

Agriculture in the COP21 Agenda



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In a few weeks, world leaders and international negotiators will gather in Paris, home of the famed *Champs-Élysées*, to establish a new generation's global climate accord. However, the agreement is not likely to delve into the sector-level practicalities of how countries will achieve the relevant targets. From the perspective of agriculture, one of the foremost drivers and burden-bearers of climate change, the COP21 agreement might best be dubbed "*Les Champs-Oubliés*," or forgotten fields, since it will largely neglect this fundamental concern of societies everywhere.

What is the relationship between agriculture and climate?

There are at least four core dimensions to the global agriculture-climate challenge.

1. First, humanity needs to substantially increase the amount of food it produces in order to meet the needs of a growing population and rising average incomes per person, the latter of which is linked to greater demand for animal products. By 2050, the world needs to produce at least 50 percent more food than it does today.
2. Second, agriculture accounts for approximately 14 percent of greenhouse gas emissions, and 25 percent when including forestry and other land use. The major drivers of the problem are deforestation, soil and nutrient management, and livestock emissions, so a "business as usual" (BAU) approach to boosting global food production would have substantial negative consequences for climate change.
3. Third, due to its dependence on the biophysical environment, agriculture is the economic sector most uniquely susceptible to changes in climate patterns. The effects are highly place- and crop-specific. Some geographies, such as the Sahelian region of Africa, have already experienced a significant long-term decline in precipitation. Other regions, especially in Asia, have seen increases in both inland and coastal flooding. Meanwhile, colder regions like Canada, Russia, and the Nordic countries may see their farms benefit from warming temperatures, linked to longer growing seasons and expanded opportunities for planting. Across all regions, pests and dis-



eases are likely to diffuse in new patterns under changing physical environments. In the worst case, major long-term warming will have disastrous agricultural consequences in many places. There is evidence to suggest that if local temperatures rise more than 4 degrees Celsius above pre-industrial levels, then many farming systems and natural ecosystems will be significantly compromised.

4. Fourth, the human costs of climate change are unequally spread. Many of the most significant agricultural consequences of climate change, such as extreme drought and flooding, are already being born by individuals and societies with the least ability to withstand shocks. There is also considerable evidence that increased temperatures are statistically linked to worse economic outcomes and even to higher risk of violence.

‘Climate-smart agriculture’

To address these issues, there is a global imperative to promote “climate-smart agriculture” (CSA)—meaning agriculture that uses inputs as efficiently as possible, is resilient to climate change, and significantly decreases greenhouse gas emissions, while still meeting the demand for food. On the mitigation side, agriculture’s main GHGs are nitrous oxide and methane, rather than carbon dioxide. Much of the medium-term solution lies in better carbon capture in soils, either through avoidance of carbon release or increased sequestration, although this is something of a one-off generational gain, since carbon sinks might saturate within 25 to 35 years.

A host of practical steps are needed to mitigate agriculture’s GHG emissions. They include better grassland management; restoration of degraded land (through steps like revegetation, reduced tillage, and water conservation); and improved cropland management (through steps like improved crop rotations, increased use of cover crops, reduced burning of residue, improved fertilizer application, and better water and nutrient management for rice). Livestock-driven methane emissions present around 10 percent of the sector’s abatement potential. They can be reduced through dietary adjustments, improved manure management to recapture nutrients and energy, and even changes in breeding practices. Reducing post-harvest food loss and post-retail food waste is also vital to decreasing the volume of food that must be produced.

The adaptation side of agriculture has multiple components, too—all of them dependent on the place-specific climate challenges. For rain-fed farming systems facing increasing propensity of drought, as in many parts of sub-Saharan Africa, one of the most important priorities is expanded access to irrigation, especially small-scale irrigation. For many parts of Asia, the opposing challenge of flood resistance is paramount, often tackled through improved seed varieties. Soil management is meanwhile crucial for strengthening the biological, chemical, and physical conditions under which crops are able to resist climate shocks. Insurance instruments are important for pooling risk and responding quickly to shocks when they arise.

Agriculture in Paris: Frail but not fallow

The U.N. Framework Convention on Climate Change (UNFCCC) has historically given short shrift to agriculture. Coming out of the Conference of the Parties in Lima last year (COP20), there was hope that agriculture would receive specific attention in Paris, but the draft agreement issued in early October 2015 indicates this is not likely to be the case. Instead, most of the implications for agriculture will be indirect, and overall Paris outcomes will be framed by general parameters. They will also be indirectly defined by the country-level strategies that have been presented through Intended Nationally Determined Contributions (INDCs) submitted in the lead-up to Paris. As of late October 2015, 155 countries, accounting for roughly 90 percent of global emissions, have submitted strategies, many of which include adaptation or mitigation actions in the agricultural sector.

Alongside the formal COP process in Paris, a large number of stakeholders will also participate in the Global Landscapes Forum, a major event first launched alongside the Warsaw COP in 2013. It convenes thousands of people from government, business, science, and civil society to discuss the interwoven challenges of climate and development. This year's forum will focus on issues like promoting support for the role of landscapes in climate solutions, beyond avoided deforestation; linking sustainable supply chain commitments to increased investments in sustainable landscapes; and strengthening the role of indigenous communities in decision-making for land management.

