



Submission in response to the invitation to accredited observer organizations to provide views on: Enhanced action on mitigation, Cooperative sectoral approaches and sector-specific actions, in order to enhance the implementation of Article 4, paragraph 1(c), of the Convention, (SBSTA). Views from Parties and accredited observer organizations on the issues related to agriculture referred to in paragraph 75 of decision [-/CP.17] Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention.

The Research Program on Climate Change, Agriculture and Food Security (CCAFS) of the Consortium of International Agricultural Research Centers (CGIAR) thanks SBSTA for the opportunity to make available to Parties its views on the key issues to take into account during discussions in the SBSTA forum leading to the possible implementation of a work program on agriculture.

Agriculture will be affected both by *long-term trends* in mean temperature, precipitation and winds, and by increasing climate *variability*, associated with greater frequency and severity of extreme events such as droughts and floods. Changes in hydrological cycles will have major impacts on agricultural production. Agriculture contributes to food security not only via agricultural production but also through provision of livelihoods and incomes to many millions of small-scale, resource-constrained farmers, fishers, livestock herders and harvesters of wild products. In addition, agriculture is a major contributor of greenhouse gas emissions, while having high potential for mitigation. Not including land use change, the total technical potential for mitigation in the agricultural sector is calculated as 5.5-6 Gt CO₂-eq per year, which is almost equal to the current total annual emissions of 5.1-6.1 Gt CO₂-eq per year.

The role of the CGIAR and CCAFS

CCAFS is a 10-year international research initiative between the CGIAR and the Earth System Science Partnership (ESSP) that seeks to overcome the threats to agriculture and food security in a changing climate, exploring new ways of helping vulnerable rural communities and poor urban food consumers adjust to global changes in climate. Launched in 2011, the over-arching objectives of CCAFS are: (i) to identify and test pro-poor adaptation and mitigation practices, technologies and policies for food systems, adaptive capacity and rural livelihoods, and (ii) to provide diagnosis and analysis that will ensure cost-effective investments, the inclusion of agriculture in climate change policies, and the inclusion of climate issues in agricultural policies, from the sub-national to the global level in a way that brings benefits to the rural poor.

CCAFS, on behalf of all of the CGIAR Centers, is well placed to assist SBSTA as a research partner going forward. CCAFS works in close partnership with a number of global organizations and initiatives, including the Food and Agriculture Organization of the United Nations (FAO) and the Global Research Alliance on agricultural greenhouse gases. The work of CCAFS addresses both adaptation and mitigation, with a strong emphasis on tools and approaches to maximize the synergies and successfully navigate the trade-offs among food security, adaptation and mitigation. A key focus is to bridge gaps

between science and practice, by involving researchers, farmers and policy-makers to integrate their needs into the tools and approaches that are developed.

Considerations for SBSTA in discussions on establishment of a work program on agriculture

SBSTA may wish to take the following into account in discussing the establishment of a work program:

1. Agriculture provides unique opportunities to address adaptation and mitigation together.

Agriculture is a distinct sector in its fundamental role in providing the food security that underpins human survival and development. Assuring the continued provision of food security of vulnerable populations, both rural and urban, should be the primary goal of treatment of agriculture within the UNFCCC process. The role of agriculture in providing food security stems not only from the direct provision of food but, perhaps more importantly, in its provision of livelihoods and incomes to producers, processors and traders. Actions in agriculture that favour livelihood and employment opportunities enable poverty reduction and hence food security.

Assuring the continued role of agriculture in food security under climate change will require attention predominantly to measures in support of adaptation, supplemented by mitigation measures that reduce greenhouse gas emissions and set agriculture on a low emissions pathway of intensification within a timeframe that minimizes the negative impacts of climate change on food production. SBSTA will note that many of the technical actions proposed for adaptation in agriculture also deliver on near-term food security and on mitigation. Examples include interventions to reduce post-harvest losses and minimize wastage in the food delivery system, or breeding for new crop varieties and livestock breeds that produce greater yields for smaller inputs of fertilizer, feed and land. However, direct trade-offs are also possible, for example where adapted varieties are more resilient to climate variability but produce lower average yields, compromising food security, or greater emissions, compromising mitigation, such as with increased use of fertilizer and irrigated crop agriculture. Good management of the many potential synergies among adaptation, food security and mitigation, and the possible trade-offs, will require local-level decision-making supported by wider policy frameworks.

