INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)

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25-26 October 2022

Contribution by Kenya

to the CSTD 2022-2023 priority themes on "Technology and innovation for cleaner and more productive and competitive production" and "Ensuring safe water and sanitation for all: a solution by science, technology and innovation"

PERMANENT MISSION OF THE REPUBLIC OF KENYA

TO THE UNITED NATIONS
AND OTHER INTERNATIONAL ORGANISATIONS
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The Permanent Mission of the Republic of Kenya to the United Nations Office at Geneva and other International Organizations in Switzerland presents its compliments to the Secretariat of the United Nations Commission on Science and Technology for Development, United Nations Conference on Trade and Development (UNCTAD), and has the honour to transmit the attached submissions from the Government of Kenya, on two priority themes listed below, for discussion at the hybrid Intersessional Panel from 25-27 October 2022.

- PRIORITY THEME 1: Technology and innovation for cleaner and more productive and competitive production

- PRIORITY THEME 2: Ensuring safe water and sanitation for all: a solution by science, technology and innovation

The Permanent Mission of the Republic of Kenya to the United Nations Office at Geneva and other International Organizations in Switzerland avails itself of this opportunity to renew to the the Secretariat, of the United Nations Commission on Science and Technology for Development, United Nations Conference on Trade and Development (UNCTAD) the assurances of its highest consideration.

GENEVA, 31st August 2022

CSTD Secretariat
United Nations Commission on Science and Technology for Development
United Nations Conference on Trade and Development
GENEVA

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PERMANENT MISSION OF KENYA TO THE UNITED NATIONS * GENEVA *

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COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD) PRIORITY THEMES

(To be presented at Intersessional Panel Meeting to be held on 25th to 27th October 2022)

PRIORITY THEME 1: TECHNOLOGY AND INNOVATION FOR CLEANER AND MORE PRODUCTIVE AND COMPETITIVE PRODUCTION

1. What are some specific examples (from the public and private sectors) of green technology and innovation for cleaner and more productive and competitive production in your country? Please include contact, website, link to reports, and any other relevant information concerning these projects and initiatives.

S/No.	Examples of Green Technology and Innovation	Contact/ Website /Link to Reports
1	1.4 MW solar power plant designed to provide off grid power to the Oloitoktok Water Supply pumping facilities	https://twitter.com/AthiWaterWorks/status/1356680883324018691
2	GivePower's Solar Water Farm in Kiunga- a small fishing community of about 3,500 people. The area is also extremely dry. With advanced filtration systems and new solar-powered desalination technology, GivePower is converting sea and brackish salt water into clean and healthy water. Each solar water farm produces enough fresh drinking water for 35,000 people every single day. Compared to most ground well systems, the GivePower solar water farm produces a higher	https://givepower.org/introducing-first-givepower-solar-water-farm/

S/No.	Examples of Green Technology and Innovation	Contact/ Website /Link to Reports
	quality of water over a longer period of time with no negative environmental impact.	

2. What are the national strategies, policies, and laws concerning green technology and innovation for cleaner and more productive and competitive production in your country?

The Ministry of Water, Sanitation and Irrigation through Sessional Paper No. 1 of 2021 on National Water Policy talks about water sector research, technology and innovation. The policy aims at developing guidelines to mainstream water sector education into the basic education curriculum; continuously implement public awareness; and implement a strategy through which the water sector can develop optimum technical capacity, and solutions responsive to national needs through appropriate training, research and innovation approaches. It also promotes the use of appropriate research and innovation in order for the water sector research to address critical sector challenges and also to put in place and implement a sustainable financing mechanism for water sector research and innovation solutions including for uptake and adoption for Kenyan market.

3. What are the key industries that are pioneering green innovation in the country? List the key actors in the national ecosystem of innovation related to green innovation in your country (firms, universities, financial institutions, regulators)? What are the key networks of the ecosystem in your country (including online networks, innovation hubs, forums, etc.)?

a. Sanergy Kenya- A private firm which uses an approach involving building a repertoire of low-cost, high-quality sanitation products and services for residents living in urban non-sewered areas, safely removing all of the waste generated to a central processing plant for treatment and up-cycling into high quality agricultural inputs. https://www.sanergy.com/

b. Sanivation Kenya partners with local governments to help meet the growing waste processing needs from septic tanks and pit latrines. They design, build, and operate fecal sludge treatment plants so that they can be operationally sustainable. The plants transform fecal sludge into biomass fuels. The revenue from the sales of fuel covers operational costs. Each plant deployed ensures waste is safely managed, creates local employment, prevents environmental pollution, and saves trees through innovative biomass fuels. https://sanivation.com/approach

c. Meru University of Science and Technology (MUST) has developed an inbuilt-self-sustaining human waste management system using the Black Soldier Fly (BSF) that

converts the wastes into commercially viable products through ecologically and environmentally friendly interventions supported by innovative research and technology. https://www.must.ac.ke/from-waste-to-health-and-wealth/

d. Strathmore Energy Research Centre (SERC) which is an applied technology lab within Strathmore University to provide professional training, laboratory testing and project development for the renewable energy sector in Kenya. https://strathmore.edu/about/about-us/

4. What are the challenges that your government have faced or may face in promoting green technology and innovation in your country to contribute to national development priorities and accelerate the progress towards the SDGs?

a. There is low adoption of research and development, technology and innovation in decision making for the development of the sector. This is attributed to limited research initiatives which are also not responsive to the needs of the sector.
b. There are inadequate systems to catalyze and finance innovation in the water sector. Although there are many stakeholders playing distinct yet complementary roles in research and technology advancement, they are not effectively networked, which undermines integrated uptake of research and innovation outcomes.
c. Universities and the private sector invest in Research and Development (R&D) but this is limited in terms of scale and reach, thus limiting impact.
d. Further, research and innovation in the sector is adversely affected by limited access to, and the sharing of data.
e. There is inadequate support for technological innovation with respect to incentives, development of institutional capacities, enforcement of intellectual property rights, financing and other facilitation
f. There are low patenting levels in Kenya attributed challenges/obstacles to patenting being a long and tedious process, difficult patent drafting, limited intellectual property knowledge, lack of intellectual property professionals, limited Research & Development funds and a weak Intellectual Property Rights (IPR) regime.

5. What should governments, the private sector, organized civil society, and other stakeholders do so that developing countries can benefit from these technologies?

a. Develop clear guidelines and policies on green technology and innovations.
b. Providing intellectual support and finances to upcoming innovations both at individual level and research institutions.
c. Helping in copywriting and protection of patents.

6. What are some examples of international cooperation mechanisms, projects, programs or strategies, including triangular and South-South cooperation, in green technology and innovation that your country is part of?

a. Kenya, Nordic Countries Collaboration on Climate Change https://kam.co.ke/kenya-nordic-countries-collaborate-on-climate-change/
b. African Ministers Council on Water (AMCOW). https://amcow-online.org
c. United Nation International Children's Emergency Fund (UNICEF). https://unicef.org

7. What actions can the international community, including the CSTD, take to help your country take advantage of green technology and innovation for cleaner and more productive and competitive production?

a. Use of integrated data and Information, Communication and Technology (ICT) for disaster forecasting, planning, & response.
b. Providing synergy between ministries to come up with green technologies and technologies in water and sanitation sector.
c. Support in integration of ICT in various water-related areas.
d. Provide financial support in implementation of green infrastructure technologies and innovations.
e. Strengthening and supporting research institutions and individuals to be able to pilot and incubate the projects that have been researched.

8. Could you suggest some contact persons of the nodal agency responsible for projects/policies and international collaboration in this context as well as any experts (from academia, private sector, civil society or government) dealing with projects in this area? We might contact them directly for further input or invite some of them as speakers for the CSTD inter-sessional panel and annual session.

a. Dr. Riungu, Director Sanitation Research Institute, Meru University of Science and Technology- https://www.must.ac.ke/
b. Jomo Kenyatta University of Agriculture and Technology- https://www.jkuat.ac.ke/
c. University of Nairobi- https://www.uonbi.ac.ke
d. Strathmore University- https://strathmore.edu/
e. Kenyatta University- http://www.ku.ac.ke/index.php/about-ku/contact-info
f. Sanergy- https://www.sanergy.com/
g. Sanivation- https://sanivation.com/

9. Do you have any documentation, references, technological assessments, future studies or reports on the priority theme in your country or region?

a. The Ministry of Water, Sanitation and Irrigation's Sessional Paper No. 1 of 2021 on National Water Policy, published on 14th October, 2021.
b. Sanergy Kenya- https://www.sanergy.com/

c. Sanivation Kenya -https://sanivation.com/approach
d. Meru University of Science and Technology- https://www.must.ac.ke/from-waste-to-health-and-wealth/
e. Strathmore Energy Research Centre- https://strathmore.edu/about/about-us/

PRIORITY THEME 2: ENSURING SAFE WATER AND SANITATION FOR ALL: A SOLUTION BY SCIENCE, TECHNOLOGY, AND INNOVATION

1. ***What are the concrete challenges that your country has encountered in managing water and sanitation and providing access for all to these services?***

a. Kenya is a water-scarce country with low annual renewable freshwater availability which is on a declining trend. Further exploration of water resources is limited and there is a disparity in the distribution of water resources across the country.

b. In terms of water resource management, loss, depletion, and degradation of water resources continues to affect the quantity and quality of water. The potential for groundwater resources has not been fully determined and utilized.

c. Harvesting and storage of water is extremely low. This has been mainly due to low investment and financing of requisite infrastructure as well as low adoption of appropriate technologies.

d. In water supply and sanitation services, there is increasing demand for water due to the rising population and expansion of economic activities across sectors. The sewerage coverage is low despite the rapid increase in urbanization. There is also inefficiency in the operations of water service institutions.

e. Investment and financing requirements for the sector have not been fully realized. This is due to a lack of a clear national investment plan for the sector, inadequate public financing resources, and limited stakeholder participation, especially in the private sector. Water has not been adequately priced as an economic good and this hinders self-financing as a strategy for sustainable service. The sector has not fully explored alternative sources of funds such as through climate finance, as well as models of financing, such as enabling subsidies, that allow water access for the vulnerable and underserved while still allowing for full cost coverage.

f. The sector faces various capacity challenges and the lack of a clear coordination mechanism among the state, and non-state actors. There have been challenges in coordination between the national government and county governments. This has resulted in low compliance and enforcement of standards, regulations, and guidelines.

g. There is a gap between the research, training, and innovation, and the sector needs, and the overall level of funding remains low. The uptake of research and innovation outcomes remains low. This affects the overall performance of the sector and its impact on the economy.

h. The sector is also affected by a number of emerging and cross-cutting issues like climate change, water conflicts, and disputes, and low levels of gender mainstreaming. In addition, the sector has not fully implemented affirmative action for vulnerable groups including, children, marginalized communities, youth, and persons with disability, among others.

i. Water security is affected by challenges resulting from the land tenure system. These include land use practices that negatively impact water resource management and storage and worsen climate change vulnerabilities. The absence of strong land use controls remains a problem. The rising cost of compensation for land acquired for the development of water infrastructure presents an additional challenge.

