council of Governors; the draft Legal Notice for the establishment of the Irrigation Research, Innovation and Training Institute was developed and submitted to the Attorney General.


The Gazettement of National Public Water and Sewerage Works has been submitted to the Attorney General for approval.

The Intergovernmental Cooperation Framework was recently signed by both levels of Government. It is now ready for implementation.

### **2.1.2 Projects and Programmes Implementation**

The Ministry was able to increase water coverage by 12.1% from 59.9% in 2017 to 72% in 2023, while urban sewerage coverage increased by 6% from 26.1% to 32% in the same period. During the review period, 29,873.43 acres of land were brought under irrigation. The increase was achieved through the following:

- (i) Under Water Resources Management, upgrading 8 River Gauging stations and 45 weather stations to telemetry to enhance data and information collection was undertaken. A total of 144 critical catchment areas were identified for gazettelement. Management plans for Dik-dik wetlands, Lamu Sand Dunes and Kikuyu Groundwater Conservation Area were developed. 4 Sub-Catchment Management Plans (SCMPs) were developed and implemented. Groundwater mapping for Wajir, Turkana and Marsabit County was finalized and groundwater potential maps were submitted. In addition, groundwater mapping of Mandera County, Athi and Tana basin areas covering 17 counties has been initiated.
- (ii) Water Resources Funding has been lagging for a long time. It is generally important that funding for Water Resources Management be undertaken for the sustainable use and restoration of freshwater endowment. In the year on review, the Ministry, working with Global Water Partnership East Africa (GWPEA) came up with an Investment Plan, which would see the private sector funding specific interventions in Integrated Water Resources Management (IWRM) in Upper Athi Catchment.
- (iii) Sustainable management of transboundary water resources under Joint Framework Agreements has resulted in the development and implementation of joint water projects with riparian states. Currently, the Governments of Kenya and Uganda are jointly implementing the Angololo Multipurpose Dam on the Sio Malaba Malakisi River along the border. 5 Sub-Catchment Management Plans (SCMPs) were developed and implemented. In addition, 5 telemetric stations were installed in the Malakisi River Basin and Turkana Basin.

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- (iv) The Water Sector Inter-Governmental Consultation and Co-operation Framework (WSIGCCF) between the Ministry and Chair Environment and Natural Resources of the County Governments, which is a framework for forging collaboration and cooperation in water and sanitation service delivery through effective cross-sectoral co-ordination, was initiated.
  - (v) Under Water Infrastructure Development, one of the major programmes being undertaken is the 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 and creating 15,000 new jobs during and after construction. The program is jointly funded by the Government of Kenya and the African Development Bank (ADB) at an overall cost of Ksh.45.5 billion. The programme is at an average of 80% progress with 16 projects completed and 8 studies for future investments also complete. The 9 Projects completed in the review period are; Murang'a South Water Supply Project -LMC, Murang'a Urban Water Supply Project-LMC, Garissa Water Supply-LMC, Isiolo Water Supply-LMC, Narok Sewerage Project, Chepararia Sewerage Project, Oyugis Water Supply and Sewerage Project, Siaya and Bondo towns water supply connectivity and sewerage project and Kiptogot-Kolongolo Water Supply project.
  - (vi) On water harvesting and storage, the Ministry has completed the following dams: Karimenu Dam, Thiba Dam and Yamo Dam. The Ministry also fast-tracked the construction of large multipurpose dams namely Thwake Dam (86%) to supply 150,000 cubic meters of water per day to Makueni County including Konza City, Mwache Dam (5%) to supply 186,000 cubic meters of water per day to Mombasa, Kilifi and Kwale Counties. The Ministry is also constructing medium-sized dams such as the Siyoi Muruny Dam (59%) to supply 39,000 cubic meters of water per day to Kapenguria in West Pokot County.
  - (vii) The Ministry has embarked on an ambitious programme in line with the Bottom-Up Economic Transformative Agenda (BETA) to enhance water security for irrigation, domestic, and industrial uses and hydro-power generation through Public-Private Partnership (PPP). The 100 PPP Dams initiative, seeks private sector capital and technology through a Design, Finance, Build, Operate, Maintain and Transfer Model. Currently evaluation of EOIs submitted by investors for advertised 34 No. Proposed dams spread across the country are ongoing.
  - (viii) The Kenya National Water and Sanitation Investment and Financing Plan (NAWASIP) 2022-2030 was signed and launched for implementation in March 2023. NAWASIP is an investment plan of KSh.995 billion jointly approved by the National government and County Governments for achieving universal access to Water and Sanitation in all 47 Counties. The Ministry approached World Bank Management and secured support worth USD 250 million for rural Water Supply and Sanitation to align with the World Bank Country Partnership Framework (CPF). This is a component of NAWASIP named K-WASH Program, a results-based financing targeting 3 million beneficiaries in 18 selected counties. Currently, the Ministry is preparing a coordinated expenditure framework, with the program expected to be effective after the signing of the financing agreement in the year 2024.
  - (ix) The Ministry Initiated the Water for Schools programme in April 2016 with expected



completion in August 2024. As at the end of June 2021, the project completion was 14% with a cumulative expenditure of Ksh.330 million. During the FY 2021/2022, the Ministry was able to connect 65 no. schools with water surpassing its annual target of connecting 40 no. schools. This was due to the reduced scope of work in some schools leading to savings and thus the ability to increase implementation of the program to more schools.

- (x) The Water and Sanitation Development (WSDP) project initiated in June 2017 to April 2024 with a total project cost of USD 330 million, is aimed to improve access to water services for approximately 2.02 million people by rehabilitating and expanding urban water supply and sanitation services in the coastal region and marginalized Northeastern Counties of Kenya. In addition, it will establish a performance-based financing mechanism at the national level to support water and sanitation infrastructure investments and services. Out of the signed 42no. works contracts, 14no. have a progress between 0 - 40%, 16no. between 41 - 70% and 12 no. between 71-100%. The 3no. works contract that is complete; (a) Three replacement boreholes at Baricho wells; (b) Baricho immediate works - lot 3, gap financing to an ongoing contract;(c) Low-income areas pipeline, an intervention with a 9.85km distribution pipeline and 30 no. communal water points. The overall project progress is 50.8%.
- (xi) The Ministry launched the Non-Revenue Water Management Standards to be operationalised in all the Water Service Providers across the Country joining the list of a few countries in Africa to have the standards. WASREB is to take charge and ensure implementation of the standards in the next few months as well as coming up with a working mechanism of reducing Non-Revenue water to acceptable levels of 20%. In addition, KEWI is to provide training to certified staff to be engaged in the 88 registered WSPs. The Water Infrastructure Police Unit was also launched in January 2023, an initiative named "Linda Maji Lipa Maji" meant to curb vandalism of critical water assets and curb Non-Revenue Water across the country.
- (xii) In line with the Bottom-up Economic Transformation Agenda (BETA) of addressing immediate water needs in the country, the Water 10,000 programme has been proposed. This is a 5-year (2023-2027) result-oriented development programme that will deliver high-impact low-cost interventions in terms of water service delivery and enhancing implementation capacity in the short term. The interventions will involve; Boreholes, Water pans, small dams, roof catchment, spring protection, desilting works, pipeline extensions, sand dams, combined sanitation, decentralized treatment facilities, septic tanks, last mile connectivity, trunk sewers, wastewater treatment plant, faecal sludge treatment plant among others. The implementing agencies are the 9 regional waterworks development agencies with an approximate budget of 466 billion.
- (xiii) During the FY2022/2023, the area under irrigation increased by 29,873.43 acres against a target of 26,800 acres through the following projects; Community-Based Irrigation Projects (1,200 acres), Supplemental Irrigation using harvested water (10,437.95 acres), Turkana Irrigation Development Project (1,864.25 acres), National Expanded Irrigation Programme (6,957.28 acres), Lower Kuja Irrigation Development Project (1,450 acres), Galana Kulalu Food Security Irrigation Project (5,000 acres) and Ground Water Exploration (2,964 acres). These projects have benefitted 27,456 households earning them a gross income of approximately Ksh.

7.452 billion annually from irrigation. Construction of Waga Machame and Anyiko irrigation projects progressed from 0% to 25% and will put an additional 1750 acres under irrigation when complete.

- (xiv) Under the Household Irrigation Water Harvesting project, the Ministry constructed 5,583 household water pans with a cumulative volume of 7.7 MCM benefitting 5,583 people. In addition, 57 community water pans were constructed across the Country with a cumulative volume of 4 MCM benefitting 2,730 farmers.
- (xv) Under the Smallholder Irrigation Programme Mt Kenya Region, contracts were awarded and signed for the construction of five (5) irrigation schemes on a cost-sharing basis. The five schemes will put an additional 1,500 acres under irrigation to benefit 1,300 farmers when complete in the next financial year. They are Gatene in Embu County, Miuka & Kandeki in Kirinyaga County, and Kiramanti and Magatianthi in Tharaka Nithi County). Survey, design and development of BoQs were completed for three additional irrigation projects ready for implementation (Nyamaji & Okundi in Homa Bay and Laghale in Taita Taveta).
- (xvi) The Ministry drilled 4 boreholes to supply water to 4 public schools to support in training school-going children to begin commercial irrigation of horticultural crops and fruit/tree seedlings production using drip irrigation in greenhouses.
- (xvii) The Ministry targets to carry out land degradation assessments for 15 sub-catchments/sub-basins. The Ministry concluded river basin-based land degradation assessments for the Upper Kerio Valley and Upper Ewaso Nyiro North basins by disseminating the two LADA reports virtually. In addition, the Ministry identified three sub-basins (Middle Tana, Sondu Miriu and Mara) for Land Degradation Assessment. In total 3 LADAs have been completed, including an assessment for Lake Magadi.
- (xviii) The Ministry developed seven (7) Irrigation Water Users Association (IWUA) Training Manuals to equip the counties and other irrigation service providers with the requisite skills for capacity building of the IWUAs and other irrigators. In line with this, four (4) IWUAs were capacity-built on governance and water use management for efficient use.
- (xix) The Ministry, with the support of JICA, carried out preliminary mapping of irrigation projects/schemes in three pilot counties of Kisumu, Baringo and Kirinyaga for quality irrigation data and information management. The Ministry also developed a draft quality management system Toolkit and User Manual for small-scale irrigation projects under the FAO-WAPOR project for efficient field water management practices.
- (xx) The Ministry has developed a zero draft of the Career Guideline as directed by the Public Service Commission to all Ministries in the National Government. It had been resolved that all Schemes of Service be translated to Staff Career Guidelines going forward by respective scheme administrators. The Ministry has been able to transition officers from the Manual Performance Appraisal System to the Online Performance Evaluation System (GHRIS) platform by carrying out sensitization. Currently, 314 officers have been able to set their targets and are appraised in GHRIS.
- (xxi) On Performance Contracting, aimed at improving efficiency and effectiveness in the management of the Public Service, the Ministry of Water, Sanitation and Irrigation in the FY 2020/21 had a composite score of 3.2454 and ranked No. 6 out

of 24 Ministries/Offices/Departments by the Ministry of Public and Gender.

### **2.1.3 Kenya Vision 2030, Bottom-up Economic Transformation Agenda and Fourth Medium Term Plan**

The Bottom-up Economic Transformation Agenda (BETA) is anchored on five key pillars: Agricultural transformation, MSME Economy, Housing and Settlement, Healthcare, and the Digital Superhighway and Creative Economy. The priority interventions proposed in the plan are expected to contribute toward six broad objectives including lowering the cost of living, eradicating hunger, managing unemployment, improving fiscal performance, stabilizing foreign exchange and ensuring inclusive economic growth.

As an enabler of the Bottom-up Economic Transformation Agenda (BETA), the Ministry will focus on inclusive growth and people-centred development anchored on the United Nations 2030 Agenda for Sustainable Development called “leaving no one behind”, expanding the country revenue base as well as pursue prudent fiscal and monetary policies that seek to promote economic participation of the private sector in the financing, construction, development, operation or maintenance of infrastructure or development projects through Public Private Partnerships (PPPs) in a bid to address the infrastructure gap. This will translate to the provision of reliable water to all the BETA pillars for the next five years and in line with Vision 2030. This will be through the construction of multi-purpose dams, water supply and sewerage projects to serve the proposed business parks, Special Economic Zones and Constituency Industrial Development Centres (CIDCs); planned affordable housing in identified areas and health care facilities.

## **2.2 Regulatory Frameworks**

The Ministry of Water, Sanitation and Irrigation has various Acts, Regulations, Policies and Strategies that guide the execution of its mandate. The functions of the Ministry are outlined in Executive Order No. 1 of 2023 on the Organisation of Government. The Constitution guides the Ministry in undertaking its mandate to achieve universal access to water and sanitation and food security.

The Acts that guide the implementation of the mandate of the Ministry include:

- Water Act 2016;
- Irrigation Act 2019;
- Hydrologists Act 2017;
- KEWI Act 2001; and
- Legal Notice No. 252

Other key Policy Documents are:

- The Fourth Medium Term Plan 2023-2027 (MTP IV) of the Kenya Vision 2030;
- Bottom-up Economic Transformation Agenda (BETA);
- Sessional Paper No. 01 of 2021 on National Water Policy;
- National Irrigation Policy, 2017
- Water Services Strategy 2021-2026;
- Water Harvesting and Storage Strategy 2021-2026;
- Water Resources Strategy 2021-2026,
- National Irrigation Services Strategy 2022-2026; and

- Irrigation (General) Regulations 2021

### **2.2.1 Water Act 2016**

Water Act 2016 is an Act of Parliament that provides for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes. It came into force in April 2017 when the Cabinet Secretary published notices in the Kenya Gazette, announcing the commencement of its implementation. However, the Act has various gaps which called for its amendment. The draft Amendment Bill is undergoing stakeholder participation before onward forwarding to Parliament.

### **2.2.2 Irrigation Act 2019**

The Irrigation Act 2019 provides for the development, management and regulation of irrigation, to support sustainable food security and socioeconomic development in Kenya, and for other connected purposes. The Act also provides for the establishment of the National Irrigation Authority (NIA) with a national mandate to undertake irrigation development and County Irrigation Development Units (CIDUs) to manage irrigation development at the County level.

### **2.2.3 Hydrologists Act 2017**

The Hydrologist Act, of 2017 created the Hydrologists Registration Board (HRB) whose mandate includes the regulation of the hydrology profession and practice in the Country. HRB has developed the Hydrologists' Rules and Regulations in a consultative process. The rules and regulations have been submitted to the Attorney General's Office for consideration and later to be forwarded to Parliament. It has also developed its Strategic Plan and Human Resources Instruments and approvals obtained.

### **2.2.4 KEWI Act 2001**

The KEWI Act 2001 established the Kenya Water Institute (KEWI) as a Semi-Autonomous Government Agency (SAGA). The institution is charged with the responsibility of capacity building for the water sector. It plays a key role in addressing human resource needs and provides solutions to challenges facing the sector. KEWI currently has four campuses; Nairobi, Kisumu, Kitui and Chiakariga campuses located in Nairobi, Kisumu, Kitui, and Tharaka Nithi Counties with a total student population of 1,382.

The KEWI Act 2001 is under review for the institution to execute its mandate effectively by aligning it to the Constitution. The draft KEWI Bill is currently undergoing public consultation.

### **2.2.5 Legal Notice No. 252**

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

## **2.3 Status of Human Resources**

In May 2021, the Ministry of Water, Sanitation and Irrigation received an approved Organization Structure and Staff Establishment from the Public Service Commission which



revised the current Authorized Staff Establishment to 430 with an Organization Structure that omitted some critical Departments. The Ministry raised pertinent issues observed and submitted a proposed Organization Structure and Staff Establishment of 696 to the Public Service Commission for consideration and approval.

The State Department for Water and Sanitation and the State Department for Irrigation were established following the release of Executive Order No.1 of 2023 (Revised), as comprising the Ministry of Water, Sanitation and Irrigation.

The Principal Secretary, State Department for Public Service vide letter Ref No. MSPG. DPSM/MIN/22/1 dated 6th January 2023 appointed a team of Management Consultants to provide technical assistance to the State Department for Water and Sanitation in developing an appropriate Organizational Structure and determining optimal staffing levels to facilitate the achievement of its core mandate.

### 2.3.1 Human Resources at the Ministry Headquarters

The Ministry's total number of staff is 581 against an Authorized Establishment of 430 officers, resulting in a variance of 151 staff. Out of the 581 in post, the Technical Departments constitute 51.8 % of staff while shared services is 48.2%. The breakdown is summarized in Table 2.1.

**Table 2.1: Current staffing levels per approved departments**

| S/No.            | Department  | Authorized establishment | In post    | Variance   |
|------------------|---|--------------------------|------------|------------|
| 1.               | Office of the Cabinet Secretary                       | 7                        | 7          | 0          |
| 2.               | Office of the Chief Administrative Secretary          | 4                        | 3          | -1         |
| 3.               | Office of the Principal Secretary                     | 7                        | 10         | 3          |
| 4.               | Water & Sanitation Infrastructure Development & Mngt. | 89                       | 88         | -1         |
| 5.               | National & Transboundary Water Resources              | 126                      | 113        | -13        |
| 6.               | Irrigation Water Management and Drainage Department   | 69                       | 53         | -16        |
| 7.               | Land Reclamation                                      | 25                       | 27         | 2          |
| <b>Sub Total</b> |   | <b>327</b>               | <b>301</b> | <b>-26</b> |
| 8.               | Administration Department                             | 6                        | 12         | 6          |
| 9.               | Legal Unit  | 2                        | 3          | 1          |
| 10.              | Public Communication                                  | 7                        | 9          | 2          |
| 11.              | Clerical Officers                                     | 12                       | 14         | 2          |
| 12.              | Drivers   | 10                       | 30         | 20         |
| 13.              | Support Staff   | 9                        | 19         | 10         |
| 14.              | Secretarial Services                                  | 13                       | 39         | 26         |
| 15.              | Human Resource Management and Development             | 11                       | 18         | 7          |

| S/No.              | Department  | Authorized establishment | In post    | Variance   |
|--------------------|---|--------------------------|------------|------------|
| 16.                | Finance Department                                  | 3                        | 5          | 2          |
| 17.                | Accounts Department                                 | 6                        | 19         | 13         |
| 18.                | Supply Chain Management Department                  | 10                       | 17         | 7          |
| 19.                | Records Management                                  | 3                        | 8          | 5          |
| 20.                | Central Planning and Projects Monitoring Department | 5                        | 8          | 3          |
| 21.                | Information Communication Technology Department     | 6                        | 7          | 1          |
| 22.                | Pension Assistant [3]                               | 0                        | 1          | 1          |
| 23.                | Principal Librarian                                 | 0                        | 1          | 1          |
| 24.                | Supernumerary Posts                                 | 0                        | 58         | 58         |
| 25.                | Officers to be transferred to Infrastructure        | 0                        | 12         | 12         |
| <b>Sub Total</b>   |   | <b>103</b>               | <b>280</b> | <b>177</b> |
| <b>Grand Total</b> |   | <b>430</b>               | <b>581</b> | <b>151</b> |

The proposed staffing of the State Department for Water and Sanitation:

| S/No.            | Divisions                          | A/E        | In post    | Proposed   |
|------------------|------------------------------------|------------|------------|------------|
| 1.               | Administration                     | 5          | 4          | 7          |
| 2.               | Records Management                 | 3          | 3          | 12         |
| 3.               | Library                            | 0          | 1          | 3          |
| 4.               | Human Resource                     | 11         | 15         | 22         |
| 5.               | Office Administrative Services     | 13         | 34         | 43         |
| 6.               | Drivers                            | 10         | 24         | 24         |
| 7.               | Clerical Officers                  | 12         | 8          | 15         |
| 8.               | Cleaning Supervisors/Support Staff | 9          | 14         | 27         |
| 9.               | Finance                            | 3          | 5          | 6          |
| 10.              | Accounts                           | 6          | 14         | 19         |
| 11.              | ICT                                | 6          | 5          | 10         |
| 12.              | Central Planning Unit              | 5          | 6          | 9          |
| 13.              | Supply Chain                       | 10         | 10         | 14         |
| 14.              | Public Communication Unit          | 7          | 5          | 13         |
| 15.              | Legal                              | 2          | 3          | 3          |
| 16.              | Counselling                        | 0          | 0          | 3          |
| 17.              | Cabinet Secretary                  | 7          | 1          | 9          |
| 18.              | Chief Administrative Secretary     | 4          | 0          | 7          |
| 19.              | Principal Secretary                | 5          | 1          | 9          |
| <b>Sub Total</b> |                                    | <b>118</b> | <b>153</b> | <b>255</b> |

| S/No. | Divisions                                | A/E        | In post    | Proposed    |
|-------|--|------------|------------|-------------|
| 1.    | Water Resources                          | 0          | 0          | 0           |
| 2.    | Surface Water & Hydrometry               | 20         | 23         | 37          |
| 3.    | Groundwater Exploration Management       | 41         | 81         | 48          |
| 4.    | Transboundary                            | 24         | 14         | 32          |
| 5.    | Water Quality & Pollution Control        | 30         | 8          | 36          |
| 6.    | Water Inspectors                         | 0          | 0          | 14          |
| 7.    | Water Infrastructure Development         | 0          | 0          | 1           |
| 8.    | Water Infrastructure                     | 85         | 95         | 54          |
| 9.    | Water Sector Coordination                | 0          | 0          | 46          |
| 10.   | Water Harvesting & Storage               | 0          | 0          | 42          |
| 11.   | Sanitation Management                    | 0          | 0          | 0           |
| 12.   | Urban Sanitation                         | 0          | 0          | 21          |
| 13.   | Rural Sanitation                         | 0          | 0          | 39          |
| 14.   | Research, Innovation and Data Management | 11         | 14         | 25          |
|       | <b>Sub Total</b>                         | <b>211</b> | <b>235</b> | <b>395</b>  |
|       | <b>Grand Total</b>                       | <b>329</b> | <b>388</b> | <b>650</b>  |
|       | <b>Support Services Staff</b>            |            | <b>255</b> | <b>39%</b>  |
|       | <b>Technical Staff</b>                   |            | <b>395</b> | <b>61%</b>  |
|       |  |            | <b>650</b> | <b>100%</b> |

The proposed staffing of the State Department for Water and Sanitation is shown in Table 2.2 while that for the State Department for Irrigation is in Table 2.3.

*Table 2.2: Proposed Staffing for State Department for Water and Sanitation*

| S/No. | Divisions                          | A/E | In post | Proposed |
|-------|------------------------------------|-----|---------|----------|
| 1.    | Administration                     | 5   | 4       | 7        |
| 2.    | Records Management                 | 3   | 3       | 12       |
| 3.    | Library                            | 0   | 1       | 3        |
| 4.    | Human Resource                     | 11  | 15      | 22       |
| 5.    | Office Administrative Services     | 13  | 34      | 43       |
| 6.    | Drivers                            | 10  | 24      | 24       |
| 7.    | Clerical Officers                  | 12  | 8       | 15       |
| 8.    | Cleaning Supervisors/Support Staff | 9   | 14      | 27       |
| 9.    | Finance                            | 3   | 5       | 6        |
| 10.   | Accounts                           | 6   | 14      | 19       |
| 11.   | ICT                                | 6   | 5       | 10       |
| 12.   | Central Planning Unit              | 5   | 6       | 9        |
| 13.   | Supply Chain                       | 10  | 10      | 14       |
| 14.   | Public Communication Unit          | 7   | 5       | 13       |
| 15.   | Legal                              | 2   | 3       | 3        |

| S/No. | Divisions                      | A/E        | In post    | Proposed   |
|-------|--------------------------------|------------|------------|------------|
| 16.   | Counselling                    | 0          | 0          | 3          |
| 17.   | Cabinet Secretary              | 7          | 1          | 9          |
| 18.   | Chief Administrative Secretary | 4          | 0          | 7          |
| 19.   | Principal Secretary            | 5          | 1          | 9          |
|       | <b>Sub Total</b>               | <b>118</b> | <b>153</b> | <b>255</b> |

| S/No. | Divisions                                | A/E        | In post    | Proposed    |
|-------|--|------------|------------|-------------|
| 1.    | Water Resources                          | 0          | 0          | 0           |
| 2.    | Surface Water & Hydrometry               | 20         | 23         | 37          |
| 3.    | Groundwater Exploration Management       | 41         | 81         | 48          |
| 4.    | Transboundary                            | 24         | 14         | 32          |
| 5.    | Water Quality & Pollution Control        | 30         | 8          | 36          |
| 6.    | Water Inspectors                         | 0          | 0          | 14          |
| 7.    | Water Infrastructure Development         | 0          | 0          | 1           |
| 8.    | Water Infrastructure                     | 85         | 95         | 54          |
| 9.    | Water Sector Coordination                | 0          | 0          | 46          |
| 10.   | Water Harvesting & Storage               | 0          | 0          | 42          |
| 11.   | Sanitation Management                    | 0          | 0          | 0           |
| 12.   | Urban Sanitation                         | 0          | 0          | 21          |
| 13.   | Rural Sanitation                         | 0          | 0          | 39          |
| 14.   | Research, Innovation and Data Management | 11         | 14         | 25          |
|       | <b>Sub Total</b>                         | <b>211</b> | <b>235</b> | <b>395</b>  |
|       | <b>Grand Total</b>                       | <b>329</b> | <b>388</b> | <b>650</b>  |
|       | <b>Support Services Staff</b>            |            | <b>255</b> | <b>39%</b>  |
|       | <b>Technical Staff</b>                   |            | <b>395</b> | <b>61%</b>  |
|       |  |            | <b>650</b> | <b>100%</b> |

*Table 2.3: Proposed Staffing for State Department for Irrigation*

| S/No. | Divisions                          | A/E | In post | Proposed |
|-------|------------------------------------|-----|---------|----------|
| 1.    | Administration                     | 5   | 2       | 9        |
| 2.    | Records Management                 | 6   | 7       | 9        |
| 3.    | Library                            | 2   | 1       | 1        |
| 4.    | Human Resource                     | 9   | 12      | 14       |
| 5.    | Office Administrative Services     | 63  | 32      | 81       |
| 6.    | Drivers                            | 14  | 26      | 40       |
| 7.    | Security Warden                    | 4   | 0       | 7        |
| 8.    | Clerical Officers                  | 40  | 9       | 62       |
| 9.    | Cleaning Supervisors/Support Staff | 31  | 30      | 32       |

| S/No.            | Divisions                      | A/E        | In post    | Proposed   |
|------------------|--------------------------------|------------|------------|------------|
| 10.              | Finance                        | 6          | 6          | 6          |
| 11.              | Accounts                       | 7          | 9          | 8          |
| 12.              | ICT                            | 6          | 4          | 8          |
| 13.              | Central Planning Unit          | 4          | 5          | 6          |
| 14.              | Supply Chain                   | 9          | 13         | 12         |
| 15.              | Public Communication Unit      | 3          | 5          | 6          |
| 16.              | Legal                          | 2          | 3          | 4          |
| 17.              | Counselling                    | 0          | 0          | 3          |
| 18.              | Cabinet Secretary              | 8          | 6          | 8          |
| 19.              | Chief Administrative Secretary | 8          | 6          | 8          |
| 20.              | Principal Secretary            | 7          | 7          | 7          |
| <b>Sub Total</b> |                                | <b>236</b> | <b>188</b> | <b>341</b> |

| S/No.                         | Divisions   | A/E        | In post    | Proposed    |
|-------------------------------|---|------------|------------|-------------|
| 1.                            | Directorate of Irrigation Infrastructure Development and Management | 0          | 0          | 5           |
| 2.                            | Irrigation and Drainage Development Division                        |            | 23         | 37          |
| 3.                            | Water Harvesting and Storage Division                               | 42         | 25         | 69          |
| 4.                            | Directorate of Land Reclamation and Climate Resilience              | 0          | 5          | 62          |
| 5.                            | Land Reclamation and Ecosystem Restoration Division                 | 0          | 0          | 5           |
| 6.                            | Reclaimed Land Management Division                                  | 14         | 15         | 54          |
| 7.                            | Climate Resilience for Water and Food Security Division             | 14         | 15         | 66          |
| 8.                            | Directorate of Irrigation Management and Quality Assurance          | 14         | 15         | 51          |
| 9.                            | Irrigation Policy and Sector Development Coordination Division      | 4          | 3          | 5           |
| 10.                           | Irrigation Water Management Division                                | 0          | 0          | 16          |
| 11.                           | Irrigation Research, Innovation and Training Section                | 17         | 13         | 56          |
| 12.                           | Irrigation Quality Assurance and Licensing Division                 | 17         | 13         | 73          |
| <b>Sub Total</b>              |   | <b>105</b> | <b>92</b>  | <b>428</b>  |
| <b>Grand Total</b>            |   | <b>341</b> | <b>280</b> | <b>769</b>  |
| <b>Support Services Staff</b> |   |            | <b>341</b> | <b>56%</b>  |
| <b>Technical Staff</b>        |   |            | <b>428</b> | <b>44%</b>  |
|                               |   |            | <b>769</b> | <b>100%</b> |

### 2.3.2 Human Resource in the Water Sector Institutions

The total authorized establishment in the Water Sector Institutions is three thousand three hundred and thirty-seven (3,337) employees against an in-post of one thousand nine hundred and sixty-eight (1,968) giving a variance/ gap of one thousand three hundred and fifty-nine (1,359) as presented in Table 2.4.

**Table 2.4: 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   | 658     | -515          | The Authority has not hired staff due to financial constraints   |
| Water Services Regulatory Board (WASREB)                         | 77  | 48      | -29           |  |
| Water Sector Trust Fund (Water Fund)                             | 175   | 95      | -80           | 78 staff in permanent and pensionable terms of employment while others are in renewable 5-year contracts |
| Kenya Water Institute (KEWI)                                     | 314   | 121     | -193          | The organizational structure and Human Resource instruments have been partially implemented.             |
| National Water Harvesting and Storage Authority (NWHSA)          | 100   | 196     | 96            | The organizational structure and Human Resource instruments are currently under review                   |
| Regional Centre on Groundwater Resources, Education and Research | 80  | 9       | -71           | 5 officers are in renewable 3-year contracts   |
| National Irrigation Authority (NIA)                              | 350   | 291     | -59           |  |
| Tana Water Works Development Agency (TWWDA)                      | 105   | 83      | -22           |  |
| Athi Water Works Development Agency (AWWDA)                      | 99  | 44      | -45           |  |
| Northern Water Works Development Agency (NWWDA)                  | 89  | 32      | -57           |  |
| Coast Water Works Development Agency                             | 172   | 171     | -1            |  |

| Water Sector Institution                                     | Required number of staff as per Establishment | In-Post | Variance/ Gap | Remark   |
|--|---|---------|---------------|--|
| Lake Victoria South Water Works Development Agency (LVSWWDA) | 151   | 69      | -82           |  |
| Lake Victoria North Water Works Development Agency (LVNWWDA) | 88  | 66      | -22           |  |
| Tanathi Water Works Development Agency                       | 91  | 48      | -43           |  |
| Central Rift Water Works Development Agency (CRWWDA)         | 96  | 30      | -66           | Vacancies are to be filled using the newly approved establishment.   |
| North Rift Water Works Development Agency (NRWWDA)           | 99  | 1       | -98           | The Agency recruited a substantive CEO who assumed his duties on 1st May 2022<br>The other staff are seconded as follows <ul style="list-style-type: none"> <li>• 6 No. from LVNWWDA</li> <li>• 7 No from CRVWWDA</li> <li>• 1 No from LVSWWDA</li> <li>• 3 No. from AWWDA</li> <li>• 7 No from MWSI</li> <li>• 3 No. staff on contract</li> </ul> The total number of staff at the Agency is 30 |
| Hydrologist Registration Board                               | 78  | 6       | -72           | 2 staff are permanent and pensionable while 4 staff are on contract.   |
| Totals   | 3,337   | 1,968   | -1,359        |  |

### 2.3.3 Achievements in Human Resources

The State Department for Water has managed to transit from the Integrated Personal Pay Data (IPPD) to the Unified Human Resource System as directed by the Public Service Commission. The State Department has maintained prompt payment of Salaries and Allowances by the 30th of every Month. In the year under review, the State Department managed to recruit four Clerical Officers, Seven Support Staff, Two Drivers, Six Geologists, one Engineer, and Four Staff for the Cabinet Secretary's Office. Fifty-five officers were promoted during the year under review. On the management of pension cases, the State Department processed the following pension claims as follows:

- 267 pending cases were identified and classified (Death cases, Mandatory retirement cases)
- 253 were processed and submitted to pension for payment

- 14 Death Cases claims were finalised and submitted to pension for payment.

The State Department Submitted to the State Department for Public Service the proposed Organization Structure and Authorized Staff Establishment for approval of 650 for consideration and guidance.

The State Department is awaiting the development of a zero draft Career Guidelines as directed by the Public Service Commission to all State Departments in the National Government to harmonize the changes issued in the various circulars against the schemes of services.

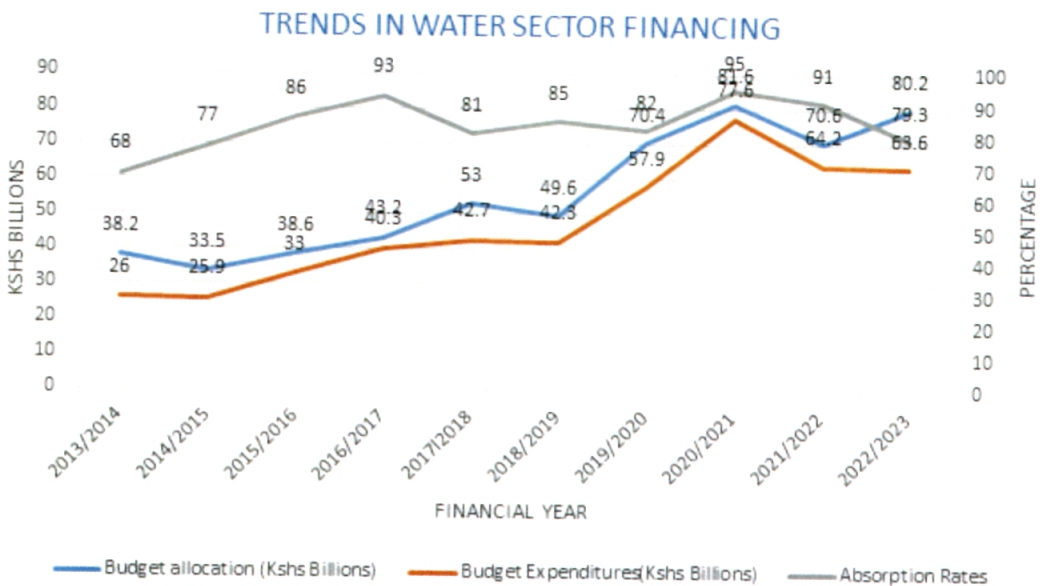
The Ministry has been able to transition officers from Manual performance appraisal system to an electronic performance system (GHRIS) platform by carrying out sensitization.

