

Info Note

Measures for climate change adaptation in agriculture

Messages to the SBSTA 44 agriculture workshops

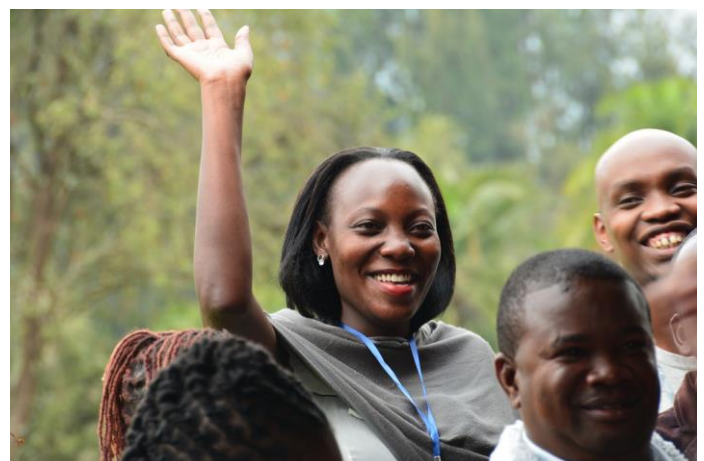
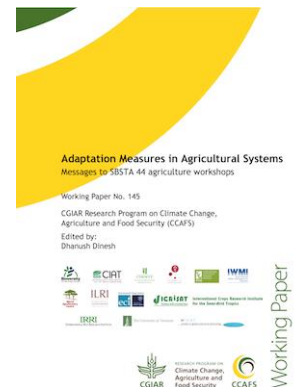
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Key messages

- **International governance arrangements and national policy frameworks** already provide a robust foundation for adaptation in agricultural systems.
- **National planning** using prioritization tools can result in efficient, effective and equitable allocation of limited resources to benefit the most vulnerable farmers and systems.
- **Local planning** involves devolution of decision-making and participatory approaches to match local contexts, capacities and preferences.
- Access to **adaptation finance** remains critical to achieving local and global goals for adaptation. Both **economic incentives** and **value chain initiatives** can ensure that financial investments achieve adaptation at scale.
- **Effective research and knowledge systems** connect farmers, policy-makers, businesses and researchers to accelerate sharing of emerging knowledge, and help adapt to dynamic current climates and to **future scenarios** for climate and development.
- Modernizing **extension services, capacity building and technology transfer** approaches are important to capture the attention and participation of a wider group of rural people, including youth.
- **Indigenous knowledge** strengthens adaptation measures by working closely with knowledge-holders at both local and national levels.
- **Gender equality and social inclusion** can be strengthened if adaptation measures are well designed.
- Adaptation measures in agricultural systems also offer opportunity to achieve multiple co-benefits, for **environmental health and mitigation**.

In 2014 the United Nations Framework Convention on Climate Change (UNFCCC) Subsidiary Body for Scientific and Technological Advice (SBSTA), as part of its mandate to consider issues related to agriculture, invited submissions from parties and observers, covering four topics, in 2015 and 2016. Of the two topics for consideration in 2016, one relates to *“Identification of adaptation measures, taking into account the diversity of the agricultural systems, indigenous knowledge systems and the differences in scale as well as possible co-benefits and sharing experiences in research and development and on the ground activities, including socioeconomic, environmental and gender aspects”*.



Participatory approaches, are critical for developing adaptation measures. Photo: S. Kilungu (CCAFS)

In this info note we provide a brief overview of key adaptation measures in agriculture. A [twinned info note](https://cgspace.cgiar.org/handle/10568/71053) considers agricultural practices and technologies, which are one sub-set of adaptation measures. Both info notes are drawn from longer working papers, all available at <https://cgspace.cgiar.org/handle/10568/71053>

Identification of adaptation measures

Adaptation measures refer to the wide range of actions and institutions that raise the adaptive capacity of agricultural systems. Here we consider the set of public sector and private sector measures that have particular potential to raise adaptive capacity among smallholder farmers in low-income and middle-income countries. These measures provide an enabling environment for implementation of the practices and technologies described in the twinned info note. In agricultural systems, successful measures for adaptation have been demonstrated in governance, policy frameworks and readiness; national planning; local planning; finance, economic incentives and value chains; research and knowledge systems; extension, capacity building and technology transfer.

Governance, policy frameworks and readiness

Positive momentum among multiple governmental and non-governmental stakeholders is supporting the transformation of agricultural systems to address climate change. Examples of **international governance arrangements** include NEPAD's Vision 25x25, which aims to help 25 million African farmers become more resilient by 2025, and the Global Alliance for Climate Smart Agriculture, which brings interested stakeholders together for learning and exchange at the global level.