2. ***What projects/policies has your country implemented to use the above-mentioned range of technologies and innovations or other STI, including frontier technologies (e.g., AI and drones) to address these challenges? What are the main outcomes? What are the main difficulties confronted while trying to implement these projects/policies? Pls. include the gender dimension.***

a. The Kenya Environmental Sanitation Hygiene policy, for instance, aspires to achieve and sustain universal access to improved sanitation for all Kenyans by 2030. The major outcome of this policy has seen some counties being declared Open Defecation Free (ODF) as in the case of Busia, Siaya, and Kitui Counties. Amref Health Africa has come up with Financial Inclusion Improves Sanitation and Health in Kenya (FINISH-INK), an innovation that responds to community sanitation challenges through public-private collaborative efforts between government, financial institutions, and non-governmental organizations and businesses. *Ensuring Safe Sanitation for all When Nature Calls: What is Needed by 2030? - Newsroom (amref.org)*

b. "Fresh Life" toilets –an innovation of Sanergy has played a key role in eradicating the environmental, health, and emotional human danger associated with the lack of sanitary options in the majority of informal settlements in Nairobi County. The basis for the entire operation is the installation of safe and hygienic "Fresh Life" toilets which are purchased, operated and maintained by local resident(s) called "Fresh Life Operator" (FLO). *"Sanergy" Creates Sustainable Solutions for Sanitation in Kenya (borgenmagazine.com)*

c. Sanivation-Kenya partners with local governments to help meet the growing waste processing needs from septic tanks and pit latrines. They design, build, and operate fecal sludge treatment plants so that they can be operationally sustainable. The plants transform

fecal sludge into biomass fuels. The revenue from the sales of fuel covers operational costs. Each plant deployed ensures waste is safely managed, creates local employment, prevents environmental pollution, and saves trees through our innovative biomass fuels. *https://sanivation.com/approach*

d. World Vision Kenya through its SanPlat (Sanitation Platform) has trained various groups on this cost-friendly technology that eases the construction of toilets. This has resulted in improved hygiene by effectively controlling flies and smell emanating from latrines. Sanitation & Hygiene: New construction technology improves toilet coverage and use in rural Kenya | Kenya | World Vision International (wvi.org)

e. The main difficulties confronted while trying to implement the projects/policies include:

   i. Low uptake of the new technologies and innovations by the local community.

   ii. Lack of clear policies to govern the establishment and sustainability of the technologies.

   iii. Inadequate financial resources in some cases.

3. ***Can your country provide examples of policies/projects/initiatives aimed at strengthening national STI capabilities in managing water and sanitation for ensuring their access by all population in your country? One example is what institutional and regulatory arrangements are in place to stimulate R & D and innovation in managing water and sanitation for access by all.***

a. As per the National Water Policy 2021, on water sector education, training, research, technology and innovation, the policy outlines that the ministry will:

   i. Develop, implement and regularly update, a national strategy for enhancing public awareness and civic education on relevant water sector issues.

   ii. Partner with Kenya Institute of Curriculum Development (KICD) to mainstream water sector issues into the national basic education curriculum.

   iii. Assess the human capacity needs of the water sector and develop curricula for professional and technical training and certification.

   iv. Establish a mechanism to enhance collaboration and build synergies for water research, development, innovation amongst water sector institutions, academia, research institutions and industry.

   v. Promote the use of appropriate research and innovation in order for the water sector to address critical sector challenges.

vi. Put in place and implement a sustainable financing mechanism for water sector research and innovation solutions including for uptake and adoption for Kenyan market.

vii. Review the mandate of the Kenya Water Institute and make it a responsive center for excellence for training, research and innovation for the water sector.

viii. Implement a national water sector information management system to support and enhance accountability, decision making, efficiency and effectiveness.

b. Kenya developed its first National Water and Sanitation Investment Program (NAWASIP) to provide a shared intergovernmental strategy for expanding access to water and sanitation for the progressive realization of the right to water and sanitation.

4. Could you share case studies of regional and international cooperation that have helped your country in strengthening STI capacities? Can you provide success stories in this regard?

a. Kenya Sanitation Alliance is a pioneering drive funded by the United States Agency for International Development (USAID) designed to eliminate open defecation in Kenya by 2025 and has been launched by the Government, UNICEF, and partners which targets 15 counties with the highest rates of open defecation in Kenya. The alliance has really strengthened synergy and political goodwill between the national government and the respective county governments hence accelerating progress to end open defecation. *Kenya Sanitation Alliance was launched by Government and UNICEF, targeting 15 counties with the highest rates of open defecation*

b. The African Ministers Council on Water (AMCOW) commissioned the production of the second round of Country Status Overviews (CSOs) to better understand what underpins progress in water supply and sanitation and what its member governments can do to accelerate that progress across countries in Sub-Saharan Africa (SSA). AMCOW delegated this task to the World Bank's Water and Sanitation Program and the African Development Bank which are implementing it in close partnership with UNICEF and WHO in over 30 countries across SSA. The success of this collaboration has been enhanced policy revision and restructuring of institutional roles to enhance the delivery of SDG 6 CSO-Kenya.pdf (wsp.org)

INPUTS ON THE 2022-2023 COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD) PRIORITY THEMES TO BE PRESENTED AT ITS INTER-SESSIONAL PANEL MEETING TO BE HELD FROM 25TH-27TH OCTOBER, 2022

PRIORITY THEME 1: TECHNOLOGY AND INNOVATION FOR CLEANER AND MORE PRODUCTIVE AND COMPETITIVE PRODUCTION

1. **What are some specific examples (from the public and private sectors) of green technology and innovation for cleaner and more productive and competitive production in your country? Please include contact, website, link to reports and any other relevant information concerning these project and initiatives**

   Cleaner Production (CP), according to the United Nations Environmental Programme, is the continuous application of an integrated preventative environmental and business strategy to procure resources, process and produce products or provide services at a higher efficiency, increased profitability, and at reduced risks to the environment. CP can be applied to the processes in any industry and to industrial products themselves. For processes, CP results from one or a combination of the following measures:

   - Conserving raw materials, water and energy;
   - Eliminating toxic and dangerous raw materials;
   - Reducing the quantity and toxicity of all emissions and wastes before they leave a process.

   For products, CP aims at reducing the environmental, health and safety impact of products over their entire life cycles,

   Sessional paper No. 6 of 1999 stipulates government policy on Environment and Development but lacks clarity on CP.

   Green economy encompasses all activities or actions that help reduce carbon emissions into the atmosphere which is a major component of greenhouse gases that enhances global warming thus causing climate change. Further, green economy upholds the efficient use of natural resources and energy while enabling economic growth that supports creation of job opportunities and improvement of livelihoods thus alleviating poverty. It is only under these conditions that sustainable development can prevail. Green economy advocates for activities or actions that reduce carbon dioxide emissions into the atmosphere, the efficient use of natural resources for sustainable development and creation of job opportunities to alleviate poverty.

   Technology Development and Transfer Whereas large industries can easily adopt western technologies, the high cost and operational nature of SMEs makes it difficult to adopt such technologies. Therefore, CP technology promotion need to focus more on indeginisation of western technologies to suit local energy, raw material resources and local sustainable development policies. The recently established Industrial Ecology Institute (IEI) in Nairobi is proposing the establishment of a technology transfer agency

to lead the process by an increased Africa-Asia interaction for technical collaboration, information sharing and capacity building. The choice of Asian countries (mainly those in Association of South East Asian Countries (ASEAN) began their CP adoption activities earlier, about a decade ago, having SME structures similar to those in most African countries. During initial CP inception, these countries had economies similar to those prevailing in Africa. Furthermore, many cheap, cleaner energy technologies have emerged from countries such as India and Thailand, which could easily be transferred to other places. Similarly, a lot of experience has also been acquired by entrepreneurs through the numerous training and sensitisation programs. But perhaps of much significance are the developed networks and agencies for technology enquiry and transfer to which African institutions could be linked. To support any gains made from such links, local research and development could be co-ordinated by organisational groups of individual SMEs for their own benefit. Industryacademia links could also be strengthened.