## 2.4 Sector Financing

The Water, Sanitation and Irrigation Sector budgetary allocation has tremendously increased from Kshs. 38.2 billion in the financial year 2013/2014 to Kshs. 80.2 billion in the financial year 2022/23 translating to an overall percentage increase of 109% as shown in Figure 2.1.

During the same period, expenditures have also increased from Kshs 26 billion to Ksh 79.3 billion translating to an overall percentage increase of 205%. Further, the budget absorption rates in the same period has increased from 68% to 79.3%.

*Figure 2.1: Trends in the Water, Sanitation and Irrigation Sector Financing from 2013/14 to 2021/22 Financial Years*



### 2.4.1 Sector Investment Plan

The Ministry undertook to develop the National Water and Sanitation Investment Program (NAWASIP), by aggregating resource mobilization bringing together the National Government priorities and the County Governments' County Development Plans for Water and Sanitation. NAWASIP aggregated a total of 2,742 projects meant to achieve Universal Coverage for Water and Sanitation by 2030. The Ministry is in the initial stages of developing a Water Resources Investment Plan. The outline for the National Irrigation Sector Investment Plan (NISIP) has been developed.

## 2.5 Status of Water Resources


### 2.5.1 Overview of Water Resources

Water resources play a central role in all sectors of the economy; including agriculture, energy, industry, tourism, and urban and rural development. Its importance is also underscored in the Constitution of Kenya 2010 as it articulates that "Every person has a right to clean and safe water in adequate quantities" and that the state shall use and manage the water resource in a manner that is equitable, efficient, productive and sustainable, and in accordance with the principles of equity, security, equitable access, sustainability, productive management of the resource and sound conservation. Therefore, the need to manage water resources sustainably is critical in ensuring its security and availability.

The country's renewable water resource availability per capita has been below 1,000 (m<sup>3</sup>/capita/year) over a long period, currently, it is estimated to be at 450 (m<sup>3</sup>/capita/year). Despite water scarcity, there are a myriad of challenges facing the water resource which includes; the rising water demand from key economic sectors, catchment degradation, encroachment of riparian land and wetlands, pollution, uncontrolled and unregulated use of water resource, climate variability and climate change and limited technical and enforcement capacities.

Different initiatives have been put in place to abide by the constitutional obligations to ensure sustainable exploitation, utilization, management and conservation of water resources. The Development of the National Water Policy of 2021 and Water Resources Regulations 2021 operationalizes the obligations of the national government with regards to ensuring the protection and conservation of the Water catchments, pollution control, regulation of water abstraction, criteria for prioritization and allocation of the water resource as well as other functions. The basin areas have also been designated through legal notice No 43 of 2016 as they form the management areas of water resources.

Further, the Water Resources Strategy 2020-2025 is also being implemented by the water sector in the management of its Water Resources. The implementation of the Strategy is based on the strategic goals which were formulated around thematic areas in line with the national obligations and emerging issues in the water sector; this includes Water Resources Monitoring and Assessment, Water Protection and Conservation, Availability and equitable access to water for all, Water Disaster management, Governance of inter-basin and inter-



county water resources, Water Resources Regulation, Planning and Financing and Research Innovation and Capacity Building

Water resources monitoring and assessment have been enhanced through the deliberate process by the Water Resources Authority and the Ministry, to rehabilitate and upgrade Water monitoring stations to telemetry, this will improve the data reliability and timeliness. Water resources assessment has also been enhanced through the groundwater mapping programme which is envisaged to understand groundwater potential. In the year, groundwater potential knowledge was enhanced through undertaking 30 hydrogeological assessments in various parts of the country and aquifer profiling of three aquifers; Kakamega, Nairobi aquifer suite and Mt. Elgon. Two exploratory boreholes were also drilled.

Water quality monitoring and enforcement continue to be key with regard to sustainable conservation and protection of freshwater resources from point and non-point sources of pollution. This is in view of emerging environmental pollutants, climate change, human activities and lifestyle changes. Generally, the groundwater bodies continued to exhibit better water quality status as compared to the surface water bodies. This is attributed to the fact that surface water bodies are more vulnerable to pollution as accelerated by unfriendly human activities in the environment.

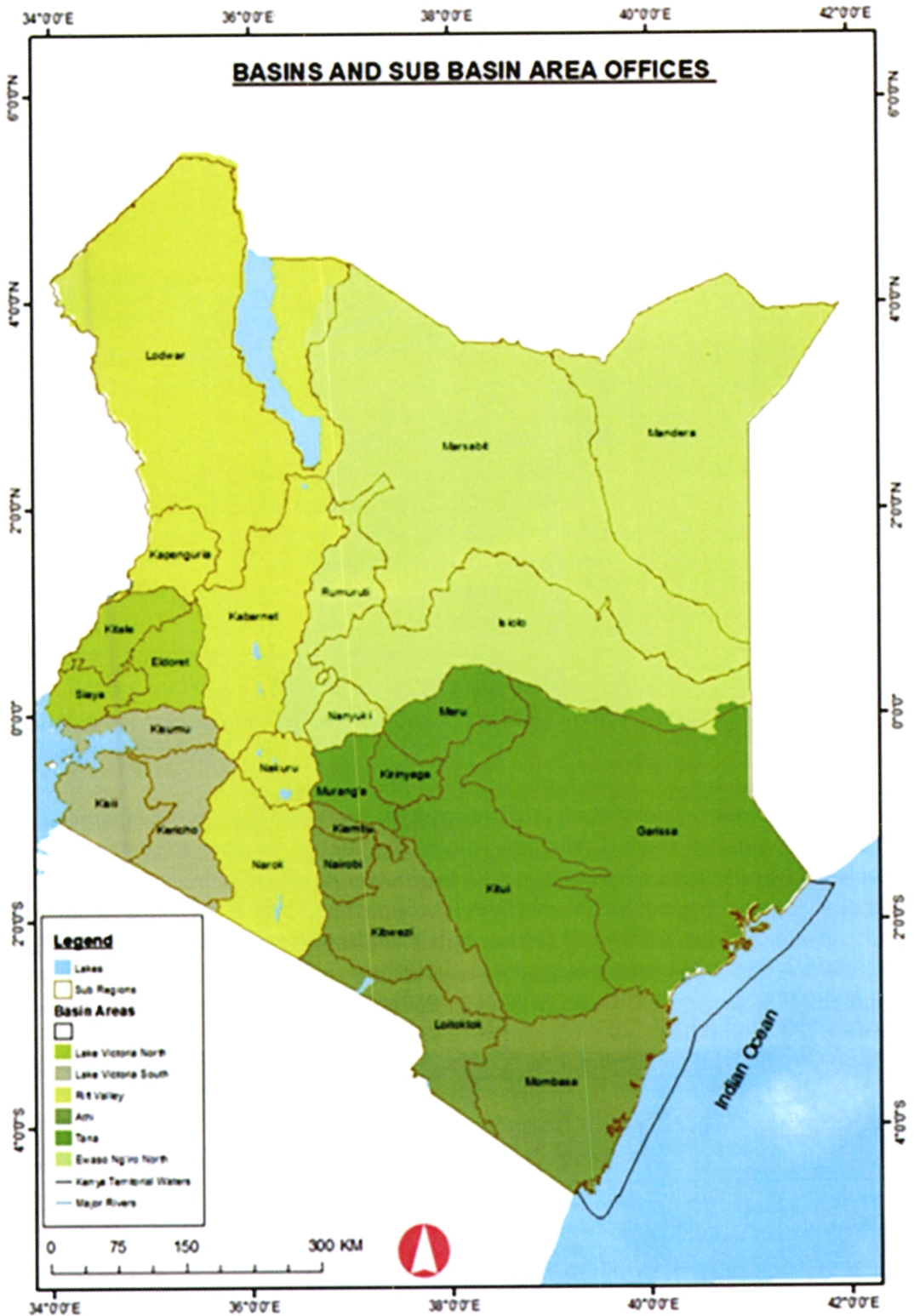
Pollution to water resources is largely due to catchment degradation, improper solid and liquid waste management; and encroachment to the riparian reserves, an issue that allows express pollution to the surface water bodies. Continued collaboration by the established multisectoral approaches including the Inter-Agency Technical Committee (IATC) that is coordinated by the Ministry (State Department of Water and Sanitation) for Nairobi Rivers Protection proves to be an appropriate approach; where each institution plays the collective roles as per their mandates with focus to the shared goal of improving the status of water resources.

The formulation of the legal framework; including the Water Act 2016, Water Policy 2021, Water Resources Strategy (2020-2025) and the Water Resources Guidelines in tandem with provisions of the Constitution, has strengthened the management of Water Resources. However, there is a need to deliberately strengthen water resources financing and enhance technical and enforcement capacities. This will enhance the implementation of the themed strategic objectives in the Water Resources Strategy and also minimize some of the enumerated challenges facing Water Resources.

### **2.5.2 Water Resources Management**

Water Resources Management is carried out at the River Basin Level. The Water Act, 2016 provides for the designation and gazettment of the Basin areas by the Water Resources Authority in consultation with the Cabinet Secretary. The Cabinet Secretary is mandated to establish basin water resource committees for each respective basin area. There are six designated basin areas as follows:

Figure 2.2: Basin and Sub-Basin Area Offices



### 2.5.2.1 Lake Victoria Basin

Lake Victoria is the largest Lake in Africa, and due to its expansive nature, it has a very large Catchment Area. The Catchment is shared between five countries (Kenya, Uganda, Tanzania, Rwanda and Burundi) while the Riparian is shared between three countries (Kenya, Uganda and Tanzania). Kenya's section of the catchment area covers about 42,460 km<sup>2</sup> covering about 15 counties with different physical characteristics. Due to the complex nature of the Basin, WRA divided it into two:

#### i. Lake Victoria North Basin Area

This covers 8 counties (Trans Nzoia, Kakamega, Bungoma, Siaya, Vihiga, Nandi, Uasin Gishu and Busia). WRA headquarters for this area is located in Kakamega. The major rivers within the Basin are the Nzoia River, which drains 70% of the catchment and the Yala River which drains about 18% of the catchment. Both rivers flow into the L. Victoria. The Sio River, a transboundary river, falls within the Basin. This Basin is divided into 40 sub-basins

#### ii. Lake Victoria South Basin Area

This covers 7 counties (Kisii, Kisumu, Kericho, Nyamira, Migori, Homa Bay and Bomet). WRA headquarters for this area is located in Kisumu. The Basin is characterized by the Nandi escarpment and the Mau Forest Complex on its northeastern border from where its major rivers originate. The major rivers within the Basin include the Nyando, Sondu, Mara and Gucha Rivers. The four rivers drain into L. Victoria. The Mara River crosses the border into Tanzania. Smaller catchments drain the Basin into L. Victoria, discharging into the Winum Gulf. The main wetlands within this Basin are associated with the Migori, Nyando and Sondu Miriu Rivers. This Basin is divided into 29 sub-basins.

### 2.5.2.2 Rift Valley Basin Area

This covers 7 counties (Nakuru, Turkana, West Pokot, Baringo, Elgeyo Marakwet, Narok and Nyandarua). WRA headquarters for this area is located in Nakuru. The Basin covers most of the former Rift Valley Province, bordering all the other Basins on the East and West. The Central parts of the Basin are covered by the water towers of the Cherangany Hills, Mau Forest Complex and the Aberdare Ranges. It is characterized by the seven major lakes and their respective drainages as follows:

- Lake Turkana (a transboundary lake) and its entire drainage, including the Omo River catchment in Ethiopia and the Kerio and Turkwel Rivers catchment in Kenya;
- Lake Magadi in the south of the Basin Area, mainly fed by underground rivers;
- Lake Baringo which is fed by the Perkerra, Molo and Mukutan Rivers;
- Lake Naivasha is fed by the Malewa and Gilgil rivers.
- Lake Bogoria, fed by the Waseges (or Sandai) river originating from the slopes of the Nyandarua Plateau, just below the Aberdare Ranges;
- Lake Nakuru and Lake Elementaita.

In addition to the above lakes, three more river basins are located within the Basin. These are the Tarish River (feeding the Lotiki Swamp), the Suguta River and the Ewaso

Ng'iro South River originating from the Mau Escarpment. This Basin is divided into 33 sub-basins.

#### **2.5.2.3 Athi River Basin Area**

This covers 9 counties (Kiambu, Nairobi, Kajiado, Machakos, Makueni, Kilifi, Taita Taveta, Kwale and Mombasa). WRA headquarters for this is located in Machakos. The major river within the Basin is the Athi River which drains into the Indian Ocean. It is the second-longest river in the Country. Two other transboundary rivers are found within the catchment. The Lumi River originates along the Eastern Slopes of the Kilimanjaro and flows across the border into Tanzania and the Uмба River flows from Tanzania into the Basin south of Mombasa. Major wetlands within the Basin include the Ondiri Swamp, Ol Ngarua Swamp, Ol Keju Ado, Ndumato, Jipe, Mangeri Swamp and the Mangroves along the Coast. A few inland freshwater lakes are found within the Basin, Jipe, Chala and Amboseli. This Basin is divided into 32 sub-basins.

#### **2.5.2.4 Tana River Basin Area**

This covers 10 counties (Kirinyaga, Nyeri, Embu, Murang'a, Tharaka Nithi, Garissa, Kitui, Tana River, Meru and Lamu). WRA headquarters for this is located in Embu. The major river within the Basin is the Tana River which drains to the Indian Ocean at the Tana Delta. It is the longest river in the country, originating from the slopes of Mt. Kenya. The upstream tributaries include the Chania, Thiba, Maragua and Thika rivers. This Basin is divided into 39 sub-basins.

#### **2.5.2.5 Ewaso Ng'iro Basin Area**

This covers 6 counties (Laikipia, Samburu, Isiolo, Mandera, Marsabit and Wajir). WRA headquarters for this is located in Nanyuki, Laikipia County. The Ewaso Ng'iro River is the largest in the Basin. It discharges into the Lorian Swamp. The upstream tributaries include the Ewaso Narok, Nanyuki, Isiolo, Osinyai and Milgis Rivers. Several transboundary rivers flow within the Basin, of note, the Kore and Bolo Rivers flow from Ethiopia; and the Dawa River which forms a part of the Kenya-Ethiopia Border. Other wetlands include Ewaso Narok and Suguta Marmar swamps. This Basin is divided into 26 sub-basins.

### **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 3. The available per capita water resource was estimated at 586m<sup>3</sup>/y/capita in 2013. The Available per capita is dwindling towards the projected years of 2030 and 2050. Table 3 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 the impacts of climate change.

Table 2.5: Renewable and Available Water Resources

| Item   | 2010  | 2030  | 2050  |
|--|-------|-------|-------|
| Precipitation (P) *(BCM/y)                         | 400.1 | 441.6 | 471.9 |
| Evapotranspiration (E) **(BCM/y)                   | 358.0 | 397.3 | 425.9 |
| Renewable WR (P-E) (BCM/y)                         | 42.1  | 44.3  | 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 <sup>3</sup> /y/capita)          | 1,093 | 653   | 475   |
| Per Capita Available WR (m <sup>3</sup> /y/capita) | 586   | 393   | 293   |

Source: National Water Master Plan (NWMP 2030)

### 2.5.3.1 Groundwater Potential and Exploitation

In the Financial year 2022/2023, the country continued to experience drought and the hardest hit counties include the Northern and North Eastern areas of the country. In the year under review, the Horn of Africa Groundwater for Resilience Project commenced the process of assessment of eight(8 No.) aquifers to inform groundwater investments in exploitation, conservation and managed aquifer recharge of groundwater resources sustainability in Turkana, Marsabit, Wajir, Mandera and Garissa Counties which will be completed in the financial year 2023/2024. Through the same initiative process for groundwater information systems has commenced for information acquisition, storage and sharing of groundwater data for decision-making.

Other initiatives are underway to establish groundwater potential; Ministry of Water Sanitation and Irrigation United States Geological Survey (USGS) Mapping groundwater potential in Mandera County, Athi and Tana basin which constitute 17 Counties and also mapping of groundwater by UNICEF in Turkana, Marsabit, Garissa, Mandera and Marsabit.

### 2.5.4 Water Use

The Water Resources Authority is mandated through the Water Act 2016 as a lead Agency to regulate the management and use of 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 water resources. Similarly, the Authority

protects and conserves the limited freshwater resources from pollution through Waste Disposal Control Plans that include Effluent Discharge Control Plans (EDCPs). In this case, all potential Effluent Dischargers are required to develop the prerequisite EDCPs, acquire an Effluent Discharge Permit (EDP) and adhere to therein conditions for compliance. The Water Resources Authority undertakes enforcement of EDPs to ensure that the effluent dischargers comply with the prescribed environmental and water resources standards.

Towards sustainable utilization of groundwater resources water allocation plan for the Nairobi Aquifer Suite has been reviewed and the water allocation plan for Lamu Island has been developed. Concerted efforts have also been employed in the determination of the abstraction boreholes through the development and population of the WRA borehole database across the country. A new groundwater information system is being proposed to be rolled out under the Horn of Africa Groundwater for Resilience Project. Figure 2.3 shows the spatial borehole distribution across the country.

#### **2.5.4.1 Groundwater Monitoring**

The Ministry through the 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. Towards this end, WRA has continued to get data from these boreholes which currently number 157 across the country. However, it is crucial that a dedicated groundwater monitoring network is set up to enable the monitoring of groundwater levels and quality. In 2021/2022 the Authority continued to maintain the existing telemetric network which gives data to inform groundwater levels under the Nairobi Aquifer Suite, Tiwi Aquifer and the Lamu Sand Dunes Aquifer. Seven monitoring wells in the Lamu Sand Dunes and two in the Nairobi Aquifer Suite were completed in the year under review. 5 data loggers are in place in Kisumu, Kabatini and Bungoma monitoring boreholes. These monitoring wells are already giving groundwater level data received in the water resources information system of WRA.

Installation of monitoring well in the seven aquifers (Walda Rawana, Lotikipi, Napuu, Daua, Merti, Logologo Shuur and Neogene aquifers) has been proposed through the Horn of Africa – Groundwater for Resilience Project. This will lead to better groundwater management towards achieving the goals of ensuring sustainable access and management of groundwater.

### **2.5.5 Water Resources Monitoring**

#### **2.5.5.1 Surface Water Monitoring**

The attainment of the government's target of ensuring improved availability and access to water by all requires a robust and comprehensive assessment and monitoring system which accurately tracks the quantity and quality of water resources for effective management.

Monitoring networks in the country comprise meteorological stations and hydromet stations. The distribution of hydrometeorological and weather monitoring stations for the country is shown in Table 2.6.



There are a total of 223 rationalized surface water monitoring stations categorized as National, Management Unit, Intra Management Unit and Special Stations. The stations have been geo-referenced and uploaded to the National Monitoring and Georeferenced Information System. The number of stations and operational status are shown in Table 2.4.

*Table 2.6: Surface Water Monitoring Stations and Operational Status*

| Region | Category |                 |                       |         | Total | % Operational |
|--------|----------|-----------------|-----------------------|---------|-------|---------------|
|        | National | Management Unit | Intra Management Unit | Special |       |               |
| LVNCA  | 5        | 8               | 9                     | 6       | 28    | 82.6          |
| LVSCA  | 5        | 14              | 20                    | 1       | 40    | 75            |
| RVCA   | 7        | 13              | 20                    | 0       | 40    | 82.5          |
| ACA    | 3        | 4               | 22                    | 3       | 32    | 75            |
| TCA    | 1        | 7               | 21                    | 16      | 45    | 80            |
| ENNCA  | 1        | 4               | 31                    | 2       | 38    | 81.5          |
| Total  | 22       | 48              | 122                   | 31      | 223   |               |

Source: WRA Water Situation Report 2020-2021

#### 2.5.5.2 Rehabilitation of the Surface Water Monitoring Station

Surface Water stations are periodically rehabilitated and upgraded to telemetry to improve data collection and enhance effective decision-making. The upgrading of stations to automatic logging and telemetric transmission has ensured that accurate and timely data is captured. The automatic stations are configured to record data on an hourly basis and transmit it to a server which can be accessed via a web-based portal.

In the financial year (2022-2023), the Water Resources Authority rehabilitated 4No. and the Ministry 4No. to surface water monitoring stations under the IGAD HYCOS project, totalling 8 telemetry stations. The upgraded stations by WRA to telemetric stations were the ones whose sensors had been washed away by floods. The work done included the reinstallation of water level sensors, configuration, calibration and reactivation of the loggers and modems to transmit data to the WRA server. The 8 rehabilitated stations were as follows:

1. 1AA01 Malaba River in Lake Victoria North Basin area
2. 2B33 Suam River and 2B21 Turkwel River in the Rift Valley Basin area
3. 4BB01 Ragati River in Tana basin area
4. 5ED01 EwasoNg'iro in EwasoNg'iro North Basin area
5. 2EC02 Rongai in Rift Valley Basin
6. 5DA08 Isiolo in Ewaso Ng'iro North Basin area
7. Kirichwa Kubwa in Athi Catchment

### 2.5.5.3 Weather Monitoring Stations.

Water Resources Authority operates a weather monitoring network comprising rainfall, evaporation and climate stations. A total of 156 rainfall stations, 47 evaporation and 17 climate stations were operational as of the end of quarter 3. The regional breakdown is given in Table 2.5.

*Table 2.7: Weather monitoring network*

| Basin | Rainfall | No. Operational | Evaporation | No. Operational | Climate | No. Operational |
|-------|----------|-----------------|-------------|-----------------|---------|-----------------|
| ACA   | 45       | 25              | 7           | 3               | 5       | 2               |
| ENNCA | 26       | 6               | 4           | 2               | 9       | 2               |
| LVNCA | 72       | 30              | 10          | 3               | 5       | 0               |
| LVSCA | 47       | 36              | 20          | 18              | 12      | 10              |
| RVCA  | 23       | 21              | 7           | 6               | 3       | 3               |
| TCA   | 53       | 38              | 17          | 15              | 2       | 0               |
| Total | 266      | 156             | 65          | 47              | 36      | 17              |

Source: WRA Water Situation Report 2020-2021

The weather monitoring stations operated by WRA are strategically located at various parts of the catchments. Data is also obtained from various stakeholders such as private institutions, government and learning institutions. The data collected from these stations are used for modelling and planning purposes. Figure 2.4 shows the distribution of weather monitoring stations.

### 2.5.5.4 Rehabilitation of New Weather Stations

During the period under review, 45 weather stations were configured to transmit data to the WRA server. The stations were upgraded to telemetry through the Kenya Water Security and Climate Resilience Project and had been configured to only transmit data to the Kenya Meteorological Department server. The proposed configuration enabled data to be transmitted to WRA server as a backup.

### 2.5.5.5 Water Quality and Pollution Control

The Authority has an obligation to conserve and protect Water Resources from pollution. The Authority continues to undertake water quality and pollution monitoring through Water Quality Laboratory Facilities on water samples from the rationalized monitoring network across all six basins (see Table 2.6 below). The monitoring network encompasses point and nonpoint sources of pollution to the water resources. Due to emerging environmental challenges, new appropriate monitoring stations can be established depending on the intentions that include research purposes.

Figure 2.4: Rainfall monitoring network

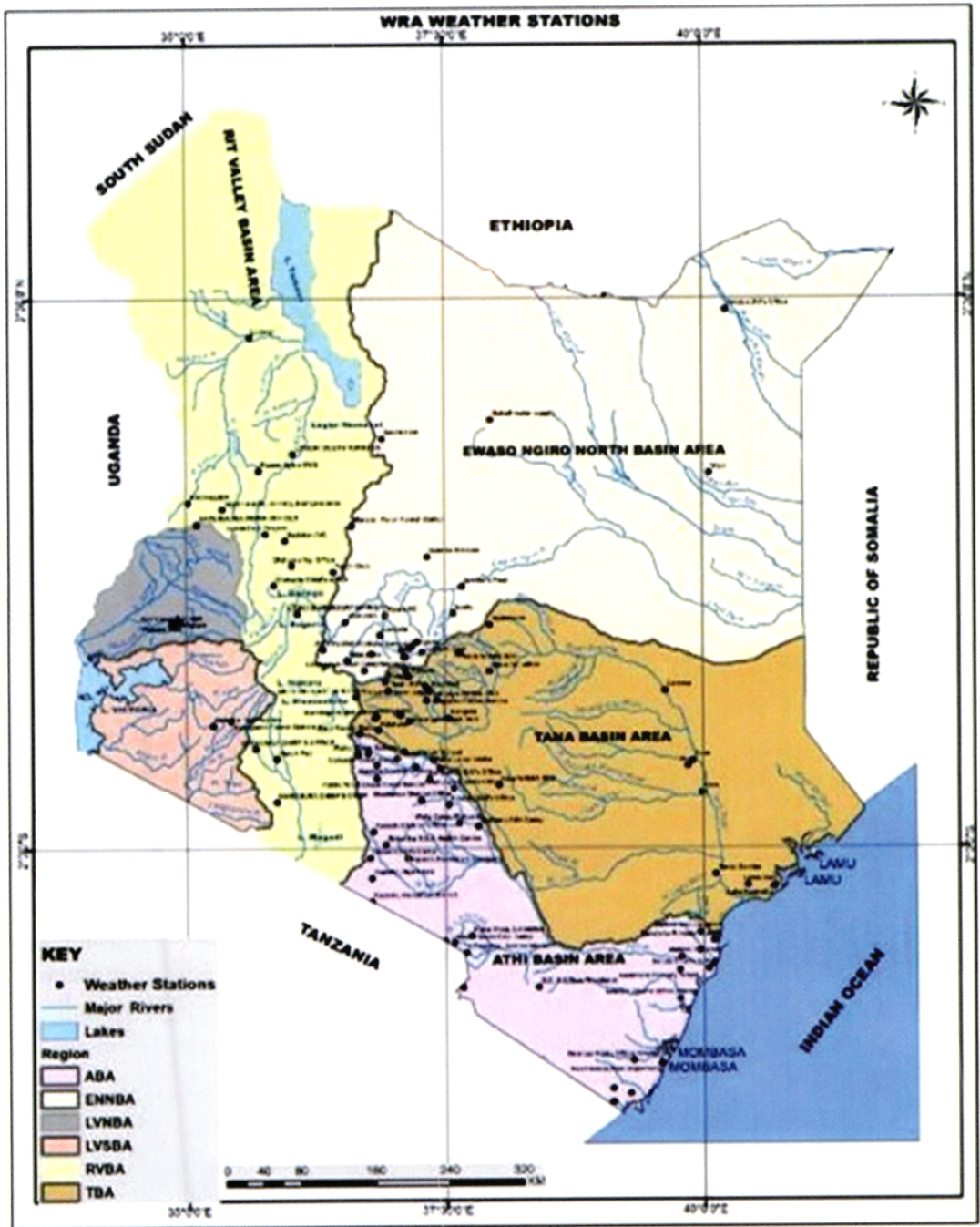


Figure 2.5: Screenshot of WRA FTP server with weather station telemetry data

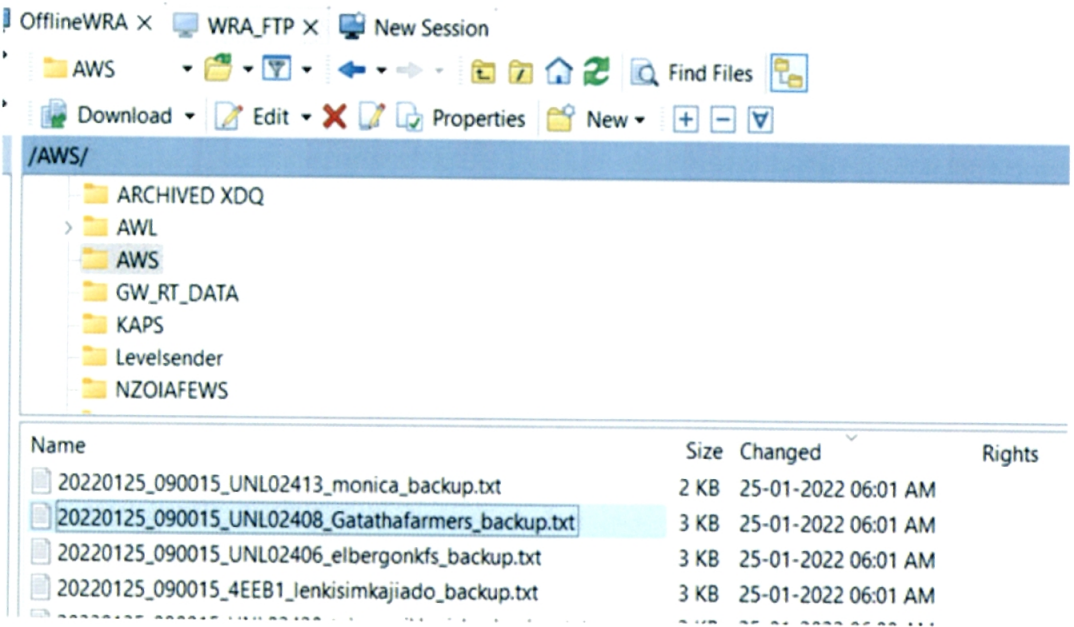


Figure 2.6: Display of Telemetric Stations on WRA Web Portal and Sagana State Lodge Weather Station data

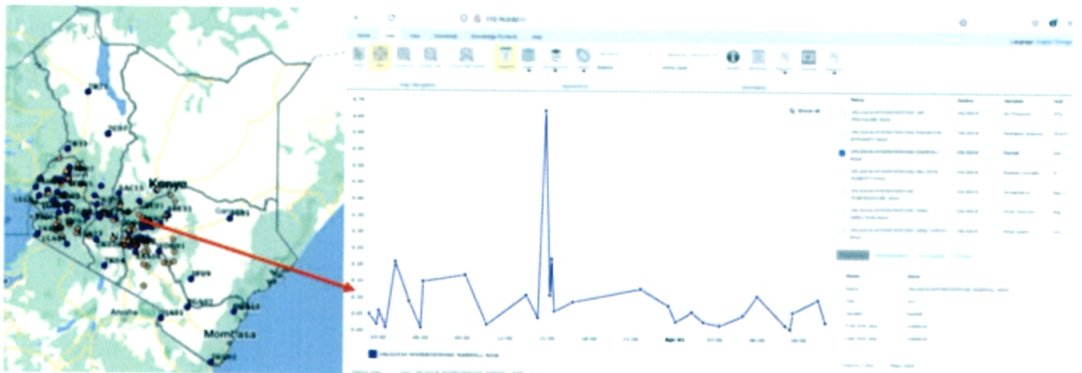


Table 2.8: National Revised Water Quality Monitoring Network

| Station Type Basin Area | Surface Water | Ground Water | Effluent Discharge | 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                    |
| <b>Grand Total</b>      | <b>329</b>    | <b>161</b>   | <b>168</b>         | <b>658</b> | <b>202</b>            |

Source: Water Quality Monitoring and Management Guideline. Volume D2 -3, 2020

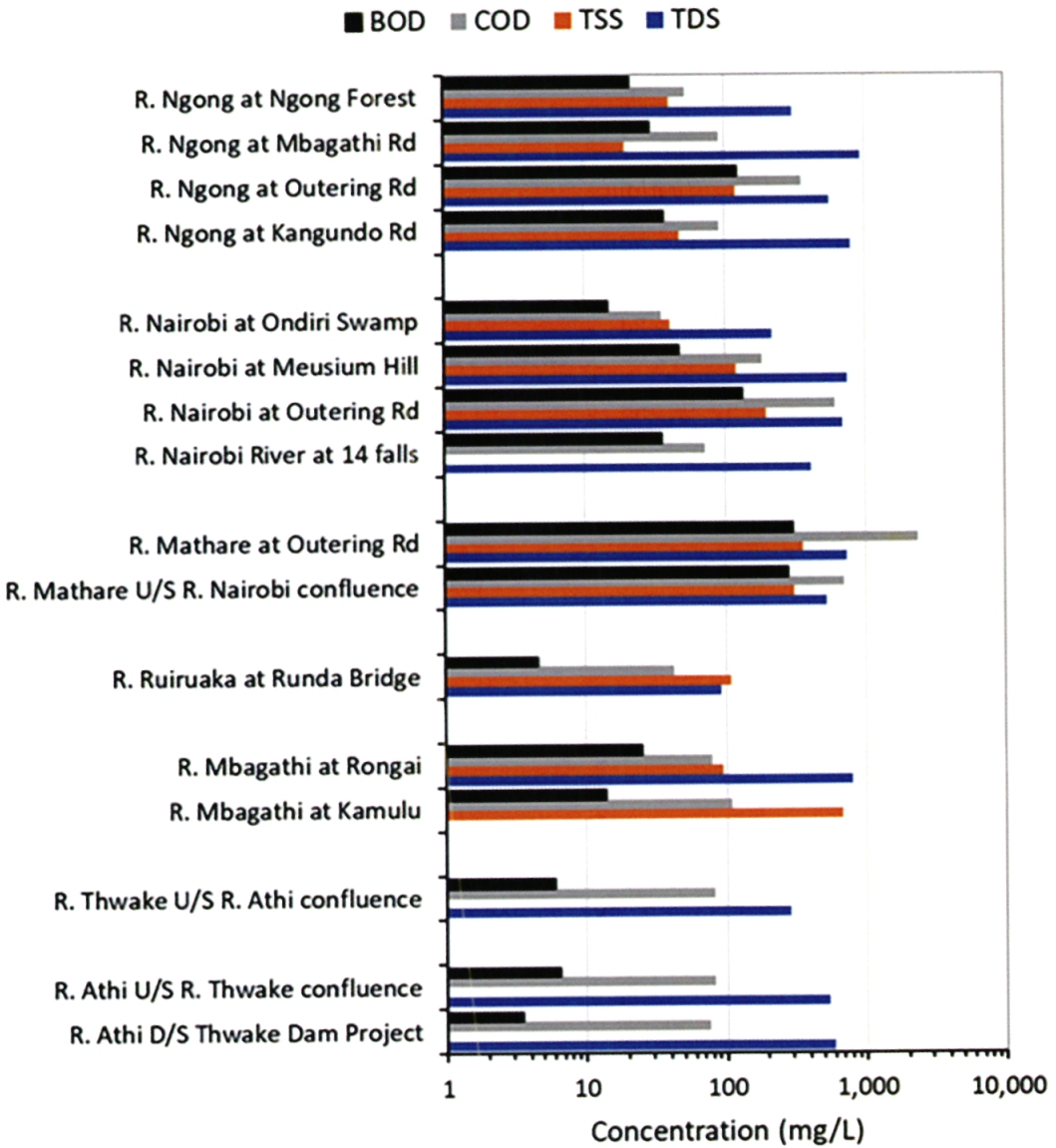
Over 584 water quality and pollution datasets were generated from the monitoring Programme of WRA in addition to the customers' samples that were received at the WRA laboratories for the analyses.