Among countries that included adaptation in their INDCs, 90% prioritized agriculture as a sector for action. This international commitment is further demonstrated in national **policy frameworks**. For example, the Kenyan National Climate Change Action Plan prioritizes interventions in the agricultural sector to increase resilience and improve resource use efficiency. Cross-sectoral policy coordination is also important, particularly with other forestry, water and energy sectors, as well as alignment with national visions for development. In India, the new National Agroforestry Policy provides for smallholder farmers to enhance productivity and income while strengthening climate resilience. In Nigeria, the National Agricultural Resilience Framework seeks to minimize climate risks associated with the country's ambitions to promote rural development through export-led agriculture.

As countries seek international support for implementation of their policy frameworks and action plans for adaptation, international investors must assess

and manage investment risk. Tools to demonstrate **country readiness** will be a growing priority and asset to developing countries seeking international assistance.



Kenya's National Climate Change Action Plan is an example of a national policy framework that prioritizes action in the agriculture sector. Photo: G. Kinyanjui.

National planning

Once policy frameworks are in place, national policy-makers may be faced with hard choices about where to channel tightly constrained resources. Tools are emerging to assist with reaching decisions that lead to efficient, effective and equitable outcomes.

In Mali, decision-makers have successfully used a **prioritization framework** to identify vulnerable regions and short-list potential interventions. A similar toolkit for prioritising adaptation options is being piloted in Bangladesh, Nepal and at the sub-national level in India. Another tool is **climate-smart agriculture country profiles**, which provide a rapid diagnosis of capacities and options by local experts, and have been developed so far for Argentina, Colombia, Costa Rica, El Salvador, Nicaragua, Grenada, Mexico and Peru.

Evaluation suggests that **careful planning gives long-term pay-offs**. In Uruguay, for example, appropriately planned adaptation measures have quadrupled agricultural production within a decade, while increasing system-level resilience to climate change, and significantly reducing greenhouse gas emission associated with food production.

Local planning

Adaptation planning at the local level is important to address the granularity of climate change impacts, which may vary within national boundaries, and to enable farmers and communities to be in charge of their own choices and futures under climate change.

Multiple approaches to **participatory planning** have proven effective in matching adaptation investments to

local preferences, needs and capacities. In Burkina Faso, participatory diagnosis with communities in Yatenga led to the identification of potential solutions for the region. A participatory approach that helps farmer cooperatives identify agro-ecological practices for investment is being tested with the cooperative Promoter of Cooperative Development in the Segovias in Nicaragua and with Barillense Farmers Association in Guatemala.



In Viet Nam, researchers are working with farmers in Climate-Smart Villages to test agricultural interventions and develop portfolios of activities. Photo: G. Smith (CIAT)

Local planning is useful in ensuring that adaptation actions are holistic, rather than focused on only one or two technologies or practices. For example, “climate-smart villages” that enhance climate literacy of farmers and local stakeholders and implement **portfolios of climate solutions** are being piloted in Nepal and Bangladesh and scaled up in around 1500 villages in India. In Viet Nam, local knowledge has been integrated with scientific knowledge to develop participatory land use plans in three climate-smart villages.

Subsidiarity, in other words **devolving power over planning and budgets** to the lowest appropriate level can ensure more agile and accountable governance of adaptation. In Kenya, implementation of the National Climate Change Action Plan is devolved to county governments, who mainstream adaptation priorities and actions into 5-year County Integrated Development Plans

Finance, economic incentives and value chain initiatives

Increasing availability of, and access to, **adaptation finance** is key to raising adaptive capacity locally and globally. The unmet need is vast. For example, the 20 climate funds active in sub-Saharan Africa are not yet able to deliver the estimated annual need across all sectors to meet the US\$18 billion needed each year for adaptation across all sectors. Introduction of **novel financial instruments**, such as climate bonds or use of

mitigation finance to deliver co-benefits for adaptation, is a promising avenue for future support.

A wide range of **economic incentives**, such as tax exemptions, price and purchase guarantees and soft rural credit, can help climate finance reach its goals by transferring risk away from the smallholder farmers who need to invest in adaptation. One example is India’s Sub Mission on Agricultural Mechanization, which allocates US\$ 2.11 billion to providing farmers with subsidies of 25-50 % on purchase of new machines for zero-tilling, seed-drilling and laser land levelling.

Working with already established **value chain initiatives** can enable benefits to reach scale much more quickly. For example, climate change adaptation measures are being built into existing voluntary certification networks in the coffee and cocoa sub-sectors, allowing rapid scaling up to 30% of global cocoa producers and 15% of global coffee producers, with an initial focus on Ghana, Nicaragua and Peru.