2. **What are the national strategies, policies and laws concerning green technology and innovation for cleaner and more productive and competitive production in your country?**

The Ministry of Environment and Mineral Resources is the official policy organ of the Government of Kenya for the management and conservation of the environment and natural resources. In this regard, the Ministry is expected to formulate policies, standards and procedures to support the implementation of sustainable development. Further, the Ministry is the link to internal Multi-lateral Environmental Agreements (MEAs) to which Kenya is Party thus providing modalities for domestication and negotiations. Structures of the Ministry of Environment & Mineral Resources. The Ministry has created the necessary structures to facilitate the delivery of its mandate. It comprises one Parastatal and three key Departments. These include: National Environment Management Authority (NEMA), Kenya Meteorological Department (KMD), Department of Remote Sensing & Resources Surveys (DRSRS) and Mines & Geological Department. A summary of the roles and functions of the branches is provided below:

i)The National Environmental Management Authority (NEMA) is the principal agency of government for the implementation of all policies related to the environment. The Authority implements environmental legislation including the Environmental Management & Coordination Act (EMCA, 1999) and relevant regulations. The environmental legislation stipulates standards and procedures for handling various types of waste in order to reduce environmental pollution. It sensitizes and builds capacity of the regulated community aimed at enhancing their compliance and receives feedback on the implementation of the laws. Further, it has put in place an elaborate mechanism for enforcement of environmental laws and initiates prosecution of environmental offenders in collaboration with relevant arms of government. NEMA is the focal point for various MEAs thus spearheading their implementation of agreed decisions, domestication and

negotiations. For instance, NEMA is the Designated National Authority (DNA) to undertake evaluation and approval of eligible projects for Clean Development Mechanism (CDM) funding in Kenya. In addition, NEMA has been accredited as the National Implementation Entity (NIE) to access funding from the Adaptation Fund to support adaptation of related activities that mitigate adverse effects of climate change. The Adaptation Fund was established to finance concrete adaptation projects and programmes in developing countries, least developed countries and Island states that are parties to the UNFCCC. The Authority will now be able to receive environmental project proposals from other sectors, evaluate, fund and monitor their implementation. It also coordinates the environmental action planning in the country aimed at prioritizing implementation of key interventions by various sectors. The process formulates Green Initiatives in Kenya NEMA Kenya, 2012, a five year National Environmental Action Plan (NEAP). In addition, the status of the environment at any given time is documented through the annual State of Environment Reporting.

ii) Kenya Meteorological Department (KMD) facilitates access and interpretation of meteorological data, information and related services. This provides an opportunity to infuse scientific knowledge to spur socio-economic growth and development. In this regard, KMD provides meteorological and climatological services to support operations of key sectors such as agriculture, forestry, water resource management, civil aviation and maritime navigation among others. The private sector also benefits from meteorological services for efficient operations of industry, commerce and public utilities to promote sustainable exploitation and utilization of natural resources. In this regard the department has invested in modern equipment for collection, analysis and interpretation, prediction of anticipated weather patterns contributing to climate change. Kenya Meteorological Department plays a key role in supporting the needs of each sector to adapt to the adverse effects of climate change through dissemination of sector specific simplified information. For instance, the agriculture sector benefits from weather information especially the amounts and time of expected rainfall and appropriate planting time by the farmers. This ensures better yields and coping mechanisms to abate environmental disasters. Further, the information is disseminated to the public as early warning to impending environmental disasters through the introduction of vernacular local radio stations. Some of the common disasters include: floods, droughts, landslides and tsunamis among others. The Department has established stations in Nairobi and on Mt. Kenya to monitor levels of air pollution and advice on level of emissions of greenhouse gases. Other equipment has been installed in Nairobi and Mombasa to measure air pollution from vehicular emissions. The cities have a high human population and hence are highly susceptible to air pollution. The availability of this information has alleviated potential risks to human lives and damage to property thus improving the state of disaster preparedness to prone areas.

iii) Department of Resource Surveys and Remote Sensing (DRSRS) is mandated to undertake natural resources mapping using remote sensing techniques. In this regard, DRSRS undertakes collection, analysis, manipulation into resource maps and storage of

natural resource database. The information on natural resources is crucial for demonstrating distribution, quantities and trends of resources to support informed decision making and policy formulation. The updating and dissemination of geo-spatial information on natural resources has supported conservation, development plans and the sustainable use of the same by relevant sectors. Green Initiatives in Kenya NEMA Kenya, 2012. The mapping covers various ecosystems and resources such as forests, crop forecasting, livestock and wildlife resources, water catchment areas, waste dumping area, land use patterns, settlements, rivers and dams among others. This information guides the country's economic planning and ensuring our resources are utilized sustainably.

iv) Mines and Geological Department is mandated to carry out geological survey, prospecting and research on mineral resources in the country. The Department maintains a database of geo-scientific information, administration of legislation relating to mineral resource development, policy formulation on mining and provide advice to Government on mineral resources, supervise quarrying activities, safety and security of commercial explosives. Further, the department advises miners to rehabilitate disused mines and construct strong supports for active mines to prevent collapsing. Some of the rehabilitated mines include: Kinango lead mines, zinc and silver mines in Kilifi County and parts of Macalder copper and gold mines. Rehabilitation of disused mines is expected to seal off the exposed mineralized surface which might release dangerous greenhouse gases to the atmosphere thus increasing global warming. This intervention favour the strengthening of green economy and sustainable mining.

Key Activities & Programmes

The Ministry has undertaken key programmes across its branches to promote environmental protection and conservation. Some of the major programmes include;

i) Awareness creation and public sensitization on the value of the environment as a resource and its conservation.

ii) Participation in Conference of Parties to various MEAs representing the interests of Kenya in specific aspects of agreement.

iii) The Ministry has formulated and published a National Climate Change Response Strategy to guide all sectors in mitigating, adapting and coping with effects of climate change. In this regard, the Ministry is spearheading the implementation of the Strategy to ensure the proposed interventions are adopted by the relevant sectors. The implementation of the Strategy will enhance resilience to adverse effects of climate change and ensure programmes and projects become "climate proof". Further, an implementation plan for various sectors has been developed to action the strategy.

iv) The Ministry is undertaking review of EMCA 1999 in-line with the Constitution of Kenya and also enable the capturing of emerging environmental issues such as climate change and related environmental disasters, invasive species, strengthening institutional

framework for sound environmental management and promoting green economy initiatives by various players.

v) The School Green Initiative is a major programme coordinated by the Ministry in collaboration with Ministry of Education. The programme is encouraging tree planting in schools since the learning institutions own land and the student population guarantees high survival rates of the trees. Through the "adopt a tree initiative" Green Initiatives in Kenya NEMA Kenya, 2012 pupils and students are encouraged to adopt and care for a tree during their schooling period thus enhancing survival and increase in forest cover.

3. **What are the key industries that are pioneering green innovation in the country? List the key actors in the national ecosystem of innovation related to green innovation in your country (firms, universities, financial institutions, regulators)? What are the key networks of the ecosystem in your country (including online networks, innovation hubs, forums, etc)?**

Green initiatives in the energy sector include:

- Geothermal power production,
- Solar energy,
- Biogas energy,
- Wind energy power,
- Power production from the sugar processing sector among others.

There has been deliberate investment by government in collaboration with partners in exploration and drilling of geothermal energy spearheaded by the Geothermal Development Company with the capacity to meet all domestic and industrial needs including those of neighboring countries when fully exploited.

Geothermal installed capacity of electricity and co-generation remained unchanged at 863.1 MW and 2.0 MW, respectively in 2021. Solar capacity more than tripled to 172.5 MW while hydro capacity rose by 4.1 MW to 838.1 MW in 2021. However, thermal capacity decreased from 749.1 MW in 2020 to 677.8 MW in 2021. 9.16. Total effective capacity of electricity rose by 5.6 per cent to 2,857.6 MW due to significant rise in Solar and Wind capacities in 2021. In addition, thermal effective capacity declined by 71.8 MW to 643.7 MW in 2021. On the other hand, effective solar capacity expanded by 120 MW to 172.2 MW in 2021. Effective capacity of co-generation and geothermal remained unchanged.

Investment in wind energy generation has gained currency. For instance, the Turkana Wind Farm which was opened in 2017, is currently the largest such facility in Kenya comprising of 365 wind turbines each with a capacity of 850 kilo Watts with a capacity of 310 Mega Watts. The generation of wind energy is dependent on wind speed. The Turkana Wind Farm is driven by an average wind speed of about 11metres per second

according to available records. Other small scale wind farms have been established in Ngong Hills and Isiolo regions. Similarly, major milestones have been achieved and impressive progress in solar energy generation. This initiative has penetrated into domestic levels through the production a wide range of household appliances to meet the needs of local communities

Biogas production has been promoted at household levels using manure. Farmers keeping as few as two zero grazing cattle are able to generate enough power to meet the cooking and lighting needs. Biogas generation is also undertaken at commercial levels.

The Kenya Meteorological Department (KMD) provides, collects and generates data and information to support weather services. The department undertakes projections and prediction of weather patterns which has varying adverse effects on different sectors. The department has installed state of art equipment and technology in weather data collection, analysis/ interpretation and manipulations and projections at near real time status. In this regard, KMD has disseminated early warning and specific data and information to all sectors and the general public aimed at mitigating the adverse effects of climate change. Dissemination of information is further aided by installation of vernacular FM stations in disaster prone areas susceptible to flooding and landslides such as Bundalang'i and Muran'ga respectively.

The Kenya Forest Services (KFS) is spearheading reforestation programmes aimed at enhancing forest cover in the country. Forests provide natural purification system by absorbing carbon dioxide from the atmosphere serving as a carbon sink and releasing oxygen. The internationally recommended forest cover is 10% of the territorial surface area of any country.

KFS has also introduced technologies for processing forest produce aimed at value addition. The registration of Charcoal Producer Associations and individuals has enhanced awareness on the use of different types of charcoal production technologies based on matching tree. The institution is involved in alternative green energy programmes across all levels to minimize use of wood fuel and subsequently reduce pressure on forest resources.

The Kenya Forestry Research Institute (KEFRI) is spearheading forestry research aimed at improving tree varieties that are fast growing and drought resistant. Research based on forest pathology is helping the country to control diseases that can wipe out forest stands.

