Kenya's Climate Change Action Plan:

Low Carbon Climate Resilient Development Pathway

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Abbreviations

ASAL	Arid and Semi-arid Lands
CO_2e	carbon dioxide equivalent
COP	Conference of the Parties
GDP	gross domestic product
GHG	greenhouse gas
KSh	Kenyan Shilling
MEMR	Ministry of Environment and Mineral Resources
MPND	Ministry of State for Planning, National Development and Vision 2030
Mt	million tonnes
MTP2	Second Medium Term Plan
NAMA	nationally appropriate mitigation action
NCCRS	National Climate Change Response Strategy
REDD+	reducing emissions from deforestation and forest degradation plus the role of conservation, sustainable management of forests and enhancement of forest carbon stocks
SC	Subcomponent
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction

Kenya Vision 2030 – the long-term development blueprint for the country – aims to transform Kenya into "a newly industrialising, middle-income country providing a high quality of life to all its citizens in a clean and secure environment."[1] A low carbon climate resilient development pathway, as set out in this *Climate Change Action Plan*, can help meet Vision 2030 goals through actions that address both sustainable development and climate change. This pathway can also help the Government achieve the Millennium Development Goals and other internationally agreed development goals without compromising the environment and its natural resources.

As Kenya realizes its development aspirations, there will be gains and risks. A growing population and economy with migration to cities will mean increases in greenhouse gas (GHG) emissions. Resulting environmental and social conditions, including increased competition over resources, could intensify vulnerability to climate risks. Transitioning to a low carbon climate resilient development pathway can address future risks thereby improving Kenya's ability to prosper under a changing climate while reducing the emissions intensity of a growing economy.

Moving forward on the 2010 *National Climate Change Response Strategy* will help Kenya transition to a low carbon climate resilient development pathway that puts people and livelihoods at the forefront.[2] The strategy recognized the importance of climate change and development, and this *Climate Change Action Plan* is the logical next step. A yearlong multi-stakeholder participatory process involving the public sector, private sector and civil society resulted in this Action Plan that identifies priority climate change actions for Kenya for the short, medium and long term.

The Government of Kenya takes climate change and its impact on development seriously. Climate change is considered a crosscutting issue that will be mainstreamed in the planning process both at the national and county levels and in all the sectors of the economy. The Medium-Term Plan (2013-17) provides a singular opportunity to incorporate climate change programmes into the national development plans. The Medium-Term Plan will build on both the *National Climate Change Response Strategy* and its Action Plan to incorporate climate change programmes and projects in the next planning cycle (2013-17).

2. The Benefits of Low Carbon Climate Resilient Development in Kenya

Kenya Vision 2030 sets out a development path aimed at creating a prosperous country with a high quality of life.[3] Kenya's Climate Change Action Plan will support efforts towards the attainment of *Vision 2030* and encourage people-centred development – ensuring that climate change actions help the country move toward long-term development goals. An integrated low carbon climate resilient pathway emphasises:

- **Sustainable Development** – Achieving sustainable development should be at the forefront of all climate actions; climate change and development are intricately linked.
- **Adaptation** – Reducing vulnerability to avoid or cushion the impacts of climate change, and enable people to respond to climate risks by moving toward a climate-resilient society.
- **Mitigation** – Taking actions, where possible, to encourage GHG emissions that are lower than business-as-usual practice; and to reduce the human causes of emissions by moving toward a resource efficient economy that is as low carbon as possible.

For Kenya, the conundrum of choosing between action on climate change and action on development is a false one; the two are interlinked and will become increasingly so over the coming decades. Building climate resilience, or increasing the ability to adapt to climate change, in as low carbon a way as possible will help Kenya achieve sustainable development and *Vision 2030* goals. Some of the actions in the Action Plan contribute to development, climate resilience and transitioning to a low carbon economy; while other actions focus on development and climate resilience. In Kenya, low carbon actions should be considered as priority actions only if they also have climate resilience or significant sustainable development benefits.

A low carbon climate resilient development pathway should be tailored to the country's unique circumstances. Kenya has little historical or current responsibility for global climate change, and emissions are low relative to global emissions. Kenya's low carbon climate resilient development pathway recognizes that national emissions will increase with population and economic growth. However, the pathway can help ensure that Kenya remains a low emitter as the country develops and takes steps to reduce vulnerability to climate change.