During the financial year under review, the following activities were carried out as part of conserving and protecting the water resources from pollution:

- Undertook water quality assessment and assurance with the selected arid and semi-arid landscapes of Mid Tana, Sabarwawa and Chyulu Hills. This exercise was to generate data and information to appropriately advise on the water quality management interventions in view of limited availability in these landscapes;
- Carried out Water Abstraction and Pollution surveys in the Kiu River basin under the Kiambu sub-basin and the Suguroi River basin under the Nanyuki sub-basin. The Authority also conducted the findings and recommendations of the Water Abstraction and Pollution surveys that had been previously carried out in Mwanja Mbogo and Muringaton river basins in Nyeri and Moi Ben river basin in Eldoret for compliance with water resources regulations;
- 268 water quality and pollution monitoring stations were geo-referenced and mapped as part of the water quality and pollution monitoring network stations in the six basins;
- Carried out solid waste management assessment in the upstream catchment of Thwake Dam. The key findings indicate solid waste is one of the major contributors to the decline of the quality of water resources. Most of the solid wastes are on the riparian, road reserves and in the river course. Solid waste management guidelines were developed and shared with the stakeholders - largely the County Governments, who are mandated to satisfactorily manage the solid wastes;
- Carried out quarterly water quality monitoring of the upstream ecosystems of the Athi River feeding into Thwake dam within the Athi River Basin.



Figure 2.9: Average concentration of BOD, COD, TSS and TDS along R. Athi and its tributaries during the 2022 period

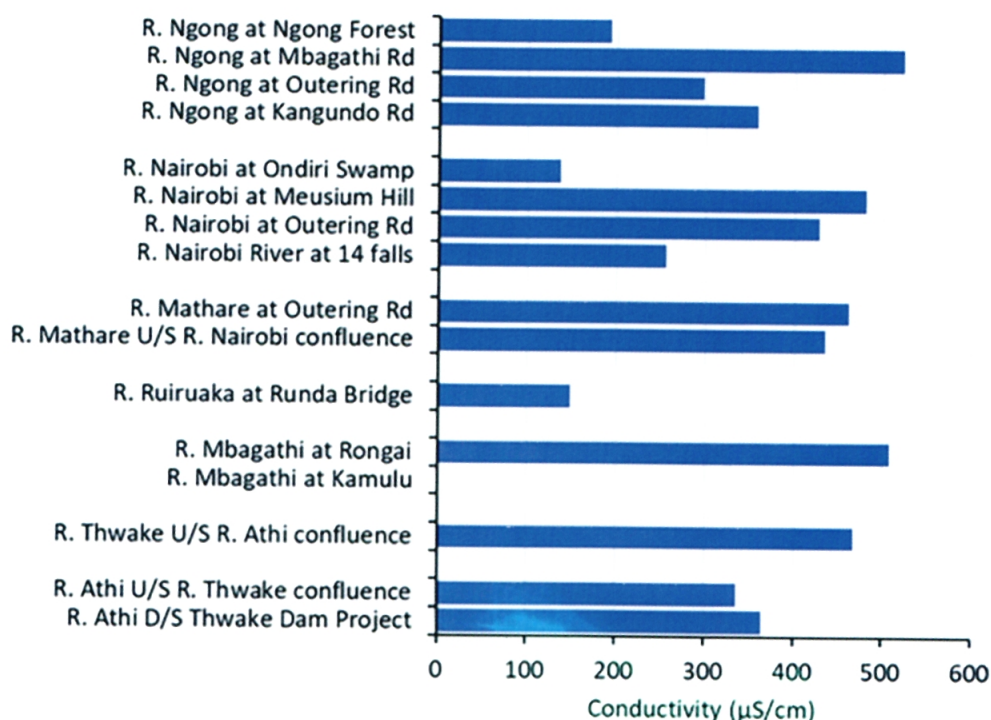


- A similar trend was observed in River Nairobi. However, at Thika 14 Falls, the BOD and COD concentrations were reduced significantly. The reduction can be attributed to (i) self-epuration of the river which is further facilitated by reduced pollutants input and aeration provided by the waterfalls albeit at low retention time, and (ii) dilution by tributaries emanating from the Kiambu region such as R. Ruiru which have less organic load. The two locations along R. Mathare, however, show no particular pattern even though the BOD and TSS are more or less constant. From Thika 14 falls to R. Athi at Thwake dam, the organic load reduces drastically by up to

one order of magnitude, with the average BOD concentration dropping to between 4 and 7 mg L<sup>-1</sup>. It should be noted that between 14 Falls and R. Athi at Thwake Dam, there is reduced input of pollutants from the few seasonal rivers that feed into the river. Moreover, the impact of urbanization on water quality is also reduced.

Like with the BOD, COD, TDS and TSS, the electrical conductivity showed a similar distribution pattern along each river profile (Figure 2.10).

Figure 2.10: Average conductivity along R. Athi and its tributaries during the 2022 period



- Following the fishkill in Lake Victoria, regular water quality monitoring continued to be undertaken. The fishkill was associated with the lake upwelling phenomenon, a case where the low-oxygen water accompanied by debris on the lake bed comes up to the surface resulting in fish experiencing clogging of gills and suffocation leading to death;
- Conducted in collaboration with Thika River Basin stakeholders the Thika Water Allocation Plan. The plan entails sustainable water resources conservation, protection and use equitably amongst the stakeholders.

### 2.5.6 Catchment Protection and Conservation

WRA has continuously implemented interventions for the protection and conservation of water catchment areas. To this end, significant strides have been made towards the declaration and protection of catchment areas. A total of 144 critical catchment areas and wetlands that require gazettelement have been identified countrywide. The Act mandates

the Authority to protect catchment areas (Section 22) and groundwater conservation (Section 23) by preparing Management Guidelines/Plans for the Protected (surface water) or Groundwater Conservation Area (groundwater). The Management Guidelines are prepared in conjunction with stakeholders in the area, describing the area and water resources issues, proposed measures required for the protection and conservation of water resources and proscribed activities within the protected or groundwater conservation area. The Guidelines are published as part of the Order in the Kenya Gazette, imposing such requirements or prohibiting some activities as may be considered necessary for the conservation of water resources.

The following 5 areas have been gazetted for protection and conservation:

- i) The Dik Dik Gardens Wetland is located in the Kilimani area of Nairobi County and the source of the Kirichwa Ndogo River (Dik Dik Gardens Wetland Conservation Area Order, 2021 LN No. 206 of 2021);
- ii) Ngarelen Springs is located in Rombo and Njukiini Sub Locations of Rombo Location Kajiado County and a source of River Rombo (Ngarelen Springs Catchment Conservation Area, 2021- LN No. 207 of 2021);
- iii) Kikuyu Springs Aquifer Groundwater Conservation Area located within Kiambu and Nairobi City Counties and a major recharge zone for Nairobi Aquifer Suite (Kikuyu Springs Aquifer Groundwater Conservation Area Management Order, 2021 LN No. 208 of 2021);
- iv) Lake Kenyatta Sub Catchment located within Lamu County is a source of water for the Mpeketoni Division of Lamu West Sub County, Lamu County (Lake Kenyatta Sub Catchment Conservation Area Order, 2021- LN No. 209 of 2021); and
- v) Amu Sand-dunes located within Amu Island and the main source of water for the island (Amu Sand-dunes Groundwater Conservation Area, Order 2021- LN No. 210 of 2021)

In addition, the process for the gazettelement of 8 more areas is at an advanced stage, having been forwarded to the Attorney General's Chambers for perusal and transmission to Parliament for approval. These areas include:

- i) Kajulu Hills in Kisumu County;
- ii) Ewaso Narok (Marura) Swamp in Laikipia County;
- iii) Kabeere Springs in Laikipia County;
- iv) Manguo Swamp in Kiambu County;
- v) Lari Swamp in Kiambu County;
- vi) Karai Swamp in Kiambu County;
- vii) Lake Ol Bolossat in Nyandarua County;
- viii) Mwangea Hills in Kilifi County.

In the financial year 2023 – 2024, WRA will initiate the gazettelement of the following areas:

- i) Fafi swamp in Garissa County;
- ii) Kamatargui Wetland Conservancy in Nandi County;
- iii) Kibirong Wetland in Nandi County;
- iv) Chereni wetlands in Nairobi City and Machakos Counties;
- v) Eneyampui Swamp in Nakuru and Narok Counties;
- vi) Siany wetland in Nyamira and Kisii Counties;

vii) Mereroni-Mbaruk swamp in Nakuru County.

The activities carried out in these recharge areas are done in collaboration with the Water Resources Users Associations, communities, and National/County Governments among others. At the policy level, a draft policy for the protection of groundwater has been developed.

### **2.5.7 Water Resources Management intervention measures**

The Ministry is mandated to Manage Water Resources. Thus far, the Ministry has put in place policies, strategies and Regulations to improve the management of Water resources. The Ministry developed the Water Resources Strategy 2020-2025. The strategy provides the government's plan and programmes for the regulation, monitoring, protection, conservation and management of the Water Resources for the strategy period. The Water Resources Authority is implementing the strategy.

Water resources management intervention measures undertaken to improve water availability and reduce adverse effects on water resources include the following: 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.

### **2.5.8 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 neighbouring countries. These Countries are the Republic of Uganda, the United Republic of Tanzania, the Republic of South Sudan, the Republic of Ethiopia and the Federal Republic of Somalia. 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 Government of Kenya with riparian states have been developing Framework Agreements such as Memorandum of Understandings (MoUs) and Cooperative Framework Agreements among others. The shared water resources between Kenya and other neighbouring countries are as follows:

The shared water resources between Kenya and other neighbouring countries are as follows:

- a) Shared Surface water resources
  - Lake Victoria Basin; Kenya shares with Tanzania, Uganda and by extension the Nile River Basin member states
  - Sio-Malaba-Malakisi River Basin; Kenya shares with Uganda
  - Lake Turkana and its river basins; Kenya shares with Ethiopia
  - Daua River Basin; Kenya shares with Somalia
  - Uмба and Lumi River basins – Kenya shares with Tanzania

- Lakes Natron, Jipe and Challa; Kenya shares with Tanzania

b) Shared Groundwater Resources

- North and South Rift Valley Aquifer; Kenya shares with Ethiopia and S, Sudan/ Tanzania in the south
- Mt. Kilimanjaro aquifer- Kenya shares with Tanzania
- Mt. Elgon aquifer –Kenya shares with Uganda
- Lamu - Kiunga sand aquifer –Kenya shares with Somalia
- Merti aquifer -Kenya shares with Somalia
- Sudd aquifer – Kenya shares with South Sudan

#### 2.5.8.1 Lake Victoria Basin

The Lake Victoria Basin is shared by Kenya, the United Republic of Tanzania and the Republic of 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 the 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 have been improving, water availability was projected to increase by approximately 1.25% annually (NWMP, 2030). In the year 2019 - 2020, rainfall recorded in the lake basin from April 2019 to April 2020 was high compared to previous years. The water quality in the lake has been affected by the inflow of sediment and nutrients influx from the catchment areas due to extensive agricultural activities in the lake basin. Hence joint efforts between the ministry and stakeholders have developed different programmes to reduce the inflow of nutrients, waste water and solid wastes into the lake. These include tracing of point and non-point sources of water pollution, relocation of solid waste dumping sites, tree planting at the degraded areas in the catchments, gabion construction to reduce transfer of sediments into the water bodies and installation of 10 telemetric hydromet stations to measure water levels and flows.

#### 2.5.8.2 Ewaso Ng'iro South River Basin

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

#### 2.5.8.3 Lake Challa Basin

Lake Challa is a crater lake that straddles the border between the Republic of Kenya and the United Republic of Tanzania. The lake is east of Mount Kilimanjaro, 8 kilometres (5.0 mi) north of Taveta, Kenya, and 55 kilometres east of Moshi, Tanzania. The lake is surrounded by a steep crater rim with a maximum height of 170 metres (560 ft). Approximately 80% 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). The freshwater lake lacks the outlet to discharge inflow water hence the lake levels have been increasing by about 0.5 m annually. Through a signed MOU between the two countries, a water allocation plan for Lake Challa was developed to enable equitable utilization of the freshwater in Lake Challa. The implementation of the signed MoU is ongoing by the joint working groups.

#### **2.5.8.4 Lake Jipe and Lumi River Basin**

Lake Jipe starts at the slopes of Mt. Kilimanjaro borders the Republic of Kenya and the United Republic of Tanzania. The lake is fed mainly by the Lumi River, which descends from Mount Kilimanjaro and traverses 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. Tsavo West National Park protects and Mkomazi Game Reserve surrounds the Lake Jipe protecting from encroachment by the communities. Rainfall received in the Lumi River Basin is high during the wet season causing flash floods downstream. The Lumi River being the only source of surface water in Loitoktok - Taveta experiences low flows during dry periods due to over abstraction and lack of rainfall to refill the water channel. Hence this seasonal variability has resulted in water shortage. In order to curb water shortage, the ministry has initiated groundwater mapping in the entire Mt. Kilimanjaro region Kenyan side to provide alternative water sources for various water demands.

#### **2.5.8.5 Lake Turkana and its river basin**

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 the 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 the 250 m high Gilgel Gibe III Dam on the 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.

Agricultural activities taking place in the catchments of the lake have increased the inflow of sediments into the lake reducing the water quality. Despite the fact that the lake waters are saline, communities living around the lake rely on spring and borehole water for domestic purposes. The rains received in 2019-2020 increased the lake levels in Rift Valley lakes including Lake Turkana.

Identification of degraded hotspot areas in the Lake Basin in the Kenyan side was done in 2020 and catchment rehabilitation measures will be conducted in the basin to reduce soil erosion. To regulate water abstraction in the catchment areas and at the lake 30 telemetric hydrometric stations were installed in 2019-2020 to monitor river and lake levels from upstream to downstream.

#### **2.5.8.6 Daua and Lagh Dera River Basin**

Daua and Lagh Dera River basin is shared by Kenya, Ethiopia and Somalia. The rivers which drain the Daua and Lagh Dera River Basin on the Kenyan side are the Daua River flowing through the borders of Kenya and Ethiopia in Mandera County, River

Kutulo that emanates from Mandera County during wet season, Lak Bor and LaghBogal originating from Marsabit County and flows through Wajir County, EwasoNg'iro North and Milgis flowing from Mt. Kenya and hills of Marsabit County at the upstream and flows through Wajir to Somalia. The river basin in Kenya is characterized by aridity and hence the rivers become seasonal during dry spells. This creates water and food shortages in the northern region and leaves the residents to rely on groundwater.

#### **2.5.8.7 *The Rift Valley Groundwater Aquifers***

There are seven shared aquifers between Kenya and its neighbouring countries. In the northern part of Kenya, the North Rift Valley Aquifer begins from Menengai Crater in Nakuru and extends towards the southern parts of Ethiopia. In the southern part of Kenya, South Rift Valley Aquifers begin from the Kenyan Rift Valley extending towards Lake Eyasi in the United Republic of Tanzania.

#### **2.5.8.8 *Mt. Kilimanjaro-Chyulu Hills Aquifer***

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

#### **2.5.8.9 *Kenyan Coastal Aquifers***

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

#### **2.5.8.10 *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 freshwater in the region, relatively little is known about the extent of the aquifer, its hydrogeological parameters and groundwater recharge. The aquifer extends from the 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 for 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.

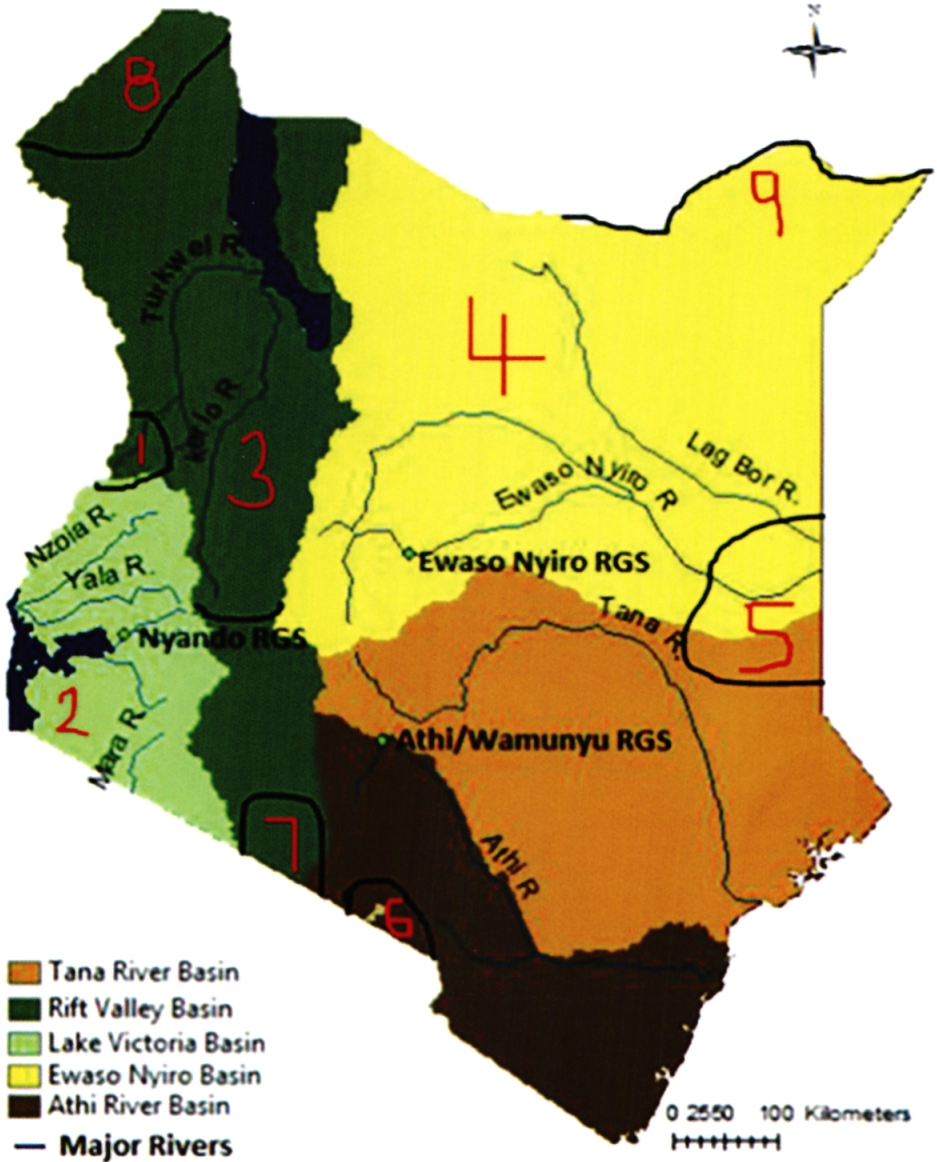
#### **2.5.8.11 *Sudd aquifer***

The Sudd aquifer is located in the northwestern 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.

### **2.5.9 *Water Resources Management Projects/Programmes***

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

Figure 2.11: Transboundary Water Resources in Kenya



**KEY**

1. Sio-Malaba-Malakisi, Lwakhakha and Suam rivers and Mt. Elgon aquifer - shared with Uganda
2. Lake Victoria Basin - shared with Tanzania and Uganda
3. Lake Turkana and its river basins - is shared with Ethiopia
4. Lag Dera and Lag Bor - shared with Somalia
5. Merti Aquifer - shared with Somalia
6. Lakes Challa and Jipe - shared with Tanzania
7. EwasoNygiro South River and Lake Natron- shared with Tanzania
8. Sudd Aquifer – Shared with South Sudan and Ethiopia
9. River Daua surface and groundwater- shared with Ethiopia and Somalia

*i. Kenya Groundwater Mapping Programme*

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

The Ministry has initiated the process of mapping Mandera County, Athi and Tana Basin areas covering 17 counties. The Ministry is in the process of engaging a consultant to undertake Mapping of Mandera County. The Collaboration created with USGS in Mapping Marsabit and Turkana counties has been extended to Map the seventeen counties in the Athi and Tana basins. The process is in the initial stage.

*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 managing Water resources with sufficient knowledge and enabling floods and drought to be predicted thereby providing adequate mitigation measures to be taken. The Ministry has been upgrading stations to telemetric to improve the reliability and timeliness of the data. In 2021/2022 the Ministry through the IGAD HYCOS programme upgraded a total of 4No. of stations to telemetry. The Upgraded stations were 5DA08 in Ewaso Ng'iro Basin at Isiolo 2EC02 in the Rift Valley Basin area and 2No. stations at Ruiruaka and Kirichwa Kubwa in Athi Catchment.

*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 Lake Turkana and its River Basins, the Government of Kenya and the Government of Ethiopia formed and operationalized steering and technical committees in the 2017/2018 financial year.

To restore the receding lake levels, sustainable management and development is required. The Government of Kenya has installed 30 telemetric Hydromet stations in Lake Turkana and its river basin to monitor the lake and river water levels. By the end of the 2020/2021 financial year, additional 3 telemetric Hydromet stations were installed, an assessment of water resources status in the catchments areas of the lake was conducted, developed catchment micromanagement plan, degraded hotspots in

the basin identified and installed observatory monitoring remote sensing networks.

At the end of 2021/2022 additional 5 hydromet stations were designed for Weiwei tributary, rehabilitated degraded catchment areas through tree planting in Kongelai, Kacheliba and Suam Sub catchments. Also, groundwater recharge zones in the river basin were mapped. The next phase of the project is to conduct a basin-wide green villages program and water quality and quantity surveillance to determine water seasonal variability.

*iv. Kocholia Multipurpose Water Resources Project:*

The Kocholia multipurpose project consists of a 43 m high dam with an approximate capacity of 66.9 million cubic metres of water. The project aims at supplying water for irrigating 2000 hectares of horticultural lands, to generate electricity and water supply to communities. The project will boost food security, and 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 location of the project is in the Malakisi River Basin. Community sensitization and stakeholders' forums have been ongoing since 2018 to date.

At the end of the financial year 2020/2021 financial year 5 telemetric hydromet stations were installed in the Malakisi River Basin, catchment rehabilitation activities such as soil conservation, tree planting, tree nursery prepared, spring protection and a 2km riparian pegging in Toloso Sub catchment. Tree planting, tree nursery preparation and rainwater harvesting in the Kaposokipi sub-catchment were done. In 2021/2022, the implementation of SCMP in the Malakisi River basin was conducted. These include capacity building of WRUA members, development and review of 5 additional SCMPs and development of flood integrated plan.

In 2022/2023, an Integrated flash flood management document was developed for the upper Malakisi river basin. Additionally, 5 sub-catchment management plans were reviewed and 3 staff gauges hydrometric stations were upgraded to telemetric stations which relay real-time data.

Resource mobilization is ongoing for feasibility study, and dam construction. The next phase of the project will be to conduct a feasibility study and develop a resettlement action plan, installation of the 5 additional telemetric hydromet stations, catchment rehabilitation in other sub-catchments and conduct Abstraction Surveys on River Lwakhakha.

*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. The project will support irrigation development of a net command area of 3876 ha of land (1,965ha in Kenya and 1,911ha in Uganda), water supply to benefit 266,486 people (127,544 people on Kenya side from Kamuriai, Osajai, Angurai, Amagoro and Busia town on the Kenya side and 138,942 people on the Uganda side from Mella, Malaba and Tororo town) and generate 1.3MW of hydropower.

It will control floods, and restore 30% of the 447 Km<sup>2</sup> of degraded upstream watershed, among other benefits. The project, when implemented, is expected to benefit at least 300,000 people from Western Kenya and Eastern Uganda directly or indirectly through the creation of employment opportunities, agricultural production (irrigation), and livestock and fisheries production. The estimated cost of the project is USD 105 million and it is being implemented by the two countries with the help of Nile Equatorial Lakes Subsidiary Action Plans. In the 2020/2021 financial year, a project inception report and detailed feasibility study was conducted.

In the next phase of the project, detailed dam designs and Environmental and social impact studies will be done. In 2022/2023, a feasibility study, Environmental and Social Impact Assessment (ESIA), Resettlement Action Plan (RAP) and Final Detailed dam designs were completed. Resource mobilization is ongoing for dam construction. The draft ToR for the water supply component has also been developed and is under review. The final draft of Sio Malaba Malakisi MoU was cleared by the Kenya Attorney General just waiting for the Republic of Uganda to finalize their part. The next phase of the project is to develop a MoU for the implementation of the Angololo Transboundary Multipurpose Project and conduct Abstraction Surveys on River Malaba.

*vi. Horn of Africa Groundwater for Resilience Project*

The HoAGW4R Project aims to enhance sustainable access to and management of groundwater resources in the borders of the Horn of Africa. Under this project, a feasibility study was conducted in the Merti Aquifer in the year 2020-2022. Also, negotiations on how to utilize the shared water resources between countries and resource mobilization to develop groundwater in the Horn of Africa region is ongoing. In 2022/2023 the TOR for finalization of transboundary water resources policy and development of draft bill was undertaken and ready for engaging consultant

*vii. Water Quality Investment Planning and Prioritization*

Under this project, the draft policy for the development of a strategy and action plan is being finalized. In addition, the procurement of Water quality field kits, laboratory equipment and instrumentation is under process by NBI. The water quality database for the Nile Basin region was developed awaiting to be populated by Nile Basin states. The water quality model has been initiated awaiting data from Nile Basin States and the Identification of water quality hotspots has been finalized.

*viii. Nile Cooperation for Climate Resilience (NCCR) Project*

The transboundary water department in collaboration with the Nile Basin Initiative (NBI) is implementing the NCCR project. The objective of the project is to improve the water management infrastructure in the Nile River Basin and increase resilience to water insecurity to reduce the increasingly severe effects of climate change.

Additionally, to improve Floods and Drought management in the Nile Basin. Under the project, the development of the Nile Basin Flash Flood and Drought Early Warning System (FFEWS) model has been initiated. Through the project, NBI plans to expand its Data and Analytics Services (NB-DAS) for climate-resilient water resources management to strengthen NB-DAS. In 2022/2023, desk studies to understand flood

and drought-prone areas in the Nile Region have been undertaken and data collection is ongoing. Capacity building of member states water experts and NBI officers was conducted on the usage of Python and R software tools for water resources and climate data analysis. Site visits in flash flood-prone areas is ongoing

**ix. *Conjunctive Management of Surface and Groundwater Resources in Selected Transboundary Aquifers within Nile Basin***

The objective of the project is to enhance knowledge and capacity for sustainable use and management of transboundary aquifers in the Nile Basin. Participating countries are Burundi, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda. The anticipated Project Benefits are: Mapping of aquifers and understanding of quantity and quality; National climate change scenarios and build-in resilience strategies to adapt to potential climate change; Improved understanding of the interactions between surface waters and ground waters; Achieve and report progress towards SDG 6. Mt. Elgon shared between Kenya and Uganda was identified as one of the selected aquifers and the project is ongoing.

**x. *The Kilimanjaro Transboundary Aquifer System Project***

Through collaboration with UNESCO-IHE, Kenya and Tanzania are advancing a project proposal on the study of 'The Kilimanjaro Transboundary Aquifer System.' The objective of the project is to improve water security and environmental sustainability in Mt Kilimanjaro transboundary region, through a better understanding of the groundwater resources, the adoption of conjunctive surface and groundwater management approaches, and the strengthening of transboundary cooperation. UNESCO considers this as an opportunity for intergovernmental cooperation in water resources management between Tanzania and Kenya. The aquifer is hydraulically linked to rivers that flow across the border from Tanzania to Kenya or emerge from springs, interacting with surface waters and freshwater ecosystems such as the transboundary Chala and Jipe lakes. In a clear upstream-downstream context, recharge in Tanzania influences groundwater availability in Kenya. The project will benefit the community through Consistent and reliable water supply. In 2022/2023 draft concept note was developed.

**xi. *Nile Basin River Flow Regional Hydromet Monitoring Project***

The Nile Basin Initiative in collaboration with the member states is implementing the Regional Hydromet Monitoring Project. In 2022/2023, the installation of the Regional Hydromet System including renovating/upgrading selected transboundary stations as well as the configuration of the data management system software was completed. The transfer of the functioning hydromet system back to the member states is ongoing. Under the project six stations were installed on the Kenyan Side of Lake Victoria Basin i.e.; Nzoia River at Ruambwa, Yala River at Kadenge, Nyando River at Ogilo, Sondu Miriu River at Nyakwere, Gucha Migori at Wath Onger and Mara at Kitchwa Tembo.

**xii. *Lake Victoria Water Resources Project***

Lake Victoria Water Resources Project aims to improve water quality and availability through strategic and sustainable management of the LVB via regional IWRM investments. Under this project, the IWRM strategy and the first 5-year action plan



have been finalized and awaiting to be presented to the Sectoral Council of Ministers for approval. Development of the Lake Victoria Basin Water Information System (LVB-WIS) and Capacity building of technical officers on the software (LVB-WIS, Delft-FEWS and XML files) to be used in the project is ongoing.

*Figure 2.12: Bench testing and installation of hydromet equipment*



## 2.6 Water Sector Institutions

### 2.6.1 Introduction

The Water Act 2016 was developed in consultation with the County Government and enacted in 2016. The Act established various 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, and setting service standards and guidelines for tariffs 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 were the successors of the Water Services Boards.

- Water Sector Trust Fund (Waterfund) - 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 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 a 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 the Water Appeals Board. The function of the Water Tribunal has since been transferred to the Judiciary.
- National Water Harvesting and Storage Authority (NWHSA) - is established under 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 the National Water Conservation and Pipeline Corporation.

Other Water Sector Institutions are:

- Kenya Water Institute (KEWI) which was transformed into a semi-autonomous institution in July 2002 through the Kenya Water Institute Act of 2001, provides training, research and consultancy services in the water and irrigation sector.
- Hydrologists Registration Board (HRB) is established under the Hydrologists Act No. 19 of 2017. The Board's mandate is to regulate the hydrology profession and Practice in the country.
- Regional Centre on Ground Water Resources Education, Training and Research, established under Legal Notice No.252 of 18th December 2015, to build knowledge and information on groundwater potential and undertake training and research on groundwater resources.

## 2.7 Status of Water Supply and Sewerage

### 2.7.1 Analysis of Water Supply and Sanitation Projects in the Ministry

The Ministry is currently implementing 158 key water and sanitation projects valued at

Ksh. 552 billion. These projects are at different levels of completion with 82 of them being more than 50% complete and targeted to be complete by 2023.

### **2.7.2 Public Private Partnership Framework for Dams Projects**

Kenya's annual per capita freshwater endowment was estimated at 406m<sup>3</sup> in 2022 meaning, that renewable freshwater is scarce. This coupled with rapid population growth, urbanization and increasing rate of economic development has created increased water demand. Kenya's varied agroecological zones, climate change and variability add to this complexity especially the severity of droughts and floods.

The Government of Kenya has therefore embarked on an ambitious programme to enhance water security for irrigation, domestic, and industrial uses and hydro-power generation through Public Private Partnership (PPP). The 100 PPP Dams Initiative, seeks private sector capital and technology through a Design, Finance, Build, Operate, Maintain and Transfer model. The targeted dams are spread across the country.

The scope of the projects will cover multiple uses of water. This includes portable water supply, irrigation and attendant catchment conservation measures. The scope also aims at increasing operational efficiencies and sustainability of downstream water and irrigation services.

The private investors will enter into a contract with the relevant State Department in the Ministry of Water, Sanitation and Irrigation or water sector agency as the Contracting Authority (CA). The investors, will undertake the implementation of the project as per the performance specifications agreed with the CA and recoup their investment cost through bulk and retail tariffs over the concession period.

So far 56 dam projects listed in Annex IV have been identified are suitable for consideration to be implemented under the PPP model as provided in the PPP Act of 2021 with agencies as Contracting Authorities and off-takers.

The dams will harvest and store 8.16 BCM to provide domestic water to 19,214,705 people, provide irrigation water for 890,365 acres and support the generation of 1,164 MW of power. The total cost is estimated at Kshs 829 billion.

### **2.7.3 Trend in Water Coverage;**

The Ministry has been undertaking monitoring of the provision of water services nationally on an annual basis. This is to track the impact of the investment that the Government has been putting into 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 six years, the water coverage by population increased from 58.0% in FY 2014/15 to 72.0% in FY 2021/22. This is distributed in different Water Works Development Agencies as shown in Table 2.7.