Ultimately a unified approach rather than separate treatment in different negotiating streams is required to achieve harmony among the multiple functions of agriculture within climate change (as a source and a sink, and in both adaptation and mitigation). Recognising that agriculture is in the Kyoto Protocol text under LULUCF, SBSTA will need to work to ensure that this is linked to adaptation and to clarify what this means for Non-Annex I countries and for agriculture under an expanded Clean Development Mechanism. A focus on national investments under NAPs and NAMAs might provide SBSTA with working examples of how to achieve harmony and synergy between adaptation and mitigation in agriculture, among other sectors. SBSTA may seek to inform how future and planned mechanisms, such as the Green Climate Fund, might support integrated interventions in agriculture that seek to balance food security, adaptation and mitigation.

2. Landscape-wide and food-system-wide approaches are needed for both adaptation and mitigation in agriculture.

Specific interventions only make sense within the overall context for any given agricultural system or food system. There may not be any net mitigation effect if interventions to sequester carbon, for example, displace emissions to other parts of the landscape or food chain. Benefits to both mitigation

and adaptation need to be weighed against other benefits that agriculture provides, in terms of environmental services (e.g. biodiversity and water) and social well-being (e.g. poverty and gender equity). Agriculture is the primary driver of land use conversion of forests, grasslands, and wetlands. Much of agriculture's mitigation potential lies in providing incentives for maintenance of high-carbon landscapes, particularly through coordination with REDD+. Forestry and agricultural perspectives need to come together to stimulate synergies between food security and mitigation, as well as building the adaptive capacity of these land-based activities. The landscape level is also appropriate to planning of adaptation interventions, to ensure the appropriate balance between public provision of essential infrastructure (e.g. roads, waterways and water storage, food storage) and incentive mechanisms for on-farm autonomous adaptation. Similarly, a food-system-wide approach ensures that any gains to adaptation or mitigation in agriculture are not undermined, for example, by wasteful practices in retail, catering or household sectors. Internationally, negotiations on trade, measurement, finance, technology transfer, and capacity development will be important to achieving a balance among the various objectives of agriculture.

At the national level, Parties may seek to develop holistic Climate Change Action Plans that bring together adaptation and mitigation into landscape-wide and economy-wide contexts as the best means of ensuring that climate-motivated actions in agriculture contribute to food security. A key component to which the CGIAR might contribute is the testing of scenarios for agricultural development pathways that reduce potential emissions, while enabling increased food security and adaptation in agriculture, both through direct food production and through provision of agricultural incomes and sustained livelihoods. The testing should include scenarios for (i) intensification and more efficient use of inputs and reduction of waste at the farm level, (ii) intensification and reduced land use conversion at the landscape level, (iii) alternative scales and spatial distributions for production to meet a range of food security objectives involving different mixes of regional as well as local production and trade. This work could contribute to improve targeting of investments by the Green Climate Fund.

3. Agriculture offers options for immediate context-specific actions, transfer of technology and learning among Parties, and areas for further research, to improve achievement of food security, adaptation and mitigation.

As climate change progresses, all Parties – not only those with significant populations of resource-constrained small-scale producers – will need to step up and support the development and uptake of technologies for climate resilient agriculture. Technical options for adaptation and mitigation in agriculture need to be tailored to specific agro-ecological, social and cultural contexts and cannot in general be identified *a priori* at the global level. Many of the most effective options are likely to build on, or scale up, current practice. This means that although technical options must always be locally appropriate, there is nonetheless considerable opportunity for transfer and learning across countries, farming systems, or agro-ecological zones. This holds for both technically sophisticated innovations (e.g. enteric fermentation) and simple low-cost adjustments (e.g. changes to planting and harvesting calendars), and for both technical and institutional interventions. Investment is needed now in technical and in institutional dimensions of adaptation and mitigation, particularly to support small-scale farmers in dealing with already increasing variability in climates, and to embark on longer-term adaptations, particularly options such as animal and plant breeding that have long lead-times.