The carbonization of sugarcane, baggasse, saw dust, coffee and rice husks has transformed the production of charcoal by generating smokeless briquettes. KEFRI has also developed a technology on on-farm power saw aimed at increasing efficiency in timber recovery from 30% to 56%. Through this innovation, it is now possible to produce high quality timber and less saw dust resulting to higher economic returns to farmers. This has in turn contributed to reduction in cutting of trees.

The Mines & Geological Department is spearheading exploration and mapping of mineral resources in the country. The department advises the government on mineral resources that have economic value to support exploitation. The aggressive exploration efforts are quickly transforming the economy of Kenya from agricultural to mineral based thus strengthening the Gross Domestic Product (GDP) thus alleviating poverty. The department is responsible for mining and follow-up on the rehabilitation of abandoned sites hence transforming them to near original state.

The Kenya Wildlife Service (KWS) protects wildlife resources in natural habitats in national parks and reserves. Through community-based partnerships, KWS has enhanced benefits to local communities in proximity to protected areas. Eco-tourism has been promoted making communities to earn from wildlife conservation.

Standards supporting green economy

- The Kenya Bureau of Standards (KEBS) is mandated to develop and enforce the standards of industrial products in order to achieve production of goods and services that meet global demands. This enhances quality of Kenyan Products and improves access to both local and international markets. KEBS has initiated a five-year programme designed to remove barriers to market transformation of energy efficient products and services in Kenya. These standards have been replicated in four countries in the East African Community (EAC) namely; Burundi, Rwanda, Tanzania and Uganda. The goal of the programme is to reduce carbon emissions in the EAC Region by improving energy efficiency of selected appliances and equipment in residential, commercial and industrial sectors. Green Initiatives in the Industrial Sector.
- The Ministry of Industrialization is spearheading innovation and green initiatives at all levels.
- The informal sector (Jua kali) is making equipment for house use such as the energy saving stoves and jikos for use by local communities.
- The Kenya Green Initiative is making briquettes from rice husks.
- The water hyacinth weed is being used to make mats, baskets and furniture. When harvested, the water hyacinth also been used to makes manure.
- The Kenya National Cleaner Production Centre (KNCPC) promotes cleaner production technologies that enhance the efficient use of raw materials, water and energy resources, while minimizing waste generation at source. KNCPC provides technical support to industries to adopt cleaner production technologies in their systems. As such, the Centre is an important tool for the promotion of green economy in the country as it promotes activities that reduce carbon emissions, enhance efficient use of resources thus making industrial production profitable while supporting creation of job opportunities and alleviating poverty.

Green Initiatives in Transport Sector

The Transport Sector has not been ignored in the adoption of green initiatives. The on-going expansion of roads is a major achievement in adopting green initiatives. The expansion is not only improving the efficiency of transport but also reducing carbon

emissions through decongestion of heavy vehicular traffic. It is important to note that vehicular exhaust emissions are rich in carbon dioxide which is a major component of greenhouse gases that contributes to global warming.

The improved roads will therefore enhance fuel combustion through increased speed of vehicles and smooth movement. The government is planning to phase out the fourteen-seater matatus and embrace the larger capacity mini-buses aimed at increasing commuter capacity and efficiency all geared towards reduction of carbon emissions.

Green Initiatives in the Housing Sector

The Housing Sector has made major milestones in embracing green initiative leading to green buildings with modern structures and technologies. These efforts are aimed at adapting to adverse effects of climate change and ensure climate proof buildings and infrastructure.

Real Estate Developers have been encouraged to fit up-coming real estate projects with eco-friendly technologies that will enable:

- Solid waste segregation,
- Waste water treatment and recycling,
- Solar heating
- Harvesting of rain water from roof catchment among others.

This is aimed at safeguarding over-exploitation of natural capital resource base and promotion of sustainable development.

The Private Sector

The government is encouraging participation of private sector in embracing green initiatives. This is aimed promoting corporate responsibility in supporting waste management through recycling technologies.

In addressing the reduction of flimsy plastics in the environment, the Authority has banned the production of below 30 microns plastic and raised the standards to 60 microns in line with the Plastics Bill under the East African Community standards. NEMA banned use of packing materials that are not eco-friendly. Nakumatt chain supermarkets distributed over 200 litter bins within Nairobi in an effort to promote waste collection and disposal aimed at improving cleanliness and better quality of environment.

4. **What are the challenges that your government have faced or may face in promoting green technology and innovation in your country to contribute to national development priorities and accelerate the progress towards the SDGs?**
   Water levels in dams due to prolonged droughts as a result of climate change has adversely affected power generation leading rationing and power outages. The adoption of green initiatives in the energy sector is an important intervention as the country strives to become an emerging economy by 2030.

The forest cover in Kenya is barely 4% and still below the recommended level. In this regard, KFS has established Community Forest Association aimed at promoting community involvement in forest management and ownership. Through these initiative KFS oversees registration of agencies and community projects to benefit from carbon credits.

Large-scale private investment is unlikely due to the complex institutional setup in the sector, still evolving tariff regulation, and low political support for private sector participation (PSP). At medium scale, open competition for contracts for WS provider operation and management has been limited

5. **What should governments, the private sector, organized civil society and other stakeholder do so that developing countries can benefit from these technologies?**
    - Contracting private enterprises to provide specific services (such as monitoring, billing, or rural water supply
    - Policy led on Environmental Sanitation and Hygiene (ESH).
    - Ministry of Education (MOE). Supervision of ESH in schools.
    - Local authorities (Las) to enhance supervision of urban sanitation.
    - Water Services Regulatory Board (WASREB) to enhance technical standards and tariffs, issues licenses and tariff guidelines.
    - National Water Conservation and Pipeline Corporation (NWCPC)- Bulk supply development.
    - Water Services Trust Fund (WSTF)- Provides grants for capital investment in underserved areas.
    - Water Institute (capacity development);
    - Water Appeal Board (dispute resolution).
    - Water Supply and Sanitation in Kenya:

6. **What are some examples of international cooperation mechanisms, projects, programmes or strategies, including triangular and south-south cooperation, in green technology and innovation that country is part of.**
    - Integrated Health and Environment Observatories and Legal and Institutional Strengthening for the Sound Management of Chemicals in Africa (African ChemObs) 2017-2022 whose objective is, "To contribute to improved health and environment through strengthening national and regional institutions, and implementing priority chemicals and waste related interventions". GEF Trust Fund9.
    - Knowledge for Action: Promoting Innovation Among Environmental Funds 2015-2018 whose objective was, "To strengthen EFs' capacities on financial innovations through knowledge management and exchange". GEF Trust Fund.
    - Sharing Knowledge on the Use of Biochar for Sustainable Land Management 2014 whose objective is to demonstrate and promote the adoption of SLM practices involving the use of innovative organic amendments, based on biochar,

that improve the capture and efficient use of nutrients, and enhance productivity, improve climate resilience, support rural livelihoods, and contribute to watershed management. South-South Cooperation". GEF Trust Fund.

7. **What actions can the international community, including the CSTD, take to help your country take advantage of green technology and innovation for cleaner and more productive and competitive production?**
   i) Installation of solar systems for the urban and rural poor.
   ii) Ensuring the mechanisms of garbage collection are in place in both rural and urban areas.
   iii) Establishing household mechanisms for water purification
   iv) Installation of water tanks in various households.
   v) Educating the masses on the importance of organic farming.
   vi) Establishment of wind power generation plants across the country.
   vii) Encouraging integrated small-scale organic farming.
   viii) Capacity building in the institutions of higher learning though supported research programmes.

8. **Could you suggest some contact persons of the nodal agency responsible for projects/policies and international collaboration in this context as well as any experts (from academia, private sector, civil society or government) dealing with projects in this area? We might contact them directly for further input or invite some of them as speakers for the CSTD inter-sessional panel and annual session.**

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Mr. Paul Mungai from Ministry of Education, in charge of international collaborations in University Education; +254722586164; paul.mungai@yahoo.com

Mr. James Kiburi from the Ministry of Education, in charge of projects in University Education; +254723464696; kiburijames@yahoo.com

9. **Do you have any documentation, references, technological assessments, future studies or reports on the priority theme in your country or region?**

The references on this input at the end of the discussion.

PRIORITY THEME 2: ENSURING SAFE WATER AND SANITATION FOR ALL: A SOLUTION BY SCIENCE, TECHNOLOGY AND INNOVATION

1. **What are the concrete challenges that your country has encountered in managing water and sanitation and providing access for all to these services?**

i) Operation and maintenance challenges- These originate from initial choice of interventions and poor management practices. This is rampant in the rural areas, where studies show that up to 25% of the rural water supplies fail within 5years of age, primarily due to operation and maintenance issues. This leaves the management under community-based organizations. The poor management could have come about as a result of lack of adequate skills to manage the facilities professionally. As a result, there emerges poor control of finances, lack of transparency, over employment and many other challenges. Distrust between the community and the management team on issues centering around transparency and accountability. A good example is the case that was reported in Kisayani community.

ii) High costs associated with pumping systems. These leave the water utility companies in dire financial strains.

iii) Inadequate funding and disproportionate funding within the sector- The current level of funding in The National Government overall expenditure on water supplies and related services is expected to decrease by 13.2 per cent from KSh. 65.2 billion in 2020/21 to KSh. 56.6 billion in 2021/22 financial year. This is attributed to the tight fiscal framework during 2021/22 financial year. This level of funding is way below the level required to meet the growing demand for water. Consequently, this has resulted to commercialization of the commodity, whose outcome is:

- Bias against low-income earners, thus violating the basic rights to water
- Decline in quality and quantity from the resources
- Gravely affecting the irrigation

iv) Water quality deterioration due to catchment degradation, which makes it expensive to treat water for industrial and domestic consumption and to maintain water facilities and reservoirs thus increasing operation and maintenance costs.