**Table 2.9: Population and percentage coverage for WWDAs for the last 6 years**

| WWDA             | LVS              | R. Valley | LVN       | Tanathi   | Northern  | Tana      | Coast     | Athi      | North Rift | Totals     |
|------------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|
|                  | 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  | N/A        |
| 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 | N/A        | 25,832,883 |
| %age Pop. Served | 44.0%            | 66.3%     | 58.8%     | 40.9%     | 61.6%     | 69.3%     | 52.8%     | 74.6%     | N/A        | 58.0%      |
| 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 | N/A        | 45,538,598 |
| 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 | N/A        | 27,290,543 |
| %age Pop served  | 45.60%           | 67.85%    | 61.20%    | 42.28%    | 64.36%    | 72.00%    | 54.47%    | 76.31%    | N/A        | 59.93%     |
| 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 | N/A        | 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 | N/A        | 28,854,561 |
| %age Pop. Served | 45.29%           | 70.49%    | 61.69%    | 44.40%    | 69.76%    | 69.99%    | 66.11%    | 78.03%    | N/A        | 62.00%     |
| 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 | N/A        | 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 | N/A        | 29,904,258 |
| %age Pop. Served | 44.83%           | 71.81%    | 61.89%    | 45.19%    | 70.88%    | 70.21%    | 72.53%    | 77.96%    | N/A        | 62.87%     |

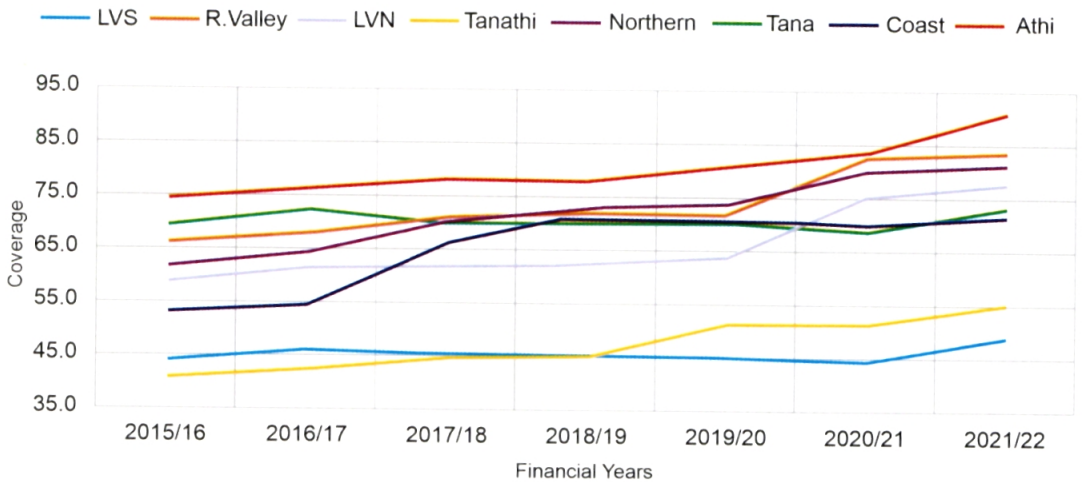


| WWDA                            |                  | LVS       | R. Valley | LVN       | Tanathi   | Northern  | Tana      | Coast     | Athi      | North Rift | Totals     |
|---------------------------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| 2019/20                         | Pop. Within WWDA | 8,224,080 | 8,492,381 | 7,049,649 | 4,766,211 | 3,605,807 | 4,003,240 | 4,424,722 | 8,044,620 | N/A        | 48,610,711 |
|                                 | Pop. Served      | 3,707,829 | 6,111,992 | 4,489,405 | 2,420,548 | 2,550,941 | 2,800,262 | 3,270,264 | 6,504,571 | N/A        | 31,855,811 |
|                                 | %age Pop. Served | 45.09%    | 71.97%    | 63.68%    | 50.79%    | 70.75%    | 69.95%    | 73.91%    | 80.86%    | N/A        | 65.53%     |
| 2020/21                         | Pop. Within WWDA | 8,391,723 | 8,665,493 | 7,193,351 | 4,863,367 | 3,679,309 | 4,084,843 | 4,514,917 | 8,287,144 | N/A        | 49,680,147 |
|                                 | Pop. Served      | 3,707,829 | 7,140,894 | 5,407,605 | 2,474,948 | 2,592,641 | 2,817,762 | 3,625,624 | 7,009,871 | N/A        | 34,777,174 |
|                                 | %age Pop. Served | 44.18%    | 82.41%    | 75.17%    | 50.89%    | 70.47%    | 68.98%    | 80.30%    | 84.59%    | N/A        | 70.0%      |
| 2021/22                         | Pop. Within WWDA | 8,595,494 | 7,887,369 | 7,371,789 | 5,198,690 | 3,529,654 | 4,228,682 | 4,771,939 | 9,187,753 | 3,256,117  | 54,027,487 |
|                                 | Pop. Served      | 4,176,624 | 6,585,164 | 5,724,194 | 2,815,611 | 2,525,820 | 3,085,246 | 3,897,720 | 8,357,180 | 1,529,073  | 38,845,583 |
|                                 | %age Pop. Served | 48.59%    | 83.49%    | 77.65%    | 54.16%    | 71.56%    | 72.96%    | 81.68%    | 90.96%    | 46.96%     | 71.9%      |
| Additional People Served (6yrs) |                  | 862,485   | 1,423,020 | 1,927,116 | 1,029,997 | 488,198   | 541,917   | 1,757,512 | 2,853,651 | 1,529,073  |            |
| Additional Pop. Growth (6yrs)   |                  | 1,057,005 | 102,946   | 909,826   | 829,808   | 224,441   | 559,167   | 716,079   | 1,813,764 | 3,256,117  |            |

Table 2.7 shows the data that was used to compute percentage coverage by population for each of the WWDA's. The trend of growth in coverage is presented in Figure 2.13.

Figure 2.13: Comparison of water coverage by various WWDAs for the last 5 years

### Water Coverage by WWDAs

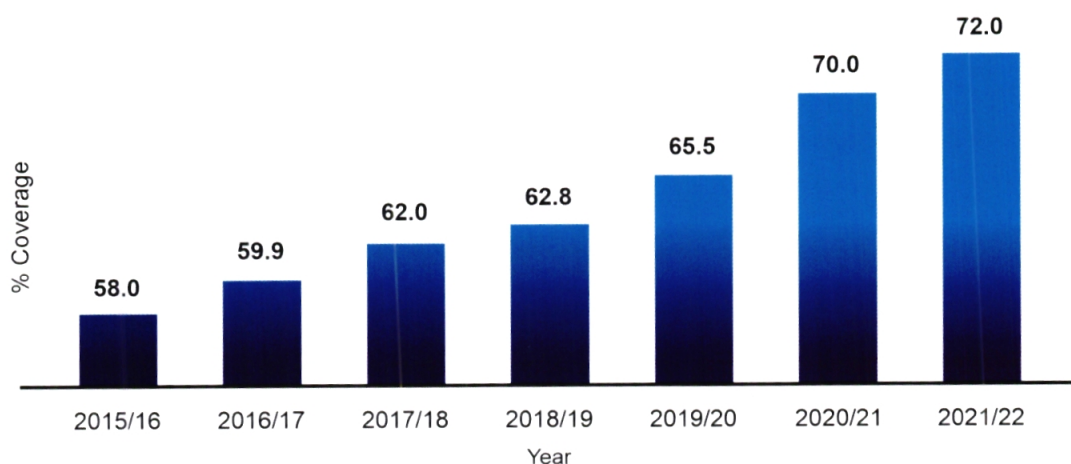


As shown in Figure 2.13, different WWDAs have achieved different results in the last five years. This is attributed to a number of projects that have been completed over the duration. Athi WWDA has the highest coverage of 90.96% influenced mostly by better coverage in Nairobi. North Rift WWDAs have the lowest coverage at 46.96% respectively. This can be attributed to project completion rates. Some of the key projects completed in each agency area are as follows:

- Athi WWDA: Bulk Water Supply NCT component IV Kiambu -Embakasi transmission line, Karimenu II dam water project, Lot 2 Western transmission line Kabete-Uthiru-Karen, Kigoro Treatment Plant, Oloitoktok Water and Sewerage, Murang'a Urban Water Supply, Northern Collector Tunnel phase 1 and Nairobi Water Distribution Project Lot I (Kiambu-Roysambu-JKIA).
- Lake Victoria South WWDA: Homabay Cluster Water Supply and Sanitation Project, Lot II Additional Last Mile Connectivity Siaya Bondo towns, Migori Water Project, West Karachuonyo Water Supply project and Expansion of Nyamira Water Supply.
- Central Rift Valley WWDA: Chemususu dam water supply project, Last Mile connectivity for Kabarnet town, Naivasha Industrial Park Water Supply Project, Olkalou town sewerage project, Rehabilitation of Leshau-Karagoini water supply Project, Narok Sewerage and last mile connectivity and Kases Dam Water Supply Project.
- Lake Victoria North WWDA: Kiptogot-Kolongolo Water Supply project, Mumias Water Supply Project, Vihiga Cluster water project, Kericho Sewerage Improvement project, Water Supply project in Chwele area Nandi Hills water project and Chepyuk Ward-Kibabii complex Water Project.
- Coast WWDA: Improvement of Water supply to Dongo Kundu Special economic zone, Water harvesting project, Construction works for west mainland works, 3No. Replacement boreholes at Baricho, Malindi informal settlement, Nyalani Water Supply Project, Watamu Lot 2A distribution network and Mkanda- Mwabandari rising main.
- Northern WWDA: Jukala Waradey Water Project, Yamo Dam, Idhido dam project, Marsabit Water Project, Marsabit Sewerage project, Wamab water supply Project, Qoloba II Water pan, Garissa Sewerage project and Isiolo Water and Sanitation Project.

- g) Tana WWDA: Chogoria Water Supply Project, Mathira Water Supply Project, Chuka Water supply project, Murang'a urban water supply project, Maua water project too and Murang'a South water supply project.
- h) Tanathi WWDA: Mavoko NHC sewerage project, Mavoko Drinking Water supply and sanitation, Kakuya Water supply, Masinga Cluster phase II, Migwani Water Supply project, Yatta Canal rehabilitation, Machakos Water and Sanitation Project and Wote Water Supply & Sanitation Project.
- i) NRVWWDA: Chepareria Sewerage project, Chesang'at Marich water project, Soy-Kosachei Water Project, Expansion of Kapsoya Treatment Works and Ellegireni pipeline, Sabor-Iten Water Supply, Tulwet water project, Kapenguria-Makutano Water Project and Leseru Water Project.

*Figure 2.14: Trend of national water coverage for the last 6 years*



As shown in Figure 2.14, the overall water coverage however has been on a steady rise from 58.0% in FY 2015/16 to 70.0% in FY 2020/21. The WWDA that has contributed most to 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 an impact in these areas. In the last 5 years, Waterfund has been able to increase the population with access to safe water by 0.9 Million through the implementation of projects by water user associations and water utilities. This is shown in Table 2.8.

#### **2.7.4 Trend in Sewerage Coverage**

For the last 5 years, the sewerage coverage has increased from 20.1% in 2014/15 to the current 31.1% in 20/2021. 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.

**Table 2.10: Population and percentage Water coverage by Waterfund Rural Marginalized/ Underserved and Urban Poor in the last 5 years**

|   | 2017/2018  | 2018/2019  | 2019/20    | 2020/21    | 2021/22    | Totals     |
|---|------------|------------|------------|------------|------------|------------|
| National Population                                       | 46,540,427 | 47,564,296 | 48,610,711 | 49,680,147 | 56,082,000 | 56,082,000 |
| Rural Marginalized/ Underserved and Urban Poor Pop Served | 248,160    | 336,496    | 163,455    | 58,597     | 87,127     | 893,835    |
| % of Pop Served   | 0.5%       | 0.7%       | 0.3%       | 0.1%       | 0.2%       | 1.6%       |

### 2.7.5 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 is charged with the responsibility of service provision including the development of distribution networks and actual service connections. The Ministry is targeting to ensure universal coverage of water and sanitation services by 2030. The short-term targets to be achieved by 2027 are:

- Achieve a national coverage of 90% for water services by 2027 from 60% in 2017
- Achieve a national coverage of 90% for sanitation services by 2027 from 67.2% in 2017
- Achieve a 70% coverage of Sewerage services in Urban areas by 2027 from 25% in 2017

The Ministry has adopted the following strategies to ensure the achievement of the target for water coverage:

1. Complete all the 198 ongoing projects by 2024 at an average cost of KShs. 49 Billion annually.
2. Mobilize resources for the construction of 51 projects proposed at an average cost of KShs. 23 billion annually.
3. Reduce Non-Revenue Water from the current 40% to 20% by 2030

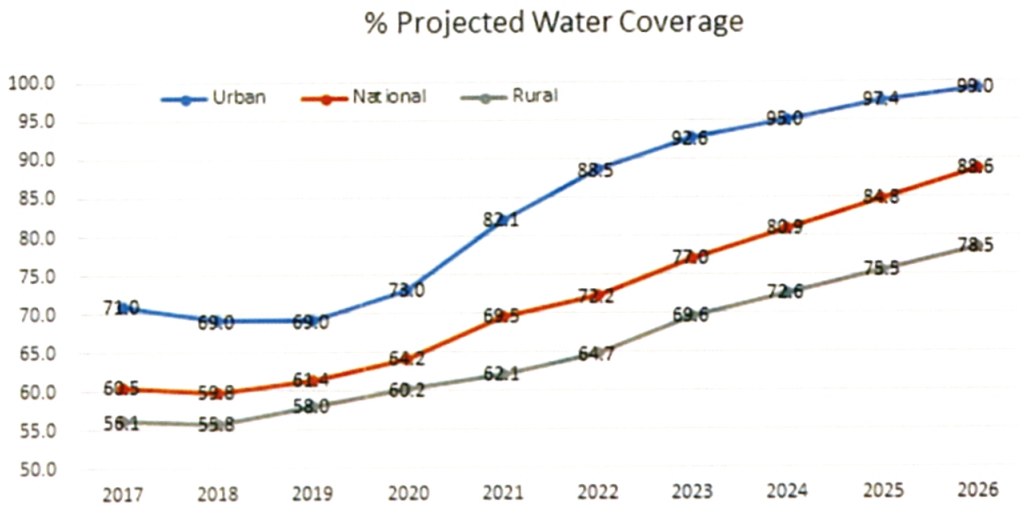
#### 2.7.5.1 Projected Water Coverage

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 70.0% in mid-2022, projects were identified (Annex II) that will be completed on or before the year 2024. The list has been revised and updated to reflect the effects of Covid-19 on funding levels. Their impact was assessed at the projected water coverage carried out as shown in Figure 2.15.

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. A high growth rate of coverage in 2021 and 2024 is expected as most of the high-impact projects will be complete and connected during that period.

Figure 2.15: Projected Water coverage to be achieved on or before the year 2026



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.

### 2.7.5.2 Projected Sewerage Coverage

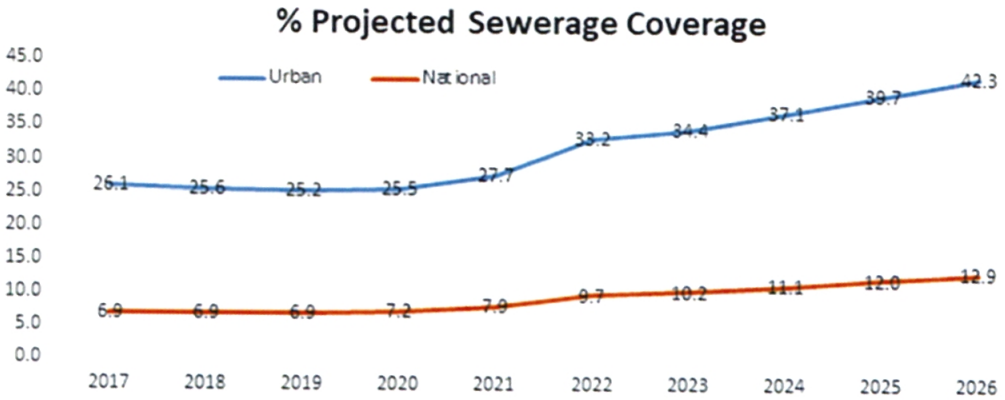
Sewerage coverage in the country is targeted in urban areas where there is a higher density of population. Currently, about 31% of Kenyans live in urban areas, a proportion which is growing.

In order to achieve 45% sewerage coverage by 2026, the last-mile sewerage connectivity will have to be done for 350,000 households annually. There is therefore need for the National Government (which undertakes to construct major infrastructure) to closely collaborate with County Governments (which are tasked with carrying out Service Provision and last-mile water connectivity).

Based on the urban sewerage coverage of 31 % in mid-2022, projects were identified (annexed) that will be completed on or before the year 2024. Their impact was assessed and projected sewerage coverage was carried out as shown in Figure 2.16.

Fig. 2.16 shows a maintenance of 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 2017 and 2019, the population grew almost at the same rate as the additional number of people that were served with sewerage services (average population growth rate of 2.2% per annum). The number of people to be connected from 2020 to 2022 will be much higher than the growth rate owing to the number of sewerage projects that will be completed by then.

Figure 2.16: Projected Sewerage coverage to be achieved on or before 2026



These statistics were based on the following assumptions:

1. 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 the 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 to 2024 including those which have not been designed. Projects that are likely to be delayed will impact 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 the achievement of the targets.
4. The budget and cash flow projections for these projects must be increased to ensure that they are completed on time.

## 2.8 Status of Sanitation

To strengthen the coordination of Sanitation, the Ministry has created a fully-fledged Sanitation Department and is in the process of staffing it with the required human resources as per the approved establishment.

### 2.8.1 Sanitation in Rural marginalized/underserved and urban poor

The Ministry through the Water Sector Trust Fund (WSTF) has been implementing various projects both in the Urban Poor and Rural Marginalized areas. This has been having an impact in these areas. In the last 5 years, WSTF has been able to increase the population with access to safe water by 569,467 through the implementation of projects by water user associations and water utilities. This is shown in Table 2.9.

**Table 2.11: Population reached with sanitation services by Water fund in rural marginalized/ underserved areas and urban poor**

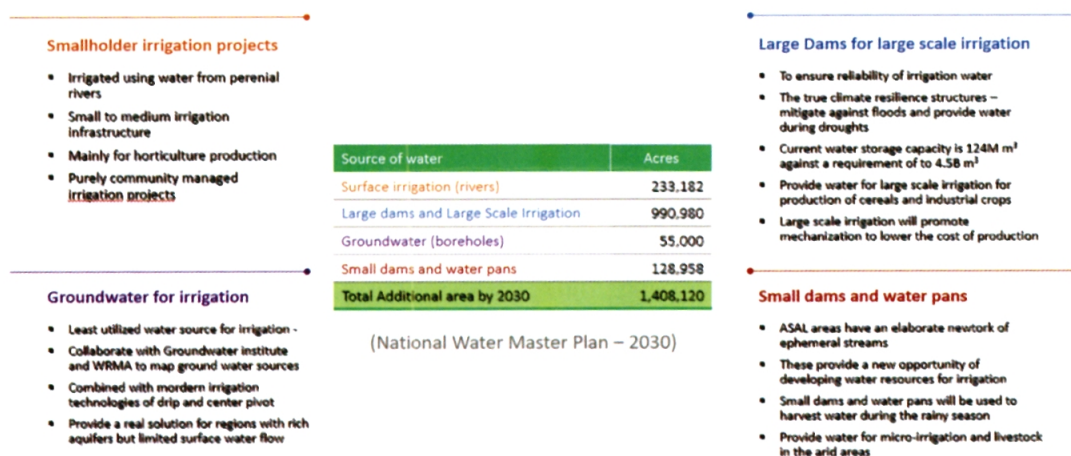
|   | 2017/2018  | 2018/2019  | 2019/20    | 2020/21    | 2021/22    | Totals     |
|---|------------|------------|------------|------------|------------|------------|
| National Population                                       | 46,540,427 | 47,564,296 | 48,610,711 | 49,680,147 | 56,082,000 | 56,082,000 |
| Rural Marginalized/ Underserved and Urban Poor Pop Served | 129,360    | 121,984    | 167,130    | 192,273    | 74,548     | 685,295    |
| % of Pop Served   | 0.3%       | 0.3%       | 0.3%       | 0.4%       | 0.1%       | 1.2%       |

## 2.9 Status of Irrigation and Land Reclamation

### 2.9.1 Irrigation

According to the Water Master Plan, the country’s irrigation potential is estimated at 1.913 million acres (765,200 ha) without water storage and can go up to 3 million acres (1.2 million ha) with storage. The Government in 2013 developed a strategy to increase national irrigation coverage by 140,000 acres annually to bridge the gap in the next 10 years. The strategy has seen the irrigation coverage progressively increase to the current 694,000 acres, accounting for 36.3% of the potential without water storage. Out of the country’s total arable land only 6% is equipped with irrigation infrastructure. The opportunities for irrigation investments may be unpacked as in figure 16.

**Figure 2.17: Opportunities for irrigation investments**



#### 2.9.1.1 Expanded Irrigation Programme

With the success of the Economic Stimulus Programme (2009-2011) directly and indirectly benefiting an estimated 1.2million households, the government initiated the National Expanded Irrigation Programme. In the Budget Statement to Parliament for the 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 the 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 the sustainability and reliability of irrigation water, the sector also embarked on providing water storage for irrigation. In arid areas, development initiatives focused on the provision of water storage reservoirs and the installation of greenhouses. The water pans provide water for domestic and animal consumption while greenhouses supplement the local community's nutritional needs and provide a source of income for women and youth groups.

To increase the reliability of irrigation water, water-harvesting and storage initiatives have been carried out that include:

- EOIs for 8 large dams were advertised during the year under the PPP financing model, 7 concepts were developed and submitted to the PPP Directorate for approval while PIPs were approved for 2 large dams to proceed to the project development phase. The se large dams have a potential water storage capacity of 7,137 BCM to irrigate 786,750 acres.
- Under irrigation water harvesting programs, the Ministry has constructed 5,583 household water pans with a cumulative volume of 7,707,845m<sup>3</sup> benefitting 5,583 citizens.
- In addition, the Ministry constructed 57 community water pans across the country with a cumulative volume of 4,094,920m<sup>3</sup> benefitting 2,730 farmers. To date a total of 421No. community water pans have been constructed creating a combined volume of 31.7 million cubic meters of water and putting 21,166 acres under irrigation.
- 8 No. water pans have been constructed creating a combined volume of 645,000m<sup>3</sup> of water and putting about 430 acres under irrigation through Water Security & Climate Adaptation in Mandera & Wajir.
- 11 No. water pans have been constructed creating a combined volume of 812,000m<sup>3</sup> of water and putting about 541 acres under irrigation under the Spate Irrigation for Climate Resilience project whose aim is to provide water for irrigation and livestock to spur economic development in the rural areas of Samburu, Marsabit and Isiolo counties.

#### ***2.9.1.2 Micro-Irrigation for Schools Programme***

The project involves constructing micro irrigation facilities in 2000 schools to enable about 2,000 acres of land in schools to be put under production. The project involves drilling boreholes to benefit 2,000 schools with water across the country annually. It is an intervention to build the 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 investments are futile as they gave poor returns. This nearly led to less interest in agriculture in our learning institutions. Micro-irrigation programme for schools is intended to reverse this by providing Water sources from boreholes and small dams to institutions and piloting commercial agriculture with intensive irrigation in greenhouses. With secured income and sustainable water availability, the intervention has attracted a lot of interest.



In FY2022/23 four (4) schools were equipped with micro-irrigation facilities to benefit the schools and the surrounding communities, giving a total of 85 boreholes since 2016. These are used for vegetable growing and tree/fruit seedling production.

### **2.9.1.3 Ongoing Irrigation projects**

During the period the Ministry did and continues to undertake the following irrigation interventions:

- i. Construction of the Thiba dam to store about 15.6 million m<sup>3</sup> of water and irrigation infrastructure under the Mwea irrigation development project was completed and the dam was commissioned by the President in October 2022. The dam is full and has stabilized water flows to provide water to increase the area under irrigation from 25,000 to 35,000 acres and support the production of a second crop. This intervention has seen the production of rice in public schemes increase to 128,000 tons to bridge the country's rice deficit.
- ii. Rehabilitation of the Bura Irrigation project in Kilifi and Tana River counties by converting the system from pump pump-fed to gravity-fed irrigation system and increasing the area from 6,000 acres to 15,000 acres. The construction works have since been phased; phase 1 which deals with the intake works is currently at 98.6% and phase 2 which handles the main gravity canal is 50.2% complete.
- iii. National Expanded Irrigation Programme and community-based irrigation projects target to bring an additional 20,000 acres under irrigation annually. Constructed over 240 irrigation projects across the country with a cumulative total area of 237,079 acres directly benefiting over 268,000 farmers.
- iv. Implementation of the 10,000-acre model farm for the Galana Kulalu Food Security Project. 5,100 acres have been achieved and are under production. All the remaining 25 centre pivots have been installed and tested. Equally, the main conveyance and Distribution Pipeline of 29 Km has been completed out of the 36 km. The project is 95.53% complete.
- v. Construction of the 1500-acre Rwabura Irrigation Development Project in Uasin Gishu county. The two intakes and the conveyance canal have been done and the project is now 63.16% complete.
- 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 have been achieved and production is going on with 1,840 farmers.
- viii. Completed construction of the 1500-acre Lower Sabor Irrigation Development Project under a gravity-fed sprinkler irrigation system and production is ongoing.
- ix. Construction of the 30,000-acre Turkana Irrigation Development Programme in Naipa through groundwater in the Lotikipi aquifer where 3,968 acres have been achieved. Overall, 20 projects have been completed with a total area of 20,195 acres to benefit 9,080 households which has provided a stable supply of grains at an average of 38,000 tons of maize and millet annually.
- x. Maintenance of public schemes' main infrastructure (canals), maintenance of pumps in pump-fed schemes, provision of irrigation water to 50,315 acres across the schemes and capacity building for farmers through training to optimize production. 3,222 acres were also expanded in the existing schemes.

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

- i. Thiba Dam as mentioned earlier is complete and is currently supplying irrigation water to the Mwea Irrigation Scheme.
- ii. Construction of water harvesting infrastructure for households to provide 125,000 households with localized reservoirs to supplement their irrigation needs. Constructed 35,070 household water pans in 31 counties with a combined volume of 49.1 million cubic meters to irrigate about 49,102 acres and benefit 35,070 households.
- iii. Rehabilitation of existing small dams and water pans to increase their capacity to meet irrigation demand for neighbouring communities. Over 4,000 water pans were to be rehabilitated with a capacity of 400 million cubic meters across the country. To this end, water pans with an estimated capacity of 24 million cubic meters have been constructed and rehabilitated for crop production and animal consumption in 31 counties.
- iv. 1,812,000 m<sup>3</sup> of water has been realized under the Post-Covid Economic Stimulus Programme (PC-ESP) jointly through Spate Irrigation for Climate Resilience in Samburu, Marsabit & Isiolo counties and Water Security & Climate Adaptation in Mandera & Wajir Clusters.

The details of ongoing projects are included in Annex II. As detailed, there are opportunities to extend 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 685,136 acres, an increase of 107%. 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.

#### ***2.9.1.4 Irrigation Development Opportunities***

Only 49.2% of the irrigation potential of 1.393 million acres has been exploited. There exists a huge potential to tap into the undeveloped potential. The sector is putting efforts towards the development of extensive irrigation projects accompanied by irrigation water harvesting and storage initiatives. Besides, the sector has continued to catalyze farmer-led irrigation development (FLID) initiatives, which have high potential for increasing area under irrigation, through diagnostic studies in collaboration with the World Bank and Water Resource Group 2030.

The potential in irrigation can be exploited through the following interventions:

#### **a) Irrigation projects**

##### ***i. Large-scale irrigation projects***

The Irrigation Act defines a large-scale irrigation scheme as a scheme whose area

is above 3,000 acres. Towards this end, the sector has seen the successful operation of the largest irrigation scheme in the name of the 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 are estimated to cost Kshs 83.7 billion. This will have a huge impact on the food and nutrition pillar of the big four through a 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 which will use the Daua River which is shared between Kenya, Ethiopia and Somali, the Umba Valley project whose water source is the 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 a need to conclude the memorandums of understanding with the neighbouring counties to enable progress in the projects.

#### *ii. Community-managed smallholder irrigation projects*

These are projects initiated by the communities to boost their agricultural production. They constitute the largest area under irrigation in the country constituting 50% of the total area under irrigation. The projects are initiated by the government, development partners or communities themselves through farmer groups. In line with the Irrigation Act, 2019 such schemes range between 100 to 3000 acres and are a responsibility of the national government to implement. The structures are small making them easy to build, operate and maintain. They can also be implemented in regions with fairly limited water resources and can use different water sources including major rivers, streams, water pans and boreholes.

The projects are quick wins in irrigation development because the implementation cycle is short from identification, and design to construction. Over 200 projects have been completed increasing the area under irrigation by 176,000 acres. They are mainly for horticultural crop production. 228 projects have been finalized and are ready for implementation out of the 610 potential projects that the sector has earmarked for implementation covering a potential area of 531,574 acres. These projects are well distributed in various counties across the country. These projects



are implemented under the National Expanded Irrigation Programme, Community Based Irrigation Projects and, recently the Smallholder Irrigation Programme Mt Kenya Region under cost-sharing with the beneficiaries. As detailed in Annex III, 240 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 incentives for farmers.

**iii. Farmer-led Irrigation Development Initiatives**

Farmer-led irrigation development (FLID) is a process where farmers assume a driving role in improving their water use for agriculture. FLID is characterised by small-scale irrigation that is low cost, initiated, developed and managed by farmers usually deriving irrigation water from rivers, lakes, shallow wells, small pans, boreholes and reservoirs.

To achieve accelerated expansion of irrigation development in the country the Ministry plans to promote and support individual small-scale farmers to transition from rain-fed to irrigated agriculture. This will entail, among other strategies, de-risking financial institutions through credit guarantee programmes to enable the small-scale farmers to access finance to acquire irrigation equipment and production inputs, in addition to providing capacity building on the management of irrigation systems, production, value addition and marketing. There is a great opportunity to rapidly scale up FLID in Kenya through creating an enabling environment for the private sector to support it. About 30,000 acres can be developed through FLID and the Ministry already submitted a proposal to the World Bank for support.

**iv. Expansion of Public Irrigation Schemes**

To realize more acreage towards achieving food security, the proposed expansion and modernization of public irrigation schemes will see the irrigation area increase by an additional 16,100 acres from the current 63,342 acres. 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 1.025 billion.

**b) Water harvesting for irrigation projects**

In recent years 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 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 construction of the 15.5 million cubic meter capacity Thiba dam for the Mwea irrigation scheme is complete and is already operational.



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 the 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 arid counties. The project will be implemented across arid areas where landowners are willing to freely cede land for the 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. During the period under review, a total of 37,070 household water pans with a potential volume of 49.1 million m<sup>3</sup> that can irrigate 49,102 acres have been achieved.


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

Over the years, spanning from colonial times, there have been numerous interventions to increase 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 the sole source of water for diverse communities. However, over time, the reservoir has 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<sup>3</sup> to irrigate 394,500,000 acres at an estimated cost of Kshs 59.2 billion as detailed in Annex VI. Community water pans with a combined volume of 23 million m<sup>3</sup> have been rehabilitated for crop production and animal consumption.

**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 stormwater in direct response to precipitation with water flowing only during and shortly after large precipitation events. The only opportunity there is to reliably use these water resources for livestock watering and agricultural production is through the provision of water harvesting and storage structures. Construction of small dams across the lagas accompanied by water pans and provision of efficient irrigation systems 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<sup>3</sup> is constructed to increase the 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, and 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 which has immense groundwater resources and 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 and complete efficient irrigation systems at an estimated cost of Kshs 7 billion.

**d) Galana Kulalu Food Security Project**

The Project involves the 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 a 10,000-acre model farm as phase I, followed by a 170,000-acre pilot farm as phase II.

The implementation of the model farm is 95.53% complete in terms of infrastructure development that includes the installation of 21 centre pivots covering 3,300 acres, pipes for drip irrigation covering 1800 acres installed and construction of the 2 pumping stations and one sedimentation basin which are under production. Notably, all pipe networks to distribute water in the entire 10,000-acre farm have been installed.

