CLIMATE-SMART AGRICULTURE
Sourcebook

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Executive Summary

Why is climate-smart agriculture needed?

Between now and 2050, the world's population will increase by one-third. Most of these additional 2 billion people will live in developing countries. At the same time, more people will be living in cities. If current income and consumption growth trends continue, FAO estimates that agricultural production will have to increase by 60 percent by 2050 to satisfy the expected demands for food and feed. Agriculture must therefore transform itself if it is to feed a growing global population and provide the basis for economic growth and poverty reduction. Climate change will make this task more difficult under a business-as-usual scenario, due to adverse impacts on agriculture, requiring spiralling adaptation and related costs.

To achieve food security and agricultural development goals, adaptation to climate change and lower emission intensities per output will be necessary. This transformation must be accomplished without depletion of the natural resource base. Climate change is already having an impact on agriculture and food security as a result of increased prevalence of extreme events and increased unpredictability of weather patterns. This can lead to reductions in production and lower incomes in vulnerable areas. These changes can also affect global food prices. Developing countries and smallholder farmers and pastoralists in particular are being especially hard hit by these changes. Many of these small-scale producers are already coping with a degraded natural resource base. They often lack knowledge about potential options for adapting their production systems and have limited assets and risk-taking capacity to access and use technologies and financial services.

Enhancing food security while contributing to mitigate climate change and preserving the natural resource base and vital ecosystem services requires the transition to agricultural production systems that are more productive, use inputs more efficiently, have less variability and greater stability in their outputs, and are more resilient to risks, shocks and long-term climate variability. More productive and more resilient agriculture requires a major shift in the way land, water, soil nutrients and genetic resources are managed to ensure that these resources are used more efficiently. Making this shift requires considerable changes in national and local governance, legislation, policies and financial mechanisms. This transformation will also involve improving producers' access to markets. By reducing greenhouse gas emissions per unit of land and/or agricultural product and increasing carbon sinks, these changes will contribute significantly to the mitigation of climate change.

Defining the concept

Climate-smart agriculture (CSA), as defined and presented by FAO at the Hague Conference on Agriculture, Food Security and Climate Change in 2010, contributes to the achievement of sustainable development goals. It integrates the three dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges. It is composed of three main pillars:

1. sustainably increasing agricultural productivity and incomes;
2. adapting and building resilience to climate change;
3. reducing and/or removing greenhouse gases emissions, where possible.

CSA is an approach to developing the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change. The magnitude, immediacy and broad scope of the effects of climate change on agricultural systems create a compelling need to ensure comprehensive integration of these effects into national agricultural planning, investments and programs. The CSA approach is designed to identify and operationalize sustainable agricultural development within the explicit parameters of climate change.

FAO and its partners are aware that achieving the transformations required for CSA and meeting these multiple objectives requires an integrated approach that is responsive to specific local conditions. Coordination across agricultural sectors (e.g. crops, livestock, forestry and fisheries) as well as other sectors, such as with

energy and water sector development is essential to capitalize on potential synergies, reduce trade-offs and optimize the use of natural resources and ecosystem services. To address this complex task and support member countries, FAO's different departments have worked together to articulate the concept of CSA. In carrying out this work, the Organization provides guidance about the practices, technologies, policies and financing that are required to achieve a productive, resilient and sustainable agriculture sector.

This approach also aims to strengthen livelihoods and food security, especially of smallholders, by improving the management and use of natural resources and adopting appropriate methods and technologies for the production, processing and marketing of agricultural goods. To maximize the benefits and minimize the trade-offs, CSA takes into consideration the social, economic, and environmental context where it will be applied. Repercussions on energy and local resources are also assessed. A key component is the integrated landscape approach that follows the principles of ecosystem management and sustainable land and water use.

CSA seeks to support countries in putting in place the necessary policy, technical and financial means to mainstream climate change considerations into agricultural sectors and provide a basis for operationalizing sustainable agricultural development under changing conditions. Innovative financing mechanisms that link and blend climate and agricultural finance from public and private sectors are a key means for implementation, as are the integration and coordination of relevant policy instruments and institutional arrangements. The scaling up of climate-smart practices will require appropriate institutional and governance mechanisms to disseminate information, ensure broad participation and harmonize policies. It may not be possible to achieve all the CSA objectives at once. Context-specific priorities need to be determined, and benefits and tradeoffs evaluated.

