# CLIMATE-SMART AGRICULTURE Farmers' perspectives

## WHAT IS IT ABOUT?

The goal of transforming African agriculture into a driver of rural prosperity and broader wealth creation has preoccupied the development community for decades, with limited success. Climate change now brings a whole new set of challenges that make the task even more daunting. Many argue that African farmers' high level of vulnerability to climate change is symptomatic of the failure to transform the sector into a vibrant economic engine over many years. While climate-related challenges call for a different trajectory, the goal remains the same. Transitioning to climate-smart agriculture (CSA) in the African context requires a transformational architecture — a systematic shift away from business as usual and a comprehensive programme for building the adaptive capacity of physical, socio-economic, human and institutional dimensions of farming systems. The threat of extreme climatic events devastating farms and destroying productive potential could be the wake-up call for the continent to look at agriculture through a new lens.

### KEY MESSAGES

- African agriculture is long overdue for a radical transformation to increase productivity sustainably. Although new approaches are now needed, productivity should remain the overachieving objective for Climate-Smart Agriculture on the continent.
- 2 Farmers urgently need access to productivity-enhancing technologies and practices such as improved soil, water and rangeland management, high yielding and adaptable crop varieties and livestock breeds, nutrient-enhancing inputs, and appropriate mechanization.
- **3** Fundamental changes and investments are required to build adaptive capacity of physical, socio-economic, human and institutional dimensions of farming systems.
- 4 Key areas for investment include innovative finance, partnership-focused research and extension services, timely information services, early warning and other riskmitigation measures, and a new generation of service-oriented farmer organizations.
- **5** Driving the transition to CSA requires coordinated, large-scale and long-term efforts by multiple stakeholders.

Many African farmers and farmers' organizations (FOs) now subscribe to the overarching CSA objectives of sustainably increasing productivity, improving adaptive capacity and harnessing mitigation co-benefits where possible. Extensive, low-productivity agro-pastoral systems that are typical on the continent are at the heart of high levels of vulnerability of rural livelihoods to climate shocks. Increasing the productivity of farming systems across the continent is perhaps the most far-reaching driver for a climate-smart future. Sustainable intensification of both crop and livestock production is vital to achieving long-term wealth creation and climate objectives. Enhancing productivity is where the triple objectives of socioeconomic advancement, building resilience and reducing emissions coincide: there is evidence that wealthier societies and households cope with climate change better because they have more alternatives. Meanwhile, soil fertility and water management practices that improve yields have been shown to reduce the pressure to expand farmlands onto forests and other marginal areas.

Although farmers are pursuing productivity gains, their progress can only be sustained if it is grounded in approaches that reduce vulnerability. This imperative should dictate options for soil, water and fertility management, seed resources and livestock breeds, income diversification and other risk management strategies. A series of institutional and policy changes are also needed to support farmers in adopting CSA practices at scale, possibly including public-private partnership arrangements.



#### SIMPLE SOLUTIONS, BIG PAY-OFF FOR FARMERS TESTING CONSERVATION AGRICULTURE IN MOZAMBIQUE

Mr Catique is now perhaps the most famous farmer in Manica province of Mozambique. His exceptional performance as one of the lead farmers in a conservation agriculture (CA) project in Barue district earned him the 'best farmer' award for the 2013/2014 season. The field day held at his farm attracted farmers, government officials, NGOs, politicians, agribusiness and the media from across the country. His story and images of his flourishing crop fields were aired on national TV. Everyone still talks about this as the most exciting day on the area's farming calendar.

Although this was Mr Catique's first season using the CA approach, he quickly appreciated the concept during project-facilitated training programmes and follow-up visits. His half-hectare CA plot included a pure stand of maize, a maize-pigeon pea intercrop and a pure stand of cowpeas. These were planted alongside a conventional maize stand. He closely followed newly learned protocols for fertilizer use, seed spacing, weed control at planting, minimum tillage at planting and mulching to reduce moisture loss, erosion and emergence of weeds. "I was pleasantly surprised by the very little effort that went into land preparation, planting and maintaining my crop up to harvesting. The results were beyond my wildest expectations," said Mr Catique. For the first time in his life he obtained a maize yield of six tonnes per hectare. On his conventional plots he only got the usual two tonnes per hectare that he is accustomed to. In addition to a good maize harvest he is also looking forward to a bumper crop from his intercropped pigeon peas, which are fetching highly lucrative prices in the area. Given the abundance of moisture on his CA plot far into the dry season, he is looking forward to harvesting a thriving sunflower crop that was planted after the harvest of the pure maize stand. A second crop of cowpeas will soon be ready for harvesting as well. Despite the challenges of wildfires during the dry months and keeping livestock away from fields in the off-season, Mr Catique has no doubt that his farming career has entered a new era.