To complete the 10,000 acres model farm, NIA disengaged with Green Arava, the Israeli Contractor who defaulted and abandoned the site and contracted Irico International to complete the remaining works (25 centre pivots, 6 pumps and 36 km of pipeline) covering 4,900 acres. Out of these, 25 centre pivots have been installed, 29 km of pipeline laid and construction of pump house is ongoing. 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 2.11, 2.12, and 2.13 below will cover all regions through the implementation of 5,715 projects. This is expected to increase the area under irrigation by **1,519,913** acres, provide a 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 2.12: Summary of 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             | 240            | 230,866      | 42,204,847,582  | 43,671,600,000            |
| Expansion of Public Irrigation Schemes | 6              | 9              | 1,500        | 1,025,000,000   | 3,573,837,500             |
| Groundwater for irrigation             | 23             | 23             | 23,000       | 8,050,000,000   | 6,575,861,000             |
|  |                | 294            | 667,097      | 135,013,462,582 | 167,821,282,517           |

*Table 2.13: Summary of 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         |
| <b>Total</b>  |   | <b>5,433</b> | <b>910,996</b> | <b>1,590,096,000</b> | <b>195,380,000,000</b> | <b>168,702,459,572</b> |

*Table 2.14: Summary of irrigation and water harvesting projects*

|                           | No of projects | Area (acres)     | Cost Kshs              | Value of produce annually |
|---------------------------|----------------|------------------|------------------------|---------------------------|
| Irrigation Projects       | 294            | 667,097          | 135,013,462,582        | 167,033,782,517           |
| Water harvesting Projects | 5,433          | 910,996          | 195,380,000,000        | 168,702,459,572           |
| <b>Total Combined</b>     | <b>5,727</b>   | <b>1,578,093</b> | <b>330,393,462,582</b> | <b>335,736,242,089</b>    |

### 2.9.2 Land Reclamation

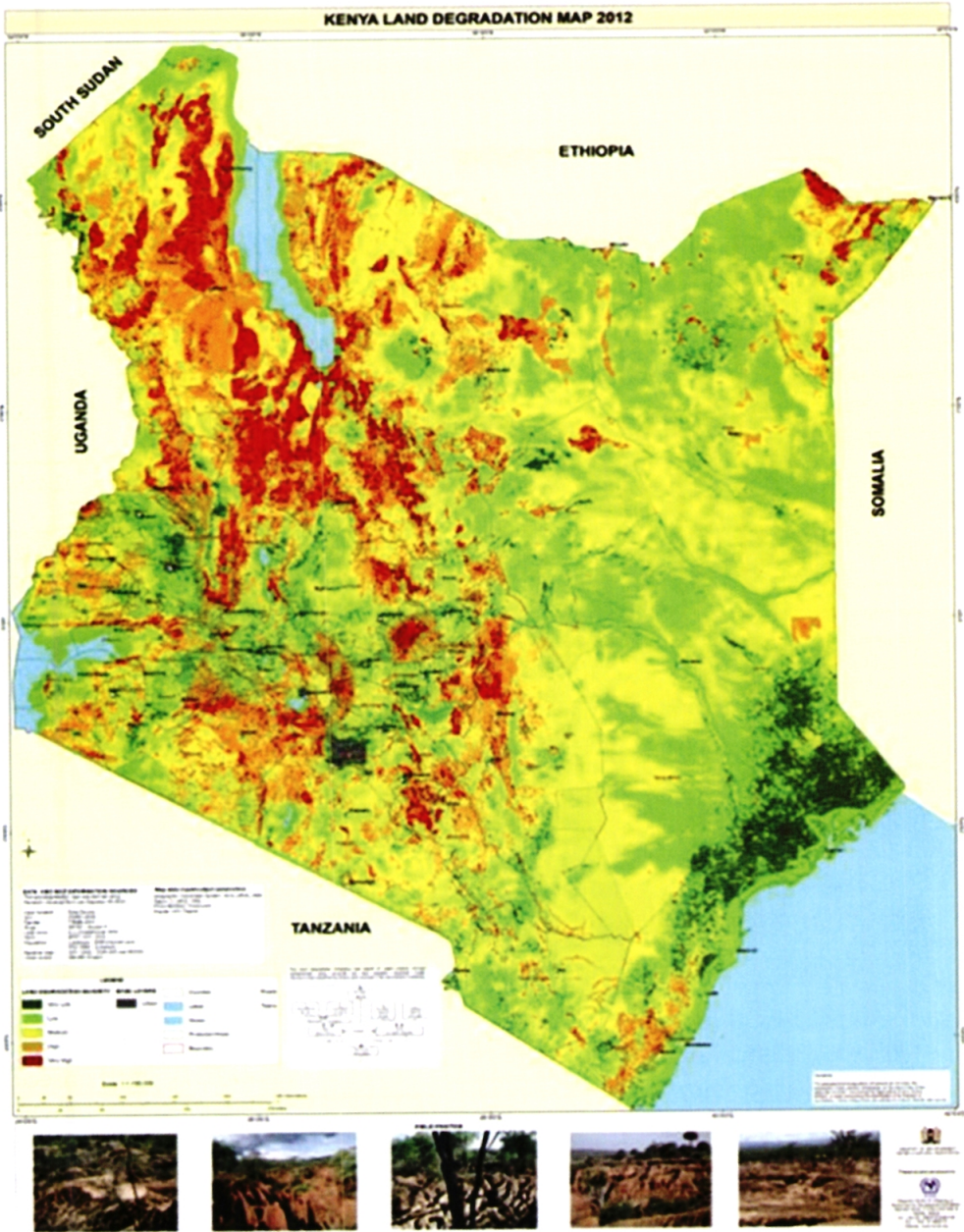
Land degradation is the reduction in land quality due to natural or human activities. It is a global problem which leads to increasing aridity and desertification of marginal, semi-arid and dry sub-humid lands. In Kenya, land degradation is a very slow process and landowners, policymakers, and legal and political leadership only recognize it at the point of severity. The long-term effect of land degradation is the loss of both ecosystem 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 25.3% of Kenya's land mass is moderately severe to severely degraded and affects over 12 million people. Land degradation negatively impacts environmental water conservation, leads to high surface water runoff, and silting of dams and is the main cause of food and water insecurity. Land degradation occurs in the whole country with varying levels of severity but whether natural or as a result of human activity, has lowered the 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 the 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 to 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 2.18.



Figure 2.18: Land Degradation Assessment (LADA); Kenya -2012



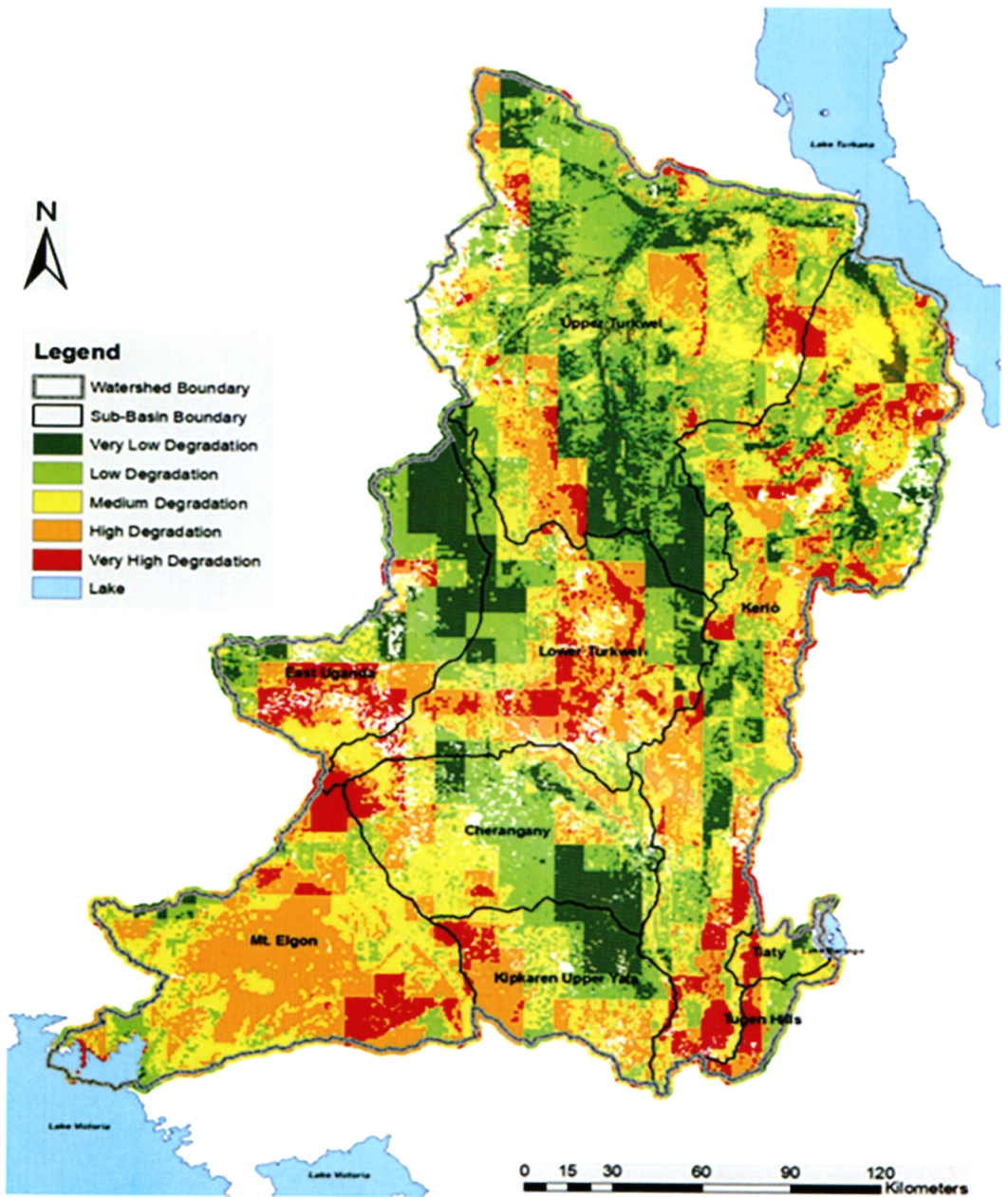
Source- RCMRD, UNEP and Ministry of Water and Irrigation

### 2.9.2.1 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 teams, professionals and policymakers. In the period under review Land degradation assessment for Upper Kerio Valley and

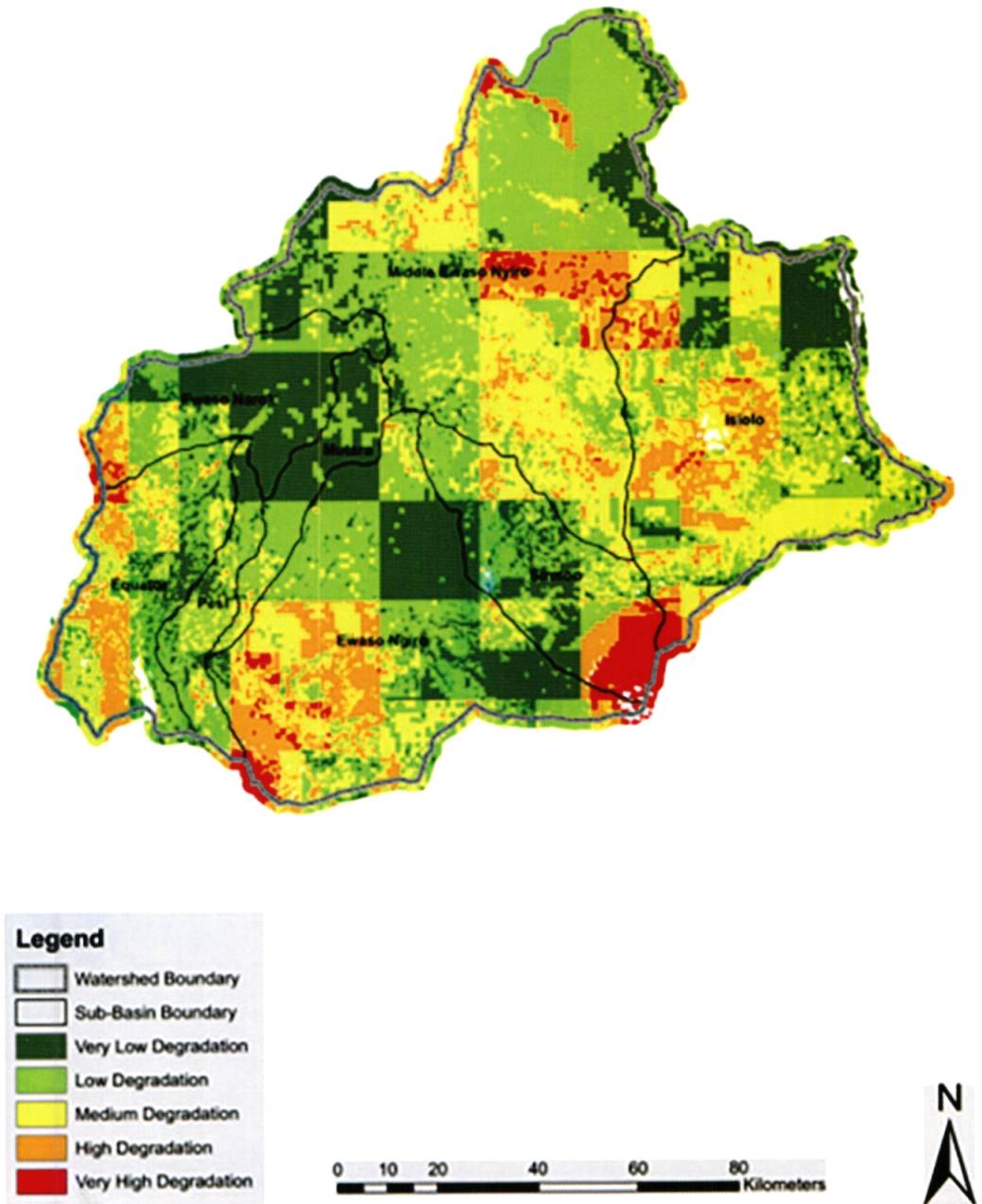
Upper Ewaso Nyiro North River watersheds was completed. The LADA findings were disseminated to stakeholders at both national and county levels for implementation. In future, 13 outstanding watersheds shall be assessed at high-resolution levels. During the reporting period, landowners were engaged to reverse land degradation trends and to achieve LDN on all land use activities.

Figure 2.19: Upper Kerio Valley Land Degradation Status 2020



Source: LADA REPORT; MWS & I 2022 by Mapinfotek Geomatiks Ltd

Figure 2.20: Upper Ewaso Nyiro North Land Degradation Status 2020



Source: LADA REPORT; MWS &I 2022 by Mapinfotek Geomatiks Ltd

Figures 2.21, 2.22, 2.23 and 2.24 show the impacts of land degradation and reclamation interventions in various Counties in the country.

*Figure 2.21: Highly degraded land at Mtembur in West Pokot County*



*Figure 2.22: Bare wasteland reclaimed in Wajir County*



*Figure 2.23: Kabinat water pan in Baringo Central where unproductive land has now been put under production through micro-irrigation*



*Figure 2.24: Land in Turkana County under reclamation*



### **2.9.2.2 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 12.5 million m<sup>3</sup> 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 are achieved with irrigation, re-vegetation, and land healing conservation.

## **2.10 Monitoring, Evaluation and Reporting**

The Ministry has the overall mandate for water sector policy and coordination. This responsibility covers the coordination of all sector activities and resources. Sector consultations, planning and monitoring are done based on established dialogue platforms, information systems, performance reporting and the medium-term planning process. The Monitoring, Evaluation and Reporting in the Sector is guided by the National Monitoring and Evaluation Framework, National Integrated Monitoring System (NIMES), Kenya



Evaluation Guidelines and the Sector Monitoring and Evaluation Framework. Key performance indicators have been developed which are being tracked and progress reports prepared quarterly and annually using a standard M & E template.

The sector has a human rights obligation to ensure every person in Kenya has the right to clean water in adequate quantities, reasonable standards of sanitation as well and food security. The achievement of this right is being monitored and reported on as well as SDG No.6 on “Ensuring Availability and Sustainable Management of Water and Sanitation for all”.

The M&E system reforms which started under the Water Act 2002, and now the Water Act 2016 and Irrigation Act 2019, have brought great gains to the water, sanitation and irrigation sector. Among these gains are: the separation of policy-making from regulation, and water services provision from water resources management and irrigation services; decentralization of key functions from the national level to the regional and county level; and a stronger pro-poor focus. The reforms have also enabled the sector to adopt the Human Right to Water as a guiding principle. The Ministry has established structures and platforms for increased stakeholder and consumer participation in decision-making and implementation processes, in an effort to combat the sector challenges.

### 2.11 Performance Contracting

Performance Contracting is part of the broader public sector reforms aimed at improving efficiency and effectiveness in the management of the Public Service since the year 2003. The Ministry since the year 2007 has been implementing annual performance contracts and has greatly improved the delivery of services to the citizens. The Ministry has been undertaking self-reporting as a good governance practice and disseminating performance evaluation reports for Water Sector Institutions

The Cabinet Secretary in the Ministry has been given the overall responsibility for negotiations, vetting, implementation, monitoring and evaluation of the Performance Contract for the Ministry and its State Corporations. The Performance Contracting is anchored on national development priorities such as Medium Term Plans of Vision 2020, Big Four, Strategic Plans, and SDGs among others. In the performance evaluation results of FY2020/21, the Ministry was ranked position 6 (among Ministries) with a composite score of 3.2454 (Good category), while one of our institutions (National Irrigation Authority-NIA) had a composite score of 1.889 (Excellent category) and was ranked position one nationally. Below is the summary of Ministry and Water Sector Institutions’ performance for FYs 2019/20, 2020/21 and 2021/22 (Note; The State Corporations under the Ministry are scheduled for performance evaluation for FY 2021/22 between, 23rd September and 28th October, 2022).

|  | Composite score FY 2019/20 | Rank (National) | Composite score FY 2020/21 | Rank (National) | Composite score FY 2021/22 |
|--|----------------------------|-----------------|----------------------------|-----------------|----------------------------|
| Ministry of Water, Sanitation and Irrigation | 3.1500                     | 5               | 3.2454                     | 6               | 3.2714                     |



| Rank (WSIs) | Institution   | Composite FY 2019.20 | Score     | Composite FY 2019.20 | Score     | Rank (National) |
|-------------|---|----------------------|-----------|----------------------|-----------|-----------------|
| 1.          | National Irrigation Authority   | 2.3539               | Excellent | 1.889                | Excellent | 1               |
| 2.          | Water Resources Authority   | 2.6837               | Very Good | 2.4307               | Very Good | 10              |
| 3.          | Water Sector Trust Fund   | 2.6448               | Very Good | 2.5041               | Very Good | 12              |
| 4.          | Athi Water Works Development Agency                                     | 3.3105               | Good      | 2.7394               | Very Good | 23              |
| 5.          | Lake Victoria South Water Works Development Agency                      | 3.0100               | Good      | 2.7999               | Very Good | 28              |
| 6.          | Tanathi Water Works Development Agency                                  | 2.9677               | Very Good | 2.8427               | Very Good | 37              |
| 7.          | Tana Water Works Development Agency                                     | 4.0763               | Poor      | 2.9426               | Very Good | 64              |
| 8.          | Water Services Regulatory Board   | 2.9873               | Very Good | 2.9902               | Very Good | 86              |
| 9.          | Kenya Water Institute   | 3.2828               | Good      | 3.1138               | Good      | 120             |
| 10.         | National Water Harvesting and Storage Authority                         | 3.5737               | Good      | 3.1199               | Good      | 123             |
| 11.         | Lake Victoria North Water Works Development Agency                      | 3.3066               | Good      | 3.1212               | Good      | 125             |
| 12.         | Regional Centre on Groundwater Resource Education Training and Research | 3.1561               | Good      | 3.1667               | Good      | 139             |

|     |   |               |             |               |                  |     |
|-----|---|---------------|-------------|---------------|------------------|-----|
| 13. | Northern Water Works Development Agency | 2.9305        | Very Good   | 3.2973        | Good             | 166 |
| 14. | Central Rift Valley Water Works Agency  | 2.9053        | Very Good   | 3.3269        | Good             | 173 |
| 15. | Coast Water Works Development Agency    | 3.3999        | Good        | 3.5145        | Good             | 203 |
|     | <b>Average</b>                          | <b>3.1059</b> | <b>Good</b> | <b>2.9199</b> | <b>Very Good</b> |     |

## 3. CHALLENGES, LESSONS LEARNT AND EMERGING ISSUES

### 3.1 Lessons Learnt

Lessons learnt during implementation include:

- i. There is a need for continuous engagement of Parliament and the National Treasury to enhance communication with project implementation agencies and grant exemption from remission of duty and taxes.
- ii. A collaborative framework between the National and County governments is essential for sustainable water resources, water, sanitation, land reclamation and irrigation management.
- iii. Water and sewerage projects completed and transferred in the last five years have had minimal impact due to low household connections. Thus, it is essential to incorporate household connectivity during the planning stage.
- iv. The adoption of advanced techniques is essential to map and access large groundwater resources.
- v. Financing irrigation development through the cost-sharing model with project beneficiaries improves the rate of irrigation development, ownership and sustainability.
- vi. Adoption of climate-smart irrigated agriculture, collection and timely dissemination of climate-related data as well as capacity building of farmers and technical officers are adaptation and mitigation measures that largely help in reducing the effects of climate change and need to be mainstreamed in projects.
- vii. There is a need to undertake studies on the water-energy nexus to map the progressive energy cost of water and also adopt energy efficiency technology to reduce the energy cost of water.
- viii. Multi-agency approach with relevant stakeholders on the security of critical water and irrigation infrastructure is essential.
- ix. Focus and financing of research and innovation in the sector to improve on absorption and utilization of new technologies.
- x. Water harvesting and storage at the household level are to be given priority at national and county legislation to enhance mitigation of effects/impacts of climate change (floods and drought).

### 3.2 Key Challenges

Despite the progress with lessons learnt, there are still a number of challenges facing the Ministry which will be used to inform policy direction going forward. These include:

- i) High Cost of Resettlement Action Plan (RAP).
- ii) Investment in the water sector is not matching the population growth. This has the effect of stagnated or recessing growth in water and sanitation coverage in the near future.
- iii) The increase in water and sanitation coverage is tracked based on the number of people supplied with water from the completed water supplies and sanitation facilities. It is however evident that there are no funds allocated for the maintenance of these water supplies and sanitation facilities leading to dilapidated infrastructure unable to serve the expected population.
- iv) Slow project implementation due to inadequate funds, delayed disbursements, and inadequate counterpart funding has negatively impacted the implementation of some

- projects.
- v) Land acquisition/ compensation; wayleaves, forest moratorium issues for large infrastructure projects
  - vi) Pollution of Water Resources: The low sewerage coverage poses a major threat to water quality and public health, largely due to inadequate effluent treatment.
  - vii) Low Capacity of farmers in irrigation farming and overall governance/management of irrigation schemes
  - viii) Land reclamation mandate is not stipulated as a national government or county government function, rendering effective implementation of land reclamation projects and programmes difficult
  - ix) Land degradation is a very slow process and land owners, policy, legal and political leadership recognize it only at the point of severity
  - x) The cost of land reclamation is very high and yet little funds are allocated nationally and at the county with no external funds support.
  - xi) Available technologies are not efficient in reverse waste and capacity building is required.
  - xii) High energy cost of water production impeding affordability of water.
  - xiii) Pending appeal at PSC on organization structure- there is a need for engaging the PSC for an outcome on pertinent issues that the Ministry raised on the same.
  - xiv) A lean staff establishment amidst an expanded mandate hence the need for top leadership intervention.
  - xv) The Ministry faces an ageing workforce yet the rate of replacement/appointment is very low leading to a low staff strength that adversely affects service delivery.
  - xvi) Inadequate training budget which often faces budget cuts thus hindering staff development and subsequent career stagnation. The inclusion of a line item on HR operations would highly enhance the execution of critical HR issues.

### 3.3 Emerging Issues

- i. Water purification through desalination has become cheaper as a result of the advancement of water purification technology.
- ii. The introduction of a pro-poor tariff band 1-6m<sup>3</sup> on water and sewerage services ensures water and sewerage services are affordable to a majority of consumers as charges will be based on the actual consumption.
- iii. Rising water levels in the inland lakes due to high sedimentation loads and rainfall as a result of climate change that is causing displacement of persons, and destruction of built-up infrastructure and livelihood support systems.
- iv. Mapping of degraded lands in the country is necessary for appropriate, efficient and effective county-specific land reclamation programs aimed at reversing degradation and achieving land degradation Neutrality (LDN).
- v. County-based mapping of irrigation schemes and national assessment of areas under irrigation is necessary for efficient and real-time reporting.
- vi. Energy efficiency has become a mainstream mitigation factor in climate change hence there is a need for the sector to create mechanisms for the adoption of the technology.

## 4. CONCLUSION AND RECOMMENDATIONS

The Ministry of Water, Sanitation and Irrigation has finalized the Water (Amendment) Bill, 2023, aimed at operationalising PPP in the Water Sector, currently being subjected to Parliamentary process. Further, the Water Laws (Amendment) Bill, the KEWI Act, 2001 Amendment Bill (KEWATRI Bill), the Hydrologist (Amendment) Bill 2023, the Water Resources Regulations, the Water Services Regulations, the Water Harvesting and Storage Regulations, the Water Sector Fund Regulations and the Hydrologists Regulations, 2023 are at various levels of completion including stakeholders participation and national validation stage. The National Sanitation Management Policy has been approved by Cabinet and the Water Sector Inter-Governmental Consultation and Co-operation Framework (WSIGCCF) has already been signed.

The Ministry finalized the Guidelines for the establishment of County Irrigation Development Units (CIDUs) and received approval from the Council of Governors (CoG) for implementation. The draft Legal Notice for the establishment of the Irrigation Research, Innovation and Training Institute (KIRITI) was also finalized and submitted to the Attorney General's office for review and guidance.


Under the Irrigation Master Plan, mapping of irrigation areas was done in three pilot counties (Kisumu, Kajiado and Kirinyaga) and locational maps were developed with the support of JICA. Two Land Degradation Assessment Reports for the Upper Kerio River Valley and Ewaso Nyiro North sub-basins were finalized and disseminated to stakeholders for information, awareness and implementation.

The Ministry, through the implementation of various projects, has been able to increase water coverage by 12.1% and urban sewerage coverage by 6% from 2017 to the current reported 72% and 32% respectively. During the review period, the land under irrigation increased by 29,873 acres to reach 694,000 acres constituting 36.3% of the total potential irrigation area in the Country.

To fast-track the achievement of the universal targets for water, sanitation and food security, the Kenya National Water and Sanitation Investment and Financing Plan (NAWASIP) 2022-2030 has been signed and launched for implementation jointly by the National and County Governments. The development of the National Irrigation Sector Investment Plan (NISIP) and the Water Resources Investment Plan is underway.

Collaborative efforts by Government Institutions to secure project sites early in the project cycle will be a game changer to reduce compensation claims, and therefore reduce overall project cost while avoiding delays in contract completion as in the case of most Ongoing projects.

The Ministry launched the Non-Revenue Water Management Standards to be operationalised in all the Water Service Providers across the Country. The reduction in Non-Revenue Water from the current 45% to levels of less than 20% can potentially bridge the gap in access to water. Implementation of the Standards and Management Tools by the WSPs should be continuously monitored and funded during operations and implementation. The Ministry,



with the support of FAO, has developed a Draft Quality Management System (QMS) Toolkit and Users' Manual for small-scale irrigation projects.

The Ministry is making efforts towards the clean up of the Nairobi/Athi River. Though at the initial stages, all stakeholders must be brought on board to ensure water resources in this river are regenerated and protected moving forward.

The Ministry has embraced digitalization in its operations moving forward. The development of the Digitalization Transformation Strategy for the Water and Sanitation Sector will help the sector to embrace the digital realities in its operations. This is done with the aim of improving efficiency in the water and sanitation sector operations by adopting technology in water resources management (through data collection, storage and dissemination), managing Non-Revenue Waters and digitising service provision, among others. It is critical to embrace low-cost, energy-efficient and appropriate technology that will be embraced by the staff in the sector.

## ANNEXES

### Annex I: Projects Completed in the Last Ten Years in WWDAs

| S/N          | Project Name   | Cost (Million KShs) | Population / Treatment Capacity  | Start  | Completion |
|--------------|--|---------------------|--|--------|------------|
| <b>AWWDA</b> |  |                     |  |        |            |
| 1.           | Theta Dam Treatment Works and Distribution Water Project   | 291,000,000         | Target Population: 60,000<br>Treatment Capacity:<br>4,000m3/day            | Mar-14 | Sep-16     |
| 2.           | Construction of Kangundo Road, Kibera, Upperhill and Kirichwa Ndogo Trunk Sewers                         | 650,000,000         | Target Population:60,000   | Aug-12 | Aug-16     |
| 3.           | Gatanga Community water project  | 264,000,000         | Target Population: 70,000<br>Treatment Capacity:<br>6,000m3/day            | Apr-17 | Jul-17     |
| 4.           | Komothai Water Augmentation Project  | 300,000,000         | Target Population: 70,000<br>Treatment Capacity:<br>additional 3,000m3/day | Feb-15 | Jun-17     |
| 5..          | Ithanga Water Supply Project   | 1,200,000,000       | Target Population: 20,000<br>Treatment Capacity: 6,000<br>m3/day           | Sep-17 | Dec-19     |
| 6.           | Murang'a South Water Supply (Last Mile Connectivity)   | 26,853,325          | Target Population: 30,000  | Sep-19 | Jan-21     |
| 7.           | 158 Independent Community-Based Projects Within Nairobi Metropolitan Area (Emergency Covid-19 boreholes) | 1,620,000,000       | Target Population:<br>1,250,000  | Jul-20 | Jun-21     |
| 8.           | Nairobi Water Distribution Project Lot I (Kiambu town - Roysambu - JKIA Transmission Line)               | 2,200,000,000       | Target Population: 336,000   | Jan-17 | Jun-21     |
| 9.           | Northern collector Tunnel Phase 1 Project  | 9,800,000,000       | 240,000 households<br>12.6km tunnel , 3 no.<br>intakes                     | Oct-16 | Feb-24     |

| S/N | Project Name  | Cost (Million KShs)   | Population / Treatment Capacity   | Start  | Completion |
|-----|---|-----------------------|---|--------|------------|
| 10. | Muranga Urban Water Supply (Last Mile Connectivity)   | 55,086,206            | Target Population: 32,000   | Sep-19 | Dec-20     |
| 11. | Construction of Oloitoktok Water and Sewerage Project   | 887,000,000           | 5,335 connections made  | Apr-17 | Sep-21     |
| 12. | Bulk Water Supply to Nairobi (Northern Collector) – Component I: Construction of Kigoro Water Treatment Plant.  | 5,777,000,000         | Target Population: 1,200,000 people (240,000 households)<br>120,000m <sup>3</sup> /d treatment capacity | Mar-16 | Nov-21     |
| 13. | Lot 2 - Construction of the Western Transmission (Kabete-Uthiru-Karen) Pipeline   | 1,289,000,000         | 124,518 households  | Jun-17 | Dec-21     |
| 14. | Bulk Water Supply to Nairobi (Northern Collector) – Component IV: Nairobi City Water Distribution Network Modification Project KfW Lot 1(Kiambu Embakasi Transmission line) | 1,486,000,000         | Target Population: 45,000 household connections (180,000 people)  | Jun-17 | Nov-21     |
| 15. | Karimenu II Dam Water Supply Project  | 23,827,700,000        | Treatment Capacity<br>73,500 m <sup>3</sup> /day  | May-19 | Jul-22     |
|     | <b>Sub-Total</b>  | <b>49,673,639,531</b> |   |        |            |
|     | <b>LAKE VICTORIA SOUTH WWDA</b>   |                       |   |        |            |
| 16. | Keroka Water Supply Project   | 1,890,000,000         | Target Population: 56,000<br>Treatment Capacity: 3,000 m <sup>3</sup> /day                              | Jan-14 | Dec-17     |
| 17. | Rangwe Water Supply Project phase 1 (Kosiga Dam)  | 45,000,000            | Target Population: 15,000   | Feb-15 | Aug-16     |
| 18. | Isebania Water Supply Project   | 440,000,000           | Target Population: 60,000   | Jan-14 | May-17     |
| 19. | Siaya - Bondo Water and Sanitation Project  | 2,200,000,000         | Target Population:200,000   | Nov-12 | Jan-17     |
| 20. | Water Sector Development (Lake Victoria South) (Kericho, Kisii, Nyamira, Litein)  | 3,880,000,000         | Target Population: 100,000<br>Treatment Capacity:<br>37,000 m <sup>3</sup> /day                         | Feb-14 | Jun-21     |

| S/N                             | Project Name   | Cost (Million KShs)   | Population / Treatment Capacity  | Start  | Completion |
|---------------------------------|--|-----------------------|--|--------|------------|
| 21.                             | Expansion of Water Supply and Sanitation Systems for Kisii and Nyamira (Water Sector Development Programme-C-Lot 1 | 2,289,840,260         | Target Population: 15,600  | Jun-17 | Nov-21     |
| 22.                             | Expansion of Kisii Water Supply-Kegati Treatment Works   | 250,000,000           | Target Population; 11,250 households   | Jan-21 | Dec-22     |
| 23.                             | Expansion of Nyamira Water Supply  | 485,000,000           | Target Population; 11,250 households   | Mar-17 | Dec-19     |
| 24.                             | West Karachuonyo Water Supply Project  | 110,072,058           | Target Population: 4700  | Nov-18 | Mar-21     |
| 25.                             | Migori Water Project   | 1,250,000,000         | Target Population: 200,000   | Jan-14 | Jul-14     |
| 26.                             | Homa Bay Cluster Water Supply and Sanitation Project.  | 1,143,100,000         | Target: 21,000 households, 1258 connections  | Jan-12 | Jan-22     |
| 27.                             | Lot III- Additional Water Supply distribution pipelines Last Mile Siaya and Bondo Towns                            | 265,310,000           | Target Population: 30,000 households   | Jan-21 | Jul-23     |
|                                 | <b>Sub-Total</b>   | <b>14,248,322,318</b> |  |        |            |
| <b>CENTRAL RIFT VALLEY WWDA</b> |  |                       |  |        |            |
| 28.                             | Lotikip Well Field Development Project   | 500,000,000           | Target Population: No estimate yet   | Jul-15 | Jun-18     |
| 29.                             | Iten Tambach Sabor Water Supply Project Phase II   | 1,000,000,000         | Target Population: 184,000   | Jun-17 | Jun-18     |
| 30.                             | 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 m <sup>3</sup> /day and a water storage tank with 2,000 cubic meters storage capacity. | Oct-14 | Feb-17     |
| 31.                             | 18 Boreholes under drought mitigation  | 30,000,000            | Target population, 100,000   | Mar-16 | Jul-17     |

