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## Adapting agriculture through local knowledge

Key findings and policy recommendations from an AfricaAdapt e-discussion

This policy brief summarizes the central themes arising from an e-discussion among members of the AfricaAdapt network. The participants considered the following question: *What are the impacts of climate change on smallholder farming and how are farmers coping with or adapting to these impacts?*

Representatives from grassroots community groups, academia, and extension organizations shared their experiences of how climate change is affecting small-scale farming. The group suggested four major policy recommendations.

### Key recommendations for policy makers

1. Mainstream climate change adaptation into environmental and agricultural policies, emphasizing integrated approaches that build on local and scientific knowledge.
2. Invest in knowledge-sharing and awareness-raising activities.
3. Improve the quality of meteorological data available to smallholder farmers.
4. Invest in research on sustainable adaptive actions, such as irrigation, water harvesting, and alternative energy sources.







“The effects of climate change on smallholder farmers in Africa are considerable; unfortunately these producers have no opportunity to bring their voices to policy makers.”

**Amadou Ba, Mauritania**

## How is climate change affecting smallholder agriculture in Africa?

Although climate change is a global issue, Africa is widely considered the world's most vulnerable region. As a percentage of GDP, the devastating effects of climate change are expected to be higher there than in any other region in the world.<sup>1</sup> While agriculture is highly vulnerable to climate change, it is also a major cause of it – directly through greenhouse gas emissions and indirectly as the main driver of deforestation and land-use change.<sup>2</sup> Africa's targets for increased food security and agricultural productivity cannot be met without first addressing the challenges of climate change.<sup>3</sup>

Smallholder farmers produce nearly 90% of Africa's agricultural output.<sup>4</sup> Yet the predominantly rain-fed agriculture they practice is particularly vulnerable to climate shocks such as droughts, floods, soil and water degradation, and disease outbreaks.<sup>5</sup> Smallholder farmers are already feeling the impacts of climate change. This brief highlights testimonies from AfricaAdapt members describing farmers' first-hand experiences.

Key impacts of climate change affecting smallholder farmers include:

- ▶ longer dry spells and increased incidence of drought
- ▶ increased desertification in the Sahel and other dry areas
- ▶ less water availability due to the drying up of rivers and lower water levels in boreholes
- ▶ increased flooding
- ▶ seasonal shifts and unpredictable weather patterns.

“Farming communities in Iseyin, Oyo State, Nigeria have realized that climate change – rather than the anger of their gods – is responsible for recent low yields and crop failure despite the proper performance of their traditional rituals. The farmers have started using improved and early-maturing varieties. Also, they are clamoring for irrigation, because the rains are not coming when they should.”

**Agoro Olayiwola, Nigeria**



“The most striking effect of climate change is the decrease in crop yields. Farmers rely on individual experience and local know-how to deal with this problem, for example by selecting for adaptive traits when planning their crop cycles and sharing successful ecotypes with neighboring communities.”

Lambert Moundzeo, Democratic Republic of the Congo

## Key recommendations

### 1. Mainstream climate change adaptation into environmental and agricultural policies, emphasizing integrated approaches that build on local and scientific knowledge.

Environmental and agricultural policies should enable communities to better cope with, and adapt to, the impacts of climate change. To be effective, adaptation strategies must combine scientific findings with farmers' own knowledge and experience. It is vital that agricultural policies across Africa incorporate local knowledge, which is often overlooked.

Pacôme Tomètissi from Benin recommended that policy and program collaboration should be an inclusive process that involves farmers. Policies should enable smallholders to adapt not only to the most direct effects of climate change, such as irregular rainfall, drought, and flooding, but also to its indirect effects in higher costs for agricultural inputs and rising food prices.

Likewise, improving traditional farming practices with the latest scientific findings is vital to helping farmers adapt to rapidly changing climatic conditions. As LeClere Diffo

from Cameroon explains, “In our villages, people have no climate education. We need to strengthen and expand local adaptation practices with scientific knowledge from research, and share this knowledge with schools and universities. Local platforms help bring together researchers, civil society organizations, non-governmental organizations (NGOs), development partners, trade unions, and community groups to better support farmers and work in harmony.”

“To help strengthen the resilience of small farmers in rural areas of Togo, the NGO Young Volunteers for Environment (JVE) promotes a community-based adaptation approach that combines local knowledge with scientific knowledge to address climate change. JVE promotes traditional farming practices that keep the moisture in the soil, for instance building windbreaks, cultivating legumes and heat-resistant varieties, combining complementary crops, and effective crop storage. They also liaise with microcredit and microfinance initiatives, and ensure that women participate in farm groups.”