Low carbon climate resilient development can bring benefits including:

- **Enhancing sustainable development** – The best low carbon climate resilient opportunities deliver multiple benefits, helping to address pressures related to increasing population growth, economic growth, urbanization and resource use. Low carbon resilient development enhances the integration of the social, economic and environmental pillars of sustainable development. Box 1 discusses green jobs, a potential benefit of transitioning to a low carbon climate resilient development pathway.

Box 1: Green Jobs – A potential benefit of low carbon climate resilient development

Green Jobs

The transition to a low carbon climate resilient development pathway can include a shift to green jobs - where the economy, companies and workplaces promote decent work that:

- Reduces consumption of energy and raw materials;
- Limits GHG emissions;
- Minimizes waste and pollution; and
- Protects and restores ecosystems.

Source: International Labour Organization. 2012. *Green Jobs*.

- **Improving lives of the poor and vulnerable** – The human impacts of climate change are often experienced most acutely by the poor – who are often women and children. The urban poor living in slums that are flood-prone and the rural poor who rely on ground water for water supply and rainfall for food production are particularly vulnerable. Efforts to improve climate resilience can further Kenya's people-centred development strategy.
- **Building adaptive capacity** – Kenya's vulnerability to climate change is influenced by the adaptive capacity of its people and institutions, or their ability to take advantage of opportunities or to cope with the consequences of potential damages.[4] Improving development outcomes such as income literacy, social networks and access to information and services is critical to building Kenya's adaptive capacity.

- **Reducing disaster risks** – The use of climate risk information in economic activities (such as farming), public infrastructure investment and government planning decisions can enhance decision-making capacity, and reduce and prevent climate-related disasters and climate risks. More than 70 percent of natural disasters in Kenya are related to extreme climate events[5].
- **Contributing towards the implementation of the Constitution of Kenya 2010** – A clean and healthy environment (Articles 42, 69 and 70) is a fundamental right under the Bill of Rights. This right cannot be fully provided for unless action is taken to address environmental pollution; which can be supported through a low carbon climate resilient development pathway.
- **Attracting international climate finance, technology and capacity building** – The evidence base provided through this Action Plan can help development partners ensure their investments align with Government of Kenya climate change priorities; and that these investments are nested within Vision 2030 and Kenya's national planning process. Potential sources of international support include bilateral and multilateral funders, the Green Climate Fund, the Adaptation Fund, carbon markets, and the emerging Nationally Appropriate Mitigation Actions (NAMAs) and REDD+ mechanisms.
- **Leveraging investment** – A coherent action plan can encourage investment in low carbon climate resilient technologies and industries, such as water resource management, renewable energy, and agroforestry. Policy and institutional reforms supported through climate finance can stimulate investment in targeted actions that support a low carbon climate resilient pathway.
- **Demonstrating global leadership** – The implementation of low carbon climate resilient development demonstrates Kenya's leadership in the global fight against climate change. The leading-edge work to mainstream the Climate Change Action Plan across national and county government departments through the national planning process is an example for other countries.

A low carbon climate resilient development pathway is a promising option for Kenya. Meeting development goals requires modernisation while increasing ability to manage climate risk. The drivers of our economy are primarily natural resource-based and climate-sensitive, and new investments in infrastructure must consider expected changes in temperature and precipitation. Kenya can advance economic growth in ways that reduce climate risk or are less carbon-intensive while seizing opportunities for innovation, such as leapfrogging to the best-available technology. Making the right investments now can prevent technology lock-in and a more costly transition in the future. This development pathway can help to improve competitiveness through a focus on the sustainable use of resources, improved productivity, and decreased vulnerability to variations in climate.

Challenges will have to be addressed in implementing low carbon climate resilient interventions; but many of these can be addressed through a systematic focus to identify and remove barriers. These efforts can be supported through international climate mechanisms and other international support. Finance, technology and capacity building support can help fill information and capacity gaps and overcome financial, regulatory and policy barriers.

3. The Need for Low Carbon Climate Resilient Development

Transitioning to a low carbon climate resilient development pathway is important for our country. Climate change poses a real threat to development prospects and livelihoods, and can undermine investments made to meet Vision 2030 goals. Chapter 5 – Adaptation, explains that average temperatures are rising, rainfall patterns are changing and the

incidence and intensity of extreme weather events such as droughts and floods is increasing. Droughts and floods have devastating consequences on the economy, environment and society, causing food insecurity, malnutrition, damage to infrastructure and loss of life. An AEA Group report estimates the cost of droughts and flooding to Kenya at about 2.4 percent of GDP per year.[6]