| S/N                             | Project Name   | Cost (Million KShs)   | Population / Treatment Capacity  | Start  | Completion |
|---------------------------------|--|-----------------------|--|--------|------------|
| 32.                             | Kapindaram Water Supply Project  | 60,000,000            | Target Population: 4,000   | Jul-16 | Jun-17     |
| 33.                             | Construction of Ellegirini Pipeline and Expansion of Kapsoya Treatment Works | 625,000,000           | Target Population: 24,000  | May-16 | Jan-18     |
| 34.                             | Pusol Water Project  | 40,000,000            | Target Population: 6,000;<br>Treatment Capacity in<br>m3/day:500       | May-16 | Mar-17     |
| 35.                             | Kapenguria Water Supply Augmentation   | 60,000,000            | Target Population: 25,000;<br>Treatment Capacity: 2,500<br>m3/day      | Jul-16 | Jun-19     |
| 36.                             | Construction of Kases Dam Water Supply Project (Peace Dam)                   | 249,754,411           | Target Population: 50,000  | Jul-20 | Jun-21     |
| 37.                             | Construction of Narok Sewerage and last mile connectivity for Narok          | 1,714,225,175         | Target Population: 25,000;<br>Treatment Capacity: 3,000<br>m3/day      | Apr-19 | Jun-21     |
| 38.                             | Rehabilitation of Leshau – Karago-ini Water Supply Project                   | 96,800,000            | Target Population: 45,000  | Feb-19 | Sept-20    |
| 39.                             | Olkalou Town Sewerage Project  | 684,327,143           | Target Population:344,000  | Sep-20 | Dec-22     |
| 40.                             | Naivasha Industrial Park Water Supply Project                                | 1,183,183,651         | Target Population:The<br>Naivasha industrial park<br>and 16,000 people | Feb-20 | Aug-23     |
| 41.                             | Last Mile Connectivity for Kabarnet Town                                     | 113,331,422           | Target Population:335,000  | Jul-21 | Nov-22     |
| 42.                             | Chemususu Dam Water Supply Project   | 2,980,992,553         | Target Population:105,000  | Sep-16 | Dec-22     |
|                                 | <b>Sub-Total</b>   | <b>10,917,614,355</b> |  |        |            |
| <b>LAKE VICTORIA NORTH WWDA</b> |  |                       |  |        |            |
| 43.                             | Construction of Water Supply Project in Chwele Area                          | 300,000,000           | Target Population: 92,000;<br>Treatment Capacity:<br>2,000m3/day       |        |            |

| S/N               | Project Name   | Cost (Million KShs)  | Population / Treatment Capacity   | Start  | Completion |
|-------------------|--|----------------------|---|--------|------------|
| 44.               | Drilling and equipping of 18No. Boreholes  | 30,000,000           | Target population, 100,000  | Mar-16 | Jan-17     |
| 45.               | Rehabilitation Sotik - Water Supply System   | 32,500,000           | Target population 60,000  | Nov-16 | Aug-17     |
| 46.               | Rehabilitation of Litein Water Supply System   | 29,700,000           | Target Population: 60,000   | Nov-16 | Aug-17     |
| 47.               | Kericho Sewerage Improvement Project   | 335,000,000          | Target Population: 80,000   | Dec-13 | Dec-17     |
| 48.               | Lake Victoria Water and Sanitation Initiative -Phase II (Kericho, Keroka and Isebania)                             | 1,506,000,000        | Target population: 200,000  | Aug-14 | Dec-20     |
| 49.               | Vihiga Cluster Project-Belgium funding   | 2,018,000,000        | Target Population:<br>120,000;<br>Treatment Capacity:<br>12,500m <sup>3</sup> /day            | Nov-17 | Dec-20     |
| 50.               | Mumias Water Supply Project  | 1,759,000,000        | Target Population: 24,000   | May-11 | Feb-24     |
| 51.               | Kiptogot Kolongolo Water Supply Project  | 1,200,000,000        | Target Population: 54,200   | Jun-19 | Apr-23     |
|                   | <b>Sub-Total</b>   | <b>7,210,200,000</b> |   |        |            |
| <b>COAST WWDA</b> |  |                      |   |        |            |
| 52.               | 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     |
| 53.               | Immediate Baricho Works Expansion & New Pipelines to Kilifi & Gongoni (Lot 3)                                      | 2,314,000,000        | Target Population: 316,700  | Sep-16 | Nov-18     |
| 54.               | Nyalani Water Supply Project   | 84,000,000           | Target Population: 12,000   | Jan-17 | Apr-17     |
| 55.               | Mombasa Network Rehabilitation - Lot 2   | 1,000,000,000        | Target Population: 20,000   | Mar-15 | Aug-17     |
| 56.               | Mkanda-Mwabandari rising main  | 32,597,212           | Target Population: 3,000  | Oct-16 | Dec-17     |
| 57.               | Immediate Baricho Works Electromechanical Works (Lot 1)  | 911,000,000          | Target Population:<br>220,000: Treatment<br>Capacity: additional<br>22,000m <sup>3</sup> /day | Jul-16 | May-18     |
| 58.               | Extend Services to Informal Settlements - Lot 2  | 121,000,000          | Target Population: 4,500  | Feb-15 | Feb-17     |

| S/N                  | Project Name   | Cost (Million KShs)  | Population / Treatment Capacity                                   | Start  | Completion |
|----------------------|--|----------------------|---|--------|------------|
| 59.                  | Malindi Informal Settlement (Lot 2)  | 75,000,000           | Target Population: 1,500  | May-15 | May-17     |
| 60.                  | Drilling and equipping of Three replacement boreholes at Baricho   | 415,032,958          | Target Population: 50,000   | May-19 | Apr-21     |
| 61.                  | Program for the Improvement of Water Services in Mombasa County – Construction Works for West Mainland Phase I | 404,375,960          | Target Population: 80,000   | Apr-18 | Jan-21     |
| 62.                  | Water harvesting project   | 154,200,000          | Target Population: 12,500   | Oct-19 | May-23     |
| 63.                  | Improvement of Water Supply to Dongo Kundu Special Economic Zone Phase I                                       | 175,000,000          | Target Population: 50,000   | Nov-19 | Jul-20     |
|                      | <b>Sub-Total</b>   | <b>5,761,206,130</b> |   |        |            |
| <b>NORTHERN WWDA</b> |  |                      |   |        |            |
| 64.                  | 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     |
| 65.                  | Kursin Water Supply  | 90,000,000           | Target Population: 4,000  | Nov-17 | May-18     |
| 66.                  | Wajir -Bor Water Piping & Supply   | 95,000,000           | Target Population: 5,000  | Nov-17 | May-18     |
| 67.                  | Eldas Enole Water Supply   | 100,000,000          | Target Population: 50,000   | Sep-16 | Feb-17     |
| 68.                  | Drilling and equipping of 30 Boreholes   | 71,000,000           | Target population: 150,000  | Jan-16 | Jun-17     |
| 69.                  | Libale Water Pan   | 60,000,000           | Target Population:5,000   | Jul-16 | Jan-17     |
| 70.                  | Rumuruti Water Supply Project  | 45,000,000           | Target Population: 40,000   | Dec-15 | Mar-17     |
| 71.                  | Moyale Water Supply  | 50,000,000           | Target Population: 35,000   | Dec-15 | Mar-17     |
| 72.                  | Isiolo Water and Sanitation Project  | 89,000,000           | Target Population: 60,000   | Jul-15 | Jan-17     |
| 73.                  | Forolle Aldere Earth Dam (Mega Pan) (Peace Dam)  | 229,652,630          | Target Population: 10,000   | Mar-20 | Mar-21     |
| 74.                  | Garissa Sewerage Project   | 836,474,387          | Target Population: 12,500 Household connections                   | Jul-15 | May-21     |

| S/N              | Project Name   | Cost (Million KShs)  | Population / Treatment Capacity   | Start   | Completion |
|------------------|--|----------------------|---|---------|------------|
| 75.              | Qoloba II Water Pan                                  | 50,000,000           | Target: 5,000 Units of Livestock  | May-21  | Nov-21     |
| 76.              | Wamba Water Supply Project                           | 62,063,569           | Target Population: 10,000   | Nov-20  | Jun-21     |
| 77.              | Marsabit Water Project                               | 723,000,000          | Target Population: 30,000   | Nov-18  | Jul-23     |
| 78.              | Marsabit Sewerage project                            | 1,001,000,000        | Target Population: 20,000   | Nov-18  | Jul-23     |
| 79.              | Idhido Dam Project                                   | 150,000,000          | Target Population: 50,000   | Mar-22  | Mar-23     |
| 80.              | Yamo Dam Project                                     | 1,191,000,000        | Target Population: 40,000   | Mar-18  | Aug-22     |
| 81.              | Jukala Waradey Water Project                         | 100,000,000          | Target Population: 8,000  | Jul-22  | Mar-22     |
|                  | <b>Sub-Total</b>                                     | <b>5,033,190,586</b> |   |         |            |
| <b>TANA WWDA</b> |  |                      |   |         |            |
| 82.              | Mukurwe-ini water Project                            | 720,000,000          | Target Population: 10,000   | May-17  | Dec-17     |
| 83.              | Kabiru-ini Water Supply                              | 65,000,000           | Target Population: 3,500<br>Treatment Capacity: 1,500 m <sup>3</sup> /day | May-17  | Dec-17     |
| 84.              | Thangatha Dam  | 40,000,000           | Target Population: 10,000   | Apr-17  | Jun-19     |
| 85.              | Ura Dam 4  | 30,000,000           | Target Population: 9,000  | Apr-17  | Jun-19     |
| 86.              | Maua Water Project II and Sewerage/ Drainage Project | 900,000,000          | Target Population: 5,000  | Apr-17  | Jun-19     |
| 87.              | Murang'a Urban Water Supply - Last mile Connectivity | 550,56206.90         | Target Population:5,000 (420 households)                                  | Jun-20  | Jun- 21    |
| 88.              | Othaya Sewerage Project (Last Mile Connectivity)     | 60,729,700           | Target Population:10,000  | Sept-19 | Jun-21     |
| 89.              | Isiolo Town Last mile Sewerage Project               | 73,240,000           | Target Population:5,000 (420 households)                                  | Nov-18  | Nov-21     |
| 90.              | Murang'a South water supply (Last Mile connectivity) | 26,850,000           | Target Population:5,000 (420 households)                                  | Sep-19  | Nov-21     |

| S/N  | Project Name  | Cost (Million KShs)  | Population / Treatment Capacity   | Start    | Completion |
|------|---|----------------------|---|----------|------------|
| 91.  | Mathira Water Supply Project                                    | 438,000,000          | Target Population:6,000   | Oct-19   | Nov-21     |
| 92.  | Chogoria Water Supply Project                                   | 645,200,000          | Target Population:180,000   | Feb-21   | Sep-23     |
|      | <b>Sub-Total</b>  | <b>3,054,075,907</b> |   |          |            |
|      | <b>TANATHI WWDA</b>   |                      |   |          |            |
| 93.  | Wote Water Supply & Sanitation Project                          | 500,000,000          | Target Population: 12,000   | Aug-16   | Sep-18     |
| 94.  | Wote Rehabilitation and Expansion of Water Supply Systems       | 15,000,000           | Target Population: 2,000  | Aug-16   | Nov-18     |
| 95.  | Yatta Canal Rehabilitation                                      | 2,200,000,000        | Target Population: 70,000 and 1,500 Farmers                               | Aug-14   | Feb-17     |
| 96.  | Equipping of Kajiado Boreholes                                  | 72,400,000           | Target Population: 100,000; 10 No. Boreholes with Capacity: 15,000 m3/day | Dec-16   | Jun-17     |
| 97.  | Migwani Water Supply Project                                    | 100,000,000          | Target Population: 15,000   | Jul-15   | Mar-17     |
| 98.  | Kakuya Water Supply (Kiambere-Mwingi Phase II)                  | 58,334,892           | Target Population: 75,000   | Mar-20   | Jun-21     |
| 99.  | Masinga Cluster Phase II; Kaewa – Kangonde Water Supply Project | 70,786,750           | Target Population: 75,000   | Oct-17   | Jan-21     |
| 100. | Mavoko Drinking Water Supply and Sanitation Project             | 2,500,000,000        | Target Population: 1,500,000  | Feb-18   | Mar-22     |
| 101. | Borehole Equipping and Rehabilitation                           | 500,000,000          | Target Population: 63,000   | Nov-15   | Nov-20     |
| 102. | Mavoko (NHC) Sewerage Project                                   | 104,000,000          | Target Population: 80,000   | Jan-22   | DEc-22     |
|      | <b>Sub-Total</b>  | <b>6,120,521,642</b> |   |          |            |
|      | <b>NRVWWDA</b>  |                      |   |          |            |
| 103. | Construction of Kases Dam Water Supply Project (Peace Dam)      | 250,000,000          | Target Population: 50,000   | Jul-20   | Jun-21     |
| 104. | Chepchor Water Project  | 10,000,000           | Target Population: 2,000  | Jul- 21- | March 2022 |

| S/N                            | Project Name  | Cost (Million KShs)  | Population / Treatment Capacity | Start   | Completion |
|--------------------------------|---|----------------------|---------------------------------|---------|------------|
| 105.                           | Merur Water Project   | 10,000,000           | Target Population: 2,000        | Jul-21- | Mar-22     |
| 106.                           | Rukuini water project   | 8,000,000            | Target Population:2,000         | Apr-22  | May-22     |
| 107.                           | Tulwet water project  | 8,000,000            | Target Population: 2,000        | Apr-22  | May-22     |
| 108.                           | Flax Water Project  | 8,000,000            | Target Population: 2,000        | Apr-22  | Jun-22     |
| 109.                           | Sabor-Iten Water Supply   | 1,900,000,000        | Target Population: 12,800       | Oct-14  | Oct-16     |
| 110.                           | Expansion of Kapsoya Treatment Works and Ellegirini pipeline  | 625,000,000          | Target Population: 90,000       | Dec-18  | May-23     |
| 111.                           | Soy-Kosachei Water project  | 300,000,000          | Target Population: 10,000       | Dec-18  | Feb-23     |
| 112.                           | Sosiani-Kosache pan   | 331,000,000          | Target Population: 5,000        | Dec-20  | May-22     |
| 113.                           | Chepareria Sewerage   | 217,000,000          | Target Population:2,000         | Jan-21  | Oct-22     |
| 114.                           | Chesangát Marich water Project  | 176,000,000          | Target Population:3,000         | Jul-17  | Apr-21     |
|                                | <b>Sub-Total</b>  | <b>3,843,000,000</b> |                                 |         |            |
| <b>WATER SECTOR TRUST FUND</b> |   |                      |                                 |         |            |
| 115.                           | Water Sector Development (Support WSTF)   | 1,656,000,000        | Target Population: 250,000      | Dec-14  | Jun-21     |
| 116.                           | Support to Equitable Access to Quality Water, Basic Sanitation and Enhanced Water Resources Management in Rural Kenya | 2,325,000,000        | Target Population 200,000       | Oct-14  | Jun-21     |
| 117.                           | The Saudi Programme for Drilling of Wells and Rural Development in Africa   | 600,000,000          | Target Population 25,000        | Jul-17  | Jun-20     |
| 118.                           | OBA Project-I) Embu sewer extension Sub-Project-Embu County   | 498,776,582          | Target Population: 25,540       | Jan-18  | Mar-21     |
| 119.                           | OBA Project-II) Nyeri Sewer Extension Subproject  | 266,162,838          | Target Population: 14,815       | Feb-18  | Mar-21     |
| 120.                           | OBA Project-II) Kisumu water extension Sub-project-Kisumu County  | 124,024,462          | Target Population: 7,595        | Aug-17  | Mar-21     |
| 121.                           | Mathira water extension subproject-Nyeri County   | 116,590,487          | Target Population: 7,085        | Mar-19  | Mar-21     |
| 122.                           | Murang'a South Water Extension Subproject Phase 1-Muranga County  | 20,715,605           | Target Population: 7,595        | Dec-14  | Nov-20     |

| S/N   | Project Name   | Cost (Million KShs)  | Population / Treatment Capacity        | Start   | Completion |
|---|--|----------------------|--|---------|------------|
| 123.  | Murang'a South Water Extension Subproject Phase II-Murang'a County | 94,919,479           | Target Population: 7,085               | Jan-18  | Mar-21     |
| 124.  | Murang'a water extension subproject- Muranga County                | 37,400,705           | Target Population: 15,974              | Mar-15  | Mar-21     |
| 125.  | Naivasha water extension subproject-Nakuru County                  | 105,608,896          | Target Population: 15,155              | Feb-18  | Mar-21     |
| 126.  | Lanqura Community Water Supply Project- Mandera County             | 34,540,000           | Target Population: 3,000               | Feb-19  | Jun-21     |
| 127.  | Kathwana Water Supply Project- Tharaka Nithi County                | 44,888,393           | Target Population: 5,000               | May-19  | Apr-21     |
| 128.  | Sake Community Rural Water Supply Project (WSTF)                   | 34,540,000           | Target Population: 4,000               | Feb-19  | Jun-21     |
| 129.  | Kizingitini Water and Sanitation Project- Lamu County              | 40,890,000           | Target Population: 2,520               | Jun-19  | Jun-21     |
| 130.  | Nyangoro Maktau Water Project-Taita Taveta County                  | 88,650,000           | Target Population: 560 Households      | Nov-20  | Nov-21     |
| 131.  | Baringo Water and Sanitation Project- Lamu County                  | 69,370,000           | Target Population: 18,475              | Oct-20  | Nov-21     |
|   | <b>Sub-Total</b>   | <b>6,158,077,477</b> |  |         |            |
| <b>Irrigation Projects Completed in the Last Five Years</b> |  |                      |  |         |            |
| 132.  | Kinyako Irrigation Project   | 33,000,000           | Area: 160 acres<br>No. of farmers: 120 | 2018    | 2019       |
| 133.  | Kaigunji Irrigation Project Phase I                                | 177,000,000          | 26 km transmission line                | 2017    | 2019       |
| 134.  | Kaigunji Irrigation Project Phase II Section I                     | 100,000,000          | Area: 600 acres<br>No. of farmers: 500 | 2019/20 | 2020       |
| 135.  | Kanini Irrigation Project  | 34,400,000           | Area: 60 acres<br>No. of farmers: 100  | 2020/21 | 2022       |





| S/N  | Project Name                                    | Cost (Million KShs) | Population / Treatment Capacity             | Start    | Completion |
|------|---|---------------------|---|----------|------------|
| 136. | Kaigunji Irrigation Project Phase II Section II | 548,700,00          | Area: 1900 acres<br>No. of farmers: 1000    | 2021/22  | 2022       |
| 137. | Thuci Ridge Irrigation Project                  | 164,000,000         | Area: 160 acres<br>No. of farmers: 418      | 2015/16  | 2022       |
| 138. | Kingirwa Irrigation project                     | 144,600,000         | Area: 100 acres<br>No. of farmers: 600      | 2015/16  | 2019       |
| 139. | Wakulima Irrigation project                     | 31,800,000          | Area: 35 acres<br>No. of farmers: 115       | 2015/16  | 2018       |
| 140. | Koibei Irrigation project                       | 31,800,000          | Area: 44 acres<br>No. of farmers: 155       | 2015/16  | 2018       |
| 141. | Muongano Irrigation project                     | 143,000,000         | Area: 160 acres<br>No. of farmers: 400      | 2015/16  | 2018       |
| 142. | Kamusinga Irrigation project                    | 70,300,000          | Area: 80 acres<br>No. of farmers: 240       | 2015/16  | 2018       |
| 143. | Chakama Clusters                                | 15,000,000          | Area:100 acres<br>No. of farmers: 200       | May-16   | Jun-2017   |
| 144. | Hola expansion                                  | 39,800,000          | Area: 3500 acres<br>No. of farmers: 300     | Jan-2014 | Jul-2020   |
| 145. | Njukini Irrigation project                      | 66,100,000          | Area:350 acres<br>No. of farmers: 350       | May-13   | Feb-20     |
| 146. | Njoro Kubwa Canal                               | 19,200,000          | Area: 3000 acres<br>No. of farmers: 3000    | Apr-19   | Jul-19     |
| 147. | Mansa irrigation project                        | 29,900,000          | Area:15 green houses<br>No. of farmers: 100 | Jul-2015 | Jul-2020   |
| 148. | Malkadalka irrigation project                   | 10,300,000          | Area: 200 acres<br>No. of farmers: 200      | Feb-21   | May-21     |
| 149. | Mwithaga Irrigation Project                     | 46,900,000          | Area: 125 acres<br>No. of farmers: 125      | Apr-15   | Apr-16     |

| S/N  | Project Name                                 | Cost (Million KShs) | Population / Treatment Capacity                             | Start  | Completion |
|------|--|---------------------|---|--------|------------|
| 150. | Mwithaga Irrigation Project                  | 15,700,000          | Area:100acres<br>No. of farmers: 500                        | May-19 | Dec-19     |
| 151. | Akaiga Irrigation Project                    | 66,200,000          | Area: 100 acres<br>No. of farmers: 100                      | Mar-15 | Sep-19     |
| 152. | Gachoka clusters 2 Irrigation Project        | 217,400,000         | Area: 350 acres<br>No. of farmers: 300                      | Jun-15 | Jun-19     |
| 153. | Runga Irrigation scheme                      | 76,200,000          | Area: 500 acres<br>No. of farmers: 500                      | Oct-15 | Oct-17     |
| 154. | Lower Kithegi Irrigation Project             | 16,900,000          | Area: 100 acres<br>No. of farmers: 95                       | May-15 | Jun-20     |
| 155. | Thua Model Farm Irrigation Project           | 81,000,000          | Area:11 green houses and<br>12 acres<br>No. of farmers: 100 | Mar-15 | Sep-19     |
| 156. | Kalundu Irrigation Project (Phase 1 & 2)     | 52,900,000          | Area: 100 acres<br>No. of farmers: 80                       | Jul-16 | Sep-19     |
| 157. | Muringa Banana Irrigation (Phase I and 2)    | 748,700,000         | Area: 3500 acres<br>No. of farmers: 7000                    | Sep-11 | Jan-16     |
| 158. | Kondo Irrigation Project (Phase 1 & 2)       | 40,500,000          | Area:50 acres<br>No. of farmers: 100                        | Feb-13 | Sep-19     |
| 159. | Kwa Majee Irrigation Project (Phase 1 and 2) | 62,100,000          | Area:20 acres<br>No. of farmers:40                          | Jan-15 | Sep-17     |
| 160. | Kako/Kathonzweni Irrigation Project          | 45,700,000          | Area: 300 acres<br>No. of farmers: 300                      | Apr-15 | Oct-17     |
| 161. | Marngarichi Water Pan                        | 30,800,000          | Area:10 acres<br>No. of farmers:50                          | Jul-15 | Jun-17     |
| 162. | Gatha dam Irrigation Development Project     | 109,500,000         | Area:200 acres<br>No. of farmers: 200                       | Nov-15 | Mar-18     |



| S/N  | Project Name  | Cost (Million KShs) | Population / Treatment Capacity         | Start  | Completion |
|------|---|---------------------|---|--------|------------|
| 163. | Gathanje Irrigation Development Project                 | 108,900,000         | Area:300 acres<br>No. of farmers: 300   | Dec-15 | Jan-18     |
| 164. | Kwa Njora Phase 1 and 2 Irrigation Projects             | 60,400,000          | Area:10 acres<br>No. of farmers: 50     | Sep-15 | Apr-17     |
| 165. | Mutumwa irrigation project                              | 34,800,000          | Area:10 acres<br>No. of farmers: 50     | Sep-15 | Oct-16     |
| 166. | Thia Kiruka Irrigation Project                          | 70,700,000          | Area:500 acres<br>No. of farmers: 300   | Mar-15 | Mar-17     |
| 167. | Riamukurwe Irrigation Project                           | 75,500,000          | Area:1000 acres<br>No. of farmers: 800  | Jan-14 | Jan-20     |
| 168. | Kamuka Irrigation scheme                                | 84,300,000          | Area:150 acres<br>No. of farmers: 100   | Feb-14 | Sep-20     |
| 169. | Lokipetot Irrigation Project                            | 53,200,000          | Area:300 acres<br>No. of farmers: 150   | May-15 | Feb-18     |
| 170. | Turkana irrigation development project ( Naipa Phase 1) | 15,400,000          | Area: 910 acres<br>No. of farmers: 1736 | Mar-20 | Mar-21     |
| 171. | Chesargatat Marich Irrigation Project                   | 154,800,000         | Area: 600 acres<br>No. of farmers: 300  | Aug-14 | Dec-21     |
| 172. | Kipchukchuk Irrigation Development Project              | 82,200,000          | Area:500 acres<br>No. of farmers: 300   | Sep-15 | Sep-17     |
| 173. | Tunyo phase II  | 11,200,000          | Area: 1000 acres<br>No. of farmers: 750 | Jul-19 | Mar-20     |
| 174. | Chemase Irrigation development Project Phase 1          | 170,200,000         | Area: 750 acres<br>No. of farmers: 1000 | Apr-15 | Apr-17     |
| 175. | Chemase Irrigation development Project - Phase 2        | 18,500,000          | Area: 100 acres<br>No. of farmers: 100  | Aug-19 | Sep-20     |
| 176. | Eldume phase 1 and 2 Irrigation Project                 | 83,800,000          | Area: 1000 acres<br>No. of farmers: 650 | Jan-12 | Feb-16     |

| S/N  | Project Name   | Cost (Million KShs) | Population / Treatment Capacity           | Start   | Completion |
|------|--|---------------------|---|---------|------------|
| 177. | Kamoskoi Phase 1 Irrigation Project                  | 104,200,000         | Area: 600 acres<br>No. of farmers: 1000   | Jan-13  | Feb-16     |
| 178. | Mutiriri Irrigation Project (water pan and pipeline) | 95,900,000          | Area: 270 acres<br>No. of farmers:300     | Jun-15  | Jul-17     |
| 179. | Mutaro Irrigation Project                            | 64,800,000          | Area: 500acres<br>No. of farmers:500      | May-19  | Nov-21     |
| 180. | Soin Irrigation Project (Phase 2)                    | 93,500,000          | Area: 500 acres<br>No. of farmers:300     | Mar-15  | Mar-16     |
| 181. | Chebara Irrigation Project (Phase 1 and 2)           | 70,500,000          | Area: 1200 acres<br>No. of farmers:600    | Jan-13  | Jul-16     |
| 182. | Sare/Gwanga irrigation Project                       | 16,800,000          | Area:80 acres<br>No. of farmers: 100      | Sep-15  | May-17     |
| 183. | Oldonyiro Irrigation project                         | 524,000,000         | Area:500 acres<br>No. of farmers: 450     | Jan-13  | Sept-20    |
| 184. | Mweru Umoja Irrigation Project                       | 151,900,000         | Area:1,000 acres<br>No. of farmers: 1,000 | Jan-19  | Sept-20    |
| 185. | Mweru Umoja (Uruku) Irrigation Project               | 19,600,000          | Area:600 acres<br>No. of farmers: 1,200   | May-19  | Nov-20     |
| 186. | Kiirua Buuri Irrigation Project                      | 284,300,000         | Area:500 acres<br>No. of farmers: 2,000   | Jun-19  | Mar-21     |
| 187. | Muringa Banana Phase 3 Irrigation Project            | 481,900,000         | Area:1,453 acres<br>No. of farmers: 2,907 | Nov-17  | Nov-20     |
| 188. | Muringa Banana Phase 4 (Mukami) Irrigation Project   | 64,700,000          | Area:350 acres<br>No. of farmers: 500     | Aug-19  | May-21     |
| 189. | Upper Gitwe Irrigation Project                       | 23,500,000          | Area:250 acres<br>No. of farmers: 285     | Sept-20 | Oct-21     |
| 190. | Nyanjigi Irrigation Project                          | 96,000,000          | Area:500 acres<br>No. of farmers: 1,000   | Jun-19  | Jan-22     |



| S/N  | Project Name  | Cost (Million KShs)  | Population / Treatment Capacity           | Start  | Completion |
|------|---|----------------------|---|--------|------------|
| 191. | Tunyo Phase III Irrigation Project                                  | 19,800,000           | Area:1,000 acres<br>No. of farmers: 750   | May-20 | May-21     |
| 192. | NGK Irrigation Project  | 29,842,666           | Area:240 acres<br>No. of farmers: 480     | Oct-22 | Apr-23     |
| 193. | Mirichu Murika Irrigation Project - Phase 4                         | 253,775,858          | Area:1,000 acres<br>No. of farmers: 2,000 | May-19 | Oct-20     |
| 194. | Boboti Kiamande<br>Thangaini<br>Ndakaini Wanduhi                    | 53,912,661           | Area:113 acres<br>No. of farmers: 290     | Sep-20 | Mar-22     |
| 195. | Ng'araria Irrigation Project  | 16,800,000           | Area:20 acres<br>No. of farmers: 20       | Aug-20 | Apr-21     |
| 196. | Turkana irrigation development project (Lotikipi/<br>Nanam) phase 2 | 19,126,832           | Area:15 acres<br>No. of farmers: 60       | Nov-21 | nov-22     |
| 197. | Aiwet Irrigation scheme   | 24,928,057           | Area : 120 acres<br>No. of farmers: 150   | May-19 | Sept-21    |
| 198. | Nyamuguna Irrigation Project  | 182,555,521          | Area : 500 acres<br>No. of farmers: 500   | May-19 | Nov-21     |
| 199. | Maka Green and Ruai Irrigation Project                              | 29,292,823           | Area : 672 acres<br>No. of farmers: 1,000 | Apr-22 | Apr-23     |
| 200. | Ngobit Imenti Irrigation Project                                    | 29,664,410           | Area : 50 acres<br>No. of farmers: 200    | May-22 | May-23     |
| 201. | Sandai Irrigation Project   | 84,100,000           | Area:1,410 acres<br>No. of farmers: 650   | May-19 | Jun-21     |
|      | <b>Sub-Total</b>  | <b>6,579,998,828</b> |   |        |            |