Value chain initiatives help climate-proof important cash crops such as cocoa. Photo: G. Mullins.

Research and knowledge systems

As climates change, consistent long-term investment in **research** at national level – and collaboratively across countries – will pay off for adaptation at farm, agriculture sector and national food security levels. For example, CGIAR’s research program on Climate change, agriculture and food security (CCAFS) is six years into an AR4D partnership of 700 organisations in five regions. Studies on the program’s impact show how adaptation research can increase farmers’ incomes by several percentage points in a few years, while also improving outcomes for environment and wider rural development.

The ideal **knowledge systems** under climate change are agricultural innovation systems that link public and private research, extension and advisory services to generate, manage, blend and share indigenous and scientific knowledge, while facilitating learning processes and network-based innovation. For example, the ClimMob

platform helps farmers identify adaptation measures faster. By joining an ICT-based platform, farmers experiment on their own farms and share results by phone. About 30,000 farmers participated in 2015, a number that is quickly growing.

Development of **public-private R&D partnerships** can enable more rapid scaling of technical and institutional innovations. For example, the programs on Drought Tolerant Maize for Africa and Stress Tolerant Rice (in Africa and South Asia) are generating positive benefits for farmers. Similar successes are happening in public-private research on index insurance products in India and Africa.

Foresight, models and scenarios

When the future is uncertain – in economic and social terms, not just climatic – shared models of how the future might plausibly turn out provide a critical tool for public sector policies and private sector strategies. In Cambodia, the Ministry of Agriculture, Forestry and Fisheries used **participatory future scenarios** for priority setting to develop its 2014-2018 Climate Change Priorities Action Plan. Similar approaches have been used widely around the world, including in Kenya and Honduras. Participatory scenarios can be complemented with **quantitative models** to assess the potential performance of different adaptation measures under a variety of possible futures.



Participatory scenario building helps countries set climate change action priorities. Photo: J.L. Urrea (CCAFS)

Extension services, capacity building and technology transfer

Greater local participation coupled with modern communications technologies are increasingly offering a powerful, cost-effective way to revitalize **extension services**. Younger farmers are attracted by new approaches. For example, in Taraori, India, young farmers' groups show a keen interest in developing new-generation technologies in the local context.

More broadly, novel approaches to **capacity building** are proving valuable in promoting awareness and adaptation. In East Africa, the Shamba Shape Up **reality TV show** reaches an average of 9 million average viewers every month with messages on climate-resilient practices. Evaluation shows that 42% of viewers have adopted practices they've seen.

South-South cooperation for **technology transfer** is another powerful mechanism for change. For example, a series of learning visits between policy-makers and practitioners from Senegal and Colombia has overcome language barriers. The key result is the transfer to Colombia of an approach of combining local and scientific knowledge to transmit climate information to farmers. Such climate information is now being provided to 1500 farmers in Colombia, building towards Senegal's success in reaching several million farmers.

Indigenous knowledge

Indigenous knowledge strengthens adaptation measures in multiple ways: by providing a wealth of observations and insights beyond the power of external experts, embedding solutions in local cultures, and by broadening the values and viewpoints at stake. Stakeholder engagement taps into indigenous knowledge when designing and implementing adaptation measures. For example, in Tanzania, participatory planning has provided a platform to integrate indigenous and scientific climate knowledge to support smallholders' decision-making and planning, while in Senegal, indigenous knowledge has proven critical to improving the quality of climate forecasting services for farmers. Indigenous knowledge is also relevant at higher levels of governance, nationally and globally. For example, the governments of Cambodia and Honduras have incorporated under-represented groups and indigenous knowledge into future scenarios to guide action on climate change.



Indigenous knowledge can strengthen development of adaptation measures, and contribute to successful implementation. Photo: S. Kilungu (CCAFS)

Around the world: Measures for climate change adaptation in agriculture



GLOBAL
Research and knowledge systems
With over 700 partners in five regions, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is an Agriculture Research for Development Partnership (AR4D) in action. The program shows how climate adaptation actions can increase farmers' incomes by several percentage points in a few years, while also improving outcomes for environment and wider rural development.

GHANA, NICARAGUA, PERU
Finance, economic incentives and value chain initiatives
Climate change adaptation measures are being built into existing voluntary certification networks in the coffee and cocoa sub-sectors, allowing rapid scaling up to 30% of global cocoa producers and 15% of global coffee producers.

MALI
National planning
Decision-makers have successfully used a prioritization framework to identify vulnerable regions and short-list potential interventions.

