

1.1 The climate challenge

Climate change is not only a concern for the future. Ongoing and noticeable changes in temperature and rainfall patterns – and the increased frequency, severity and limited predictability of extremes in weather and climate events such as droughts, floods and storm surges – are already having devastating impacts on productivity, economies and, above all, on the livelihoods of the world's poorest and most vulnerable people in sub-Saharan Africa. Added to these, longer-term, slow-onset impacts of rising temperatures and sea levels threaten development and economic growth at local, national, regional and international levels.

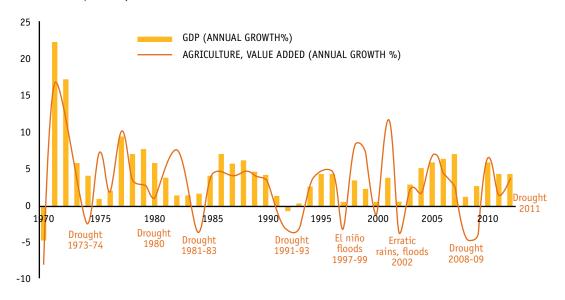
As global efforts under the UNFCCC (United Nations Framework Convention on Climate Change) Paris Agreement aim to limit temperature rises to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change (UNFCCC, 2015), the world is already committed to increased warming that makes further climate change inevitable in the coming decades (CDKN & ODI, 2014). Subsequently, increasing magnitudes of warming increase the likelihood of severe, pervasive, and irreversible impacts IPCC (2014) though at the same time, localised future climate patterns and events and the resultant risks and impacts are uncertain.

The reality of climate change therefore means that continuous adaptation to its risks and impacts is unavoidable and is fundamental to sustainable and climate resilient development and livelihoods. With climate change threatening to undermine the progress that sub-Saharan African countries have made in tackling poverty, disease and malnutrition as well as gains in agricultural productivity (CDKN & ODI, 2014), adaptation and building resilience is an urgent concern. Towards addressing this concern, most of the nationally determined contributions (NDCs) in sub-Saharan Africa prioritise adaptation in actions to address climate change under UNFCCC (World Bank; IFC; MIGA, 2016). However, planning for and implementing adaptation and building resilience is a wicked problem because of the complexity created by three defining features of climate change risks and impacts: they are diverse; they are both short- and long-term; and they are not easily predictable. This means business as usual or 'one size fits all' interventions towards adaptation will not suffice. It is critically important to enhance people's and systems' adaptive capacity (Percy & Oyoo, 2016).

1.2 Why do we need climate information and services in various sectors?

Agriculture, water and health are some of the major sectors that drive livelihoods and economic development in sub-Saharan Africa. These sectors are rainfall dependent and susceptible to temperature rises, making them highly vulnerable to risks associated with ongoing and future climate variability and change (see Figure 1). Subsequently, NDCs for many countries in sub-Saharan Africa integrate adaptation and climate risk management in these sectors.

Figure 1. Growth of Kenya's GDP is highly correlated with agricultural performance, which is highly affected by climate hazards. (World Bank Group, 2016).





Maize harvesting in Garissa, Kenya CARE-Ahmed Hassan/CARE International, 2011

It should be noted, however, that adaptation is place- and context-specific, with no single approach for reducing climate risks that is appropriate across all settings IPCC (2014). This is due to continuing uncertainty about the severity and timing of climate-change impacts on the different sectors, and dynamic context changes in vulnerabilities, capacities, development goals and priorities, among other factors, over time. Successful adaptation therefore depends upon developing resilience in the face of uncertainty. This involves decision-making processes and enhancing adaptive capacity to continually make informed, appropriate and forward-looking responses to climatic and other changes (IPCC 2014); (CDKN & ODI, 2014); (Percy & Oyoo, 2016). Climate information and services therefore play an integral role in decision making and planning for adaptation in climate-sensitive sectors and climate-resilient development, through enabling and supporting the following:

1. Understanding past climate patterns and trends and their influence on risks and vulnerabilities in the different sectors: For example, past climate information can be used to understand shifting agro-climatic zones, with implications for the types of crops that can best be grown and livestock types and breeds that do well in different areas. Agricultural transitions are already occurring: in marginal areas, reductions in length of growing period due to shifting rainfall patterns and increased variability is driving change from a mixed crop-livestock system to a rangeland-based system, as farmers find growing crops too risky in those marginal environments (Thornton et al., 2009a). On the other hand, in some arid and semi-arid lands (ASALs), changes in climate – among other determining factors – are influencing a change in livelihoods from traditional pure pastoralism to agro-pastoralism.

While diversification of agricultural livelihoods is an important strategy for spreading climate risk and building resilience in the ASALs, new strategies come with exposure to new risks (see case study 1). Consequently, climate information focuses on stakeholders' constant need to make decisions on agricultural value chains, practices and strategies best suited to variable and changing local climate contexts and risks.

- 2. Anticipation of future climate conditions and events, and their potential impacts, so as to take action on risk preparedness, early warning and early action: For example, forecasts offer an opportunity to anticipate constantly evolving risks caused by ongoing processes such as urbanisation, environmental degradation, and the influence of climate change. The information can provide early warning on changing risks as they happen by integrating forecasts of weather and climate hazards with advances in knowledge on dynamic patterns of differential vulnerability in different locations and sectors to enable early action and adaptation to evolving risks (Stephens, Coughlan de Perez, Kruczkiewicz, Boyd, & Suarez, 2016). The information is useful for preparing, reviewing and updating disaster preparedness and contingency policies, plans and programmes across sectors (UNISDR, 2015).
- 3. A service that enhances the capacity of people and systems to manage climate risk and uncertainty and to optimise opportunities and investments. For example, connecting knowledge and information on rising average annual temperatures and shifts in rainfall timing and distribution with decision making on new crop choices, water conservation and timely provision of inputs can increase agricultural and livestock yield for smallholder farmers and enhance food security.

In summary, adaptation and climate resilience in agriculture, water, health and other sectors demands building stakeholders' adaptive capacity through access to, and understanding and use of, climate information and services that are relevant to decision making.

Case Study 1

CLIMATE INFORMATION FOR ADAPTIVE AND RESILIENT AGRICULTURAL LIVELIHOODS

In Garissa County, one of the ASAL counties in Kenya, observed trends of warmer temperatures and drier conditions, and the effects of these changes on livestock production, have driven some communities to transition to a more sedentary, agropastoral way of life. Communities are combining traditional livestock rearing with irrigated crop production for food and income, taking advantage of their year-round access to water from River Tana. While this transition represents an innovation for communities in Garissa County and has generated new opportunities, it has also exposed them to new and evolving climate risks. New knowledge and skills are required to maximise productivity and protect crops from rainfall fluctuations and drought. The River Tana provides an important source of water for agriculture and domestic use, but proximity to the river increases exposure to flood risks, and there is a risk of conflicts over water needed for livestock and wild animals. Communities and local government



Noor Jelle, a farmer from Nanighi village, in Garissa, Kenya, with his bumper maize harvest. After hearing the seasonal forecast for good rains, Noor decided to plant more improved maize seed supplied by the Kenya Ministry of Agriculture. Credit: Joseph Ndiritu/CARE Kenya, 2011

services in Garissa County realise that to engage in decision making and planning that will enable them to adapt and be resilient to climate variability, access to climate information is critical. Access to and use of climate information enables communities to evaluate climate risks, weigh options and make decisions on how and when to invest their resources and apply different strategies to protect their livelihoods.

Adapted from 'Adaptation Planning with Communities', Dazie, 2015.