CSA is not a single specific agricultural technology or practice that can be universally applied. It is an approach that requires site-specific assessments to identify suitable agricultural production technologies and practices. This approach:

1. addresses the complex interrelated challenges of food security, development and climate change, and identifies integrated options that create synergies and benefits and reduce trade-offs;
2. recognizes that these options will be shaped by specific country contexts and capacities and that the particular social, economic, and environmental situation where it will be applied;
3. assesses the interactions between sectors and the needs of different involved stakeholders;
4. identifies barriers to adoption, especially among farmers, and provides appropriate solutions in terms of policies, strategies, actions and incentives;
5. seeks to create enabling environments through a greater alignment of policies, financial investments and institutional arrangements;
6. strives to achieve multiple objectives with the understanding that priorities need to be set and collective decisions made on different benefits and trade-offs;
7. should prioritize the strengthening of livelihoods, especially those of smallholders, by improving access to services, knowledge, resources (including genetic resources), financial products and markets;
8. addresses adaptation and builds resilience to shocks, especially those related to climate change, as the magnitude of the impacts of climate change has major implications for agricultural and rural development;
9. considers climate change mitigation as a potential secondary co-benefit, especially in low-income, agricultural-based populations;
10. seeks to identify opportunities to access climate-related financing and integrate it with traditional sources of agricultural investment finance.

CSA brings together practices, policies and institutions that are not necessarily new but are used in the context of climatic changes, which are unfamiliar to farmers, herders and fishers. What is also new is the fact that the multiple challenges faced by agriculture and food systems are addressed simultaneously and holistically, which helps avoid counterproductive policies, legislation or financing.

CSA implementation and the role of the sourcebook

There has been a rapid uptake of the term CSA by the international community, national entities and local institutions. However, implementing this approach is challenging, partly due to a lack of tools and experience. Climate-smart interventions are highly location-specific and knowledge-intensive. Considerable efforts are required to develop the knowledge and capacities to make CSA a reality. In large part, these are the same efforts required for achieving sustainable agricultural development which have been advocated over past decades, yet still insufficiently realized on the ground. CSA offers an opportunity to revitalize these efforts, overcome adoption barriers, while also adjusting them to the new realities of climate change. Organizations, educational establishments and other entities have started to fill these gaps, but information is still fragmented. A partnership between UN agencies (FAO, IFAD, UNEP, WB, WFP) and other organizations (CGIAR/CCAFS) has been created to address knowledge gaps and support countries in the implementation of climate-smart approaches.

The purpose of the sourcebook is to further elaborate the concept of CSA and demonstrate its potential, as well as limitations. It aims to help decision makers at a number of levels (including political administrators and natural resource managers) to understand the different options that are available for planning, policies and investments and the practices that are suitable for making different agricultural sectors, landscapes and food systems more climate-smart. This sourcebook is a reference tool for planners, practitioners and policy makers working in agriculture, forestry and fisheries at national and subnational levels. The sourcebook indicates some of the necessary ingredients required to achieve a climate-smart approach to the agricultural sectors, including existing options and barriers.

This sourcebook is divided into three main sections, which addresses the main following topics:

- **Section A "The Case for Climate-Smart Agriculture"** consists of two modules establishing a conceptual framework and is targeted to a broad audience. Module 1 explains the rationale for CSA and module 2 focuses on the adoption of a landscape approach.

- **Section B "Improved Technologies and Approaches for Sustainable Farm Management"** is divided in nine Modules. It is targeted primarily to the needs of planners and practitioners and analyzes what issues need to be addressed in the different sectors, in terms of water (Module 3), soils (Module 4), energy (Module 5) and genetic resources (Module 6) for up-scaling of practices of crop production (Module 7), livestock (Module 8), forestry (Module 9) and fisheries and aquaculture (Module 10) along sustainable and inclusive food value chains (Module 11).

- **Section C "Enabling frameworks"** encompasses seven Modules, targeted to policy makers, providing guidance on what institutional (Module 12), policy (Module 13) and finance (Module 14) options are available. It further provides information on links with disaster risk reduction (Module 15) and utilization of safety nets (Module 16) and also illustrates the key role of capacity development (Module 17) and assessments and monitoring (Module 18).

The sourcebook will be first published in a web platform which will also facilitate stakeholders' access to additional information, case studies, manuals, practices, and systems. The platform is dynamic and will be updated on a regular basis and it is available at http://www.climatesmartagriculture.org/72611/en/