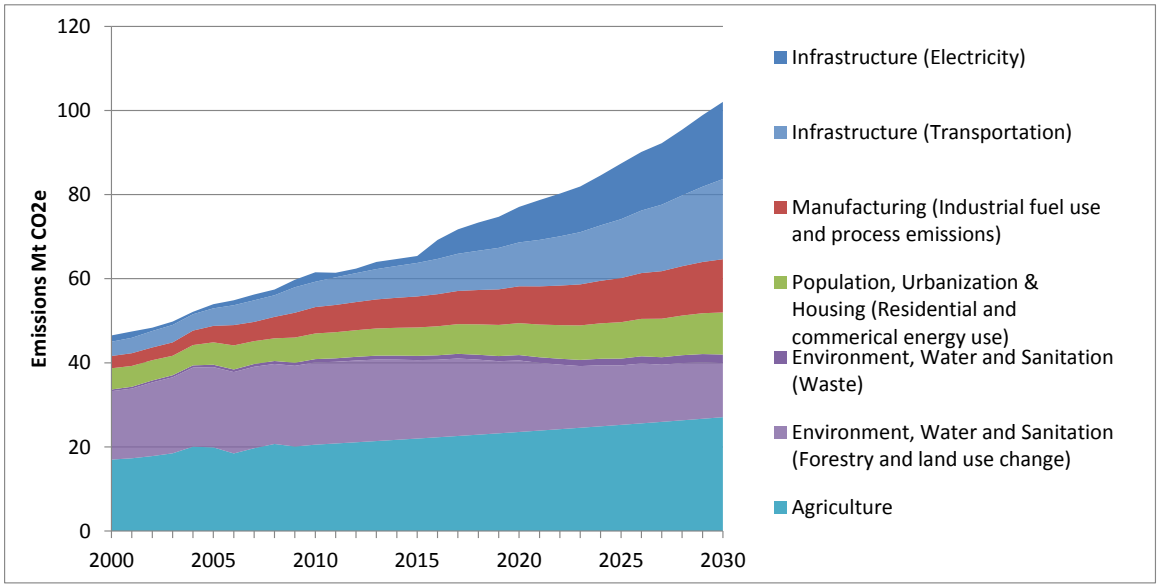
The adaptation analysis explains that exact processes that affect Kenya's climate are not fully understood and predicting future climate trends remains difficult. Research suggests that temperatures will continue to increase, and the frequency of hot days and nights will rise, with cold days and nights becoming rare. Precipitation is expected to increase in many areas, with the largest growth in rainfall occurring in the highland districts and the coastal region. The Northeast is expected to become significantly drier.

Our population is vulnerable to climate risks due to the high dependency on natural resources for food, fuel and shelter. IISD's report on climate risk and vulnerability in Kenya indicates that water availability is especially critical as we live in one of the most water scarce countries in Africa.[7] Access to this basic resource is likely to become more difficult due to population growth, economic expansion, unsustainable management of water and forest resources, and changes in rainfall patterns. At the same time water is the core input for most economic activities: irrigated and rain-fed agriculture, hydroelectric power that constitutes over half the installed capacity of electric power, sanitation and provision of drinking water.

Climate change will affect all sectors of the economy. Agriculture, which accounts for about 20 percent of the GDP[8], is very sensitive to climate change, meaning that agricultural systems will need to adapt to ensure provision of adequate food for a growing population and to improve production of export crops. Trade and industry rely on infrastructure and services such as water, energy and transport; and are vulnerable to disruptions caused by droughts and heavy rains. Tourism, an important source of foreign exchange earnings, depends on a wide range of environmental resources such as the abundance and diversity of wildlife, which will be impacted by climate change.

The low carbon analysis detailed in Chapter 6 determined that our GHG emissions are expected to rise, consistent with a growing population and expanding economy, with emissions increasing from 59 million tonnes of carbon dioxide equivalent ($MtCO_2e$) in 2010 to 102 $MtCO_2e$ in 2030 (see Figure 1). The livestock, agriculture and forestry sectors are the

Figure 1: Business as Usual GHG Emissions by MTP2 Planning Sectors between 2000 and 2030



Source: Derived from the mitigation chapter of Kenya's National Climate Change Action Plan.

largest emitters in Kenya, accounting for approximately 67 per cent of emissions in 2010 and 40 per cent in 2030. The largest absolute growth in emissions is expected in energy and transport, with energy emissions increasing from 10 $MtCO_2e$ in 2010 to 33 $MtCO_2e$ in 2030 and transport emissions increasing by about three times in the same period. The low carbon analysis detailed in Chapter 6 indicates a maximum reduction potential of about 15 per cent below the 2010 reference base by 2015; and that this reduction potential could grow to almost 70 per cent in 2030.