v) Low social acceptance and interventions- This leads to vandalism of water facilities especially in areas where water facilities are operated by government with little consultations with the beneficiaries. This ends up with most projects stalling or getting sabotaged. Thus, dragging the improvement of water situation.

vi) Conflicts- Due to the fast-growing population, there is an increase in the demand for water. This leads to an increase in conflict of interests arising from various water users. These unresolved conflicts lead to collapse of water facilities. Examples include:

- Tana River Basin where there are sporadic conflicts between the competing upstream (hydropower and irrigation) and downstream (irrigation and livestock watering) uses.
- Recuring conflicts between 2 ethnic communities during the dry season, where one community values water for irrigation and the other one for pastoralism.
- In urban areas, conflicts arise from the installation of water facilities in the source area where residents demand for consideration. In the recent past, there have been cited a number of examples which include but not limited to:
- Thika dam water project which was marred by a series of court cases

- Kariminu dam where residents of Gatundu North decried lack of water despite the dam being located in their locality.
- Nairobi's northern collector Tunnel project which is an inter-basin water transfer project, affecting far neighbuorhood of the city.
- Mzima water pipeline conveys water from springs that are approximately 200km away.

vii) Illegal connections- Around 40% of water volume is unaccounted for by the Nairobi Water and Sewerage Company. Most of it is lost through leaks or illegal connections.

viii) Uncompetitive water and sanitation tariffs- Due to inadequate funding, most of the responsibilities of the government has been taken up by private institutions, usually with little or no supervision by the government. These institutions, tend to overrate the prices of water thus, unduly exploiting the customers.

ix) Inadequate investments and infrastructures- continuous growth in the number of informal settlements have led to poor infrastructural connections which may lead to leakages thus, a lot of water is unaccounted for.

x) Mismatch between the demand for water and the supply

xi) Depletion of the natural water resources for urban supply- More people have to rely on existing water sources. Boreholes and wells, are increasingly being depleted and not renewed.

2. **What projects/policies has your country implemented to use the above-mentioned range of technologies and innovations or other STI, including frontier technologies (e.g, AI and drones) to address these challenges?**

Africa's cities are growing at an unprecedented rate. In Kenya alone, the urban population, currently at 12 million, will more than triple to 40 million by 2050. This rapid urbanization has huge implications for water use and wastewater management in the country's cities, which already face rising water and sanitation demands and problems, such as pollution and over exploitation. Today barely half of Kenya's urban population has access to water. Less than a third have access to improved sanitation, and only 40 percent of Nairobi is connected to a sewerage system. The government's national development plan, Kenya Vision 2030, articulates an ambition to fill these gaps and ensure that all citizens have access to basic water and sanitation by 2030, the deadline for the Sustainable Development Goals (SDGS). In order to achieve that vision, however, a multi-pronged approach involving financing and monitoring is needed. Through various International Development Association (IDA) investments in the Nairobi City Water and Sewerage Company (NCWSC), Athi Water Services Board (AWSB) and Kenya Informal Settlements Improvement Project (KISIP), the World Bank has had a long-established involvement in helping increase water access and sanitation services in Kenya – but there is still much more work to be done.

3. **Can your country provide examples of policies/projects/initiatives aimed at strengthening national STI capabilities in managing water and sanitation for ensuring their access by all population in your country? One example is what institutional and regulatory arrangements are in place to stimulate R&D and innovation in managing water and sanitation for access by all.**

   Development expenditure for Rural Water Supplies is expected to increase from KSh. 2.4 billion in 2020/21 to KSh. 3.5 billion 2021/22 as the Government invests more in rural water projects. Similarly, Irrigation Development and National Irrigation Authority (NIA) are expected to receive a significant increase in budgetary allocation from KSh. 0.5 billion and KSh. 8.5 billion in 2020/21 to KSh. 1.4 billion and KSh. 10.7 billion, respectively, in 2021/22.

4. **Could you share case studies of regional and international collaboration that have helped your country in strengthening STI capacities? Can you provide success stories in this regard?**

- The World Bank-supported Nairobi Sanitation Project, approved in 2012, focused on providing greater water and sanitation access for people in urban settlements by leveraging commercial and customer finance to support project financing, as well as by increasing the amount of safely disposed fecal sludge, reducing water contamination and improving the overall environmental health risk – certainly no small feat.
- To deliver on this ambition, the Bank provided US$4.08 million in output-based aid subsidies (OBA) for water and sanitation services, US$250,000 for monitoring the use of such services, and technical assistance. The OBA subsidies aimed to support the financing of the infrastructure needed for household water and sanitation and its connection to trunk sewers and mainline water supplies. The technical assistance focused on activities such as supporting community engagement, helping NCWSC access a commercial loan and the implementation of social marketing and hygiene promotion activities.
- Through collaboration with World Bank, in a project deemed, "Providing Sustainable Sanitation and Water services to Low-income Communities in Nairobi" 84,940 people in Nairobi's informal settlements were provided with access to improved water sources, and 137,243 people were connected to the sewerage network. Moreover, the project also resulted in numerous environmental and public health benefits, such as less drainage from pit latrines flowing into the streets, decreases in open defecation, and fewer reported incidents of diseases such as cholera. "Since the water and sanitation project started, we have really benefited. They built water flush toilets, a water tank, and sewer connections. Now our children never get sick and we are all doing fine." Angeline Mutunga, *Beneficiary and resident of Matopeni/ Spring Valley Ward.*
- One of the most notable observations, and an important factor that made these efforts possible in the first place, was the desire by Nairobi's residents themselves to see increased access to water, sanitation and sewerage services. In all Nairobi settlements surveyed, over 85 percent of residents reported a willingness to pay more for water and

sewerage connections, with that number reaching 98 percent in the Mailisaba and Huruma settlements.

- water.org is collaborating with Water Services Trust Fund, created by World Bank, to build the bank ability of water utilities, through technical assistance and improved financial management. Through the programme, Kenyans are able to obtain credit through banks that are partners with warter.org, and install water or buy storage tanks.
    - Case examples:

- Leah who bought 3 rain storage tanks.
- Patricia bought 3 rain storage tanks after obtaining a loan from water.org.
- Josephine from solidarity primary school was able to install water in her school courtesy of water.org.

- By combining nutrition programming with improved access to water, sanitation, and hygiene (WASH), the U.S. Agency for International Development designed the Kenya Integrated Water, Sanitation, and Hygiene Project (KIWASH). KIWASH enabled nearly 900,000 Kenyans across nine counties to gain access to improved water security, sanitation, and hygiene services (WSSH) and assist households in gaining access to irrigation and nutrition services.
- As county governments take on responsibility for investment in and oversight of service delivery to keep their constituents healthy—and their economies thriving—there is great opportunity to expand service delivery through public-private partnerships that bring new actors into the WSSH sector. KIWASH partnered with water and sanitation service providers to develop bankable business plans, improve operations, and facilitate access to financing. In parallel, behavior change communication activities linked to community-led total sanitation and hygiene stimulated demand for improved household sanitation, hygiene, and nutrition. Our target counties were Busia, Kakamega, Kisumu, Kitui, Makueni, Migori, Nairobi, Nyamira, and Siaya.

Sample Activities

- Assist water service providers (WSPs) to improve service delivery and business operations.
- Facilitate access to financing for WSPs and WASH enterprises.
- Ensure women have equal access to the opportunities created by KIWASH activities.
- Support achievement of the Government of Kenya's Community-Led Total Sanitation targets.
- Incubate private sector WSSH enterprises to develop innovative products and approaches.
- Integrate WSSH and nutrition best practices into Kenyan health services delivery.

Select Results

- Extended basic drinking water services to more than 874,388 people; another 69,566 gained access to basic sanitation services with 1,687 villages verified open-defecation free with monitoring plans in place.

- Mobilized $44 million in new sector funding to expand the services or increase the efficiency of water service providers.
- Supported 22 projects to install solar power.
- Provided training and technical assistance to 13 partner WSPs to improve their performance and ability to qualify for financing that can expand and improve water services; the focus is to achieve greater cost recovery from users, increased efficiency in service, improved governance, and access to financing.
- Provided training to 231 WSSH enterprises on water sector reforms and rights to water access, basic computer skills, business planning, and strategic marketing, accompanied by on-the-job coaching and mentoring to help enterprises improve access to WSSH services for targeted communities.
- Trained 78 public health officers to initiate community-led total sanitation programs in their respective areas.
- Facilitated the establishment of 12 farming demonstration sites to showcase low-cost methods for producing nutritious food and improved irrigation technologies that can significantly increase crop yields and raise incomes.
- Trained 24 Water Resource Users Association (WRUAs) to understand and plan for effective conservation; protected 68 springs and planted 153,400 indigenous trees around water sources.
- Established 234 demonstration farms at farmer's homesteads to showcase various technologies for adoption by community members; trained more than 4,400 farmers on establishing kitchen gardens, with 5,949 kitchen gardens established in eight counties.
- Collaborated with Busia Water Company to decrease non-revenue water by 66 percent and establish more than 200 new water connections, benefitting more than 1,000 people.
- Launched mobile payment options in light of COVID-19 crisis.
- Equipped 583 schools and health facilities with handwashing stations.
- Reached 528,666 people with WSSH COVID-19 messaging.

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REPUBLIC OF KENYA

STATE DEPARTMENT OF UNIVERSITY EDUCATION AND RESEARCH
MINISTRY OF EDUCATION

KENYA'S INPUTS ON PRIORITY THEMES 1 AND 2 OF THE 2022-2023 COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD) - to be presented at the Commission's Intersessional Panel Meeting to take place from 25th to 27th October 2022.

PRIORITY THEME 1: Technology and innovation for a cleaner and more productive and competitive production.

