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Africa: Climate Change Impact and Mitigation

Africa is one of the lowest contributors to global greenhouse gas emissions, yet key development sectors are already experiencing widespread losses and damages attributed to human-induced climate change.

Widespread negative impacts of 1.5-2°C of global warming are projected for Africa. These impacts are likely to be severe due to reduced food production, reduced economic growth, increased inequality and poverty, biodiversity loss, and increased human mortality.

Exposure to climate change in Africa is multi-dimensional. There are socioeconomic, political, and environmental factors which make people more vulnerable. Socioeconomically, Africans are disproportionately employed in climate-exposed sectors: 55-62% of the sub-Saharan workforce is employed in agriculture and 95% of cropland is rainfed. In decision-making, particularly in rural Africa, poor and female-headed households have less sway and face greater livelihood risks from climate hazards. Environmentally, in urban areas, growing informal settlements without basic services increase the vulnerability of large populations to climate hazards, especially women, children, and the elderly.

Climate adaptation across Africa is therefore crucial to lessen the impact of future warming, is generally cost-effective, and will provide social, economic, and environmental benefits to the vulnerable. However, the current finance available is far less than adaptation costs. Most adaption options are effective at present-day warming but their effectiveness for future warming is unknown.

Climate: Impact and projected risks

Most African countries will enter unprecedented high temperature climates earlier in this century than generally wealthier, higher latitude countries, emphasising the urgency of adaptation measures in Africa.

Both mean temperature and extreme temperature trends will increase across the continent, resulting in more heatwaves and drought. With above 1.5°C of global warming, drought frequency and duration will particularly increase over southern Africa. If 2°C global warming occurs there will be decreased precipitation in North Africa whilst any rise above 3°C of global warming will lead to drought duration in North Africa, the western Sahel, and southern Africa doubling from 2 to 4 months.

Bar north and southwestern Africa, rainfall events will also increase in frequency and intensity across Africa, at all levels of global warming.

Consequently, multiple African countries are facing compounding risks in the twenty-first century.

Hydrological variability and water scarcity will increase and will have a cascading impact on water supply and hydrological power production.

Climate change has already reduced economic growth across Africa, one estimate suggests gross domestic product (GDP) per capita for 1991–2010 in Africa was on average 13.6% lower than if climate change had not occurred.

Future warming will negatively affect food systems in Africa by shortening growing seasons and increasing water stress. With 1.5°C of global warming, declines are projected in suitable areas for coffee and tea in east Africa, for olives yields in north Africa, and for sorghum yields in west Africa.

Mortality and morbidity are expected to escalate as of tens of millions of Africans will be exposed to extreme weather and an increase in the range and transmission of infectious diseases.

Climate change is projected to increase migration. Africa's rapidly growing cities will be hotspots of risks from climate change and climate-induced in-migration, which will amplify pre-existing stresses such as poverty, informality, social and economic exclusion, and governance.

Increasing temperatures are likely to cause drought-associated conflict risk.

Adaptation

African indigenous knowledge (IK) systems are exceptionally rich in ecosystem-specific knowledge used for management of climate variability.

Climate hazard	Adaptation
Floods	Use IK to predict floods (village elders acted as meteorologists) and prepare coping mechanisms (social capital); place valuable goods on higher ground, raise the floor level, leave the fields uncultivated when facing flood/drought, Indigenous earthen walls used to protect homesteads from flooding, planting of culturally flood-immunising Indigenous plants
Wildfires	Early burning to prevent the intensity of late season fires
Rainfall variability	Change crop type (from maize to traditional millet and sorghum); no weeding; forecasting, rainwater harvesting; women perform rainmaking rituals, seed dressing and crop maintenance as adaptation measures; mulching
Droughts	Traditional drying of food for preservation (to consume during short-term droughts); harvesting wild fruits and vegetables; herd splitting by pastorals
Drought-related water scarcity	Traditional rainwater harvesting to supplement both irrigation and domestic water; Indigenous water bottle technology for irrigation

To mitigate growing **water** stress, countries like Ethiopia, Rwanda, Tanzania and Uganda are striving to improve irrigation efficiency.

Dependency on groundwater withdrawals is projected to increase. Surface-groundwater management and rainwater harvesting is required. Soft adaptation options include

increasing water use efficiency, changing agricultural practices, more appropriate water pricing.

A range of options is considered potentially effective in reducing future climate change risk for **food** supply, including plant breeding, crop diversification alongside livestock, mixed planting, intercrops, crop rotation and integrated crop–livestock systems.

Adjusting cropping choices, planting times, and the type and location of planted areas will help African households cope with climate change. For example, in southern Africa, changes in planting dates provide farmers with greater yield stability in uncertain climate conditions.

African farmers are also diversifying their income sources to offset reduced yields or crop losses. However, some off-farm activities can be maladaptive such as when households turn to charcoal production, which contributes to deforestation.

Ecosystem-based approaches are also being deployed in mitigating and adapting to climate change in African cities. Examples are below:

Project	City	Ecosystem-based adaptation
Green Urban Infrastructure	Beira, Mozambique	Mitigating against increased flood risks through restoration of mangrove and other natural habitats along the Chiveve river and the development of urban green spaces.
The Msimbazi Opportunity Plan 2019-2024	Dar es Salaam, Tanzania	Enhancing urban resilience to flood risk by reducing flood hazard, and reducing people, properties and critical infrastructure exposed to flood hazard.
Tanzania Ecosystem-based Adaptation	Dar es Salaam and five coastal districts, Tanzania	Rehabilitation of over 3000 ha of climate-resilient mangrove species.
Building Resilience in the Coastal Zone through ecosystem-based Approaches to Adaptation	Maputo, Mozambique	Restoration of mangrove and riparian ecosystems for flood control and protection from coastal flooding enhanced water supply.
Addressing Urgent Coastal Adaptation Needs and Capacity Gaps in Angola	Five coastal communities in Angola	Restoration of 561 ha of wetland, mangroves and other ecological habitats to promote flood defence and mitigate the threat of drought.
Green City Kigali 2016	Kigali, Rwanda	Planned neighbourhood of 600 ha, integrating green building and design, efficient and renewable energy, recycling and inclusive living.

Urban Natural Assets for Africa—Rivers for Life	Kampala, Uganda	Preservation of natural buffers to enhance the protective functions offered by natural ecosystems that support disaster resilience benefit.

Adaptation actions in the health sector range from building resilient health systems to preparing responses to health impacts of extreme weather events to reducing effects of increasing temperatures in residential and occupational settings. For example, to prevent malaria, extending public health responses when there is an increase in the total number of months where climate conditions are suitable for mosquito survival.
To limit vulnerability to extreme heat events, changes in behaviour, health promotion initiatives, health system interventions and modifications to the built environment are required.

All text adapted from the WGII report of the IPCC Sixth Assessment Report https://www.ipcc.ch/report/ar6/wg2, Chapter 9