4. Priority Actions for Transitioning to a Low Carbon Climate Resilient Development Pathway

This *Climate Change Action Plan* identifies a series of actions that begin to transform our country's climate change ambitions into reality. These include investing in actions that deliver development, mitigation and adaptation benefits; and enabling actions to improve the conditions for success.

4.1 Investing in Actions that deliver Sustainable Development, Climate Resilience and Low Carbon Benefits

Success in achieving low carbon climate resilient development will require a series of discrete priority actions and related investments across government, society and industry. These priority investments will generally alter current practices or technology choices and ideally result in a range of benefits that improve livelihoods and environmental quality while contributing to economic performance. Priority areas for action demonstrate an integrated approach to climate change – that is, developing sustainably in a low carbon manner while building climate resilience.

People-centred development is a priority and underlies *Vision 2030*; and low carbon climate resilient actions will need to support the government's development priorities, including those related to economic growth, food security, forest cover, ending drought, water management and improved energy access, including in the ASALs. Priority low carbon climate resilient actions, discussed below by select Government of Kenya planning sector and elaborated in the Adaptation and Mitigation chapters (Chapters 5 and 6), have considerable sustainable development benefits at both the household (improved livelihoods and increased food production) and national level (improved energy security, economic growth). Increasing climate resilience and achieving the mitigation potential in each of the these sectors will require a range of enabling actions, such as institutional strengthening, capacity building, improved information systems, and mainstreaming climate change across policies and programmes. These enabling actions are discussed in Section 4.2.

The six priority low carbon actions identified and described in detail in Chapter 6 (restoration of degraded forests, reforestation, agroforestry, geothermal, improved and liquid propane gas (LPG) cookstoves, bus rapid transit with light rail corridors) represent about three-quarters of the mitigation potential identified in the low carbon assessment. The full deployment of these actions would almost halve GHG emissions by 2030 compared to the baseline scenario. Investment costs would vary, but significant GHG emissions reductions can be obtained at marginal costs of less than US$15 per tonne of carbon.

Agriculture

The agriculture sector, including livestock, is very sensitive to climate change, meaning that agricultural systems will need to adapt to ensure provision of adequate food for a growing population and increase export crops production to generate foreign exchange. At the same time, the sector is a large and growing GHG emitter, responsible for about 30 per cent of

Kenya's emissions in 2010, with about 90 per cent of these emissions generated by the livestock sector.

The agriculture sector offers great potential for synergies among the objectives of food security, poverty reduction, adaptation and mitigation. Many climate smart agricultural practices that reduce climate vulnerability also reduce emissions and improve agricultural production potential. Agroforestry, for example, has the potential to abate 4.2 $MtCO_2e$ by 2030, while offering climate resilience benefits of improved soil quality, improved water retention in the soil, reduced erosion, and perennials that are better able to withstand climatic changes.

Agroforestry also contributes to the government's goal of 10 per cent tree cover on farms in addition to benefits of enhanced food security and improved livelihoods of farmers. In regard to livestock, priority low carbon climate resilient actions include improved management of grazing systems, livestock diversification, and breeding of animals to improve their ability to adapt to climate change and produce lower emissions. Adaptation actions to improve the resilience of livestock are particularly important for the ASALs.

Other important low carbon priorities that have significant adaptation benefits are conservation tillage and limiting the use of fire in cropland and rangeland management, which have the potential to abate 1.1 and 1.2 $MtCO_2e$ by 2030, respectively. Priority adaptation actions to increase climate resilience include the promotion of drought tolerant crops, water harvesting, integrated soil fertility management, insurance schemes, price stabilization schemes for livestock, strategic food reserves, providing farmers and pastoralists with climate change-related information, and mainstreaming climate change into agricultural extension services.

Environment, Water and Sanitation

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.

Increasing tree cover to 10 per cent of total land area is a goal stated in Kenya's constitution. Actions to increase forest cover have important climate resilience and low carbon benefits. Forests help to prevent flooding and landslides, and reduce erosion and sediment discharge into rivers. Forests also contribute to water availability by slowing the loss of rainwater from the ecosystem, demonstrating the importance of reforesting and rehabilitating the main water towers and water catchment areas. Moreover, forest conservation can contribute to livelihood improvements and has biodiversity benefits. An important low carbon climate resilient action is the restoration of forests on degraded lands, which has a mitigation potential of over 30 $MtCO_2e$ a year in 2030, the largest potential identified in the low carbon scenario analysis discussed in Chapter 6. Other important low carbon climate resilient actions are reforestation and reducing deforestation and forest degradation, with mitigation potentials of 6.1 and 1.6 $MtCO_2e$, respectively.