BURKINA FASO
Local planning
Farmers, researchers and government agencies identify priority adaptation actions based on participatory diagnosis and planning in Yatenga.

NIGERIA
Governance, policy frameworks and readiness
The National Agricultural Resilience Framework seeks to minimize climate risks associated with the country's ambitions to promote rural development through export-led agriculture.

URUGUAY
National planning
Adaptation measures have quadrupled agricultural production within a decade, while increasing system-level resilience to climate change, and significantly reducing greenhouse gas emissions associated with food production.

COLOMBIA
Extension services, capacity building and technology transfer
South-South cooperation with Senegal leads to a new climate information service that combines local and scientific knowledge. Pilot now reaching 1500 farmers.



ARGENTINA, COLOMBIA, COSTA RICA, EL SALVADOR, GRENADA, MEXICO, NICARAGUA, PERU
National planning
Climate-smart agriculture country profiles provide a rapid diagnosis of capacities and options by local experts



INDIA
Governance, policy frameworks and readiness
National Agroforestry Policy provides for smallholder farmers to enhance productivity and income while strengthening climate resilience.
Local planning
"climate-smart villages" that enhance climate literacy of farmers and local stakeholders and implement portfolios of climate solutions are being scaled up in around 1500 villages in India.
Finance, economic incentives and value chain initiatives
Sub Mission on Agricultural Mechanization allocates US\$ 2.11 billion to providing farmers with subsidies of 25-50% on purchase of new machines for zero-tilling, seed-drilling and laser land levelling.

VIETNAM
Local planning
Participatory land use planning in climate-smart villages integrates community knowledge of limitations and potentials of natural resources, including climate-related risks, in developing land use plans.

KENYA, UGANDA, TANZANIA
Extension services, capacity building and technology transfer
Shamba Shape Up reality TV show reaches 9 million average viewers every month with messages on climate-resilient practices. Evaluation shows that 42% of viewers have adopted practices they've seen.



SUB-SAHARAN AFRICA
Finance, economic incentives and value chain initiatives
NEPAD's Vision 25x25 aims to help 25 million African farmers become more resilient by 2025.



CAMBODIA
Foresight, models and scenarios
The Ministry of Agriculture, Forestry and Fisheries used participatory future scenarios to develop the 2014-2018 Climate Change Priorities Action Plan.

- INDC refers to agriculture as an adaptation priority
- INDC refers to agricultural mitigation, but not adaptation
- INDC does not refer to agriculture
- No INDC submitted

Data source: Richards et al. 2015

The geographic designation employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of CCAFS concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

Strengthening gender equality

Rural women play an increasing role in smallholder agriculture as a result of out-migration of men. In least developed countries, 79% of economically active women report agriculture as their primary economic activity. Women and men farmers have different vulnerabilities and capacities to adapt to climate change. Women face lower access to resources, finance, information and extension services. Adaptation measures can provide co-benefits to gender equality and social inclusion. Greater engagement with women in technology design and management decisions can help maximise women's potential as agents of change. For example, in western Kenya, training and agro-advisory services directed at women have helped reduce by 60 percentage points the number of households that experience at least two months per year with one or no meals per day.



Including both men and women in developing adaptation measures can help close the gender gap. Photo: J.L. Urrea (CCAFS)

Achieving co-benefits for environmental health and mitigation

Adaptation practices in agricultural systems can deliver multiple co-benefits to environment, including higher biodiversity, reduced soil erosion and higher water use efficiency. Significant mitigation co-benefits can also be achieved under many conditions without compromising farm livelihoods. Mitigation makes sense where feasible, as agriculture emits 10-12% of global greenhouse gas emissions and drives deforestation amounting to about another 12% of emissions. Adaptation measures can work synergistically with mitigation from farm-level to policy-level. Relevant adaptation measures include holistic policy frameworks, multi-functional land use planning, and supply chain standards that address both adaptation and mitigation.

Addressing the diversity of agricultural systems

Performance of adaptation measures depends on multiple factors that vary across agricultural systems. Variables include climate impacts, soil and water conditions, and household adaptive capacity and resource availability. A major function of national and local planning is to match adaptation options to local contexts.

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This brief was made possible based on inputs of the following authors to CCAFS Working Paper 145, "Adaptation measures in agricultural systems: Messages to SBSTA 44 agriculture workshops".

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Further reading, with links to all referenced case studies and cited

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This brief synthesizes knowledge within CGIAR on adaptation measures in agricultural systems. This brief has been prepared for the benefit of parties and observers making submissions to the UNFCCC SBSTA 44 on issues related to agriculture.

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