### WHAT ARE THE KEY CSA PRIORITIES FOR FARMERS?

#### 1. Improving access to productivity-enhancing CSA technologies and practices

Foremost on the CSA agenda for farmers is a series of measures to broaden access to technologies and practices for boosting productivity, especially in the case of smallholder farmers. Improved soil, water and rangeland management, use of high-yielding and adaptable crop varieties and livestock breeds, nutrient enhancement, appropriate mechanization, and improved crop and animal husbandry are key areas that need wider application in African farming systems. In many parts of Africa moisture stress is a key constraint on crop performance, and climate change is worsening this hazard. Farmers urgently need high-yielding varieties that are tolerant to drought and retain important nutritional, taste and storage qualities despite elevated carbon dioxide and temperature levels. Practices that improve soil health and water management to conserve available moisture are also crucial responses to the climate challenge. Although some of these have been in use for many years in other parts of the world, they have seen limited uptake by African farmers for various reasons.

Appropriate mechanization of production systems to improve efficiency and reduce drudgery has remained a pipe dream for the majority of African farmers. The hand-hoe remains the most dominant tool across the continent despite rapid technological advances seen in almost every other sector. The intense manual labour associated with farming in Africa and its limited commercial orientation have no doubt earned the sector negative perceptions, especially among youth. It is inconceivable that a climate-smart revolution across Africa could be driven by the hand-hoe. Prospects of a transition to climate-smart agriculture are bleak without significant improvements in access to labour-saving and productivity-enhancing innovations in agricultural production systems.

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Although raising productivity alone is not sufficient to support CSA in the long term, it is low-hanging fruit' for Africa; it will go a long way in delivering immediate and substantial socio-economic and environmental benefits that are necessary for building a resilient agricultural system. A series of complementary support systems are required, however, to build and sustain CSA across the continent. Below some of the key support systems are discussed, including how current approaches could be transformed.

### 2. Transforming farmer support services to drive CSA

Adoption of CSA at scale will rely on wellfunctioning farmer support services in areas such as research and extension, information exchange, financing and insurance, market capacity building access, and farmer organization. Numerous initiatives spearheaded by different stakeholders, including state, private and non-state entities, are currently being implemented with varying levels of success. Significant innovation is required in providing such support functions if they are to drive a climate-smart revolution.

#### a. Reorienting research and extension services

Agricultural research and extension is perhaps the most important driver of agricultural transformation. Unfortunately this is an area where Africa has fared badly over many decades. The gap between research priorities and farmers' needs will have to be narrowed considerably if CSA is to take off on the continent. The research agenda should be driven more by realities on the ground rather than by scientific ambitions. Even incentive systems for major agricultural research centres will need to be reoriented to encourage responsiveness to the most pressing problems facing farmers. Action research and farmermanaged research trials must become the norm rather than the exception in agricultural research. Co-creation of knowledge with farmers should be a top priority, moving away from traditional top-down models of disseminating information that farmers had no role in generating.

State-led extension approaches have largely failed across the continent, with catastrophic consequences for farmers. Inadequate budgets, a lack of sufficiently motivated personnel in required numbers and a lack of depth in technical and practical matters are some of the weaknesses that have contributed to an ineffectual extension system. A large majority of farmers have not had any meaningful contact with extension-service providers. Traditional agronomic practices are still the norm in smallholder systems across wide swaths of Africa, with little input from scientific and technological advances in the sector. The scale of challenges brought by climate change requires that these shortcomings be confronted head-on. Innovative and more cost-effective extension models will need to be explored. These new models should facilitate greater involvement of the private sector, farmers' organizations and farmer-to-farmer exchanges.

### b. Innovative financing models for CSA investments

Much of African agriculture remains an informal economic activity, despite supporting vast numbers of people. A large portion of investments are funded by farmers' own resources, and profit considerations are not always the most important imperative. In most cases farmers do not have legally recognized tenure rights to the land they use. Most products do not reach markets; those that do go through informal marketing channels, and most transactions do not go into formal banking systems.

Bringing this sector into mainstream economic systems has proven daunting. One of the most elusive goals has been financing the investments required to transform the sector. While the past few decades have seen substantial investment of development funds, private-sector financing has largely stayed away due to perceptions of high risk, except in the case of highly commercialized farms. Private financiers have described agriculture in Africa as 'unbankable'.