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.

Water resource management is important for addressing drought, and forests in water catchments are critical for sustaining water availability, which is needed for generation of hydropower, drinking water and water for irrigation. 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 ASALs.

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, and flood mitigation schemes. These actions reduce the impact of droughts and floods on crop yields and livelihoods, and more irrigation-based agriculture reduces the reliance of crop production on rainfall.

Waste management has important low carbon climate resilient impacts. Improved waste management systems are being 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 abatement potential of 1.1 $MtCO_2e$ for methane capture and 0.5 $MtCO_2e$ from electricity generation from landfill gas.

Mining and mineral resources 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. Kenya has options to develop these resources taking low carbon considerations into account, including encouraging the use of clean coal technologies with international support; making use of the natural gas, which 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.

Tourism

Coastal rainforests, marine ecosystems, wildlife and Mt. Kenya's glaciers make our country one of the top tourist destinations in the world. Tourism is a highly climate-sensitive industry because climate change affects a wide range of the environmental resources that are critical attractions for tourists, such as wildlife and biodiversity. Climate change also has an important influence on environmental conditions and incidents that can deter tourists, such as very high temperatures, infectious disease, wildfires, increased wildlife mortality, and insects and waterborne pests.

A low carbon climate resilient pathway can help to ensure long-term sustainable growth of the tourism industry. Priority adaptation actions include completion of the National Wildlife Adaptation Strategy, and undertaking research to determine the vulnerabilities of wildlife populations and habitats. GHG emissions in the tourism sector are low relative to Kenya's overall national emissions, but many low carbon actions can be applied – such as solar water heating, the use of energy efficient lighting and appliances, and of more efficient passenger vehicles. A concerted program could help to create a niche market by branding Kenya as a low carbon footprint destination. This could include replication of sustainable tourism initiatives, and guidelines on resource efficiency and greening the sector.

Infrastructure

Physical infrastructure, particularly for energy and transport, is an important and necessary enabler of socio-economic development. An improved, expanded, effective and reliable national infrastructure – to lower the cost of doing business and increase competitiveness – is crucial for development. A low carbon climate resilient pathway means that:

1) GHG emissions are as low as possible in the sector – recognizing that emissions will rise as Kenya develops; and
2) Infrastructure is "climate proofed" – that is, designed, constructed and operated in a way that accounts for anticipated risks and opportunities that result from climate change, ensuring that infrastructure investments are not compromised in the future.

For the ASALs, this means a road network that can stand up to a changing climate, the establishment of strategic multipurpose dams and expanding renewable energy capabilities (wind, solar and biogas), both decentralized and connected to the national grid.

In regard to *transport infrastructure*, port facilities, roads, railways and bridges will need to account for rising sea levels and the increased occurrence of extreme weather events and flooding. Kenya is expected to have high growth in the transport sector and a challenge will be to develop the required infrastructure in a low carbon and climate resilient manner. A priority low carbon action is an extensive mass transit system for Greater Nairobi in the form of bus rapid transit corridors complemented by light rail transit, which could abate about 2.8 $MtCo_2e$ in 2030. Construction of a mass transit system can also be a starting point for non-motorised transport infrastructure, such as bicycle lanes and sidewalks, which can be developed in parallel with the transit system. Other low carbon transport options include a shift of freight from road to rail, improved passenger and freight vehicle efficiency, and bioethanol blending and biodiesel use – with a combined mitigation potential of 4.1 $MtCO_2e$ a year in 2030.

The aviation sector is a growing source of GHG emissions, and Kenyan airlines that fly into countries of the European Union will be expected to offset the emissions associated with this international travel. Research is needed to determine the best way for Kenyan airlines to meet or reduce these costs. Low carbon actions can be taken to make refurbished airports as energy efficient as possible; and climate resilience can be improved through up-to-date weather observations systems, which also improves airline safety.

Infrastructure for *electricity generation* is a priority to support Kenya's development ambitions. Improved electricity production helps to ensure a stable and secure supply of power – which is critical for economic growth and job creation. Increased generation of renewable energy also has the benefit of improved energy security by reducing reliance on fossil fuel imports. A climate resilient pathway includes electricity generating systems and a national grid that can withstand the extreme weather events expected as a result of climate change.

