
# Background Brief

## Resilience, vulnerability and climate-smart agriculture

This background brief has been jointly produced by
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Land use change and agriculture account for 24-30% of global greenhouse gas (GHG) emissions. Deforestation and forest degradation are estimated to be responsible for at least 11 of that amount. If sequestration from reforestation and afforestation are excluded, the share of global GHG emissions rises to nearly 20%. According to the US Environmental Protection Agency, agricultural production accounts for about 10-12% of the total global anthropogenic emissions of GHGs or between 5.1 and 6.1 $GtCO_2e$ per annum. Between 1990 and 2010, emissions increased by around 18%, with a greater increase after 2005. Emissions are expected to continue to increase due to increased demand for food as populations grow, and higher income leads to dietary shifts resulting in more meat consumption.

At the same time, climate change is already negatively affecting forestry, agriculture and rural communities. The IPCC's Fifth Assessment Report predicts an average decline of 8% in crop productivity across Africa and South Asia, with staples such as wheat, maize, sorghum and millet yields being affected most seriously. A decrease of up to 40 percent in tropical fisheries yields is also predicted. Actions in both the agriculture and forestry sectors can contribute to reducing emissions, and to enhancing resilience and reducing vulnerability of rural populations around the world.

There is significant technical and financial potential for reducing emissions from agriculture – but also limitations to what agriculture can do. The technical mitigation potential (considering all gases and sources) by 2030 is estimated to be between 4.5 and 6.0 Gt $CO_2e\ yr^{-1}$. However, doing this is expensive, and estimates of the economic potential for emission reductions by 2030 are considerably lower than the technical potential. Emissions reductions between about 8 and 20 percent are achievable, depending on the price of carbon. Thirty percent of this potential can be achieved in developed countries and 70 percent in developing countries.

To meet the food demands of the world's growing and increasingly affluent population, expected to exceed 9 billion by 2050, production will have to increase by between 60 and 110 percent. At the same time, the impact of agricultural practices on soil fertility, land degradation, water use and biological diversity needs to be reduced to ensure that our use of natural resources does not undermine the carrying capacity and provisioning of ecosystem services long term.

Meeting the growing demand for food and commodities does not need to be at the expense of converting high conservation value forests or forests with watersheds or other ecosystem benefits. There are opportunities, through integrated agricultural practices, more efficient use of inorganic inputs, sustainable intensification, investments in degraded lands, and reduction in processing and consumption waste, for making increased food production compatible with the broader agenda or climate resilience and adaptation

International policies (e.g. REDD+, CDM, NAMAs, NAPs) as well as national climate strategies and voluntary platforms (e.g. the recently launched Global Alliance for Climate-Smart Agriculture) provide opportunities to connect agricultural development with sustainable management of natural resources, mitigation and adaptation. But policy makers and practitioners at international, national and subnational levels face financial, technical and social challenges in the development and implementation of mitigation and adaptation policies and measures.

## Common misconceptions

Climate-smart agriculture (CSA) is often mistaken for a specific agricultural technology or practice, and even as a labeling methodology used to define quality. CSA is in fact a process by which a set of methodologies for farming systems is tailored in the context of an enabling environment (including policy, financial and institutional framework alongside access to resource). This holistic approach is built upon site-specific assessments of needs, potential synergies and trade-offs. CSA prioritizes increases in productivity and resilience to climatic change in agricultural production systems. It has sometimes been misunderstood to promote the reduction of greenhouse gas emissions to the detriment of productivity and resilience, which is not the case. Mitigation is only considered in cases where co-benefits with productivity resilience increases are possible. Neither is CSA limited to the agricultural sector – other sectors such as forestry play a key role for sustainable agricultural practices.

Reducing emissions from deforestation and forest degradation (REDD+) was initially proposed as a low cost and easy means to begin cutting anthropogenic emissions of GHGs in the Stern Report. However, to professionals with experience in tropical forestry, it is not surprising that REDD+ is proving to be much harder to implement than expected. Deforestation and forest degradation have a long history and powerful interests have a stake in their continuation. The challenge is to create a system that provides forest users with economic incentives that reflect the value of the carbon stored in trees. Building that system is an ambitious political, economic and social project.

## Key points of debate

The high-level panelists will discuss the critical elements that need to be put in place for successful forests, agriculture and land use in the new climate regime.