1.What are some of the specific examples from the public and private sectors of green technology and innovation for cleaner and more productive and competitive production in Kenya? Please include contact, website, links to reports and any other relevant information concerning these projects and initiatives.

Kenya is on the verge of green energy transformation that will be instrumental to economic innovations. The country is the largest producer of renewable energy in Africa and ninth globally with capacity of 7,000 MW of geothermal energy. The proportion of renewable energy namely, hydropower, geothermal, wind and solar which is at 70% has now surpassed diesel-generated electricity.

Renewable Energy Sources:

Hydro Energy
Kenya's total installed large hydropower capacity is 826.23 MW. Small hydro potential is estimated at 3,000MW, of which…
READ MORE
Geothermal Energy
Geothermal resources in Kenya are located within the Rift Valley with an estimated potential of between 7,000 MW to 10,000 MW…
READ MORE
Wind Energy
Kenya's wind installed capacity is 5.1 MW, operated by KenGen at the Ngong site. High capital cost and lack of sufficient wind regime…
READ MORE
Solar Energy
The Government has zero-rated the import duty and removed Value Added Tax (VAT) on renewable energy equipment and…
READ MORE
Bioenergy

Bio-energy is the energy derived from various sources of solids, liquids and gaseous biomass, including fuel wood…
READ MORE

Tidal Energy

The only technology that draws on energy inherent in the orbital characteristics of the Earth…
READ MORE

2. What are the national strategies, policies and laws concerning green technology and innovation for cleaner and more productive and competitive production in Kenya?

The East African Regional Bioeconomy Strategy 2021/2022 to 2031/2032 by the EAC and Stockholm Environment Institute (SEI). The strategy is anchored on four thematic areas: Food security and sustainable agriculture; health and wellbeing; sustainable energy, and bio-based industrial development. It seeks to create new forms of sustainable bioenergy, and the conversion of waste materials to useful products. The strategy further seeks to ensure the transformation of EAC economies and places innovation in bio-based products and processes at the centre, with a bio-based circular economy as the organizing framework.

The Kenya National Energy Efficiency and Conservation Strategy, 2020 by Kenya's Ministry of Energy and the Copenhagen Centre on Energy Efficiency. It is a framework for Kenya to achieve her energy efficiency targets and goals for the next five years.

The National Energy Policy, 2018
The overall objective of this Energy Policy is to ensure affordable, competitive, sustainable and reliable supply of energy at the least cost in order to achieve the national and county development needs, while protecting and conserving the environment for inter-generational benefits.

Green Economy Strategy and Implementation Plan 2016 – 2030: A low carbon, resource- efficient, equitable and inclusive socio-economic transformation.
It focuses on the main binding socio-economic constraints towards the attainment of Kenya's Vision 2030. It is meant to guide both the National and County governments, the private sector, civil society and other actors adopt development pathways with higher green growth, cleaner environment and higher productivity relative to the business-as-usual growth scenario.

3. What are the key industries that are pioneering green innovation in Kenya? List the key actors in the national ecosystem of innovation related to green innovation in Kenya, (firms, universities, financial institutions, regulators)? What are the key networks of the ecosystem in Kenya (including online networks, innovation hubs, forums etc.)?

The **Partnering for Green Growth and the Global Goals 2030 (P4G)** is global platform accelerating pioneering green partnerships to drive inclusive and resilient economic growth. The partnerships aim to catalyze solutions and accelerate innovative partnerships, which can then act as engines for change and transformations for delivery of Kenya Vision 2030 as well as for solving systemic challenges to green growth and sustainable development. P4G partnerships include both private- and public-sector actors who are working together to advance innovative and commercially viable projects in at least one of the five SDG sectors P4G targets. The partners can come from any country, but their work must target sustainable development and growth in one of the 150 developing and emerging countries eligible for P4G projects.

The eleven start-ups in Kenya that have been made investment-ready are:

I. Kencoco Limited – producing charcoal briquettes from biomass material.
II. Boma Safi Limited – selling affordable solar products, clean cook stoves and briquettes to rural households.

III. Green Pencils Limited – making customized pencils and ball pens from old newspapers.
IV. Skynotch Energy Africa – running a mini-hydro power generation plant and distributing solar energy tools.
V. Strauss Energy – enabling home owners and companies to earn income from power generating photovaltaic roofing tiles.
VI. Plexus Energy Limited – distributing off grid power solutions such solar lighting, solar water heating and UPS systems for network masts.
VII. Cobitech Solar Limited – providing solar kits on loan to rural poor households for repayment within one year.
VIII. Afrisol Energy Limited – using biogas digesters to produce clean and cheaper energy for institutions.
IX. Classic Foods Limited – processing dairy products, fruit juice, tomato saucem and honey, milling flour and manufacturing animal feeds.
X. Sanivation – installing portable toilets and providing sanitation and energy services to household in congested areas.
XI. Consumer Choice Limited – providing economical Bio-Ethanol Gel and environmentally-friendly clean cook stoves.

4. What are the challenges that the Kenya government has faced or may face in promoting green technology and innovation in your country to contribute to national development priorities and accelerate the progress towards SDGs?

Political short-termism: Despite much political rhetoric pledging change, governments are often swayed by public opinion, populist media and short-term political cycles, which can derail policies to address complex, longer-term challenges. Governments and local authorities are mandated to make and implement sustainable development laws, policies, strategies, standards, programs, agreements with other countries and actions. Without defined budgets, policies, regulations or detailed sector plans and targets to underpin pledges, it's hard to achieve progress in terms of green production and innovation.
Competing priorities for policies and funding: The COVID-19 recovery is putting a further strain on public finances already challenged by record levels of debt. This may reduce funds for green investments and change donor organizations' priorities on green energy technologies. Siloed cultures can also hinder cooperation between government departments, with conflicting aims preventing a coordinated environmental effort.
Poor planning and implementation: Governments must create the right conditions for sustainability and some initiatives have failed to take account of key dependencies. Lack of proper planning leads to channeling resources to non-priority areas. Green production and green innovation are key emerging issues that needs to be addressed not only to allow for economic growth but also to reduce adverse effects including climate change.

5. What should governments, the private sector, organised civil society and other stakeholders do so that developing countries can benefit from these technologies?

Governments can choose from a wide range of policy interventions and financing measures to support the transformation of energy and industrial systems and improve energy.

Loans and grants are needed for green investments in sustainable renewable or low-carbon energy sources and energy-efficient buildings. Governments, the private sector, civil society organizations and the development partners should be able to give grants and loans towards

green production and green innovations. Development partners can also give technical assistance in terms of training, technology donations either in kind or low cost among other contributions.

Subsidies and tax rebates are additional tools to boost demand for green products and services like EV, solar panels or renewable energy. Governments should also offer subsidies and grant funding to research institutes, academic institutions and private R&D firms to boost innovation and develop transformative innovative technologies.

6. What are some examples of international cooperation mechanisms, projects, programmes, or strategies, including triangular and South-South cooperation in green technology and innovation that Kenya is part of?

Diffusion Strategy of Green Technology and Green Industry in Africa - United Nations Industrial Development Organisation (UNIDO)

This was a South-South cooperation project on Renewable Energy Technology Market and Energy Efficiency Adoption in Maize and Cassava Processing Industries in Kenya and Nigeria.

7. What actions can the international community, including CSTD, take to help Kenya take advantage of green technology and innovation for cleaner and more productive and innovative production?

- Offer financial support to enable Kenya promote green innovations, entrepreneurship and innovation.
- Speed up the flow of goods across regional borders, like the East African Community (EAC), by curbing regulations that stifle competition to allow easy commercialization of green innovations.
- Adapt international climate-friendly policies to allow for a more green economy.

8. Could Kenya suggest some contact persons of the nodal agency responsible for projects /policies and international collaboration in this context as well as any experts (from academia, private sector, civil society and government dealing with projects in this area? We might contact them directly for further input or invite some of them as speakers for the CSTD intersessional panel and annual session.

Nomination not done

9. Does Kenya have any documentation, references, technological assessments, future studies or reports on the priority theme in your country or region?

- **Final Energy Report Kenya - Sustainable Agricultural Innovative International.** A report of the Africa Development Bank's Power, Energy, Climate Change and Green Growth (PEVP), 30th July 2018.

- **Country Priority Plan and Diagnostic of the Electricity Sector Report: Factors influencing Household Adoption of Renewable Energy Technologies in Rural Kenya** by National Environment Trust Fund (NETFUND) and Kenya Industrial Research and Development Institute KIRDI, 2017.

- **Open Energy Data Assessment**, Nairobi, Kenya by World Bank, November 1st 2015.

- **Environmental Impact Assessment in Kenya: Challenges of Emerging Technologies on Development Projects.** Proceedings of International Conference on Sustainable Research and Innovation, Volume 5, 7th-9th May, 2014.

- **Green Energy Assessment Report - Kenya, 2014.**
This Ministry of Environment, Water and Natural Resources in partnership with UNEP-commissioned study examined investments under "business-as-usual" (BAU) compared to green economy scenarios in four key sectors that are critical for Kenya's green growth, namely: agriculture, energy, manufacturing and transport.

Priority Theme 2: Ensuring safe water and sanitation for all: a solution by science, technology and innovation

Introduction

With an estimated population of 53 million in 2022, 15% of Kenyans rely on unimproved water sources, such as ponds, shallow wells and rivers, while 41% of Kenyans lack access to basic sanitation solutions. These challenges are especially evident in rural areas and urban slums where people are often unable to connect to piped water infrastructure.

In 2020, 59% Kenyans had access to safe drinking water while only 29% had access to basic sanitation. Since 2000, access to safe drinking water has increased by 12%, while access to basic sanitation has been falling (UNICEF, 2020). Estimates suggest that population could double by 2050 relative to 2015 given current growth rates, while 30 million Kenyans (48% of the population) are expected to live in urban areas by 2030. These pressures place increased demands on institutions and infrastructure, and stretch limited water sector finance that has not been able to keep pace with current demands.