The lack of financing for much of the sector is one of the main obstacles that has limited farmers' access to productivity-enhancing technologies such as quality seed and livestock breeds, fertilizers and implements. Without a change in this pattern, it is difficult to imagine a climatesmart revolution in Africa. A large portion of farms will have to evolve toward a commercial orientation, financed by the private sector and doing business through more formalized channels. Such a shift will require innovation in tailoring financial instruments for smallholder farming systems to deal with scale issues, transaction costs and profitability considerations. Examples are available of successful valuechain financing and aggregation approaches for resolving problems of scale. These can provide useful lessons for crafting the next generation of smallholder financing models. Public and development funds will still be important in financing African agriculture, but their role needs to focus on leveraging private-sector resources and de-risking such investments.

### c. Information systems, early warning and other risk mitigation measures

Geographical and infrastructural limitations present major challenges in the development of efficient and cost-effective information systems for supporting farmers in Africa. However, the explosion of cellular technology into rural Africa is proving to be a game changer in recent efforts to develop next-generation platforms for connecting farmers with information and financial services. The full potential brought by information and communication technologies (ICTs) need to be fully exploited to improve access to a range of information services, including weather-related data and warnings.

African agricultural systems largely treat weather patterns, particularly extreme events such as droughts and floods, as unpredictable variables over which farmers have no control. With climate change increasing the frequency and intensity of such events, the impacts are potentially devastating. Farmers now need timely weatherrelated information and warnings that enable them to protect their assets against damage. Farmers have relied for decades on traditional information systems to estimate the onset of seasonal rains or frosts, mid-season droughts and other key weather parameters, but these are increasingly failing to deal with wild fluctuations from year to year. Science-based weather monitoring systems need to become an integral part of a farmer's planning process. The biggest challenge across the continent is the lack of infrastructure to enable accurate weather forecasting services. Investments in both physical and human capabilities to provide this support function are a key ingredient in building a climate-smart agricultural sector.

Insurance is largely a new phenomenon in smallholder agriculture on the continent. The need for risk mitigation strategies to deal with unpredictable and extreme weather events has now brought this subject to the fore. Promising examples such as weather index insurance are part of a new generation of measures to safeguard farmers against the impacts of climatic shocks. While this is a step in the right direction, a lot more refinement is needed. Insurers still have to come up with instruments that are cost-effective yet accurate at isolating climatic risks in Africa's highly heterogeneous agro-ecological systems.

### d. A new generation of service-oriented farmer organizations

Most African farmers' organizations have largely focused on policy advocacy and have limited capacity to provide direct services to members. This limited role has dampened the organizations' appeal in the eyes of farmers. A shift in the architecture and orientation of farmers' organizations is urgently needed if they are to effectively support key functions of CSA such as research and extension, value-chain integration and farmer development.

In smallholder systems for example, various forms of aggregation are desirable — in service delivery, procurement of inputs, financing and marketing. Farmers' organizations are well placed to anchor such aggregation services for their members. Various forms of partnerships between FOs and research, agribusiness, governmental and nongovernmental stakeholders could substantially increase adoption of climate-smart approaches. To make this transition, however, most FOs need substantial support to revamp their governance structures, configure appropriate service portfolios for their members, hire or train more skilled personnel, and improve their image in the eyes of their members and other stakeholders. This must be one of the core pillars of any climate-smart agriculture programme in Africa.

## WHAT ARE FARMERS ALREADY DOING IN TERMS OF CSA?

Farmers and farmers' organizations are currently involved in partnerships to develop and test a number of CSA technologies and practices. Many of these are aimed at increasing productivity and building adaptive capacity of physical, economic and human capital elements of farming households. While numerous initiatives are currently underway, it must be stated that the scale of such efforts is far too modest to drive a transition to CSA in the foreseeable future. Coordinated, large-scale and long-term programmes are required, covering key aspects of farming systems. The table below summarizes examples of CSA initiatives in which farmers and farmers' organizations have participated.