Presenters will demonstrate how creating the correct financial, policy and institutional enabling environment, complemented by knowledge transfer systems, access to natural resources as well as markets and financial services, will empower farmers and allow them to transition to systems that are sustainable, productive and resilient to shocks.

Any change to regulating land use will have impacts on current land uses. As mitigation programs are implemented, there are challenges of ensuring local rights are recognized and protected and that communities do not lose access to and use of land and forests. Livelihoods of rural peoples need to be protected and enhanced through mitigation schemes.

Mitigation schemes are agreed and mandated at national levels, but implemented at local and regional levels. There is a need for integrating these national objectives with subnational realities in appropriate ways that take into account local realities and local aspirations for development.

Much of the discussion in the climate change arena has focused on adaptation as separate from mitigation. In land-based sectors an integrated approach to forestry and agriculture (landscape management) can be beneficial and generate greater benefits than a sector specific approach. An integrated approach to climate change action: adaptation-based mitigation could be a no-regrets option if done deliberately and carefully. The challenge has been on how to effectively operationalize this concept.

# Recommendations

- To facilitate the implementation of CSA, four actions are recommended: expanding the evidence base and assessment tools to identify agricultural growth strategies for food security that integrate mitigation and adaptation; building policy frameworks to support implementation at scale; strengthen national and local institutions to enable farmer management of climate risks and appropriate CSA practices, technologies and systems; and enhance financing options to support implementation, linking climate and agricultural governance.

- Policy makers need to consider the full range of policy measures, including the establishment of financial incentives mechanisms to promote the wider adoption of best practices in forestry and agriculture that reduce GHG emissions and improve resilience to climate variability.

- Given the importance of agricultural emissions and vulnerability of the sector to climate change and climate variation, it will be essential to find ways to produce more food while emitting less GHGs. Progress can be made if the right incentives that generate more country or region specific knowledge to support better, less polluting agricultural practices are in place.

- Building on experience from REDD+, efforts to reduce emission from agriculture and land use will need to safeguard communities rights and access to land resources, as well as identify low-emission agricultural management practices that are economically viable and help conserve ecosystem functions and biodiversity. Social responsibility and environmental sustainability are key functions.

- Best practice guidelines for developing appropriate strategies for Ecosystem-Based Adaptation (EBA) practices can help reduce vulnerability of forestry and agriculture to climate variability. These strategies can complement other adaption strategies, be cost effective and sustainable, and generate environmental, social and economic cultural benefits.

- The international processes that are being coordinated by the United Nations can be a motor for change, but ultimately governments, the private sector, civil society and farmers are going to have to work together to implement better land stewardship in real places.

## Remaining knowledge gaps

- In order to provide a mechanism to support and coordinate the adoption of CSA, the Global Alliance for Climate-Smart Agriculture was launched in September 2014. With membership from governments, civil society, non-governmental organizations, multi-lateral and international organizations and private sector, the focus of the ACSA is on knowledge, investment and enabling environment. The NEPAD led Africa Climate-Smart Agriculture Alliance, launched in May 2014, will develop a road map to stimulate the uptake of CSA with focus on the most vulnerable rural communities.

- Further work is needed to improve assessments of GHG emissions from agriculture, to improve management practices to ensure environmental integrity, to design efficient policies to implement GHG mitigation, and to strengthen the potential of agriculture to contribute to producing renewable energy. Better country-specific information on the mitigation potential of different practices for agriculture will help countries design the most appropriate portfolios of mitigation practices. The information on mitigation potential contained in the IPCC AR4, AR5 and FCCC/TP/2008/8 provides a good starting point, but does not provide the necessary level of regional/national disaggregation needed for national implementation.

- Adaptation based mitigation approaches can meet short term needs to reduce vulnerability to climate change and enhance resilience while reducing the GHG emissions of land-based sectors. Additional work is needed to understand how to operationalize adaptation based mitigation, both through policies, incentives and mechanisms for coordination, harmonization and cooperation among ministries (especially ministries responsible for agriculture, water, land and forests).

- Identifying synergies and co-benefits that may exist in relation to climate change policies, sustainable development, food security, energy security, and improvements in environmental quality would make mitigation practices more attractive and acceptable to farmers, land managers and policy makers. Understanding trade-offs is equally important so that appropriate decisions can be made.

The thematic area on forests, agriculture and land use in the new climate regime explores these opportunities and shares lessons and linkages among sectors in the landscape and how to feature these in a future climate agreement.

## Literature

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