A. What are the concrete challenges Kenya has encountered in managing water and sanitation and providing access for all to these services?

1. Rapid population growth that strains the management of water and provision of adequate sanitation services.
2. Inadequate and outdated infrastructure.
3. Inadequate wastewater management/ treatment resources and systems that are insufficient has led to effluent discharge into water systems (rivers, lakes and ocean).
4. Encroachment into catchment areas with activities such as poor farming practices and deforestation; leading to degradation of these areas and resulting in increased surface runoff, flash floods, reduction in infiltration, erosion and siltation among others.
5. Climate change which has led to harsh and unpredictable weather conditions such as floods, drying rivers etc.
6. Inadequate resources (financial and human) to manage water safety and sanitation.

B. What projects/policies has Kenya implemented to use the above-mentioned range of technologies and innovations or other STI, including frontier technologies (AI and drones) to address these challenges? What are the main outcomes? What are the main difficulties confronted while trying to implement these projects/policies? Pls. include the gender dimension.

1. Rapid population growth that strains the management of water and provision of adequate sanitation services.

Projects:

- **Kibera Integrated Water, Sanitation and Waste Management Project** – Nairobi; Under UN-HABITAT and Kenya Slum Upgrading Program.
- **Mombasa Slum Upgrading Program**; Under UN-HABITAT and Kenya Slum Upgrading Program.
- **Karimenu II Dam, Kiambu County**.
- **Badasa Dam**

  The National Water Conservation and Pipeline Corporation (NWCPC) wishes to implement a dam project to supply water to Marsabit Town, Marsabit District, Eastern Province, Kenya.

- **Maruba Dam**
  Maruba Dam, the source of water for Machakos Water Supply is located across River Maruba in Central Division of Machakos District, Machakos Town Constituency. The dam supplies water to parts of Machakos town and its environs.
- **Chemususu Dam Project**- Chemususu Dam Project located on the Chemususu River, a tributary of the Tigiri River, some 80 kms North-West of Nakuru Town and approximately 15 kms West of Eldama-Ravine Town. The proposed dam is intended to improve storage by storing approximately 10.94 Million M3 and enhance uninterrupted water supply of about 35,000 m^3/day to Nakuru Town and parts of Baringo and Koibatek District including Eldama-Ravine Town.
- **Umaa Dam Project** - Umaa Dam Project at Umaa dam site is located on the Nzeu River, - Kitui Water supply is circa 25,000 people in Kitui Town.

2. Inadequate and outdated infrastructure.

Projects:

a) **Community Lead Sanitation Project in Mwaeba Village in Kilifi County**. This was a USAID project aimed at installation of new water and sanitation facilities to address inadequacy. 1,543 new latrines were constructed and community was trained on rehabilitation of broken wells, repair management and prevention of future issues (USAID 2021 Report).

b) **Kenya Towns Sustainable Water Supply and Sanitation Program (2016-2023)** - Funded by African Development Bank, African Development Fund, Middle Income Countries Fund and Government of Kenya (GoK). The implementer was the GoK by the Ministry of Water and Irrigation (MoWI). The Program was to be implemented in 28 towns and consisted of large and small sub-projects throughout Kenya. It was to contribute to the development of water supply infrastructure in 19 towns and sanitation infrastructure in 17 towns (where reliable water was already provided).

c) **Nkararo area, Trans Mara West Sub-County** - The area has been subject to local skirmishes for many years. This has made any attempts to improve the water infrastructure difficult in the past. Sponsorship from a non-governmental organization has brought about the 'water to school' project. The project provides water to local schools as well as to water kiosks where people can buy water at KES. 5 for 20 liters of water.

d) **Danida Sustainable Infrastructure Finance Project in Kenya** - Danida Sustainable Infrastructure Finance (DSIF) provides funding for Thika and Githunguri Water Supply and Sanitation Project in Kenya. The procedures are ongoing with actual ground breaking to be in the first quarter of 2024.

3. Inadequate wastewater management/ treatment resources and systems that are insufficient has led to effluent discharge into water systems (rivers, lakes and ocean).

Projects:

a. **Construction of a wastewater treatment plant in the Kakamega County** at a total cost of KES. 17.2 million (more than US$ 149,000). The county government is funding the project with support from the Water Sector Trust Fund (WSTF). The initiative is part of the Kenya Sustainable Urban Water Supply and Sanitation Program (KSUWSSP)

b. **Kodiaga Waste Water Treatment Plant** – The project is part of the Kenya Sustainable Urban Water Supply and Sanitation Programme funded by the Water Sector Trust Fund. The

treatment plant is expected to serve 10,000 people, including 7,000 residents of Kodiaga Prison. The project will benefit another 3,000 people in Kisumu County.

4. **Encroachment into catchment areas with activities such as poor farming practices and deforestation leading to degradation of these areas resulting in increased surface runoff, flash floods, reduction in infiltration, erosion and siltation among others.**

Projects:

a) **Catchment to Tap [C2T] Flagship Project (2021 – 2025)** aims at creating a linkage between Integrated Water Resources Management and Water Access, Sanitation and Hygiene (WASH) while also addressing emerging challenges to water use and exploitation in key catchment areas. The C2T Project is expected to address major threats to water sources, including catchment degradation, unsustainable land use and practices, increased pollution, deforestation and the adverse effects of climate change. The project will be implemented by the World Wide Fund and the Netherlands-based firm *WaterNet* through a close collaboration with key National and County Governments' agencies and regulators.
b) **Nyandarua County** - KES. 1.2 billion has been dedicated to water projects in various parts of Nyandarua County. 40 projects under the National Irrigation Authority would benefit some 4,000 families. Many of the water projects aim to irrigate farm land. A KES. 29.7 million project to desilt the Githunguri Cascading Earth Dam in Rurii Ward, targets 66 households and has the potential to irrigate 66 acres of land. The Theuri Borehole Irrigation Water Project in Kaimbaga Ward, a KES. 12.3 million project, targets 300 households (CESPAFRICA, 2021).

5. **Climate change which has led to harsh and unpredictable weather conditions such as floods, drying rivers etc.**

Projects:

a) **TWENDE Project (Green Climate Fund (GCF) Project)** - This is an ecosystem-based adaptation project to be implemented in Kenya's arid and semi-arid rangelands. The project launched on 10th February 2021 is funded by the Green Climate Fund (GCF) and implementing partners. The project is expected to help 620,000 people in 11 counties of Garissa, Tana River, Isiolo, Marsabit, Samburu, Kajiado, Kitui, Makueni, Tharaka-Nithi, Meru and Taita Taveta and aims to restore over 500,000 hectares of degraded rangelands.

6. **Inadequate resources (financial and human) to manage water safety and sanitation.**

Projects:

a) **Kenya Integrated Water, Sanitation and Hygiene (KIWASH)** - was a five-year activity (October 2015-Sep 2020) funded by US Agency for International Development (USAID)/Kenya and East Africa. It was implemented in 9 counties with two focus areas- Lake Victoria focus area and Tana/Athi focus area. KIWASH partnered with water and sanitation service providers to develop bankable business plans, improve operations, and facilitate access to financing. In parallel, behavior change communication activities linked to community-led total sanitation and hygiene stimulated demand for improved household sanitation, hygiene, and nutrition.
b) **Financing Locally–Led Climate Action (FLLoCA) Program (2021)** - It is funded by the World Bank's International Development Association (IDA). The program's development objective is to deliver locally-led climate resilience actions and strengthen county and national governments' capacity to manage climate risks. At the county level, the FLLoCA program will be implemented under the Program for Results (PforR) instrument in which

counties will receive their annual disbursements based on their performance against a specified results-based criterion.

c) **County Climate Change Fund (CCCF) Mechanism Curriculum and Facilitator's Guide** - Government, in partnership with Adaptation Consortium on 4th August 2022, launched this Curriculum which seeks to build the capacity of government officers at the national and county levels, civil society, and other stakeholders in managing financial resources for climate change adaptation and mitigation actions in the country. It will be instrumental in equipping officers, particularly at the lower levels in the county, with requisite skills and bring into practice four key components of devolved climate finance that County Governments will use to deliver on community-led climate adaptation and mitigation projects. The CCCF mechanism curriculum was developed in partnership with key government institutions including the Kenya Meteorological Department, Climate Change Directorate, National Treasury, Council of Governors, and National Drought Management Authority and civil society organizations including Christian Aid Kenya and Anglican Development Services among others.
Thus far, the Curriculum has been piloted in five arid and semi-arid counties, namely, Wajir, Garissa, Isiolo, Kitui, and Makueni between 2013 and 2018 and is now being scaled-out to the rest of the counties.

d) **Sustainable Water and Sanitation in Africa Project – Kenya (SUWASA-Kenya)** is a regional initiative of the USAID, implemented by Tetra Tech, with a mission of fostering the transformation of water and sanitation delivery services in Africa to achieve long-term financial sustainability through the application of market-based principles. In 2020, USAID had an interagency agreement with the US-Government States (USGS) within the Department of the interior to support groundwater mapping through remote sensing and modeling. The Department of State trained officials on the rehabilitation of the Nairobi River Basin in collaboration with the U.S. Water Partnership. Meanwhile, HHS/CDC worked to enhance cholera preparedness for, prevention of, and response to cholera.

