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Climate-smart agriculture (CSA) and integrated approach to managing landscapes-cropland, livestock, forests and fisheries- that address the interlinked challenges of food security and climate change

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Introduction:

The climate-smart agriculture (CSA) concept reflects an ambition to improve the integration of agriculture development and climate responsiveness. It aims to achieve food security and broader development goals under a changing climate and increasing food demand. CSA initiatives sustainably increase productivity, enhance resilience, and reduce/remove greenhouse gases (GHGs), and require planning to address trade-offs and synergies between these three pillars: productivity, adaptation, and mitigation.

Climate change continues to make headlines, as its impacts are felt by people and the planet in unprecedented ways. Farmers aren't spared, as more frequent extreme weather events affect productivity of crops and livestock, and drive down incomes. As climate change intensifies, the food system will continue to be among the sectors that is the most vulnerable. Agriculture is also a major part of the climate problem, generating 19-29% of total GHG emissions.

Climate change and food and nutrition insecurity pose two of the greatest development challenges of our time. Yet a more sustainable food system can not only heal the planet, but ensure food security for all.

Today, the global agrifood system emits one-third of all emissions. Global food demand is estimated to increase to feed a projected global population of 9.7 billion people by 2050. Traditionally, the increase in food production has been linked to agricultural expansion, and unsustainable use of land and resources. This creates a vicious circle, leading to an increase in emissions.

Food systems are the leading source of methane emissions and biodiversity loss, and they use around 70% of fresh water. If food waste were a country, it would be the third highest emitter in the world. Meanwhile, emissions from agriculture are increasing in developing countries – a worrying trend which must be reversed.

Without significant climate mitigation

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action in the agri-food sector, the Paris Agreement goals cannot be reached. Agriculture is the primary cause of deforestation, threatening pristine ecosystems such as the Amazon and the Congo Basin. Without action, emissions from food systems will rise even further, with increasing food production.

In September 2015, world leaders of the 193 United Nations members formally adopted the new Sustainable Development Goals (SDGs), perhaps the strongest international agenda to bring an end to global poverty. The SDGs aim to address the interlinked problems of inequality, hunger and climate change by 2030.

The priorities of different countries and stakeholders are reflected to achieve more efficient, effective, and equitable food systems that address challenges in environmental, social, and economic dimensions across productive landscapes. While the concept is new, and still evolving, many contexts specific practices that make up CSA already exist worldwide and are used by farmers to cope with various production risks. Mainstreaming CSA requires critical stocktaking of ongoing and promising practices for the future, and of institutional and financial enablers for CSA adoption. This country profile provides a snapshot of a developing baseline created to initiate discussions, both within countries and globally, about entry points for investing in CSA at scale.

Achieving many of the SDGs rests upon the ability to provide a climate-smart food system that will feed a growing population with nutritious food, provide livelihoods and also help steward our natural resources.

A new World Bank report, ***Future of Food: Shaping a Climate-Smart Global Food System***, examines ways to improve the productivity and resilience of the food system and to make agriculture part of the solution to climate change.

The report recommends implementing agriculture and food production practices that secure a triple win: boosting productivity, enhancing resilience and lowering greenhouse gas emissions (GHG) – the three pillars that form the basis of climate-smart agriculture (CSA).

Recommendations include:

- Ensuring access to existing and new climate-smart technologies for poor farmers. These technologies can help reduce yield gaps and improve resilience.
- Closing the gender gap. Providing women farmers with proper resources and support will help raise yields and improve food security.
- Reducing GHG emissions through improved fertilizer use, alternate wet and

dry irrigation of rice and improved livestock breeding and waste management.

Shaping a Climate-Smart Food System **builds upon a previous report,** ***Ending Poverty and Hunger by 2030: An Agenda for the Global Food System***, which was published in April 2015. That paper provides an overview of key actions for ending widespread hunger. Outlined in the report are three focus areas that can have the greatest impact: climate-smart agriculture, better nutrition and stronger market access for farmers.

Improving global agricultural performance is central to addressing poverty and food insecurity, as three-quarters of poor people still live in rural areas, and nearly two-thirds of the world's poor people work in agriculture. The World Bank continues to be committed to helping build a climate-smart food system that can feed everyone, every day, everywhere.

Achieving the Triple Win of CSA

The global agrifood system must therefore deliver on multiple fronts. It must feed the world, adapt to climate change, and drastically reduce its greenhouse gas emissions. In response to these challenges, the concept of Climate-smart Agriculture (CSA) has emerged as a holistic approach to end food security and promote sustainable development while addressing climate change issues.

CSA is a set of agricultural practices and technologies which simultaneously boost productivity, enhance resilience and reduce GHG emissions. Although it is built on existing agricultural knowledge, technologies, and sustainability principles, CSA is distinct in several ways. First, it has an explicit focus on addressing climate change in the agrifood system. Second, CSA systematically considers the synergies and trade offs that exist between productivity, adaptation, and mitigation. And third, CSA encompasses a range of practices and technologies that are tailored to specific agro-ecological conditions and socio-economic contexts including the adoption of climate-resilient crop varieties, conservation agriculture techniques, agroforestry, precision farming, water management strategies, and improved livestock management. By implementing these practices, triple win results can be achieved:

1. **Increased productivity:** Produce more and higher quality food without putting an additional strain on natural resources, to improve nutrition security and boost incomes, especially for 75 percent of the world's poor who live in rural areas and mainly rely on agriculture for their livelihoods.