Koffi Apedjagbo, Togo



“Climate change issues are not as widely known as people might think, especially in marginalized communities. People might be aware of the signs of change, like frequent droughts, shifts in seasons, and heat waves, but they are not aware of the causative agents; nor are they using adaptation measures on a sustainable basis.”

**Ignitius Chagonda, Zimbabwe**

## **2. Invest in knowledge-sharing and awareness-raising activities.**

Sharing experience and learning can lead to innovative approaches to climate change adaptation. Often, traditional coping strategies are known locally but are not well disseminated. Africa needs policies that encourage and facilitate this exchange of information, bringing it to those who need it most and who can contribute to the greater pool of knowledge. The e-discussion participants put forward several suggestions for ways to support knowledge sharing:

- ▶ Governments should foster knowledge-sharing strategies that include the media, farmers, NGOs, governments, and researchers networking as a stakeholders' platform on climate change adaptation for food security.
- ▶ Policy formulation should be participatory in order to 'break the wall' between scientists and farmers. AfricaAdapt's knowledge-sharing platforms are one example of this collaborative approach.
- ▶ Evidence should be collected through stakeholder exchange workshops – which involve the media, academia, governments, farmers, and other vulnerable groups – and through field visits. This will help farmers learn adaptation strategies from both academia and their peers.
- ▶ The media play a key role in disseminating data and raising awareness of climate change. Radio shows and news reports on success stories or local farming innovations should be supported and promoted.

Farmers also need to be aware of the broader issues raised by climate change and of how their knowledge can be fed into policy processes.

“Rural communities suffering from the impacts of climate change have no alternative but to raise their voices. This is the case for the *Mbororo* in North Cameroon, a marginalized ethnic group of about 50,000 people who are excluded from local and national decisions affecting agriculture in the face of climate change. Their lack of knowledge of ways to adapt to climate change makes them more vulnerable to its effects. However, a process of settlement has begun that will allow them to form an organized and visible group, allowing their collective voice to carry much farther than if they remain scattered.”

**Boniface Botna, Cameroon**

## **3. Improve the quality of meteorological data available to smallholders.**

What do farmers really need to adapt? Participants in the e-discussion agreed that reliable weather forecasts are crucial to creating successful adaptation strategies, and offered these suggestions:

- ▶ Local and regional meteorological offices should issue more precise rainfall forecasts (short-term, intermediate, and long-term) to guide smallholder farmers in their choice of the farming technologies offered by local agricultural extension officers; for example, selecting short-season varieties and drought-tolerant crops when low rainfall is expected. However, some noted that many extension officers lack knowledge of the forecasts and how to interpret them, raising the issue of capacity building.
- ▶ Forecasts can be disseminated via church gatherings, field days, political rallies, and any event that brings communities together.
- ▶ Meteorological offices in developed nations should join with those in developing nations (especially in Africa) to produce better forecasts for small-scale farming communities.

Jean Merlin Etohe from Cameroon suggested the creation of local observatories to identify and disseminate information about local adaptations to climate change. However, climate change adaptation requires reliable weather data, which have not been disseminated in Cameroon for nearly three decades. A recent report by the NGO Association Citoyenne de Défense des Intérêts Collectifs (ACDIC) cites that the Department of Meteorology of Cameroon was listed last of 186 countries in a study by the World Meteorological Organization.<sup>6</sup>

“In 2012, when climate change data are being made available in several countries throughout Africa and worldwide, in Cameroon we cannot obtain basic weather data. There is a total blackout of weather information in this country.”

**LeClere Dikko, Cameroon**

“Many mechanisms for coping with climate variability and change exist, but how effective are they and which ones are good enough for scaling up? We need more research in this area.”

Bewket Belay, Ethiopia

#### 4. Invest in research on sustainable adaptive actions, such as irrigation, water harvesting, and alternative energy sources.

There are several agricultural practices that offer ways to both mitigate climate change and adapt to its worst effects. Many of these are traditional or locally adapted techniques used by smallholder farmers for centuries. However, to be sustainable, these practices must avoid creating new vulnerabilities in the future. Maladaptation can occur when certain approaches are overused or are practiced in the wrong way.

Capacity building for climate change, particularly adaptation, must be a priority to ensure that adaptation strategies are sustainable. Lambert Moundzeo from the Democratic Republic of the Congo stated that capacity building should focus on “the enhancement of local knowledge and advances in science that have a significant impact on the land.”