A low carbon climate resilient pathway prioritizes renewable energy systems, which increase reliability of the electricity supply by reducing reliance on hydropower, which is vulnerable to climate change-induced variations in rainfall patterns. Development of Kenya's geothermal energy potential will arguably be the powerhouse for renewable energy development. This low carbon option has the largest abatement potential in the electricity generation sector at approximately 14 $MtCO_2e$ a year in 2030. Other low carbon options include the expansion of wind and hydropower-based electricity generation with an abatement potential of 2.5 $MtCO_2e$ by 2030.

Off-grid electricity generation systems are important for communities where it is not economically viable or physically feasible to connect them to the national grid. These systems, which are likely to use wind turbines, solar panels or small hydro systems, can help to provide electricity to the 70 per cent of Kenyans who have no access to power.[9]

Climate resilient actions in the infrastructure sector include improved use of weather and climate information in infrastructure development, and research to identify design and material that enhance the resilience of infrastructure. Regulations and codes should be revised to account for climate change impacts, and climate risk screening should be undertaken for flagship projects in the infrastructure sector.

Manufacturing

Kenya has one of the largest manufacturing sectors in sub-Saharan Africa, and expansion of the sector forms a significant part of the country's development strategy. Climate change causes real problems for the manufacturing sector. For example, increased frequency of droughts creates water scarcity that disrupts industrial processes and compromises hydroelectric power generation meaning additional operating costs for running generators or paying more for electricity due to increased use of thermal-based sources. Many cement manufacturers in Kenya plan to turn to coal as a reliable and cheap fuel source, which will lead to increased GHG emissions.

Greenhouse gas emissions from the manufacturing sector are still relatively low compared to other sectors, with emissions coming from electricity and fuel use in industry as well as from industrial processes (mainly from cement and charcoal production). Improvements in the energy efficiency of industrial processes will enhance competiveness and potentially create cost reductions. The use of state-of-the-art technology and equipment for manufacturing processes can reduce emissions – both by reducing use of electricity and reducing emissions in the industrial process. For example, process emissions from cement manufacturing can be reduced by replacing clinker in the cement mix with alternative materials – a low carbon option implemented by some Kenyan cement companies. The most significant low carbon opportunity in regard to process emissions is the introduction of more efficient kilns for charcoal production, with an abatement potential of 1.6 $MtCO_2e$ a year in 2030.

A low carbon pathway also includes actions to improve energy efficiency in the manufacturing sector, which can abate 1.3 $MtCO_2e$ a year in 2030. Another important low carbon option is industrial-scale cogeneration using biogas produced from agricultural residues, which is used to generate electricity and heat. The co-generation action has a mitigation potential of 1.6 $MtCO_2e$ a year in 2030. Governments can also help to stimulate markets for climate-friendly products by prioritising purchases from manufacturers of green products.

A low carbon climate resilient pathway includes active planning of industrial development, taking into account energy and water use and scarcity. Climate resilient actions include the generation of data to improve awareness of impacts and decision making in the sector. Support for the growth of insurance markets can help manufacturers have access to a range of insurance products.

Population, Urbanisation and Housing

Kenya is expected to become a predominately urban country by 2030 mainly due to rural-urban migration.[10] Climate change is likely to make rural livelihood strategies and living conditions increasingly challenging, which will exaggerate the rural to urban migration trend. Climate drivers, and particularly extreme events such as flash flooding and severe and persistent droughts, are responsible for global and regional migration and internally displaced persons. Building capacity to manage climate risks in urban centres will increase in importance, particularly since cities such as Nairobi and Mombasa are predicted to play a vital role in Kenya's future economic development.

Priority adaptation actions to promote a climate resilient pathway in the population, urbanisation and housing sector include expanded flood management in high-risk areas, including in slums, which need upgrading to increase the resilience of the poor. Also important is the upgrading of building codes to include climate resilience and green building concepts. Climate risk assessments should be undertaken for essential public buildings and emergency services, and priority actions implemented in a timely manner. Research is needed to assess migration as an adjustment or coping mechanism for climate variability, and to identify alternatives to allow people to remain in their communities. This is closely linked to the drought and climate change actions discussed below.

A low carbon pathway includes distributed clean energy solutions for households and institutions (such as solar lanterns, improved cookstoves and LPG cookstoves, and energy efficient lighting and appliances), which can have huge social and economic benefits. Improved cookstoves can better the lives of individuals, particularly women and children, in rural and urban areas – by reducing time to collect fuelwood, reducing indoor air pollution, and potentially introducing cost savings to households. Access to modern energy solutions enables income generating activities, health services, access to communication and improved education outcomes – all of which are of particular benefit to women and children. The mitigation potential of stepping up distributed clean energy technologies is over 10 $MtCO_2e$ per year in 2030. Some of the options, such as solar lamps, have very attractive payback times and can introduce cost savings to consumers.