The INDCs are a mixed bag for agriculture

Country-level actions outlined in INDCs will likely be the most important COP21 outcome for agriculture. The challenge here is a lack of clear benchmarks. Much of the follow-up work will need to be addressed by the UNFCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA), which links the policy negotiations to the technical communities. SBSTA needs to ensure there are clear standards for comparing and assessing the agricultural components of national CSA strategies. A number of initiatives are working in this direction. The Food and Agricultural Organization (FAO), for example, has launched the Economics and Policy Innovations for Climate-Smart Agriculture (EPIC) program. Meanwhile the World Bank and a number of agricultural research institutions have collaborated to develop an index-based country profile approach. These might all serve as useful starting points for more formal global standards.

A quick examination of submitted INDCs highlights the variation in country-level approaches to climate and agriculture. Advanced economy agricultural producers like Australia, Canada, and the United States do not mention specific emissions reductions in agriculture, apart from a brief mention that the sector will be included. The European Union identifies more specific areas within agriculture for emissions reduction, but does not clarify how those emissions will be measured.

Some large developing economies with major agricultural sectors are more specific. In Ethiopia, for example, livestock and crop cultivation are estimated to be responsible for more than half of total

emissions as of 2010. The share grows to around 85 percent of emissions when forestry is included. To achieve the country's goal of reducing 2030 emissions by 64 percent compared to fast-growing BAU trajectories, the government expects the vast majority of its reductions (around 86 percent) to come from the agriculture and forestry sectors.

Actions by major agricultural emitters will be important to watch. In India more than half the labor force is still employed in agriculture. The country produces the world's second-largest volume of agricultural emissions, after China, but its INDC emphasizes adaptation in agriculture rather than mitigation. Nonetheless, many of India's strategies to address agricultural adaptation will also support mitigation, such as the promotion of crop genotypes that consume less water, are more climate-resilient, and have enhanced potential for CO₂ fixation. The strategy also seeks to capture 2.5 to 3 million tons of carbon dioxide through expanded forest and tree cover by 2030.

Brazil is the third-largest agricultural emitter. Its INDC outlines a strategy to restore 15 million hectares of degraded pasturelands and to enhance 5 million hectares of integrated cropland-livestock-forestry systems by 2030. It also commits to strengthening South-South cooperation in low-carbon, resilient agriculture and reforestation activities.

Indonesia, a large emerging economy, is a major agricultural emitter and the top emitter in land-use change and forestry. Its INDC pledges a 29 percent decline from BAU scenarios by 2030, with a focus on improving land use, since 63 percent of its emissions come from land-use change, and peat and forest fires.

Some countries have made pledges conditional on international support. In Bangladesh, for example, the INDC's unconditional mitigation commitments are for 5 percent emission reductions by 2030, compared to BAU. Beyond that, however, the government outlines a variety of specific incremental measures that could be taken in agriculture, contingent on international support. These include a 50 percent reduction in draft animals, through increasing mechanization; a 35 percent increase in the share of organic compared to inorganic fertilizer; and expanding alternative wetting and drying irrigation for 20 percent of all rice cultivation.

Common priorities

International cooperation will be essential to advance the public goods required for individual countries' long-term success. Science and research will undoubtedly continue to play an especially major role in both adaptation and mitigation. The Consultative Group for International Agricultural Research, or CGIAR system, for example, can make crucial contributions through its collaborations with national agricultural research centers to develop location-appropriate seed varieties that are resistant to fluctuations in temperature and precipitation. The \$10 billion Green Climate Fund has identified climate-resilient agriculture as one of its five investment priorities. The Bill and Melinda Gates Foundation also allocates approximately \$100 million per year to agricultural research centers. At a SBSTA

workshop in June, countries highlighted the importance of early warning systems and contingency plans linked to extreme weather events.

Private sector resources will play a critical role. Financial innovations can, for example, support adaptation strategies through proactive public-private participation. African Risk Capacity, a specialized agency of the African Union, uses risk pooling and other modern finance mechanisms to offer insurance against extreme weather events, providing governments with direct payouts when specific climate metrics are crossed. The Caribbean Catastrophic Risk Insurance Facility was created with a similar underlying logic.

Official development assistance is crucial too. Unfortunately, funding for adaptation remains only a small share of total ODA. Research conducted for the [Ending Rural Hunger project](#) indicates that, for most donor countries, less than 20 percent of bilateral projects to promote food and nutrition security—already a very small share of ODA globally—target adaptation as the concept is classified by the OECD. The corresponding figure for mitigation is less than 10 percent.

Next steps

Paris is set to establish the meta-frame for international climate cooperation beyond 2020, generating tremendous political attention around the world. The next step will be to translate that momentum quickly into the sector-level action required if the accord's ambitions are to be realized. For agriculture, the real work will take place in country- and landscape-specific strategies to tackle interwoven efficiency, adaptation, and mitigation challenges while promoting food security. In many cases the INDCs offer a starting point. But common standards are urgently needed to promote the local innovations and implementation strategies that tackle the priorities at scale. To achieve climate success, the fields cannot be forgotten.

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