Policy makers should invest in research to scale up existing local adaptation measures and to develop new ones. The participants recommended several research investment priorities:

- ▶ drought- and disease-resistant crop varieties
- ▶ soil conservation measures (terraces, ditches, dams, or agroforestry)
- ▶ more efficient farm machinery and technology transfer to less-developed countries
- ▶ biogas and solar energy to reduce deforestation
- ▶ improved irrigation and water-harvesting techniques.

The e-discussion participants noted that smallholder farmers also need better access to markets to sell their produce, as well as crop insurance programs to protect them from severe crop failure due to flooding or drought.

“Some of the coping mechanisms practiced by farmers I work with include changing planting dates, conservation farming, and cultivating close to stream banks where there is water – although this could lead to maladaptation. Smallholder farmers need the capacity to develop strategies that are adapted to climate change, through knowledge exchange and advocacy for policy reform.”

Farirai Mageza, Zimbabwe

## An enabling policy environment

Smallholder farmers represent an enormous untapped potential for climate mitigation and adaptation. By combining local knowledge with proven technologies, these agricultural systems can become productive, sustainable and resilient to climate shocks – but only with policy support.

AfricaAdapt is addressing the above issues by sharing knowledge, facilitating learning, and generating dialogue among researchers, civil society organizations, vulnerable communities, and the policy makers who can help change the course of climate change in Africa.

## References

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- 6 Association Citoyenne de Défense des Intérêts Collectifs (ACDIC). *Météorologie : Le Cameroun, dernier sur 186 pays*. <http://www.acdic.net/ACDIC/en/component/k2/item/153>

“The rainy season in Nigeria’s Northern Guinea Savannah is so unpredictable ... in 2009, the rainy season stopped as usual in October, but then suddenly restarted in November, spoiling our sorghum and soybean. And sometimes rainfall comes in torrents, causing flooding along the seasonal riverbanks, destroying our crops.

The area cultivated in the dry season for crops such as tomatoes has also reduced, because the rate of recession of the seasonal Bambami River is no longer predictable, and the risk of crop failure due to insufficient water for irrigation is higher.”

**Olalekan Tobe, Nigeria**

“The most profound impact of climate change on the smallholder farmers of the Lurhala group in DRC is worsening food insecurity, caused by the sharp decline in agricultural productivity. Agricultural calendars are disrupted by an increasingly unpredictable climate, which also causes flooding and soil erosion, sometimes destroying whole plantations. Farmers are abandoning farm work to become small traders of imported manufactured goods, or are migrating.”

**Zihalirwa Kavali, Democratic Republic of the Congo**

“The biophysical and socio-economic effects of climate-related hazards, such as erratic rainfall, floods, drought, and pest and disease prevalence, have increased over time. The environment is no longer predictable enough to sustain a farming livelihood. Most smallholder farmers are migrating in search of employment, or have engaged in non-farm activities to feed their families. We will have a lot of climate refugees unless we have urgent adaptation interventions.”

**Bewket Belay, Ethiopia**

“In Zambia, smallholder farmers are no longer certain when the rains will begin or end. This has made their food and crop production uncertain, as it has been constrained by drought on one side and floods on the other. In Zambia, November is usually a rainy month, but in recent years the dry season has lasted as late as mid-November, as evidenced by the 2011/2012 farming season. In order to adapt, smallholder farmers will need to access and use irrigation. Although, some farmers have already begun using treadle pump and drip irrigation, the vast majority still rely on rainwater to sustain their crops.”

**Noah Zimba, Zambia**

“Smallholder farmers have been affected by dry spells and drought more than ever in recent years. In some areas, crops like maize have dried up before fully maturing, leading to poor harvests. More and more farmers are adapting to climate variability by using water-harvesting technologies such as building local dams and digging water-catchment basins.”

**Gladson Makowa, Malawi**

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**AfricaAdapt** is an independent bilingual (French/English) network focused exclusively on Africa. The network facilitates the flow of climate change adaptation knowledge for sustainable livelihoods between researchers, policy makers, civil society organizations and communities who are vulnerable to climate variability and change across the continent. AfricaAdapt is hosted by Environment and Development in the Third World (ENDA-TM), Forum for Agricultural Research in Africa (FARA) and IGAD Climate Prediction and Applications Center (ICPAC), and is funded through the UK Department for International Development (DFID) and the International Development Research Centre (IDRC) Climate Change Adaptation in Africa Programme.

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