2. **Enhanced resilience:** Reduce vulnerability to droughts, pests, diseases and other climate-related risks and shocks; and improve the capacity to adapt and grow in the face of longer-term stresses like increased seasonal variability and more erratic weather patterns.
3. **Reduced emissions:** Reduce greenhouse gas emissions of the food system, avoid deforestation due to cropland expansion, and increase the carbon sequestration of plants and soils.

Finally, funding for CSA needs to be increased to align available finance with the relevance of the sector. Despite causing one third of global greenhouse gas emissions, agrifood systems receive 4% of climate finance, with only a fifth of this going to smallholders. Current financial flows need to be realigned in order to support a sustainable agrifood system transformation.

Climate-Smart Agriculture and the World Bank Group

The World Bank has significantly scaled up its engagement and investment in climate-smart agriculture (CSA). In its Climate Change Action Plan (2021- 2025), the World Bank has identified Agriculture, Food, Water and Land as one of the five key transitions needed to tackle the Paris Agreement. Since the adoption of the Paris Agreement, the World Bank has increased financing for CSA by eight times, to almost $3 billion annually.

As of July 2023, all new World Bank operations must be aligned with the goals of the Paris Agreement, meaning that CSA is at the core of all the World Bank's new agriculture and food operations. To this end, the World Bank has prepared a Sector Note of Paris Alignment of its Agriculture and Food operations. Furthermore, all projects are screened for climate and disaster risks. Climate change indicators are used to measure outputs and outcomes, and greenhouse gas accounting of projects is conducted prior to approval . These actions will help client countries implement their Nationally Determined Contributions (NDCs) in the agriculture sector, and will contribute to progress on the Sustainable Development Goals (SDGs) for climate action, poverty, and the eradication of hunger.

The World Bank engages strategically with countries, supporting them to enhance productivity, improve resilience and reduce greenhouse gas emissions. The World Bank uses the following tools, diagnostics and other analytics to help countries in the transition towards sustainable agriculture.

- Country Climate and Development Reports (CCDRs), new core diagnostics, help countries prioritize the most impactful actions that can reduce greenhouse gas

emissions and boost adaptation, while delivering on broader development goals. CCDRs identify climate impacts on countries' agrifood systems, such as reduced yields and increased food prices, and present a variety of country-specific technology options as well as policy reforms under the umbrella of CSA.

- Climate-Smart Agriculture (CSA) Country Profiles developed by the World Bank and partners, give an overview of the agricultural challenges in countries around the world, and how CSA can help them adapt to and mitigate climate change. They bridge knowledge gaps by providing clarity on CSA terminology, components, relevant issues, and how to contextualize them under different country conditions.
- Climate-Smart Agriculture Investment Plans (CSAIPs) developed for a subset of client countries aim to mainstream CSA into national agricultural policies and to identify investment opportunities in CSA. The World Bank provides technical assistance and financial support to help countries develop and implement CSAIPs. These plans prioritize investments in climate-resilient infrastructure, capacity building, and knowledge sharing to promote sustainable agricultural practices. CSAIPs are available, or currently under preparation, for Bangladesh, Belize, Burkina Faso, Cote D'Ivoire, Cameroon, the Republic of Congo, Ethiopia, Ghana, Iraq, Jordan, Kenya, Lesotho, Madagascar, Mali, Morocco, Nepal, Senegal, Zambia, and Zimbabwe.
- The World Bank also supports research programs such as with the CGIAR, which develops and supports climate-smart technologies and management methods, early warning systems, risk insurance, and other innovations that promote resilience and combat climate change."

Working Toward Resilience and Food and Nutrition Security, while Curbing GHG Emissions

The Bank's support of CSA is making a difference across the globe, for example:

- A new US$345 million loan for the China Green Agricultural and Rural Revitalization Program for Results will support China's global public goods agenda by promoting the greening of agriculture and rural development in Hubei and Hunan provinces in central China. The program will reduce greenhouse gas (GHG) emissions from crop and livestock farming, increase carbon sequestration in farmlands, and improve biodiversity protection and restoration in agricultural ecosystems, while strengthening the institutional capacity of local governments

to integrate environmental and decarbonization objectives in government rural revitalization plans and investments. World Bank financing will complement a US$4.1 billion commitment by the Government of China (GoC).

- The US$621 million Food Systems Resilience Program for Eastern and Southern Africa (Phase 3) FSRP Project in Kenya, Comoros, Malawi, Somalia aims to increase the resilience of food systems and the recipients' preparedness for food insecurity. The project has six components, including building resilient agricultural production capacity to strengthen the productivity and resilience of domestic food production to shocks and stressors, by supporting the development and adoption of improved agricultural inputs and services and climate-smart and gender-sensitive farming technologies in the crops, livestock, and fisheries sectors.
- A US$200 million credit for the Punjab Resilient and Inclusive Agriculture Transformation Project (PRIAT) will help Pakistan enhance access to, and productivity of, agricultural water, and improve incomes of farmers supported by the project. PRIAT will notably reduce the differences in water availability among head, middle, and tail end users of watercourses, increase agricultural output per unit of water used at farm level for selected crops, increase the share of area under high-value crops cultivation, and increase agriculture incomes of households participating in project activities, yielding important climate change adaptation and mitigation co-benefits.
- The US$125 million Agriculture Resilience, Value Chain Development and Innovation (ARDI) program will play a pivotal role in strengthening the transition Jordan's agri-food sector. It supports Jordan's National Sustainable Agriculture Plan and aims to enhance climate resilience, competitiveness, and inclusivity of the agri-food sector. Over the next five years, it will support 30,000 farming household with the adoption of climate-smart and water-efficient agricultural practices, provide needs-based training, create about 12,000 employment opportunities, and promote value chain and export promotion through advanced market diagnostics. A particular focus will be on strengthening the participation of women, youth and refugees.