Executive Summary

Agriculture and Climate Change:

A Scoping Report

Meridian Institute
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***Agriculture and Climate Change: A Scoping Report*, is a product of the Meridian Institute-convened Global Dialogues on Climate Change and Agriculture initiated in August 2010.** Reflecting the special characteristics of the agricultural sector, this report aims to contribute to continued policy discussion on agriculture and climate change in the context of the UN Framework Convention on Climate Change (the Convention). Agriculture is characterized by a number of special features that distinguish it from other sectors, such as the sector's role in producing food and meeting basic survival needs; its context and site-specific nature that makes uniform strategies and solutions ineffective; the vulnerability of the sector to being directly affected by climate change compared with most other sectors; its adaptation needs and mitigation potential, mainly through sequestration; and, finally, its complex links to food security, trade, and broader land-use and forestry policies.

Impact of climate change on agriculture. The increase of the world's population to 9 billion people by 2050, the rise in global calorie intake by 60 percent between 2000 and 2050 due to greater affluence, as well the rising demands on land for the generation of food and fuels, will require significant increases in agricultural productivity in the context of more constrained availability of resources. With agriculture contributing 29 percent of developing countries' gross domestic product and providing employment to about 20 percent of the global and 65 percent of developing countries' populations, the impacts of climate change on agriculture have repercussions on livelihoods, food production, and the overall economies of countries. At the same time, the agricultural sector holds significant climate change mitigation potential through reductions of greenhouse gas emissions as well as enhancement of agricultural sequestration.

Food production and climate change. The globally accepted definition of food security is that "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." Article 2 of the Convention refers to food security more narrowly when it states that climate change mitigation should be achieved within a time frame sufficient to ensure, among other things, that *food production* is not threatened, ecosystems can adapt naturally, and economic development is pursued in a sustainable manner.

Given growing global food production needs, a carbon-neutral agricultural sector may be difficult to achieve in the short term. Therefore, it may be more appropriate to focus policy interventions on meeting global food production requirements without commensurate increases in emissions. Climate change mitigation may be achieved through greater efficiency in agricultural production (thereby lowering the emissions "intensity" per unit of production) and in some cases through absolute reductions in greenhouse gas emissions, including removal through sequestration in agricultural soils and biomass. However, increasing the profitability of agricultural lands can act as an incentive to expand them, often at the expense of forests. Policymakers must consider these interconnected and dynamic opportunity costs to farmers

and forest communities when faced with the multiple objectives of meeting agriculture and adaptation needs, forest conservation goals, and climate change mitigation targets. Integrated land-use planning and landscape approaches may help in the development of appropriate policies as they allow the integration of multiple goals within spatial planning.

Effective mitigation policies could also increase the capacity of farming and food systems to cope with climate change while maintaining or increasing food production. Both farm-level adaptation options and higher-level policies and investments to enable their adoption will be necessary for effective agricultural adaptation. In addition to agricultural measures, there is considerable scope for adaptation throughout the food chain; for example, better post-harvest storage and distribution of food could have a significant positive effect.

National policies and early action. Although there is widespread recognition that the challenges of food security and climate change are closely linked within the agriculture sector, too often, policy, institutional arrangements, and funding channels for climate change, food security, and rural development are poorly coordinated at international levels, and in many cases, at national levels. Early action on climate change in the agricultural sector allows countries to prepare for near- and longer-term agricultural adaptation and mitigation action, closely linked with national food security and development efforts. The concept of climate-smart agriculture focuses on maximizing benefits and minimizing negative trade-offs across the multiple objectives that agriculture is being called upon to address: food security, development, and climate change adaptation and mitigation.

There is as yet no blueprint for climate-smart agriculture. However, there are a number of "early action" measures countries and communities could take to facilitate confidence, capacity, knowledge, and experience to transition to sustainable, climate-smart agricultural production systems. Such measures include data collection, policy development, and the support of demonstration activities. Pursuing early action activities will result in country-specific data and knowledge as well as experience with agricultural practices and policies that could inform long-term national strategies. A strategy that brings together prioritized action, financial incentives, investment policies, institutional arrangements, tenure security, and aggregating mechanisms constitutes an important step in the transition to climate-smart agriculture.

Trade dimensions. Feeding the world's population in a context of climate change will require a gradual and significant expansion of transborder exchanges of agricultural products. It will be imperative to ensure a mutually supportive approach between climate change and trade policies as they relate to agriculture. The biophysical impacts of climate change will alter crop and animal productivity and will further accentuate current trends toward higher food prices. As a result, developing countries' agricultural imports are expected to double by 2050 due to climate change. This evolution is mirrored by a similar increase in developed-country exports. These changes will affect individual countries differently depending on the extent to which they rely on agricultural trade as part of their food security and development strategy. International

trade, combined with increased investment in agriculture, can provide an important mechanism to offset climate-induced production decreases in certain regions, and secure access to and availability of food that otherwise may be scantly accessible through domestic production.