Health

The burden of climate-sensitive disease is high in Kenya and future climate change is expected to "exacerbate the occurrence and intensity of future disease outbreaks and may increase the spread of diseases in some areas".[11] Climate change is expected to put human health at risk by exacerbating the magnitude and occurrence of heat stress, asthma, vector-borne diseases (such as malaria, dengue, schistosomiasis and tick-borne diseases), and food-borne diseases (such as diarrheal diseases). Climate change is also expected to increase exposure to Rift Valley Fever, malnutrition and water-borne diseases.[12] Geographic exposure to malaria, which is one of the most physically and economically debilitating diseases in Kenya, is predicted to expand into new areas due to increasing temperatures and changing distribution of precipitation.

Priority adaptation actions to increase climate resilience include improved disease surveillance, including strengthening existing early warning, monitoring and evaluation systems for malaria epidemics. Improved community-level health care and dissemination of information on changing health risks can enhance the response to climate-related diseases. Importantly, increased access to water and sanitation can improve disease vector control. A low carbon action is the use of water filters that provide access to clean water while reducing demand for firewood used to boil water and therefore slowing deforestation.

Disaster Preparedness[13]

The Government of Kenya has recognized the growing threat of climate-related risk to the achievement of its development goals; and, in response, has improved its capacity to prevent, manage and recover from disasters and to adapt to the impacts of climate change. Kenya has made large technological advances in predicting drought and generating credible early warning information. Yet the challenge of effective response has become more urgent as climate change increases drought vulnerability. The magnitude and severity of drought has increased in the recent past; this is particularly true in the ASALs that make up more than 89 per cent of Kenya's total land mass.

Actions to improve climate resilience in the disaster preparedness programme include modernisation of meteorological systems, and an early and appropriate response to emerging drought that includes a well-maintained early warning system. These systems should be backed by a reliable and effective social safety net program carried out by empowered youth and women. Trained county-level disaster management officers can also help to ensure a timely and effective response. Actions should also address current and anticipated levels of water scarcity, including implementing the Water Sector Investment Plan for 2008 to 2030 and Water Catchment Management Initiative. Climate-proofed infrastructure development in the ASALs, investment in sustainable livelihoods that are adaptive to climate change (such as crop farming with drought resistant seeds, dryland forestry and community-based livestock systems), and education programs are priority elements of a climate resilient pathway.

4.2 Improving the Enabling Conditions for Success

A supportive enabling environment includes appropriate institutions, national legal instruments including codes and standards, a supportive investment environment, appropriate technology development, and access to information to help make informed choices. Kenya is developing a solid policy, regulatory and institutional foundation to address climate change (see chapter 8); but more can be done to overcome barriers that inhibit the transition to a low carbon and resilient development pathway. These barriers include gaps in policy and legislation, weak institutional capacity, poor management of natural resources, limited private sector involvement, lack of capital and financing, and inadequate access to adaptation and mitigation technology. This *Action Plan* recommends actions to improve the enabling environment in five areas – finance, regulatory and policy

framework, knowledge management and capacity development, technology and measuring results – which are summarized in Table 1 and elaborated in the respective chapters of the Action Plan.

Table 1: Enabling Actions to Support the Transition to a Low Carbon Climate Resilient Development Pathway

Action plan chapter	Recommended enabling actions	Importance in the transition to a low carbon climate resilient future
Financing Implementation of the Action Plan (Chapter 8)	- Undertake targeted interventions to help overcome weakness in the investment climate: one-stop shop for permits and licenses; standardised Power Purchase Agreements for renewable energy; improvements to the Feed-in Tariff regime; the development of a national energy efficiency policy and greater co-ordination of technical assistance programmes - Establish the Kenya National Climate Fund as the primary vehicle for receiving and disbursing international climate finance - Establish a carbon trading platform to market Kenya's carbon market activity	- Finance is essential, requiring a mix of international and domestic climate finance that leverages public and private sources. - Improves investment climate - Strengthens Kenya's position as a credible and attractive destination for international public climate finance flows - Improves absorptive capacity - Stimulates involvement of private sector - Improves access to carbon finance - Improves promotion and marketing of Kenya's carbon market activities
Regulatory and Policy Framework (Chapter 9)	- Enact an overarching standalone climate change law - Amend sectoral laws to facilitate priority actions - Establish a high-level National Climate Change Council to provide oversight and coordination - Establish a Climate Change Directorate as the main technical mechanism to deliver on the Action Plan	- Provides legitimacy - Sets goals - Encourages transparency and openness - Regulates conduct and establishes sanctions to ensure compliance - Promotes coherent, crosscutting action - Promotes investment
Knowledge Management and Capacity Development (Chapter 10)	- Establish a national framework for capacity development - Establish a climate change information and knowledge management network to collect, generate and analyse climate change knowledge products - Disseminate climate change knowledge products to potential beneficiaries, especially women and other vulnerable groups, through improved public awareness and communication - Develop collaborative partnerships to engage government and civil society - Integrate climate change in the education system and in all other professional practices.	- Improves capacity to face new challenges posed by climate change - Improves knowledge of what works for people, at the national and local level, including indigenous knowledge as recognised in the Constitution Article 11 (2) (b) - Provides access to and sharing of climate change knowledge - Facilitates capturing of best practices from outside Kenya's borders to support cross-country learning - Guides strategy, planning and implementation through improved links between science and evidence-based policy and planning