#### TABLE 1 - SELECTED CSA ACTIVITIES BEING IMPLEMENTED WITH FARMER PARTICIPATION

CSA-related activities	Main focus areas	Key partners	Regions
Soil and water conservation	Crops	NGOs, international research institutions, farmers	Southern Africa, East Africa
Breeding of drought- tolerant crop varieties	Crops: maize and small grains	International research partners, agribusiness, farmers	Southern Africa, East Africa, West Africa
Agroforestry	Crops and trees	International research partners, NGOs, farmers	Southern Africa, East Africa
Fodder banks for livestock	Livestock	International research partners, NGOs	Southern Africa, East Africa, West Africa
Landscape/forest regeneration	Crops and trees	NGOs, farmers	East Africa, West Africa, North Africa
Renewable energy: solar, wind, biogas	Energy	International research partners, NGOs	Southern Africa, East Africa,
Weather index insurance	Crops	International research partners, NGOs, farmers	East Africa
Livestock improvement programmes	Livestock	International research partners, NGOs, farmers	Southern Africa, East Africa, West Africa
Rangeland management	Livestock: clearing invasive species and testing grazing regimes such as high-intensity, short-duration rational systems	NGOs, farmers	Southern Africa, East Africa, West Africa, North Africa
Water-efficient irrigation systems	Crops	NGOs, farmers	Southern Africa, East Africa, West Africa, North Africa
Water harvesting	Crops and livestock	NGOs, farmers	Southern Africa, East Africa, West Africa, North Africa

## WHAT SUPPORT DO FARMERS SEEK FROM THE GLOBAL COMMUNITY?

While farmers are at the frontline of the impacts, climate change ultimately affects entire populations. Confronting the challenges brought by climate change will require cooperation among actors at different levels. Despite protracted negotiations, farmers are confident the international community will reach a global deal that adequately recognizes the urgency of the problem, its impact on agriculture and other sectors, and the necessary response measures. Farmers in Africa expect that ultimately leaders will marshal the political will to tackle the climate crisis, leading to more decisive action and far-reaching transformation for the sector.

Farmers are committed to playing a central role in ensuring that agriculture is a part of the solution. They are ready to forge partnerships with all key stakeholders in search of solutions. The partnerships that farmers seek include cooperation with governments, research institutions, the private sector, development partners, NGOs and other practitioners, focused on these areas:

### **1. Research and development of CSA technologies and practices**

An important area for cooperation is farmer-managed initiatives to screen priority CSA technologies and practices and testing of promising solutions. Such joint initiatives are better than traditional top-down research at finding the most appropriate solutions, and they allow participants to share knowledge and develop human capacity. Other possibilities for collaboration include monitoring and management of new pests and diseases; development of early warning systems and other risk-mitigation measures; improved storage, processing and value-adding technologies; and development of simple but credible climate benefit monitoring systems for adaptation and mitigation activities in agriculture.

### 2. Private sector and agribusiness

Partnerships with the private sector need to focus on building innovative, mutually beneficial business relationships to improve financing, marketing and extension support for farmers. Such cooperation could revise banking risk evaluations and regulations to open up new streams of finance for farmers to innovate, take up climate-smart practices and insure against climate risks. Similarly this effort could strengthen farmers' organizations to provide better services to their members and bring the benefits of the formal sector to smallholder agriculture. Farmers' organizations offer a platform for relevant agribusinesses to play a more central role in providing extension support services to farmers.

### 3. Governments

In many countries, realignment of sectoral policies to make them more coherent with CSA objectives is a key task. Working in consultation with farmers and other stakeholders, governments should mainstream CSA into policies, programmes and budgets at national and local levels. Strategic allocation of public resources is perhaps the most effective way to attract private funds, donor resources and climate finance. Reconfiguring extension systems and updating curricula in schools and tertiary institutions are additional areas for government-led joint effort.

### 4. Development partners

The donor community remains a central partner in providing resources for early actions and readiness activities to prepare farmers and other stakeholders for a transition to CSA. Farmers expect donor funding for programmes that support development and testing of innovative ideas as well as initial investments that could catalyse private-sector participation.

### **5. Practitioners and NGOs**

NGOs and other practitioner organizations are key partners in testing new ideas with farmers. CSA programmes need to harness the experience of NGOs in building human and social capital through extension, research, education and information management.

## CONCLUSION

The momentum towards decisive action in response to climate change is an opportunity for a holistic makeover of the agricultural sector in Africa. Climate-smart agriculture provides a framework for sustainably increasing productivity while building the adaptive capacity of key facets of livelihood systems of farming households. But without innovative solutions to fix persistent weaknesses in key farmer support systems and institutions, promising CSA technologies and practices will once again fail to drive the necessary transformation. Supporting the emergence of wealthier farming households — with access to more alternatives for coping with climatic shocks or any other threats — is the most far-reaching solution to challenges facing farmers now and in the future.



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