## Annex II: Projects Projected to be Completed by 2023

| S/N              | County  | Constituency                            | Project Name   | Cost (KShs)   | Population (Households)    | Start  | Completion |
|------------------|---------|---|--|---------------|----------------------------|--------|------------|
| <b>ATHI WWDA</b> |         |   |  |               |                            |        |            |
| 1.               | Nairobi | Embakasi                                | Lot 4 Construction of Eastern Nairobi East and West (Karen and Utawala) sewerage improvement project | 3,100,000,000 | Target Population: 24,000  | Sep-21 | Dec-23     |
| 2.               | Nairobi | Embakasi                                | Expansion Works for Dandora Estate Sewage Treatment Plant  | 997,000,000   | Target Population: 50,000  | Nov-20 | Jul-23     |
| 3.               | Nairobi | Dagoreti, Kamukunji, Embakasi, Makadara | Construction of Nairobi Informal Settlements Water and Sanitation                                    | 105,000,000   | Target Population: 100,000 | Oct-22 | Oct-23     |
| 4.               | Nairobi | Kibera                                  | Kibera Water and Sanitation Project  | 194,000,000   | Target Population: 30,000  | Jan-22 | Jun-23     |
| 5.               | Kiambu  | Limuru                                  | Limuru Water Supply and Sewerage project   | 577,000,000   | Target Population: 200,000 | Feb-19 | Jul-23     |
| 6.               | Kiambu  | Kikuyu                                  | Kikuyu Water Supply and Sanitation project   | 636,000,000   | Target Population: 10,000  | Oct-18 | Apr-23     |
| 7.               | Kiambu  | Roysambu and Ruiru                      | Lot 2- Kahawa West, Githurai, Kahawa Sukari reticulation sewer project                               | 2,154,000,000 | Target Population: 24,000  | Mar-21 | Sep-23     |
| 8.               | Kiambu  | Ruiru                                   | Lot 3-Mwiki and Clayworks reticulation Sewer   | 1,740,000,000 | Target Population: 25,000  | Jun-21 | Dec-23     |
| 9.               | Kiambu  | Ruiru                                   | Ruiru-Juja/ Greater Githurai Water Supply project  | 1,200,000,000 | Target Population: 21,000  | May-20 | Jun-23     |
| 10.              | Kiambu  | Kiambu and Ruaka                        | Kiambu and Ruaka Water Supply  | 1,290,000,000 | Target Population: 20,000  | Jan-19 | Jun-23     |
| 11.              | Kiambu  | Gatundu South                           | Gatundu Water Supply and Sanitation  | 1,750,000,000 | Target Population: 16,000  | Feb-19 | Jul-23     |

| S/N                             | County  | Constituency                                  | Project Name  | Cost (KShs)           | Population (Households)      | Start  | Completion |
|---------------------------------|---------|---|---|-----------------------|------------------------------|--------|------------|
| 12.                             | Murangá | Gatanga                                       | Ithanga III Water Supply project  | 1,250,000,000         | Target Population:<br>14,000 | Apr-22 | Oct-23     |
| 13.                             | Kajiado | Kajiado North                                 | Ongata-Rongai Kiserian project  | 2,100,000,000         | Target Population:<br>12,000 | Oct-20 | Jul-23     |
| <b>Sub-Total</b>                |         |   |   | <b>17,093,000,000</b> |                              |        |            |
| <b>LAKE VICTORIA SOUTH WWDA</b> |         |   |   |                       |                              |        |            |
| 14.                             | Homabay | Rachuonyo                                     | Kendu-Bay Water and Sanitation  | 580,970,000           | 22,500                       | Apr-19 | Jun-23     |
| 15.                             | Homabay | Kasipul<br>Kabondo                            | Oyugis Water Supply and Sanitation project                                | 608,820,000           | 30,000                       | Apr-19 | Jan-23     |
| 16.                             | Homabay | Karachuonyo                                   | West Karachuonyo water supply project                                     | 143,190,000           | 3750                         | mar-22 | Mar-23     |
| 17.                             | Kericho | Ainamoi,<br>Kapsuser, Belgut                  | Expansion of Kericho Water Supply   | 1,025,694,297         | 37,943                       | Apr-19 | Nov-23     |
| 18.                             | Kisumu  | Kisumu West                                   | Otonglo-Riat Water Supply   | 91,090,000            | 2,500                        | Jul-22 | Jul-23     |
| 19.                             | Migori  | Rongo   | Rongo Water Supply lot 1  | 171,060,000           | 20,000                       | Jun-22 | Dec-23     |
| 20.                             | Migori  | Suna East, Suna<br>West, Uriri,<br>Kuria West | Additional Water Supply Distribution pipelines- Migori and Isebania towns | 277,050,000           | 36,000                       | Jan-21 | Jun-23     |
| 21.                             | Nyamira | Borabu  | Additional Water Supply Distribution pipelines- Keroka towns              | 114,310,000           | 8,000                        | Apr-21 | Jun-23     |
| 22.                             | Siaya   | Alego Usonga,<br>Gem and Bondo                | Additional Water Supply Distribution pipelines- Siaya and Bondo towns     | 265,310,000           | 30,000                       | Jan-21 | Jul-23     |
| 23.                             | Siaya   | Ugunja and<br>Ugenya                          | Ugunja-Ukwala-Sega Water and Sanitation project                           | 1,046,000,000         | 20,000                       | Oct-19 | Aug-23     |
| <b>Sub-Total</b>                |         |   |   | <b>4,323,494,297</b>  |                              |        |            |
| <b>CENTRAL RIFT VALLEY WWDA</b> |         |   |   |                       |                              |        |            |
| 24.                             | Narok   | Narok North                                   | Partakilat Water Supply Project   | 374,678,383           | 5,000                        | Dec-20 | Oct-23     |

| S/N                             | County             | Constituency                            | Project Name  | Cost (KShs)          | Population (Households)   | Start  | Completion |
|---------------------------------|--------------------|---|---|----------------------|---------------------------|--------|------------|
| 25.                             | Narok              | Kilgoris                                | Kilgoris and Lolgorian Water Supply and Sanitation Projects               | 518,204,478          | 200,000                   | Jan-21 | Dec-23     |
| 26.                             | Baringo            | Baringo Central and Baringo North       | Kirandich Water and Sewerage Project                                      | 2,592,330,304        | 6,500                     | Feb-17 | Jan-24     |
| <b>Sub-Total</b>                |                    |   |   | <b>3,485,213,165</b> |                           |        |            |
| <b>NORTH RIFT VALLEY WWDA</b>   |                    |   |   |                      |                           |        |            |
| 27.                             | Elgeyo Marakwet    | Marakwet East                           | Tot Water Supply Project  | 52,000,000           | Target Population: 30,000 | Apr-23 | Jan-24     |
| 28.                             | Uasin Gishu/ Nandi | Kapseret/Kesses                         | Kipkarren Dam Water Treatment Works and Associated Distribution pipelines | 1,200,000,000        | 100,000                   | Jun-19 | Aug-23     |
| 29.                             | Uasin Gishu        | Eldoret Municipality                    | Last Mile Connectivity works for Eldoret and Kakamega Towns               | 504,000,000          | 30,000                    | Apr-22 | Dec-23     |
| 30.                             | West Pokot         | Kapenguria                              | Makutano and Kapenguria Sewerage Project                                  | 482,000,000          | 28,000                    | Jan-21 | Dec-23     |
| <b>Sub-Total</b>                |                    |   |   | <b>2,238,000,000</b> |                           |        |            |
| <b>LAKE VICTORIA NORTH WWDA</b> |                    |   |   |                      |                           |        |            |
| 31.                             | Busia              | Teso South                              | Malaba Water and Sanitation project lot 1                                 | 603,000,000          | 259,000                   | Jan-21 | Jan-24     |
| 32.                             | Busia              | Teso North                              | Malaba Sanitation Project   | 306,960,000          | 140,000                   | Sep-17 | Oct-23     |
| 33.                             | Bungoma            | Mt.Elgon, Kabuchai, Sirisia and Kanduji | Chepyuk Ward-Kibabii Complex Water Supply                                 | 500,000,000          | 16,000                    | May-21 | Nov-23     |
| 34.                             | Kakamega           | Lurambi                                 | Kakamega last mile connectivity   | 129,000,000          | 14,000                    | Jan-21 | Jan-24     |
| 35.                             | Nandi              | Nandi Hills                             | Nandi Hills Water Supply Project  | 375,000,000          | 30,000                    | Jan-21 | Aug-23     |
| <b>Sub-Total</b>                |                    |   |   | <b>1,913,960,000</b> |                           |        |            |



| S/N               | County                                       | Constituency                  | Project Name   | Cost (KShs)   | Population (Households) | Start  | Completion |
|-------------------|--|-------------------------------|--|---------------|-------------------------|--------|------------|
| <b>COAST WWDA</b> |  |                               |  |               |                         |        |            |
| 36.               | Kilifi                                       | Magarini                      | Baricho Protection Works   | 791,250,000   | -                       | Nov-21 | Jan-23     |
| 37.               | Kilifi                                       | Magarini, alindi              | Second Baricho kakuyuni Pipeline   | 1,994,870,000 | 310,000                 | Apr-22 | Aug-23     |
| 38.               | Kilifi                                       | Malindi                       | Water distribution for Mawasco Watamu lot 2A                               | 218,000,000   | 150,000                 | Aug-20 | May-23     |
| 39.               | Kilifi/Kwale/<br>Tana River/<br>Taita Taveta | Various                       | Small Dams and Pans and boreholes  | 162,270,000   | 10,000                  | Feb-19 | Apr-23     |
| 40.               | Kilifi/Kwale/<br>Tana River/<br>Taita Taveta | Various                       | Equalization fund Water Supply Projects                                    | 1,260,780,000 | 1,250,000               | Dec-20 | Dec-23     |
| 41.               | Kilifi                                       | Kilifi South                  | Waterworks distribution system for Mtwapa                                  | 850,000,000   | 5,000                   | Jun-21 | Aug-23     |
| 42.               | Kilifi                                       | Kilifi North                  | Waterworks distribution system for Kilifi Town                             | 516,000,000   | 15,700                  | Jun-21 | Aug-23     |
| 43.               | Kilifi                                       | Kilifi North,<br>Kilifi South | 12No. Ablution blocks  | 152,000,000   | 8640 people per day     | Apr-21 | Aug-23     |
| 44.               | Kilifi                                       | Malindi                       | Faecal Sludge Treatment Plant in Watamu                                    | 241,000,000   | 10,500                  | Nov-21 | Nov-23     |
| 45.               | Mombasa                                      | Kisauni                       | Mombasa North mainland Short-term works lot 1A                             | 781,420,000   | 60,000                  | Mar-21 | Oct-23     |
| 46.               | Mombasa                                      | Nyali                         | Program for improvement of Mombasa North Mainland Works Phase 1-Nyali area | 516,440,000   | 60,000                  | Mar-21 | Apr-23     |
| 47.               | Mombasa                                      | Likoni                        | Improvement of Water Supply to Dongo Kundu Special Economic Zone           | 226,360,000   | 10,000                  | Jan-21 | Dec-23     |
| 48.               | Mombasa                                      | Changamwe                     | Changamwe repooling sewer network  | 204,000,000   | 30,000                  | Dec-18 | Jan-24     |

| S/N | County           | Constituency                         | Project Name   | Cost (KShs)           | Population (Households) | Start  | Completion |
|-----|------------------|--------------------------------------|--|-----------------------|-------------------------|--------|------------|
| 49. | Mombasa          | Likoni, Jomvu, Mvita, Nyali, Kisauni | Rehabilitation and extension of Mombasa Water Supply and Distribution Lot 2B                           | 749,000,000           | 3,030                   | May-21 | Sep-23     |
| 50. | Mombasa          | Changamwe and Jomvu                  | Lot 1 Improvement of stormwater outlets and combined sewer overflows in Mombasa island                 | 459,000,000           | 300,000                 | May-21 | Aug-23     |
| 51. | Mombasa          | Changamwe and Jomvu                  | Rehabilitation of the Kipevu wastewater treatment system and pumping stations                          | 241,000,000           | 150,000                 | May-21 | Aug-23     |
| 52. | Mombasa          | Mvita, Nyali, Kisauni and Jomvu      | 15No. Ablution blocks in Mombasa County  | 197,000,000           | 4,500                   | Oct-21 | Jul-23     |
| 53. | Mombasa          | Mvita, Changamwe and Jomvu           | Rehabilitation and Extension of Sewer networks in the West mainland and island                         | 314,000,000           | 15,974                  | Jun-21 | Aug-23     |
| 54. | Kwale            | Matuga                               | Rehabilitation and expansion of Kwale Water Supply and Operations Improvement Works                    | 426,000,000           | 148,000                 | Oct-20 | Sep-23     |
| 55. | Kwale            | Kinango                              | Design and Construction of Makamini Dam  | 1,500,000,000         | 50,000                  | Dec-20 | Dec-23     |
| 56. | Kwale            | Likoni/Matuga/<br>Kinango            | Construction/Supervision of Emergency works for increasing water availability in Likoni-Tiwi Boreholes | 319,750,000           | 100,000                 | Aug-21 | Jan-24     |
| 57. | Taita taveta     | Voi, Taveta, Mwatate and Wundanyi    | Upgrade of water distribution systems for Voi, Taveta, Mwatate and Wundanyi towns                      | 790,000,000           | 17,500                  | Sep-22 | Mar-23     |
|     | <b>Sub-Total</b> |                                      |  | <b>12,910,140,000</b> |                         |        |            |



| S/N                  | County        | Constituency                     | Project Name                        | Cost (KShs)        | Population (Households) | Start  | Completion |
|----------------------|---------------|----------------------------------|-------------------------------------|--------------------|-------------------------|--------|------------|
| <b>NORTHERN WWDA</b> |               |                                  |                                     |                    |                         |        |            |
| 58.                  | Wajir         | Eldas                            | Jukala Waradey Water Project        | 102,000,000        | 3,000                   | Jul-22 | Mar-23     |
| 59.                  | Garissa       | Ijara                            | Ijara-Masalani-Kabababa extension   | 88,000,000         | 20,000                  | May-23 | Dec-23     |
| 60.                  | Garissa       | Fafi                             | Huduma Waterpan                     | 10,000,000         | 10,000                  | May-23 | Sep-23     |
| 61.                  | Garissa       | Bourtargy                        | Bourtargy borehole                  | 5,000,000          | 4,000                   | Jun-23 | Aug-23     |
| 62.                  | Garissa       | Fafi                             | Desilting of Hujale Waterpan        | 5,000,000          | 10,000                  | Mar-23 | May-23     |
| 63.                  | Garissa       | Fafi                             | Desilting of Dadbula Waterpan       | 5,000,000          | 10,000                  | Mar-23 | May-23     |
| <b>Sub-Total</b>     |               |                                  |                                     | <b>215,000,000</b> |                         |        |            |
| <b>TANA WWDA</b>     |               |                                  |                                     |                    |                         |        |            |
| 64.                  | Tharaka Nithi | Maara                            | Chogoria Sewerage project           | 374,600,000        | 30,000                  | Jan-19 | Sep-23     |
| 65.                  | Tharaka Nithi | Chuka/Igamba, Ngombe             | Chuka Water Supply Project          | 606,500,000        | 150,000                 | Feb-21 | Sep-23     |
| 66.                  | Tharaka Nithi | Chuka/Igamba, Ngombe             | Chuka Sewerage Project              | 472,960,000        | 30,000                  | Jan-19 | Sep-23     |
| 67.                  | Tharaka Nithi | Maara                            | Gitije-Kandugu Water Project        | 116,400,000        | 150,000                 | May-21 | May-22     |
| 68.                  | Tharaka       | Maara                            | Kajogu Dam                          | 218,500,000        | 160,000                 | Jun-22 | Jun-23     |
| 69.                  | Tharaka Nithi | Maara                            | Thambo dam                          | 133,500,000        | 64,000                  | Jun-22 | Jun-23     |
| 70.                  | Kirinyaga     | Kirinyaga Central, Gichugu, Ndia | Kerugoya-Kutus Water supply Project | 1,301,000,000      | 350,000                 | Nov-18 | May-23     |
| 71.                  | Kirinyaga     | Kirinyaga Central, Gichugu, Ndia | Kerugoya-Kutus Sewerage Project     | 544,000,000        | 40,000                  | Nov-18 | May-23     |

| S/N                            | County  | Constituency  | Project Name  | Cost (KShs)          | Population (Households)       | Start  | Completion |
|--------------------------------|---|---|---|----------------------|-------------------------------|--------|------------|
| 72.                            | Meru  | Imenti North  | Meru Sewerage Project   | 113,800,000          | 100,000                       | Jan-19 | Dec-23     |
| <b>Sub-Total</b>               |   |   |   | <b>3,881,260,000</b> |                               |        |            |
| <b>TANATHI WWDA</b>            |   |   |   |                      |                               |        |            |
| 73.                            | Kajiado   | Kajiado South   | Rombo Clusters Irrigation Project   | 221,000,000          | 6000hh, 3240 acres            | Feb-23 | Nov-23     |
| 74.                            | Makueni/<br>Kitui/<br>Machakos  | Several   | Last-mile connectivity for Matuu, Kitui and Wote towns                      | 850,000,000          | 60,000                        | Mar-20 | Dec-23     |
| 75.                            | Machakos  | Machakos town   | Machakos Water Supply Project   | 1,068,000,000        | 50,000                        | Jul-19 | Dec-23     |
| 76.                            | Machakos  | Machakos town   | Machakos Water Sewerage Project   | 840,000,000          | 10,000                        | Jun-20 | Mar-23     |
| 77.                            | Machakos  | Mavoko  | Kenanie Leather Industrial Park Water Supply Project Phase II & III         | 293,000,000          | 6,500                         | Jul-22 | Sep-23     |
| 78.                            | Machakos  | Mavoko  | Mavoko Water and Sewer Interventions Extension of Pipeline Phase II and III | 172,000,000          | 6,200                         | Jul-22 | Jan-24     |
| <b>Sub-Total</b>               |   |   |   | <b>3,444,000,000</b> |                               |        |            |
| <b>WATER SECTOR TRUST FUND</b> |   |   |   |                      |                               |        |            |
| 79.                            | Tharaka<br>Nithi Nandi<br>Kisumu<br>Uasin Gishu<br>West Pokot<br>Mombasa<br>Taita Taveta<br>Kilifi Kwale<br>Kakamega<br>Busia | Maara Homa<br>Bay Town<br>Kapenguria<br>Changamwe<br>Mwatate<br>Kilifi North<br>Msambweni<br>Nandi Central<br>Kisumu Central<br>Eldoret North<br>Mumias West<br>Budalangi | Up-scaling of Basic Sanitation for the Urban Poor (UBSUP)                   | 1,013                | Target Population:<br>600,000 | Jul-11 | Dec-21     |



| S/N | County  | Constituency  | Project Name  | Cost (KShs) | Population (Households)       | Start  | Completion |
|-----|---|---|---|-------------|-------------------------------|--------|------------|
| 80. | Kitui<br>Muranga<br>Kirinyaga<br>Home Bay<br>Nyeri<br>Lamu<br>Vihiga<br>Meru<br>Laikipia<br>Garissa<br>Nakuru<br>Nyandarua<br>Bomet | Kitui Central<br>Maragua<br>Mwea<br>Homa Bay Town<br>Naivasha<br>Ndaragwa<br>Lamu West<br>Bomet Central<br>Mukurweini<br>Imenti South<br>Buuri<br>Nyeri Central<br>Vihiga<br>Laikipia West<br>Ijara | Water Sector Development (Support WSTF)                         | 1,656       | Target Population:<br>250,000 | Dec-14 | Jun-21     |
| 81. | Nakuru<br>Murang'a<br>Kisumu<br>Nyeri<br>Embu   | Nyeri Town<br>Embu west<br>Kandara<br>Kisumu East<br>Naivasha<br>Mathira  | Kenya Urban Water and Sanitation Output-Based Aid Project (OBA) | 1,385       | Target Population<br>120,000  | Dec-14 | Jun-22     |

| S/N | County  | Constituency   | Project Name  | Cost (KShs) | Population (Households)      | Start  | Completion |
|-----|---|--|---|-------------|------------------------------|--------|------------|
| 82. | Laikipia<br>Tharaka<br>Nithi<br>Narok<br>Kwale<br>Nandi<br>Migori | Laikipia East<br>Tharaka<br>Chuka<br>Igambangombe<br>Narok South<br>Suna East<br>Nyatike<br>Suna East<br>Laikipia Esat<br>Mosop<br>Chesumei<br>Tindiret<br>Matuga<br>Kilgoris<br>Narok East<br>Kinango<br>Matuga<br>Chuka<br>Igambangombe<br>Laikipia East<br>Lunga Lunga<br>Maara | Support to Equitable Access to Quality Water, Basic Sanitation and Enhanced Water Resources Management in Rural Kenya | 2,325       | Target Population<br>200,000 | Oct-14 | Jun-21     |



| S/N | County   | Constituency   | Project Name   | Cost (KShs) | Population (Households)      | Start   | Completion |
|-----|--|--|--|-------------|------------------------------|---------|------------|
| 83. | Garissa<br>Tana River<br>Wajir<br>Turkana<br>Mandera<br>Isiolo<br>Lamu<br>Marsabit | Lamu West<br>Lamu East<br>Bura Tana<br>Isiolo North<br>Isiolo South<br>Ijara<br>Fafi<br>Balambala<br>Garissa<br>Township<br>Galole<br>Garsen<br>Wajir North<br>Wajir South<br>Wajir West<br>Wajir East<br>Turkana East<br>Turkana Central<br>Mandera West<br>Mandera North<br>Laisamis<br>Saku | Green growth and employment creation to and management of of water resources in the Arid and Semi-Arid Lands | 2,222       | Target Population<br>200,000 | Jul-16  | Jun-22     |
| 84. | Meru<br>Makueni<br>Kirinyaga<br>Machakos   | Kibwezi East<br>Machakos Town<br>Buuri<br>Ndia   | Water Supply and Sanitation for the Urban Poor -KfW  | 800         | Target Population<br>150,000 | June 16 | Dec-22     |

| S/N              | County  | Constituency   | Project Name   | Cost (KShs)   | Population (Households)      | Start   | Completion |
|------------------|---|--|--|---------------|------------------------------|---------|------------|
| 85.              | Baringo<br>Kajiado<br>Kilifi<br>Taita Taveta<br>Mandera<br>West Pokot<br>Samburu<br>Kitui | Kitui East<br>Kitui West<br>Ganze<br>Kajiado East<br>Mwatate<br>Mandera East<br>Pokot South<br>Samburu West<br>Samburu East<br>Baringo South | Ending drought Emergencies Supports<br>drought Risk Management               | 2,653         | Target Population<br>360,000 | Jul-16  | Jun-22     |
| 86.              | Wajir<br>Mandera<br>Garissa   | To be<br>determined  | The Saudi Programme for Drilling of<br>Wells and Rural Development in Africa | 600           | Target Population<br>25,000  | Jul.-17 | Jun-20     |
| <b>Sub-Total</b> |   |  |  | <b>12,654</b> |                              |         |            |

### Annex III: Irrigation Projects Expected to be Completed by 2024

| S/N | County       | Constituency                 | Project Name                    | Cost (KShs Mill) | Area and beneficiaries                   | Start Date | Completion Date |
|-----|--------------|------------------------------|---------------------------------|------------------|--|------------|-----------------|
| 1.  | Muranga      | Kangema, Gatanga and Kandara | Muranga Cluster Lot 3           | 218.7            | Area: 200 acres<br>No. of farmers: 300   | 2020/21    | 2022/23         |
| 2.  | Kwale        | Lunga Lunga                  | Waga Machame irrigation project | 379.1            | Area: 1200 acres<br>No. of farmers: 1200 | Sept 2022  | Sept 2024       |
| 3.  | Siaya        | Ugenya                       | Anyiko irrigation project       | 478              | Area: 1200 acres<br>No. of farmers: 1200 | Aug 2022   | Aug 2024        |
|     | <b>Total</b> |                              |                                 | <b>1,075.8</b>   |  |            |                 |

## Annex IV: Details of Dams

| 6.S/<br>N7. | Name of Dam  | County             | Capacity<br>(million<br>m3) | Beneficiaries         | Approx. Cost<br>(KSh million) | Contracting<br>Authority | Project Status/Challenges   |
|-------------|--|--------------------|-----------------------------|-----------------------|-------------------------------|--------------------------|---|
| <b>8.</b>   | <b>Under Construction Phase</b>  |                    |                             |                       |                               |                          |   |
| 1.          | Bonyunyu Dam   | Nyamira            | 40                          | 450,000               | 14,200                        | LVSWSB                   | Construction Works at 10%   |
| 2.          | Thwake Dam   | Makueni            | 681                         | 1,300,000             | 42,000                        | MoWS                     | Construction works started in March 2018 and the project is at 86%.   |
| 3.          | Siyoi/Muruny   | West-Pokot         | 9.9                         | 200,000               | 10,000                        | NWWSA                    | Physical project progress at 53% Lot 1 and 92% Lot 2<br>Requires funds to avoid slow progress Rate, Suspension and pending Bills. Both LOT 1 & 2                    |
| 4.          | Mwache Dam   | Kwale              | 118                         | 2,000,000             | 15,000                        | MoWS                     | Commencement for the Dam works was 4th March 2022<br>Physical Progress at 7%  |
| 5.          | Ruiru II Dam/<br>Water Supply  | Kiambu             | 13.5                        | 800,000               | 25,200                        | AWSB                     | Geotechnical investigations have been done for Detailed Design.<br>Contract Awarded. Resettlement of Project Affected Persons in Key Dam Priority Areas is ongoing. |
|             | <b>Sub-Total</b>   |                    | <b>862.4</b>                | <b>4,750,000</b>      | <b>106,400</b>                |                          |   |
|             | <b>Dams under Evaluation for Design, Build, Finance, Operate, Maintain and Transfer under Private Public Partnership Framework</b> |                    |                             |                       |                               |                          |   |
| 1.          | Upper Solai Dam  | Nakuru and Baringo | 3                           | 100,000p              | 6,000                         | CRVWDA                   | Draft Feasibility reports submitted for review  |
| 2.          | Yatta Dam  | Machakos           | 30                          | 200,000p<br>4,000acre | 9,200                         | TAWWDA                   | Designs Complete  |
| 3.          | Mwania Dam   | Machakos           | 12                          | 200,000p              | 7,800                         | TAWWDA                   | Designs Complete  |
| 4.          | Namanga Dam  | Kajiado            | 1                           | 160,000p              | 3,400                         | TAWWDA                   | Designs Complete  |

| 6.S/<br>N7. | Name of Dam                      | County                          | Capacity<br>(million<br>m3) | Beneficiaries                  | Approx. Cost<br>(KSh million) | Contracting<br>Authority | Project Status/Challenges   |
|-------------|----------------------------------|---------------------------------|-----------------------------|--------------------------------|-------------------------------|--------------------------|---|
| 5.          | Kilome-Mukuyu Dam                | Makueni                         | 3                           | 100,000p                       | 4,600                         | TAWWDA                   | Proposal and Pre-Feasibility Report Ready   |
| 6.          | Olooiloitikosh/<br>Kitengela Dam | Kajiado                         | 34                          | 500,000p                       | 12,500                        | TAWWDA                   | Feasibility study and Preliminary Designs completed   |
| 7.          | Kitimui Dam                      | Kitui                           | 4.5                         | 185,000p                       | 1,900                         | TAWWDA                   | Concepts/Proposal completed   |
| 8.          | Nanyuki Dam                      | Laikipia                        | 3.5                         | 218,000p                       | 10,000                        | CRVWDA                   | Review of Feasibility Study ongoing to source for funding to undertake detailed design, Tender Documents and funding for construction ongoing |
| 9.          | Rumuruti Dam                     | Laikipia                        | 26                          | 45,000p<br>500acre             | 7,000                         | NWWSA                    | Procurement of Consultant for Review of Feasibility Study, Detailed Design and Tender Document at Expression of Interest stage                |
| 10.         | Isiolo Dam                       | Isiolo/<br>Laikipia/<br>Samburu | 214                         | 1,500,000p                     | 16,000                        | NWWSA                    | Designs ready for funding   |
| 11.         | Kinale Dam                       | Kiambu                          | 1                           | 126,000p                       | 15,000                        | AWWDA                    | Preliminary Designs completed   |
| 12.         | Londiani Dam                     | Kericho                         | 55                          | 1,800,000p<br>2,800acre<br>2MW | 20,000                        | NWWSA/<br>LVSWWDA        | Designs ready for funding   |
| 13.         | Igembe Dam                       | Meru                            | 8                           | 506,000p                       | 19,000                        | NWWSA                    | Designs ready for funding   |
| 14.         | Kamiti Dam                       | Kiambu                          | 23                          | 100,000p                       | 15,000                        | AWWDA                    | Feasibility Study done  |
| 15.         | Thiririka Dam                    | Kiambu                          | 14.699                      | 75,000p<br>2,000acre           | 5,000                         | AWWDA                    | Feasibility Study done  |
| 16.         | Laisamis<br>Nungunon Dam         | Marsabit                        | 23.3                        | 226,000p<br>10,000acre         | 12,000                        | NWWDA                    | Feasibility Study done  |

| 6.S/<br>N7. | Name of Dam                            | County        | Capacity<br>(million<br>m3) | Beneficiaries                 | Approx. Cost<br>(KSh million) | Contracting<br>Authority | Project Status/Challenges                              |
|-------------|--|---------------|-----------------------------|-------------------------------|-------------------------------|--------------------------|--|
| 17.         | Kobi Kalo<br>Composite Rockfill<br>Dam | Isiolo        | 1                           | 143,000p<br>2,236acre         | 6,400                         | NWWDA                    | Feasibility Study done                                 |
| 18.         | Kamumu<br>Multipurpose Dam             | Embu          | 22                          | 97,000p<br>17,500acre         | 6,700                         | TAWWDA                   | Feasibility Study done                                 |
| 19.         | Kithinu<br>Multipurpose Dam            | Meru          | 54.6                        | 130,000p<br>10,000acre        | 3,600                         | NIA                      | Concepts/Proposal completed                            |
| 20.         | Bonyunyu Dam                           | Nyamira       | 7.37                        | 450,000p                      | 15,000                        | LBDA/<br>LVSWWDA         | Feasibility study and Preliminary<br>Designs completed |
| 21.         | Maara dam                              | Tharaka-Nithi | 15                          | 500,000p<br>5,000acre         | 6,000                         | NIA                      | Designs ready for funding                              |
| 22.         | Karimeno Dam                           | Nyeri         | 12.3                        | 100,000p<br>1,000acre<br>5MW  | 8,000                         | NIA                      | Designs ready for funding                              |
| 23.         | Lowaat Dam                             | Turkana       | 348                         | 20,000p<br>25,000acre<br>15MW | 16,000                        | NIA                      | Designs ready for funding                              |
| 24.         | Thuci Dam                              | Embu          | 23                          | 70,000p<br>6,600acre<br>5MW   | 9,000                         | NIA                      | Designs ready for funding                              |
| 25.         | Rwabura Dam                            | Kiambu        | 12                          | 15,000p<br>2,800acre<br>5MW   | 14,000                        | NIA                      | Designs ready for funding                              |
| 26.         | Gogo Dam                               | Migori        | 348                         | 30,000p<br>16,000acre<br>25MW | 28,000                        | NIA                      | Designs ready for funding                              |

| 6.S/<br>N7. | Name of Dam                | County        | Capacity<br>(million<br>m3) | Beneficiaries                 | Approx. Cost<br>(KSh million) | Contracting<br>Authority | Project Status/Challenges                                     |
|-------------|----------------------------|---------------|-----------------------------|-------------------------------|-------------------------------|--------------------------|---|
| 27.         | High Grand Falls Dam       | Tharaka-Nithi | 5600                        | 5,000p<br>160,000acre<br>80MW | 154,000                       | NIA                      | Designs ready for funding                                     |
| 28.         | Naromoru Dam               | Nyeri         | 10.6                        | 13,000p<br>3250acre<br>5MW    | 7,800                         | NIA                      | Designs ready for funding                                     |
| 29.         | Umba Dam                   | Kwale         | 13.4                        | 18,000p<br>850acre            | 9,700                         | NIA                      | Pre-Feasibility Report Ready                                  |
| 30.         | Olenkirionito Dam          | Narok         | 16                          | 3,000p<br>7,333acre           | 6,100                         | NIA                      | Designs ready for funding                                     |
| 31.         | Radat Dam                  | Baringo       | 124                         | 20,000p<br>10,000acre         | 15,000                        | NIA                      | Feasibility Study done  |
| 32.         | Galana Dam                 | Tana River    | 400                         | 84,000acre                    | 50,000                        | NIA                      | To be designed  |
| 33.         | Rare Dam                   | Kilifi        | 36                          | 506,000p                      | 6,000                         | CWWDA                    | Detailed Design ongoing, size of land required is 73.15 acres |
| 34.         | Itare Dam                  | Nakuru        | 28                          | 1,000,000p                    | 28,000                        | CRVWWDA                  | The works stopped at 27% due to court case                    |
| 35.         | Bosto Dam                  | Bomet         | 18.3                        | 550,000p<br>2MW               | 20,000                        | NWHSA                    | Project Awarded under EPC-F                                   |
| 36.         | Badassa Dam                | Marsabit      | 4                           | 80,000p                       | 2,200                         | NWHSA                    | Project Awarded under EPC-F                                   |
| 37.         | Umaa Dam                   | Kitui         | 1.22                        | 70,000p                       | 2,200                         | NWHSA                    | Designs ready for funding                                     |
| 38.         | Pesi Lot 1 Dam             | Nyandarua     | 16                          | 572,000p                      | 15,000                        | CRVWWDA                  | Under detailed design and preparation of tender documents     |
| 39.         | Kyakivai and Kaiti Ngomano | Makueni       | 20                          | 10,000p<br>2024acre<br>5MW    | 10,000                        | NIA                      | Pre-Feasibility Report Ready                                  |

| 6.S/<br>N7. | Name of Dam                    | County              | Capacity<br>(million<br>m3) | Beneficiaries                 | Approx. Cost<br>(KSh million) | Contracting<br>Authority | Project Status/Challenges          |
|-------------|--------------------------------|---------------------|-----------------------------|-------------------------------|-------------------------------|--------------------------|------------------------------------|
| 40.         | Saimo Soi Dam                  | Baringo             | 12                          | 607,628p                      | 10,000                        | CRVWWDA                  | Feasibility study to be undertaken |
| 41.         | Egerton Dam                    | Nakuru              | 5                           | 163,989p                      | 7,000                         | CRVWWDA                  | Feasibility study to be undertaken |
| 42.         | Thingithu Dam                  | Tharaka-Nithi       | 3                           | 200,000p<br>8,000acre         | -                             | TAWWDA                   | Concepts/Proposal completed        |
| 43.         | Gatamaiyu Dam<br>Water Project | Kiambu              | 7                           | 500,000p                      | 6,000                         | AWWDA                    | Feasibility Study done             |
| 44.         | Kiambaa Dam                    | Kiambu              | 18.3                        | 320,000P<br>2MW               | 20,000                        | NWWSA                    | Project Awarded under EPC-F        |
| 45.         | Ndarugu 2 Dam                  | Kiambu              | 19                          | 1,500,000p                    | 40,000                        | AWWDA                    | Feasibility Study done             |
| 46.         | Ruabura Dam                    | Kiambu              | 26                          | 500,000p                      | 15,000                        | AWWDA                    | Feasibility Study done             |
| 47.         | Upper Narok Dam                | Narok               | 11                          | 25,000p                       | 6,000                         | CRVWWDA                  | Feasibility Study done             |
| 48.         | Maragua 4 Dam                  | Murang'a            | 64                          | 1,000,000p                    | 45,500                        | AWWDA                    | Feasibility Study done             |
| 49.         | Mbagathi Dam                   | Nairobi/<br>Kajiado | 54                          | 400,000p                      | 7,000                         | AWWDA                    | Feasibility Study done             |
| 50.         | Malewa Dam                     | Nyandarua           | 214                         | 1,500,000p<br>16MW            | 16,000                        | CRVWWDA                  | Designs ready for funding          |
| 51.         | Amaya/Amaiya<br>Dam            | Laikipia            | 10.45                       | 116,566p<br>16MW              | 16,000                        | CRVWWDA                  | Designs ready for funding          |
| 52.         | Beregei Dam                    | Baringo             | 8                           | 144,522p<br>100acres<br>175MW | 6,000                         | CRVWWDA                  | Designs ready for funding          |
| 53.         | Two-Rivers Dam                 | Uasin Gishu         | 16                          | 1,500,000p                    | 15,100                        | NRWWDA                   | Designs ready for funding          |
| 54.         | Kerita II Dam                  | Uasin Gishu         | 25                          | -                             | 5,520                         | NRWWDA                   | -                                  |
| 55.         | Endarasha Dam                  | Uasin Gishu         | 35                          | -                             | 16,760                        | NRWWDA                   | -                                  |
| 56.         | Arror<br>Multipurpose Dam      | Elgeyo<br>Marakwet  | 64                          | 320,000p<br>3,573acre<br>60MW | 18,000                        | NRWWDA                   | Designs ready for funding          |

| 6.S/<br>N7.           | Name of Dam      | County   | Capacity<br>(million<br>m3) | Beneficiaries    | Approx. Cost<br>(KSh million) | Contracting<br>Authority | Project Status/Challenges |
|-----------------------|------------------|----------|-----------------------------|------------------|-------------------------------|--------------------------|---------------------------|
| 57.                   | Komothai 2 Dam   | Kiambu   | 5                           | 200,000p         | 2,000                         | AWWDA                    | Feasibility Study done    |
|                       | <b>Sub-Total</b> |          | <b>8183.54</b>              |                  | <b>854,980</b>                |                          |                           |
| <b>Completed Dams</b> |                  |          |                             |                  |                               |                          |                           |
| 1.                    | Thiba Dam        | Kiambu   | 15.4                        |                  |                               | AWWDA                    | Completed in 2022         |
| 2.                    | Karimenu II Dam  | Kiambu   | 19                          | 580,000          | 27,150                        | AWSB                     | Completed in 2022         |
| 3.                    | Yamo Dam         | Samburu  | 6                           | 12,000           | 2,106                         | NWSB                     | Completed in 2022         |
| 4.                    | Chemususu Dam    | Baringo  | 35                          | 300,000          | 4,800                         | RVWSB                    | Completed in 2011         |
| 5.                    | Theta Dam        | Kiambu   | 0.4                         | 50,000           | 741                           | AWSB                     | Completed in 2015         |
| 6.                    | Kiserian Dam     | Kajiado  | 1.8                         | 253,000          | 1,000                         | NWHSA                    | Completed in 2013         |
| 7.                    | Maruba dam       | Machakos | 0.6                         | 200,000          | 500                           | NWHSA                    | Completed in 2010         |
| 8.                    | Thangatha Dam    | Meru     | 0.25                        | 165,000          | 100                           | TWSB                     | Completed in 2020         |
| 9.                    | Ura Dam          | Meru     | 0.1                         | 50,000           | 100                           | TWSB                     | Completed in 2020         |
| 10.                   | Kianjuri Dam     | Meru     | 0.25                        | 90,000           | 90                            | TWSB                     | Completed in 2020         |
| 11.                   | Wamba Dam        | Samburu  | 0.15                        | 3,100            | 106                           | NWSB                     | Completed in 2021         |
|                       | <b>Sub-Total</b> |          | <b>78.95</b>                | <b>1,700,000</b> | <b>36,587</b>                 |                          |                           |