Some of the climate change mitigation (response) measures that have emerged in recent years—such as carbon standards and labeling, subsidies for reducing greenhouse gas emissions or promoting alternative energy sources (e.g., biofuels), discussions on border tax adjustments, and free emission allowances under cap-and-trade schemes—may pose challenges to existing trade agreements, depending on how they are designed. Overall, however, good-faith climate change policies are unlikely to breach existing multilateral trade rules, either because they would not be discriminatory or because, if they are, they may be covered by the general exception under the World Trade Organization's (WTO) General Agreement on Tariffs and Trade (GATT) Article XX. Many potential conflicts can be avoided if international consensus on a climate change framework is reached. Possible avenues to advance discussions on trade and climate change can be explored under the Convention and/or in the multilateral trading system.

Enabling conditions. Adopting agricultural practices that are able to withstand changes in climate and contribute to the reduction of greenhouse gas emissions require the application of new technologies, the modification of existing ones, and changes to relevant laws and policies. Technology deployment and related capacity building in agriculture comes with significant costs for which developing countries, in particular, need financial support.

Under the Cancun Agreements, developed countries confirmed their commitment to provide new and additional resources, including forestry and investments through international institutions, approaching US$30 billion for the period 2010–2012 and to mobilize US$100 billion annually by 2020. In the context of agricultural mitigation and adaptation, the following international financing channels may be considered: the Global Environment Facility Trust Fund, UNFCCC and Kyoto Protocol-mandated financing, and—in the future—the Green Climate Fund. Relevant mechanisms to channel mitigation finance for agriculture into developing countries include a reformed clean development mechanism, finance for nationally appropriate mitigation actions or for reducing emissions from deforestation and forest degradation.

Although international climate finance is likely to be scaled up in the future, it is unlikely to address the investment needs for adaptation and mitigation in developing countries. It is, therefore, necessary to use public funds strategically to remove investment barriers and facilitate private investment and to effectively blend traditional agricultural finance with climate finance. Capacity building and institutional strengthening have to complement these efforts to enable individuals, communities, institutions, and other entities to make effective use of available knowledge, resources, and technologies.

The Cancun Agreements defined the broad architecture and functions of a technology mechanism, although without providing the specifics on how the bodies under the mechanism

should operate, what their precise priorities should be, or how their activities would be funded. Existing national technology needs assessments identify agriculture and forestry as a priority sector. Harnessing the potential of the technology mechanism to promote the research and development, demonstration, deployment, diffusion, and transfer of agricultural mitigation and adaptation technologies requires the mapping of possible options, proposals, and points of intervention in current discussions about the operationalization of the mechanism.

Measurement and performance. The Convention formulates requirements for performance and benefits measurement for both mitigation and adaptation. Reporting on vulnerability and adaptation occurs through national communications, in relation to national adaptation programmes of action in least-developed countries, and in the context of the operations of the Adaptation Fund. For measurement of adaptation performance, there is no consensus on indicators, frameworks, or methods to use, but emerging practice indicates that results-based frameworks are a suitable approach to track progress in implementing specific adaptation actions and to ensure accountability for the use of adaptation funds.

Approaches to measure mitigation impacts in agriculture already exist at international, national, sectoral, and project levels. Although there is relatively strong consensus on agricultural greenhouse gas reporting frameworks, measurement of agricultural mitigation actions is hampered by inherent variability in agricultural emissions and removals, and by a lack of available data and limited capacities for measurement in many countries. The former can be provided by strengthening existing agricultural monitoring and evaluation systems. Even within developed countries that have elected to account for cropland and grazing land emissions in the Kyoto Protocol's first commitment period, uncertainties associated with agricultural emissions range between 13 and 100 percent. Therefore, there is a strong global interest in improving the emission factors of the Intergovernmental Panel on Climate Change, and for individual countries to move toward more accurate and precise measurement frameworks.

Given the need for increased food production in the future, efficiency-accounting approaches that incentivize increased food output while reducing the intensity of greenhouse gas emissions per unit of output are relevant. Efficiency-accounting (life-cycle) approaches measure the emissions intensity per unit of output. Methods are still under development for many products are data demanding. Given the diversity of agricultural production systems, standardized approaches may not suite all contexts, presenting an obstacle to comparability within and among countries.

Conclusions. Climate change adaptation and mitigation in the agriculture sector will have to be pursued in the context of meeting projected global food production demands. Although there are practices that hold great potential for meeting both needs, there is as yet no international agreement, nor national or global policy framework within which to operate. Given this situation, early action holds great potential for countries to take positive action in the short run that can inform national and international policy, finance, and science. Potential conflicts with the international trading system can be addressed with the continued maturation of global climate policy. The ability to act depends on improved measurement systems, tools, and techniques for adaptation and mitigation. There is some cause for optimism, however, based on the trajectory of work to develop these approaches.

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About Meridian Institute

The Meridian Institute is a not-for-profit organization whose mission is to help people solve problems, make informed decisions, and find solutions to some of society's most complex and controversial problems. Meridian's mission is accomplished through applying collaborative problem-solving approaches including facilitation, mediation, and other strategic consultation services. Meridian works at the local, national, and international levels and focuses on a wide range of issues related to natural resources and environment, science and technology, agriculture and food security, sustainability, global stability, and health. For more information, please visit http://www.merid.org.

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