Action plan chapter	Recommended enabling actions	Importance in the transition to a low carbon climate resilient future
Technology (Chapter 11)	- Identify priority technologies using the updated Technology Needs Assessment - Establish and support climate change technology promotion centres - Upgrade codes and regulations to promote low carbon climate resilient technology choices - Promote research and development to ensure appropriate technologies use and development - Explore South-South technology cooperation	- Facilitates the introduction of leading-edge technology and leapfrogging to the best technologies - Develops indigenous technology in line with Article 35 of the Constitution and technology assessment - Improves technology cooperation - Improves the innovation and knowledge base in Kenya
Performance Management and Benefit Management Framework (Chapter 12)	- Measure benefits and results, including increasing resilience to climate change and emission reductions, using the MRV+ system - Identify key synergies between adaption and mitigation outcomes - Report on links between low carbon climate resilient actions and national priorities and sectoral objectives - Track Kenya's voluntary contributions to address adaptation and mitigation - Track international support and the results generated	- Ensures effectiveness and accountability of climate change actions - Attracts funding, through proper accounting and cost effective use of resources - Reinforces synergies between adaptation and mitigation outcomes - Facilitates reporting to the UNFCCC on progress to adapt to climate change, reduce GHG emissions and achieve the Convention's climate goals

5. Moving Forward

Significant investments will be required and a series of barriers addressed before the low carbon climate resilient opportunities can be realized. Moving forward on the low carbon climate resilient development pathway set out in this Action Plan will require overcoming regulatory, institutional and market barriers that currently prevent large-scale implementation. A large challenge is financing the higher upfront costs of low carbon climate resilient investments. The investment costs to 2030 for implementation of the six priority low carbon options identified in Chapter 6 are estimated to be Ksh 1,371 to 1,773 billion (US$ 16.2 to 20.84 billion) to 2030. Even with lower life-cycle costs, as is the case with many energy efficiency technologies, higher upfront costs can inhibit investment. Attracting private investment for climate resilience actions can be difficult because the benefits of doing so are often outside the scope and timeframe of private sector investment decisions. Greater involvement of the private sector is needed in financing these low carbon climate resilient investments. Especially important are the needed investments in low carbon technologies to improve energy and transport infrastructure and to develop recently discovered oil and coal deposits in as low carbon a way as possible; and the incremental investments required to ensure that infrastructure is climate-resilient.

Kenya sees clear potential to make effective use of bilateral and multilateral funding, as well as international climate finance mechanisms – such as the Green Climate Fund, Adaptation Fund and emerging NAMAs and REDD+ mechanisms– in moving forward on the Action

Plan, in addition to identifying and removing barriers through a systematic domestic focus. The evidence base provided through Kenya's *National Climate Change Action Plan* can help international partners ensure their investments align with Government of Kenya climate change priorities, and that these investments are nested within *Vision 2030* and the national planning process. International support can help Kenya create the enabling environment and implement government interventions to attract private sector investment to support the transition to a low carbon climate resilient development pathway.

Kenya welcomes support from the international community to move forward on its Climate Change Action Plan.

Endnotes

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[11] Intergovernmental Panel on Climate Change. 2001. *Climate Change 2001. Synthesis report*. Cambridge: Cambridge University Press.
[12] World Health Organization. 2011. *Global Health Observatory Data Repository*. Available from http://apps.who.int/ghodata/#.
[13] This section draws on ideas set out in a programming framework for *Ending Drought Emergencies in Kenya,* which is under development by the Government of Kenya.