



REPUBLIC OF KENYA

## Mainstreaming Kenya's National Climate Change Action Plan into the Environment (including Forestry), Water and Sanitation Sector

**Introduction:** Kenya's goal is to attain a "clean, secure and sustainable environment" by 2030. Emphasis is placed on reducing pollution and improving waste management in Vision 2030, aiming for universal access to water and improved sanitation by 2030. A national waste management system is being developed as one of the Government's flagship projects to assist in meeting this goal. Other key activities include the flagship project to rehabilitate the country's five water towers, and the Constitutional target of 10 per cent forest cover within the country.

The Environment, Water and Sanitation sector is a fundamental pillar of the Kenyan economy, providing direct and indirect goods and services. Forests and other ecosystems provide goods and services such as water, wood-fuel and fodder; and wildlife is a key tourist attraction. Water resource management is linked to Kenya's expected economic and social transformation, and is directly linked to food security, health and GDP growth – especially in the arid and semi-arid lands. Water is an essential input in hydropower generation and the agricultural, livestock and manufacturing sectors, and also is necessary for consumption and sanitation, and thus is vital for human health. These ecosystem services will be increasingly compromised by climatic change and variability unless strong adaptive measures are taken.

The Environment, Water and Sanitation sector is a significant emitter of greenhouse gases. The forestry sector was responsible for approximately 37 per cent of the country's emissions in 2010. Key sources of GHG emissions include deforestation and forest degradation, with approximately 55,000 hectares of woodlands and bushlands converted to other land uses each year through activities such as forest clearing for agriculture, illegal logging and unsustainable charcoal production. In addition, the decomposition of organic waste produces methane, a greenhouse gas many times more potent than carbon dioxide.

Mining and mineral resources, a sub-sector of the environment sector, hold promise for significant growth in Kenya, which has implications for a low carbon climate resilient pathway. Mining and minerals currently contribute less than one per cent to GDP, but this is expected to increase with the exploitation of newly found reserves of oil, coal, natural gas and other minerals.

**Risks and Impacts:** Climate change will pose important risks in this sector due to erratic rainfall, higher temperatures and increased risk of drought. For the Environment subsector, key risks include increased pressure on coastal ecosystems (such as coral reefs) and settlements (inundation of coastal communities through sea level rise), and changes in species distribution and abundance, including notable increases in extinction rates for select species. Kenya is a highly water-scarce country and climate change is likely to exacerbate the problem. Threats include less reliable freshwater availability due to changes in precipitation and other weather patterns, as well increasing demand due to population growth and economic development. Key risks in the Sanitation subsector include damage to sanitation facilities through extreme weather events such as flooding. A number of specific climate change risks were identified in the National Climate Change Action Plan (NCCAP), including:

- Prolonged droughts and erratic rainfall patterns negatively affect lakes, rivers and other water bodies, along with local ecosystems and the lives and livelihoods they support.
- Increases in average seasonal and annual temperatures reduce areas with deciduous and semi-deciduous closed canopy forests.



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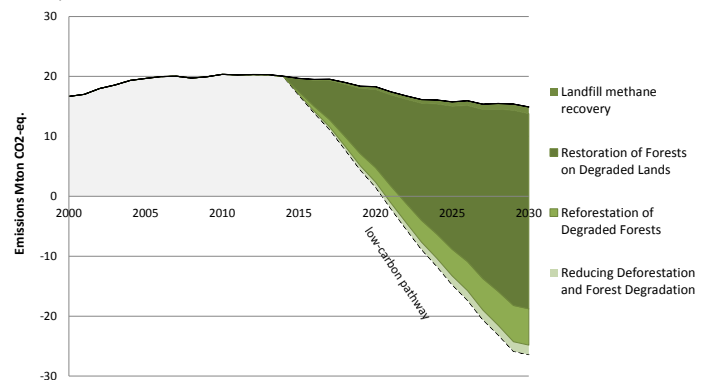
- Sea level rise poses significant threats to coastal aquifers, with saline intrusion making groundwater supplies unusable for households, farms and industries. Rising sea levels will also compromise ecosystem functioning in coastal estuaries and wetlands.
- Water stress from increasing temperatures is connected to higher incidences of cholera and other diarrheal maladies in areas with substandard sanitation facilities. These risks can be compounded by precipitation increases, due to increased sewage run off into drinking water sources.
- Water stress increases the risk of conflicts between pastoralists and agriculturalists, and between upstream and downstream users of water resources.

**Recommended Actions:** Priority actions set out in the NCCAP are discussed below. Important adaptation actions to improve climate resilience in the **environment** sector include improving coastal zone management to rehabilitate and conserve vital coastal ecosystems through the implementation of the Integrated Coastal Zone Management Plan, the National Disaster Risk Management Response Plan and National Environment Action Plan.

**Forestry** actions have important climate resilience and low carbon benefits, and increasing tree cover to 10 per cent of total land area is a goal of Kenya’s constitution. Forests slow the loss of rainwater runoff and thereby help to prevent flooding and landslides, reduce erosion and sediment discharge into rivers, and contribute to water availability. Conservation can contribute to livelihood improvements and has biodiversity benefits. Important actions are:

- Reforesting and rehabilitating the main water towers and water catchment areas.
- Restoration of forests on degraded lands, which has a mitigation potential of over 30 million tonnes of carbon dioxide equivalent (MtCO<sub>2</sub>e) a year in 2030, the largest potential identified in the Action Plan’s low carbon scenario analysis.
- Reforestation and reducing deforestation and forest degradation, with mitigation potentials of 6.1 and 1.6 MtCO<sub>2</sub>e, respectively.

Wedge diagram for low carbon development options in the Environment, Water and Sanitation sector



Kenya has options to develop **mining and mineral resources** taking low-carbon considerations into account, including encouraging the use of clean coal technologies with international support; making use of the natural gas that is a by-product of oil production, instead of flaring it; and allocating a percentage of royalties to a climate change fund to support reforestation and other low carbon actions.



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Actions in the **water** subsector can reduce the impact of droughts and floods on crop yields and livelihoods, and more irrigation-based agriculture lessens the reliance of crop production on rainfall. Priority adaptation actions to improve water management include:

- Increased domestic water supply and improved sewage systems.
- Enhanced irrigation and drainage to increase agricultural and livestock production.
- Effective trans-boundary water resources management.
- Flood mitigation schemes.

**Waste management** has important low carbon climate resilient impacts. Improved waste management systems are planned for several cities, and with proper design can contribute to mitigation. Methane produced in landfills can be captured and used for electricity generation, with an greenhouse gas abatement potential of 1.1 MtCO<sub>2</sub>e for methane capture and 0.5 MtCO<sub>2</sub>e from electricity generation from landfill gas.

**Conclusion:** A low carbon climate resilient pathway in the environment, water and sanitation sector can have important sustainable benefits and contribute to a clean and healthy environment, which is a fundamental right under Kenya's constitution. The NCCAP recognized the forestry sector as having large mitigation potential at low abatement costs; and these actions offer large sustainable development and climate resilience co-benefits,