Policies:

- Sessional Paper No. 3 of 2012 on Population Policy for National Development to guide implementation of population programs in line with Kenya Vision 2030, the Constitution of Kenya, 2010 and other international and national aspirations.
- National Water Policy, 2021
- Water Services Regulations, 2021
- National Water Resources Regulations, 2021
- National Water Harvesting and Storage Regulations, 2021
- The National Water Services Strategy (2021-2025)
- The National Water Harvesting & Storage Strategy (2021-2025)
- The Water Resources Strategy (2021-2025)

Technologies available:

i. Sequence Batch Reactor (SBR), treats the water in batches rather than constantly and completely biological. The result of this batch process is much lower power consumption, very high treatment efficiency and much less risk of shock from extra usage.
ii. Biological treatment – Anaerobic and anaerobic.
iii. Reverse Osmosis (RO) solution is best suited for hard water.

iv. Ultra Violet (UV) water purification is the best solution if the water is highly contaminated. At times, a combination of the two-RO and UV might be required if the water is both hard and highly contaminated.
v. Ultra filtration water treatment.
vi. Groundwater mapping through remote sensing and modeling.

Innovations available:

The following water and sanitation innovations in Kenya were developed with technical assistance from development partners:

i. **The Social Connections Policy Approach**
This policy champions the right of access to affordable water services on a non-discriminatory basis, especially for disadvantaged or marginalized groups. Social Connections is a term used to refer to subsidized private first-time connections of residential dwellings to public utility networks, primarily intended to benefit the low-income areas. The policy provides for subsidizing first-time connection fees but not consumption.

ii. **The Innovative Financing and Microcredit Scheme**
The objective of the innovative financing and micro-credit scheme is to increase access to and efficiency of water supply and sanitation (WSS) in Kenyan informal settlements as well as to provide Nairobi City Water and Sewerage Company (NCWSC) with innovative access to finance.

iii. **Self-Meter Reading and Billing System**
The objective of the self-meter reading and billing system is to empower low-income customer to read their own meters and pay their water bills through mobile money. This was developed for the benefit of the NCWSC but also benefits water customers.

iv. **Innovative Water Purification Sachet**
This water purification sachet, provided by Proctor & Gamble (P&G) and World Vision Kenya, purifies contaminated water in just 30 minutes. It is most useful in places where water is contaminated and unsafe for use.

Main outcomes in water safety and sanitation projects:

- Enhanced access to safe water for area residents.
- Extended basic drinking water services and gained access to basic sanitation services.
- Mobilized funds to expand the services or increase the efficiency of water service providers.
- Support for some projects to install solar power.
- Provision of training and technical assistance to partners in order to improve their performance and ability to qualify for financing that can expand and improve water services to achieve greater cost recovery from users, increased efficiency in service, improved governance, and access to financing.
- Provision of training to enterprises on water sector reforms and rights to water access, basic computer skills, business planning, and strategic marketing, accompanied by on-the-job coaching and mentoring to help enterprises improve access to Water Safety Sanitation and Hygiene services for targeted communities.
- Trained public health officers to initiate community-led total sanitation programs in their respective areas.

- Facilitated establishment of farming demonstration sites to showcase low-cost methods for producing nutritious food and improved irrigation technologies that can significantly increase crop yields and raise incomes.
- Trained Water Resource Users Association (WRUAs) to understand and plan for effective conservation; protected springs and planted indigenous trees around water sources.
- Launched mobile payment options in the light of the COVID-19 crisis.
- Equipped schools and health facilities with handwashing stations.

Main difficulties confronted while trying to implement these projects/policies:

- Complicated technological machinery.
- Limited resources (financial, human and infrastructural resources).
- Outstanding land compensation money.
- Struggle to incorporate traditional connections to water sources by slums and other informal settlements.
- Change and reviews of dam designs.

C. Can Kenya provide examples of policies/projects/initiatives aimed at strengthening national STI capabilities in managing water and sanitation for ensuring their access by all population in Kenya?

1. **The Constitution of Kenya, 2010**
   The Constitution acknowledges access to clean and safe water as a basic human right and assigns the responsibility for water supply and sanitation service provision to 47 counties. The Constitution mentions water issues such as: affirmative action programs to ensure water for marginalized groups, the responsibility of the national government for management of the use of international waters and water resources and definition of national versus county public works.
2. **The Water Act, 2016**
   The Water Act, 2016 states that its fundamental purpose is "to provide for the regulation, management and development of water resources, water supply and sewerage services, and related purposes.

The Water Act, 2016 established the:

i. **Water Tribunal -** The new Water Tribunal includes more members and is present in more locations to deal with disputes.
ii. **Water Sector Trust Fund (WSTF)** - Sources of funds for the WSTF mandate have been expanded to include funds from the national budget, county government, equalization fund, donations and grants among others.
iii. **National Water Storage Authority (NWSA) -** The NWSA is responsible for development and management of national public water works for water resource management and flood control.

To manage Water Resource Management, the following bodies have been established:

- **Water Resources Authority (WRA)** - The objective of the new WRA is to protect, conserve, control and regulate the use of water resources through the establishment of a national water resource strategy. In addition, the WRA is responsible for: formulation and enforcement of standards, procedures and regulation for the management and use of water

resources; policy development; planning and issuing of water abstraction permits; and setting and collecting permits and water use fees.

- **Basin Water Resource Committee (BWRC) -** Catchment Areas Advisory Committees (CAACs), which previously played a regulatory function at the regional level, have been replaced with BWRCs. The latter will be committees of WRA whose members will be drawn from stakeholders within the basin and aim to achieve wide stakeholder participation in the management of water resources at the basin level. The new BWRCs will retain the same regional functions as the former CAACs, which is: to manage catchments, to facilitate establishment of Water Resource User Associations and to play an advisory role to the WRA. The county government will have a representative in the BWRC whose water resources rest within the county government's geographical jurisdiction.
- **Water Resource User Associations (WRUAs)** -The Water Act, 2016 provides for establishment of WRUAs, which are community based associations for collective management of water resources and resolution of conflicts concerning the use of water resources. The BWRC may contract WRUAs as agents to perform certain duties in water resource management.

To be able to manage Water Supply and Sewerage Services, the following bodies were established:

- **Water Services Regulatory Board (WASREB)** - The constitutionally-guaranteed right to water and the need to protect consumers provides a strong basis for the national regulation and monitoring of water and sewerage services. This is critical to protect the interests and rights of consumers from exploitation and to set minimum national standards. As such, the functions of WASREB have been maintained in the Water Act, 2016. WASREB holds the mandate to approve tariffs, monitor and enforce water services standards and issue licenses to water service providers.
- **Water Works Development Agencies (WWDAs)** - The Water Act, 2016 defines national public water works as water works whose WWDAs are responsible for the:

a. Development, maintenance and management of national public works;
b. Operation of the national public waterworks and provision of water services as a water service provider, until the responsibility for the operation and management of the waterworks is handed over to the county government, joint committee or CCA; and
c. Provision of technical services and capacity-building to county governments and water service providers within its region.

- **Water Services Providers (WSPs)** - WSPs are now the responsibility of county governments who have the mandate to provide water services. WSPs are responsible for provision of water services within the area specified in their licenses and development of county assets. Currently, Water Service Boards (WSBs) sign service level agreements with WSPs and the regulator issues licenses to WSB. Under the new Water Act, 2016, WSPs must apply again for new licenses to WASREB.
- **Kenya Water Institute (KEWI) -** KEWI, as established by the KEWI Act, 2001, is mandated to offer training, administer examinations, offer research and consultancy services to the wider water sector.
- **The Kenya Water Industry Association (KWIA) –** KWIA is a national network that connects water professionals to meet water sector challenges and promote good management and governance.

D. Could Kenya provide Case Studies of regional and international cooperation that have helped Kenya in strengthening STI capacities? Can Kenya provide success stories in this regard?

a) **The Borgen Project - Kayole-Soweto Ingrid Education Center Water Project - Technology Input** - In 2021, the organization planned to complete a new water project for the Ingrid Education Center in the Kayole-Soweto Slum in Nairobi. Kayole-Soweto Slum uses conventional and unconventional tools for water access, including building wells on school land and incorporating cellphone technology, Stanford Innovates apps and mobile services that help slum dwellers pinpoint water locations.

b) **The World Bank-supported Nairobi Sanitation Project -** Implemented from 2012 to 2018, the project worked on providing greater water and sanitation access for people in urban settlements by leveraging commercial and customer finance to support project financing. As a result, 84,940 people in Nairobi's informal settlements were provided with access to improved water sources, and 137,243 people were connected to the sewerage network.

c) **Sustainable Water and Sanitation in Africa Project – Kenya (SUWASA-Kenya) 2013-2015 – A success story:**
In Kenya, SUWASA worked closely with eight WSPs to develop bankable investment proposals for financing projects valued at approximately US $4.6 million, of which US $3.4 million resulted in commercial bank loans. SUWASA also partnered with the GoK's Water and Sanitation Trust Fund (WSTF) to facilitate and accelerate commercial financing approaches for water infrastructure based on the use of Results-Based Aid (RBA) and Aid-on-Delivery. It also worked with three commercial banks (Family Bank, K-Rep Bank, and Kenya Commercial Bank - KCB) to develop tailored products for lending to WSPs for development of water supply infrastructure. It developed communications products and guidelines for both utilities and commercial banks related to commercial financing opportunities for the urban water sector. Lastly, SUWASA developed a gender mainstreaming strategy for water utilities that can serve as a model for utilities in other countries in Sub-Saharan Africa (SSA). The actual outcomes were:
• Based on the commercial financing received by WSPs, 38,231 people gained first-time access to an improved drinking water source and 62,418 people received improved service quality from existing improved drinking water sources.
• Piloted commercial financing model to support house connections for low-income residents in Kisumu resulted in 1,557 households receiving a connection via loans; and successfully piloted the pre-paid meter model of water service provision for low-income areas of Nakuru.

E. Please indicate the contact person(s) responsible for projects/policies and international collaboration in this context in case there is need for clarification on the inputs.

Nomination not done

Report prepared by Vainadu Titus Zakayo Ingana

Kenyan Focal point Officer

Signed  **by 6/10/2022**