*Annex V: Key projects to support Irrigation, Food and Nutrition Security*

| S/No | Project Name                      | Service Area                      | Cost (KShs. M) | Allocation FY 2022/23 (KShs. M) | Description  | Status   |
|------|-----------------------------------|-----------------------------------|----------------|---------------------------------|--|--|
| 1.   | Small Holder Irrigation Programme | Embu, Kirinyaga and Tharaka Nithi | 630            | 218                             | The project aims to construct 6 schemes namely: - Gatene (Embu); Miuka and Kandeki (Kirinyaga); Mutino, Magati and Kiramanti (Tharaka Nithi); On completion, 1,570 acres would be put under irrigation to benefit 1,800 farmers. | 19 irrigation schemes covering 5,460 acres and benefiting 6,088 farmers completed for phases 1-3 at a cost of Kshs 1.27 Billion. In Phase IV, contracts were awarded for the construction of 5 schemes out of the 6, expected to increase the area under irrigation by 1,300 acres and benefit 1540 farmers.   |
| 2.   | Bura Irrigation Scheme            | Tana River                        | 7,356          | 850                             | The Project aims at the installation of a 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.                          | Started in 2013 and to be completed in 2023<br>The construction works have since been phased; phase 1 which deals with the intake works is currently at 98.6% and phase 2 which handles the main gravity canal is 50.2% complete. Excavation of 26km new canal completed; construction of canal structures including piling is ongoing; Rehabilitation of infrastructure for 5000 acres complete and under production. 82% progress. |

| S/No | Project Name                           | Service Area                   | Cost (KShs. M) | Allocation FY 2022/23 (KShs. M) | Description  | Status   |
|------|--|--------------------------------|----------------|---------------------------------|--|--|
| 3.   | Community-Based Irrigation Projects    | Countrywide                    | 9,280          | 612                             | 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 the construction of intake structures, main canals and infield structures in the various schemes that are yet to be completed. | Construction of Murang'a cluster Lot 3 and Kanyenyaini irrigation projects all in Muranga county were completed covering an area of 1200 acres and benefiting 1,900 farmers. Construction of the Anyiko Rice scheme in Siaya County and the Waga Machame scheme in Kwale County were initiated during the year and progressed to 20% completion. |
| 4.   | Galana Kulalu Food Security Project    | Kilifi and Tana River Counties | 8,681          | 340                             | The project aims to develop a 10,000-acre model farm project consisting of a 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                     | 5,100 acres are complete and under production by NIA. To achieve the remaining 4,900 acres, 25No. Centre Pivots have been installed and tested. Equally, the main conveyance and Distribution Pipeline of 29 Km has been completed out of 36km and the pump house is under construction. Works are 95.53% complete.                              |
| 5.   | National Expanded Irrigation Programme | Countrywide                    | 123,930        | 3,235                           | Provision of irrigation infrastructure for abstraction, conveyance, distribution and application of irrigation water for 572 identified irrigation projects across the country   | Constructed over 240 irrigation projects across 47 counties with a cumulative total area of 237,079 acres, directly benefiting 268,000 farmers. Rehabilitation and expansion of public schemes by an additional 21,000 acres.  |

| S/No | Project Name  | Service Area     | Cost (KShs. M) | Allocation FY 2022/23 (KShs. M) | Description  | Status   |
|------|---|------------------|----------------|---------------------------------|--|--|
| 6.   | Mwea Irrigation Development Project (Thiba Dam and Irrigation Area) | Kirinyaga County | 19,967         | 1,415                           | The project aims to increase water storage by 15.4 million M3 through the construction of the Thiba Dam to facilitate double cropping in the 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  | The dam is 100% complete and is currently supplying irrigation water to the Mwea Irrigation Scheme. The scheme has expanded by 6,887 acres under outgrowers to 26,887 acres under paddy. The gates have been opened to release water downstream to the farmland for rice production.                           |
| 7.   | Rwabura Irrigation Development Project                              | Kiambu County    | 935            | 554                             | The project aims at providing irrigation infrastructure for 1500 acres that will support the production of horticultural crops and fruits valued at Kshs 390 million by 2022.  | The two intakes one on R. Rwabura and the other on R. Thiririka have been completed, the laying of the conveyance pipeline is ongoing and is 67.75% done, Trench excavation and pipelaying of Thiririka sub main line are done and 77% of distribution 5 blocks has been done. The project is 63.16% complete. |
| 8.   | Turkana Irrigation Development Project                              | Turkana County   | 9,197          | 200                             | The project aims at the construction of intake, and conveyance canals for 5,000 acres in Naipa, the expansion of Katilu clusters by 4000 acres, and 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 20 projects covering 20,195 acres to benefit 9,080 households and provide a stable supply of maize at an average of 38,000 tons of maize and millet.   |

| S/No | Project Name   | Service Area  | Cost (KShs. M) | Allocation FY 2022/23 (KShs. M) | Description   | Status   |
|------|--|---|----------------|---------------------------------|---|--|
| 9.   | Lower Kuja Irrigation Scheme                           | Migori County   | 4,694          | 50                              | Construction of intake, canal network and water control structures for 19,290 acres to benefit 3,000 farmers directly.  | Ongoing construction in phases where 4,000 acres has been achieved and production is ongoing with 1,840 farmers.   |
| 10.  | Lower Sabor Irrigation Project                         | Uasin Gishu County                                    | 400            | 0                               | Supply, laying of pipelines. Supply, and installation of drip kits and in-field sprinkler irrigation systems for 2,000 acres to benefit 4,500 people directly and indirectly  | Construction of on-farm infrastructure is complete and production is going on.   |
| 11.  | Land Reclamation (Land Degradation Assessment Program) | Countrywide in 15 proposed sub-basins/sub-catchements | 394            | 6                               | The project aims at using integrated GIS/Remote sensing. 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-sized and multipurpose dams. | 3 water basin-based land degradation assessments were conducted for Lake Magadi, Upper Kerio Valley and Upper Ewaso Nyiro North basins. 15,600 ha of land reclaimed into productive lands in Turkana, Garissa, West Pokot, Baringo, Laikipia, Isiolo, Tana River, Kwale, TaitaTaveta, Kajiado, Narok and Busia Counties. |
| 12.  | National Water Harvesting and Groundwater Exploitation | Countrywide   | 11,000         | 500                             | The project involves the construction of water pans and small dams ranging from 10,000m <sup>3</sup> to 50,000m <sup>3</sup> by 2021 to harvest and store about 18 million m <sup>3</sup> 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 m <sup>3</sup> of water; Implementation of 5 water pans and 13 boreholes ongoing   |

| S/No | Project Name  | Service Area                 | Cost (KShs. M) | Allocation FY 2022/23 (KShs. M) | Description   | Status  |
|------|---|------------------------------|----------------|---------------------------------|---|---|
| 13.  | Micro Irrigation Programme for Schools                                  | Countrywide                  | 2,030          | 90                              | 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 2,000 schools with water across the country annually. | Projects initiated in 2016. 4 schools were equipped with micro-irrigation facilities during the FY 2022/23  |
| 14.  | Spate Irrigation for Climate Resilience in Samburu, Marsabit and Isiolo | Samburu, Marsabit and Isiolo | 6,930          | 100                             | To improve climate resilience in Samburu, Marsabit and Isiolo counties through irrigation   | Constructed and rehabilitated water infrastructure with a potential volume of 1,113,000m <sup>3</sup> of water for crop production and livestock use. |
| 15.  | Water Security and Climate Adaptation in Mandera and Wajir Clusters     | Mandera and Wajir            | 4,200          | 110                             | To improve climate adaptation in Mandera and Wajir clusters   | Constructed and rehabilitated water infrastructure with a potential volume of 699,000m <sup>3</sup> of water for crop production and livestock use.   |
| 16.  | Rehabilitation of Strategic Water Facilities- NIA                       | Countrywide                  | 9,768          | 755                             | To restore and increase access to water by 7.2MCM for communities that depend on existing colonial water pans and small dams through rehabilitation and expansion to meet their water needs.  | 51 completed water pans with a cumulative volume of 3.277 million cubic meters of water for crop production, and human and livestock use.             |
|      | <b>Total</b>  |                              | <b>219,392</b> | <b>9,035</b>                    |   |   |

## Annex VI: Proposed Large-Scale and Strategic Irrigation Projects

| Project Name  | Project Features   | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)   | Action Required    | Financing options   |
|---|--|-----------------------|-------------------|--|--------------------|---|
| Lower Nzoia Phase II                                  | Location - Budalangi Siaya and Busia Counties<br>Water source – Lower Nzoia<br>Intake works and intake headrace construction are ongoing under the Lower Nzoia Phase I project<br>A major irrigation scheme with a total area of 9,490 acres.<br>Canal irrigation system with option for lining and closed conduits in some sections<br>Feasibility study and detailed designs completed. RAP carried out – land compensation not yet. | 9,490                 | 1,992,900,000.00  | Increase food production<br>118,625 bags of maize annually<br>11,388 MT of paddy rice<br>Various horticulture and high-value crops worth Kshs 2 billion<br>Create direct and indirect employment for 47450<br>Add GDP value of Kshs 3.6 billion annually from the value of produce.<br>Improve agricultural productivity through irrigation water management<br>Promote the growth of agro-based industries by providing a reliable and steady supply of raw materials.<br>Improved the income levels of the local population by at least 40% thereby improving their socioeconomic well-being | Construction       | World Bank/ KfW had shown interest  |
| Lower Kuja Irrigation Development Project, Lot 2 to 6 | Location - Nyatike District Kisii, Migori Counties<br>Water source - Kuja River<br>Major irrigation scheme at a 19,290 acres net command area.<br>Intake weir and conveyance canals have been constructed.<br>Total length of Branch canal offtaking from the main canal is 26 km.<br><br>Feasibility study and detailed designs completed and land acquisition for primary infrastructure partially completed                         | 19,290                | 4,050,900,000.00  | Increase food production<br>241,100 bags of maize annually<br>23,151 MT of paddy rice<br>Various horticulture and high-value crops worth Kshs 4 billion<br>Create direct and indirect employment for 96,000<br>Add GDP value of Kshs 7.4 billion annually from value of produce.<br>Improve agricultural productivity through irrigation water management<br>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br>Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being       | Construction works | Gok financed the construction of the intake weir and conveyance canals under lot 1<br>JICA had shown interest and the Rice Production intensification programme |

| Project Name                                 | Project Features   | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)   | Action Required  | Financing options   |
|--|--|-----------------------|-------------------|--|--|---|
| Perkerra Irrigation scheme                   | <p>Location - Marigat Baringo County<br/>Water Source - Perkerra river<br/>800ha of gazetted land as National Scheme<br/>Scheme targeted for expansion to 5,050 acres<br/>Components<br/>Modernizing the irrigation system through lining of canals.<br/>Improve water management modern irrigation system of drip or sprinkler combined with solar power.<br/>10 No. night storage dams to supply the 15 No. units with water<br/>Flood protection dykes and access roads</p> <p>Feasibility study and detailed designs completed</p> | 5,050                 | 1,060,500,000.00  | <p>Increase food production<br/>126,250 bags of maize annually<br/>Various horticulture and high value crops worth Kshs 1billion<br/>Create direct and indirect employment for 25,000<br/>Add GDP value of Kshs 2 billion annually from value of produce.<br/>Improve agricultural productivity through irrigation water management<br/>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br/>Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being</p>             | Construction of modern irrigation infrastructure                                 | Be financed through GoK expenditure<br>Project suitable for climate funding |
| Lower Muranga Irrigation Development project | <p>Location - Murang'a County<br/>Water Source – R. Maragua, R. Thika, R.Sagana<br/>A major irrigation scheme at a 19,890 acres by gravity flow net command area.<br/>Conveyance pipeline system, Sub-mains<br/>Distribution network (feeder lines), 89.0 Km<br/>Infield system for sprinkler and drip hectares communal land)<br/>Feasibility study and detailed designs completed</p>  | 19,890                | 4,176,900,000.00  | <p>Increase food production<br/>497,000 bags of maize annually<br/>Various horticulture and high-value crops worth Kshs 4.2 billion<br/>Create direct and indirect employment for 99,000<br/>Add GDP value of Kshs 5.3 billion annually from the value of produce.<br/>Improve agricultural productivity through irrigation water management<br/>Promote the growth of agro-based industries by providing a reliable and steady supply of raw materials.<br/>Improved the income levels of the local population by at least 40% thereby improving their socioeconomic well-being</p> | Construction of Irrigation infrastructure<br>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 BETA (Results/ Project Benefits)  | Action Required                           | Financing options                               |
|-------------------------------------|---|-----------------------|-------------------|---|---|---|
| Hola Irrigation Development Project | <p>Location - Hola<br/>Tana River County<br/>Water Source - Tana River<br/>13,000 acres of gazetted land however only 5000 acres have been developed.<br/>The objective is to provide a gravity water abstraction system and increase area under irrigation to 13,000 acres.<br/>Components<br/>1 Headworks at Aratolo Intake on Tana River;<br/>3 No. Sedimentation Basins;<br/>1 Main canal from the Aratolo headworks;<br/>2 Branch canals from the Aratolo Main canal;<br/>6 Sub-branch canals and 6 No.Sub-Main Pipelines<br/>Tertiary Pipelines/Canals<br/>Access Roads<br/>Infield system including:-<br/>commercial farmers through center pivot and furrow system for local farmers<br/>Feasibility study and detailed designs completed and land is government land thus minimal land acquisition requirements.</p> | 13,000                | 2,730,000,000.00  | <p>Increase food production<br/>325,000 bags of maize annually<br/>13,000MT of cotton<br/>Create direct and indirect employment for 65,000<br/>Add GDP value of Kshs 5.4 billion annually from the value of produce.<br/>Improve agricultural productivity through irrigation water management<br/>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br/>Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being</p> | Construction of Irrigation infrastructure | BADEA had shown interest in funding the project |

| Project Name                                      | Project Features   | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)  | Action Required                                  | Financing options   |
|---|--|-----------------------|-------------------|---|--|---|
| Usueni – Wikithuki irrigation development project | Location - Tana river Kitui County<br>A major irrigation scheme at a 14280 acres by gravity flow net command area.<br>Head works (at Makwenje across Tana river)<br>Conveyance system (18.87km both twin 1 and 2);<br>Mainline (22.53 km twin 1 and 18.95km twin 2);<br>Sub-mains(23 lines ;40.52 km network)<br>Distribution network (feeder lines)<br>Infield system (2000 hectares; 2507 individual connections and 795 hectares communal land)<br>Feasibility study and detailed designs completed | 14,280                | 2,998,800,000.00  | Increase food production 357,000 bags of maize annually<br>7100 MT of cotton<br>Various horticulture and high-value crops worth Kshs 1.5 billion<br>Create direct and indirect employment for 71,000<br>Add GDP value of Kshs 5.9 billion annually from value of produce.<br>Improve agricultural productivity through irrigation water management<br>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br>Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being | Construction of Irrigation infrastructure        | The Indian Exim Bank had shown interest to finance the project            |
| Ahero West Kano Irrigation Project                | Location - Nyando River and L. Victoria<br>Kisumu County<br>Objective is to provide a gravity water abstraction system and increase area under irrigation to 5,130ha.<br>Components include Intake structure (side weir) for gravity system<br>Conveyance and distribution network<br><br>Feasibility study and detailed designs completed   | 12,825                | 2,693,250,000.00  | Increase food production 30,780 MT of paddy rice<br>Various horticulture and high value crops worth Kshs 2.7 billion<br>Create direct and indirect employment for 64,000<br>Add GDP value of Kshs 7.12 billion annually from value of produce.<br>Improve agricultural productivity through irrigation water management<br>Promote the growth of agro-based industries by providing a reliable and steady supply of raw materials.<br>Improved the income levels of the local population by at least 40% thereby improving their socioeconomic well-being                         | Construction works for irrigation infrastructure | JICA had shown interest and the Rice Production intensification programme |

| Project Name                             | Project Features  | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)  | Action Required  | Financing options  |
|--|---|-----------------------|-------------------|---|--|--|
| Nyabomite irrigation development project | <p>Location - Charachani Nyamira County<br/>Water Source – R. Charachani, R. Eaka</p> <p>A major irrigation scheme at a 2000ha by gravity flow net command area.</p> <p>Head works: - 2 No. Chacharani and 1 no. bombo- Bokimori Conveyance pipeline system 23.05Km<br/>Sub-mains 22.1 Km<br/>Distribution network (feeder lines), 89.0 Km<br/>Infield system for sprinkler and drip hectares communal land)<br/>Feasibility study and detailed designs completed.</p>                        | 5,000                 | 1,050,000,000.00  | <p>Increase food production 192,750 bags of maize annually<br/>Various horticulture and high value crops worth Kshs 1.6 billion<br/>Create direct and indirect employment for 38,000<br/>Add GDP value of Kshs 4.28 billion annually from value of produce.<br/>Improve agricultural productivity through irrigation water management<br/>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br/>Improved the income levels of the local population by at least 40% thereby improving their socioeconomic well-being</p>                                 | Construction of Irrigation infrastructure<br>Value chain development and support | The Spanish government had shown interest in financing the project |
| Lumi Irrigation development project      | <p>Location - Lumi River Taveta County</p> <p>A major irrigation scheme at a 14,100 acres by gravity flow net command area.</p> <p>Head works (weir, retaining walls, intake, protection works);<br/>Canals (main, branch, sub-branch and tertiary);<br/>Drains (mains and tertiary);<br/>Canal and drain structures (drops, culverts, turnouts, division boxes, cross drainage structures, flumes, etc);<br/>Access and farm roads;<br/>Feasibility study and detailed designs completed</p> | 14,100                | 2,961,000,000.00  | <p>Increase food production 173,300 bags of maize annually<br/>16,929 MT of paddy rice annually<br/>Various horticulture and high value crops worth Kshs 3billion<br/>Create direct and indirect employment for 70500<br/>Add GDP value of Kshs 5.4 billion annually from value of produce.<br/>Improve agricultural productivity through irrigation water management<br/>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br/>Improved the income levels of the local population by at least 40% thereby improving their socioeconomic well-being</p> | Construction of Irrigation infrastructure<br>Value chain development and support | GoK funding<br>Suitable for funding under climate resilience       |

| Project Name                       | Project Features  | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)  | Action Required  | Financing options  |
|------------------------------------|---|-----------------------|-------------------|---|--|--|
| Soy Irrigation Development Project | Location - Soy<br>Water Source - Little Nzoia River on Ziwa dam 2<br>Kakamega and Uasin Gishu Counties<br>A major irrigation scheme at a 3750 acres by gravity flow net command area.<br>Head works (Intake chamber)<br>Conveyance pipeline using Upv and GI<br>2 No storage dams with capacity of 2,432M m3<br>Infield system for sprinkler system<br>Feasibility study and detailed designs completed                   | 3,750                 | 787,500,000.00    | Increase food production<br>93,750 bags of maize annually<br>Various horticulture and high value crops worth Kshs 787 million<br>Create direct and indirect employment for 18,750<br>Add GDP value of Kshs 1 billion annually from value of produce.<br>Improve agricultural productivity through irrigation water management<br>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br>Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being              | Construction of Irrigation infrastructure<br>Value chain development and support                     | The Spanish government had shown interest in financing the project     |
| Thwake irrigation Area I and II    | Makueni and Kitui Counties<br>Water Source – Thwake dam-Athi river<br>Total area 40075 ha (Area 1 – 3172ha and Area II 36,900ha)<br>Draw down tower – in the dam and conveyance system for area I, intake on R. Athi and conveyance canals for area II.<br>Infield sprinkler irrigation system<br>Feasibility study as part of Thwake dam carried out. Detailed design not carried out. Thwake dam is under construction. | 100,187.5             | 21,039,375,000.00 | Increase food production<br>531,250 bags of maize annually<br>Various horticulture and high value crops worth Kshs 4.46 billion annually<br>Create direct and indirect employment for 106250<br>Add GDP value of Kshs 5.7 billion annually from value of produce.<br>Improve agricultural productivity through irrigation water management<br>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br>Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being | Review of design<br>Construction of Irrigation infrastructure<br>Value chain development and support | Funding proposal from Turkish exim bank presented to National Treasury |

| Project Name | Project Features   | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)  | Action Required  | Financing options                    |
|--------------|--|-----------------------|-------------------|---|--|--------------------------------------|
| Kavunyalalo  | <p>Malindi Sub-county, Kilifi County<br/>Water source, Sabaki river<br/>2,170 ha<br/>Intake weir, canals and distribution system</p> <p>Feasibility study and detailed design carried out.</p>   | 5,425                 | 1,139,250,000.00  | <p>Increase food production<br/>162,750 bags of maize annually<br/>Various horticulture and high value crops worth Kshs 1.36 billion<br/>Create direct and indirect employment for 27,000<br/>Add GDP value of Kshs 1.74 billion annually from value of produce.<br/>Improve agricultural productivity through irrigation water management<br/>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br/>Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being</p> | <p>Review of design<br/>Construction of Irrigation infrastructure<br/>Value chain development and support</p>                  | Funding required for implementation. |
| Greater Bura | <p>Location - Tana River Basin<br/>Kitui, Garissa and Tana River Counties<br/>Water source – Tana River<br/>Construction of HGF Dam<br/>Saka-Garissa Conveyor<br/>Nanigi Barrage<br/>Masalani Conveyor<br/>Feasibility study and detailed designs completed. RAP and Compensation not yet done</p> | 50,000 acres          | 10,500,000,000.00 | <p>Increase food production<br/>Pasture for livestock<br/>Create direct and indirect employment<br/>The project will allow for the possibility of multiple-cropping, and will therefore lead to an increase in annual output;<br/>Improve agricultural productivity through irrigation water management<br/>The facility will also contribute to the generation of electricity and thus enhance governments' effort towards rural electrification and economic development;<br/>Enhanced cross-cultural relations by attracting people from other cultures.</p>                 | <p>Construction of HGF Dam<br/><br/>Construction of Irrigation infrastructure<br/><br/>Value chain development and support</p> | Funding required for implementation. |

| Project Name      | Project Features  | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)   | Action Required   | Financing options                    |
|-------------------|---|-----------------------|-------------------|--|---|--------------------------------------|
| Turkwel and Kerio | Location - Turkana<br>Turkana County<br>Water source – Turkwel and Kerio Rivers<br>Pre-feasibility study for the middle and lower Turkwel and Kerio River Basins<br>Detailed Feasibility indicating feasibility Study option or options with a net irrigable area of up to 30,000ha preferably in one location/ basin<br>Detailed design of Intake, supply, Distribution and on-firm infrastructure<br>Feasibility study and detailed designs completed. Lowaat Dam designs completed | 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;<br>1.2 Million Bags of Maize<br>The project will allow for the possibility of multiple-cropping, and will therefore lead to an increase in annual output;<br>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;<br>The facility will also contribute to the generation of electricity and thus enhance governments' effort towards rural electrification and economic development; | Construction of Lowaat Dam to regulate flow on Kerio River<br>Construction of Irrigation infrastructure | Funding required for implementation. |
| Rahole            | Location - Mbalambala<br>Garissa County<br>Water source – R. Tana<br>Construction of 2km farm access roads within farm<br>Construction of 4.5 km secondary canal network within the farm<br>Construction of farm infield structures i.e division structures (6 major and 25 small)<br>Completion of 4.5 km drains and 2km dyke<br>Completion of solar fence   | 7500 acres            | 235,537,830       | Increase food production<br>Pasture for livestock<br>Create direct and indirect employment<br>The project will allow for the possibility of multiple-cropping, and will therefore lead to an increase in annual output;<br>Improve agricultural productivity through irrigation water management<br>The facility will also contribute to the generation of electricity and thus enhance governments' effort towards rural electrification and economic development;<br>Enhanced cross-cultural relations by attracting people from other cultures.   | Completion of water conveyance and distribution works   | Funding required for implementation. |

| Project Name | Project Features   | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)  | Action Required  | Financing options                    |
|--------------|--|-----------------------|-------------------|---|--|--------------------------------------|
| Kayatta      | Location: Matungulu and Mwala Machakos County<br>Benefit over 12,500 farmers each irrigating a proposed area of 0.4 Ha<br>Munyu Dam – Embankment Dam 35m High and 700m long Dam Crest<br>Head Works<br>Sedimentation Basin<br>Break Pressure Tank<br>Conveyance Pipeline<br>Main Pipeline<br>Distribution Pipeline<br>Infield system<br>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<br>Sustainably supply water for irrigation thorough development of irrigation infrastructure for 5,000 ha.<br>Improve food self-sufficiency and security in the project area through promotion of irrigated agriculture.<br>Create gainful employment opportunities<br>Improve income per capita hence wealth creation.                  | Design Dam<br>Review of design<br>Construction of Irrigation infrastructure<br>Value chain development and support | Funding required for implementation. |
| Suba         | Homabay County<br>Water Sources: Lake Victoria<br>Project comprises of five projects/ clusters namely:-<br>1. Rang'wena;<br>2. Nyagidha;<br>3. Olambwe;<br>4. Sindo and<br>5. Konyango<br>Head Works<br>Sedimentation Basin<br>Break Pressure Tank<br>Conveyance Pipeline<br>Main Pipeline<br>Distribution Pipeline<br>Infield system<br>Drainage works<br>Feasibility study and detailed designs completed. RAP and Compensation not yet done | 5,250 acres           | 1,102,500,000.00  | 315,000 Bags of Rice annually<br>Create direct and indirect employment for 200,000<br>Add GDP value of Kshs 1.8 billion annually from value of produce.<br>Improve agricultural productivity through irrigation water management<br>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br>Improved the income levels of the local population by at least 45% thereby improving their socio-economic well being | Review of design<br>Construction of Irrigation infrastructure<br>Value chain development and support               | Funding required for implementation. |

| Project Name | Project Features   | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)  | Action Required   | Financing options                    |
|--------------|--|-----------------------|-------------------|---|---|--------------------------------------|
| Kisumu       | <p>Kisumu County<br/>Seme<br/>Chiga<br/>Awach Kano<br/>Ombeyi<br/>Construction of intakes<br/>Canals<br/>Drainage works<br/>Feasibility study and detailed designs completed. RAP and Compensation not yet done</p>  | 9,375 acres           | 1,968,750,000.00  | <p>221,250 Bags of Rice<br/>Create direct and indirect employment for 106250<br/>Add GDP value of Kshs 2.7 billion annually from value of produce.<br/>Improve agricultural productivity through irrigation water management<br/>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br/>Improved the income levels of the local population by at least 40% thereby improving their socio-economic well being</p>           | <p>Review of design<br/>Construction of Irrigation infrastructure<br/>Value chain development and support</p> | Funding required for implementation. |
| Bondo        | <p>Bondo<br/>Siaya County<br/>Water source: River Yala and Lake Victoria<br/>Head works (weir and intake)<br/>Sedimentation basin;<br/>Pump intake;<br/>Delivery pools;<br/>Irrigation Canals (Main, branch, sub-branch, tertiary and field);<br/>Pipeline;<br/>Drainage Canals (mains, collector and field));<br/>Related canal and drain structures;<br/>Roads (inspection and farm roads);<br/>Flood protection dyke;<br/>Feasibility study and detailed designs completed. RAP and Compensation not yet done</p> | 8,000 acres           | 1,680,000,000.00  | <p>480,000 Bags of Rice annually<br/>Create direct and indirect employment for 200,000<br/>Add GDP value of Kshs 1.8 billion annually from value of produce.<br/>Improve agricultural productivity through irrigation water management<br/>Promote growth of agro-based industries by providing a reliable and steady supply of raw materials.<br/>Improved the income levels of the local population by at least 45% thereby improving their socio-economic well being</p> | <p>Review of design<br/>Construction of Irrigation infrastructure<br/>Value chain development and support</p> | Funding required for implementation. |

| Project Name | Project Features   | Irrigation Area acres | Project cost kshs | Contribution to BETA (Results/ Project Benefits)   | Action Required  | Financing options                    |
|--------------|--|-----------------------|-------------------|--|--|--------------------------------------|
| Burangi      | Magarini sub-county, Magarini location, Marikebuni and Pokea Mwana Sub-locations<br>Kilifi County<br>Water source - Sabaki River]<br>Sedimentation Basin<br>Break Pressure Tank<br>Conveyance Pipeline<br>Main Pipeline<br>Distribution Pipeline<br>Infield system | 1,169 acres           | 245,490,000.00    | Ensure food security at the local and national level with approx. 46,760 bags of Maize<br>Creation of employment and income generation of the locals approx. 3,000 people<br>Sustainable supply of raw materials for agro-based industries<br>Foreign exchange generation through export of surplus food and cash crops.       | Review of design<br>Construction of Irrigation infrastructure<br>Value chain development and support | Funding required for implementation. |
| Mwangea      | Ganze Subcounty<br>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:<br>Increased farm output approximately 156,000 bags of maize<br>Increased family income<br>Improved access to social amenities e.g. hospitals and schools<br>Improved infrastructure | Review of design<br>Construction of Irrigation infrastructure<br>Value chain development and support | Funding required for implementation. |

| 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 |

*Annex VII: List of Weather Stations configured to transmit data to WRA server*

| <b>Name</b>                                 | <b>Latitude</b> | <b>Longitude</b> | <b>County</b> |
|---|-----------------|------------------|---------------|
| Sigor Deputy County Commissioner's office   | -0.9175         | 35.3             | Bomet         |
| Huduma Centre                               | -0.78556        | 35.33667         | Bomet         |
| Sotikvetry office                           | -0.68861        | 35.11389         | Bomet         |
| Kangeta Primary School                      | -0.69328        | 37.51638         | Embu          |
| Thiba WRA SRO                               | -0.49572        | 37.27314         | Kirinyaga     |
| County Commissioner Isiolo (NEMA office)    | 0.354712        | 37.58329         | Isiolo        |
| Lenkisim Mixed Secondary School             | -2.40118        | 37.21966         | Kajiado       |
| Tebesonik Secondary School                  | -0.56311        | 35.09352         | Kericho       |
| Soin Agriculture Training Center            | -0.19263        | 35.16022         | Kericho       |
| Kaptele Primary School                      | -0.5991         | 35.07727         | Kericho       |
| Ruiru G. K. Prison                          | -1.13792        | 36.93231         | Kiambu        |
| Gatatha Farmers Company                     | -1.13146        | 36.76158         | Kiambu        |
| Limuru Sub County HQS                       | -1.1093         | 36.6398          | Kiambu        |
| St. Monica Marani Girls High School         | -0.57984        | 34.79734         | Kisii         |
| St AnjelaSengera Girls High school          | -0.85878        | 34.7243          | Kisii         |
| St. Peters Suneka Secondary School          | -0.67555        | 34.70008         | Kisii         |
| Gianchere Friends School                    | -0.74594        | 34.86553         | Kisii         |
| St. LukesKavia Secondary School             | -1.43048        | 38.08253         | Kitui         |
| St Paul Ikanga Boys High School             | -1.70116        | 38.06836         | Kitui         |
| Kanyangi Girls Secondary School             | -1.7556         | 37.9101          | Kitui         |
| Kyome Boys Secondary School                 | -1.06561        | 38.04456         | Kitui         |
| Mua Hills Girls High School                 | -1.43502        | 37.21801         | Machakos      |
| Deputy County Commissioner Office Matungulu | -1.22446        | 37.27006         | Machakos      |
| Kathiani Girls High School                  | -1.41758        | 37.32388         | Machakos      |
| Mukaa Sub County HQS                        | -1.79062        | 37.21536         | Makueni       |
| Mukaa Boys Secondary School                 | -1.83538        | 37.32767         | Makueni       |
| Kitoto Secondary School                     | -1.73774        | 37.79026         | Makueni       |
| Christ the King Igembe School               | 0.18864         | 37.96412         | Meru          |
| Kimakia Forest Station                      | -0.81412        | 36.78279         | Muranga       |
| FTC Kenyatta Farm                           | -0.80532        | 36.93667         | Muranga       |
| Wanjerere Meteorological Site               | -0.66809        | 36.88035         | Muranga       |
| Kongoi Weather Station                      | -0.31912        | 35.54064         | Nakuru        |
| Elburgon Forest Station                     | -0.27071        | 36.08516         | Nakuru        |
| Lake Nakuru National Park                   | -0.35477        | 36.10006         | Nakuru        |
| MoALFOLolulunga                             | -1.00239        | 35.66908         | Narok         |

|                                   |          |          |               |
|-----------------------------------|----------|----------|---------------|
| MoALFKilgoris                     | -0.99861 | 34.88044 | Narok         |
| Suswa Ramat Holding Ground        | -1.06329 | 36.33507 | Narok         |
| Heni Secondary School             | -0.54811 | 36.34606 | Nyandarua     |
| Ndaragwa Forest Station           | -0.06316 | 36.5407  | Nyandarua     |
| Kambaa Technical Secondary School | -0.13647 | 36.52516 | Nyandarua     |
| Kiandongoro Forest Station        | -0.2876  | 36.7659  | Nyeri         |
| Gathaihi Primary School           | -0.43774 | 37.17959 | Nyeri         |
| Sagana State Lodge                | -0.367   | 37.067   | Nyeri         |
| Caritas Kanjoro                   | 0.005355 | 38.09257 | Tharaka Nithi |
| Caritas Kamaindi                  | -0.38999 | 37.82562 | Tharaka Nithi |
|                                   |          |          |               |
|                                   |          |          |               |
|                                   |          |          |               |
|                                   |          |          |               |