Areas for further exploration include both technical and institutional mechanisms, linking adaptation and mitigation. Here the CGIAR can play a supportive research role. On the technical side, the key

challenge will be to identify the portfolio of cost-effective options for small-scale farmers for adaptation and mitigation in specific production systems and regions. A major coordinated data collection effort is needed to reduce the uncertainty associated with current emissions estimates, local-level climate change impacts, and realistic adaptation options in smallholder farming systems. On the institutional side, countries must reinvest in extension services and university education in agriculture and natural resource management. Lack of investment over the past 30 years has decimated these services in many developing countries. A range of financial and cultural knowledge and policy barriers may deter implementation of the range of immediately viable technical options. Beneficial research on institutional mechanisms might include coverage of: appropriate measures, incentives and regulations at the national level to promote adoption of appropriate adaptation practices and high-carbon landscapes; knowledge systems, extension services and multi-stakeholder platforms for learning-by-doing; instruments for financing that encourage uptake and overcome barriers to adoption; and economic safeguards for those populations most vulnerable to food insecurity. Enabling mechanisms being developed in the context of the Convention (NAPAs, NAMAs, Adaptation Fund, Green Climate Fund, technology transfer mechanisms) should be reviewed and adapted to take into account the specificities of agriculture. A key issue will be how these mechanisms might prioritize and reward options that deliver multiple benefits to food security, adaptation and mitigation.

4. Address agriculture as a driver of deforestation under REDD+

REDD+ is an opportunity to establish policies, institutions and capacity to address agricultural drivers of land conversion. Agriculture contributes to about three-quarters of tropical deforestation and most studies predict that the expansion of croplands and grasslands will continue to be the dominant cause of land-use change in the future. As pressures for food production increase, policies should be in place to address agricultural expansion, recognizing that the underlying causes vary by country and change over time. Options include aligning REDD+ readiness, financing and targets with:

1. **Agricultural intensification and the siting of agriculture.** REDD+ finance and actions could decrease forest conversion by supporting:
 - a. Policies to sustainably intensify agricultural production and stabilize food security in the face of increasing climate change impacts. For example, REDD+ can be linked to investments in adjacent agricultural development and monitoring and enforcement of boundaries across forest-agriculture landscapes (Brazil's Proambiente project). Support for agricultural intensification activities that increase carbon storage (such as agroforestry), combine animal husbandry and food production (Mexico's PROGAN ecológico) and are geared towards increasing soil fertility (Brazil's success with techniques for fixing nitrogen that decreased use of fertilizers) could further enhance climate benefits.
 - b. Promotion of more efficient use of land by appropriate siting of small- and large-scale agricultural expansion, steering agricultural expansion to already degraded lands (with low carbon sequestration potential) and providing agricultural extension services to priority landscapes where the conflicts with REDD+ are most likely.
2. **Cross-sectoral policy and implementation.** REDD+ readiness and financing could assist agricultural policies to better support REDD by facilitating
 - a. Alignment of REDD+ with national low carbon development planning, comprehensive climate change action plans, transparent and enforced land use planning, local government administration, and the allocation and enforcement of land rights.

- b. Development of shared modalities with NAPAs and NAMAs so that funding directed to agricultural and biofuel initiatives does not conflict with REDD+ performance.
- c. Measurement, monitoring and reporting (MRV) systems that account for the role of agriculture in forest landscapes. MRV should enable identification of optimal land uses and land use change for rubber or oil palm plantations and swidden agriculture where the distinction between forest and agricultural practices is not always clear.
- d. Development of decision support tools, linked to policy formulation, that help reconcile sectoral conflicts and trade-offs, such as Argentina's deforestation risk index and Kenya's spatially-explicit future trajectories of emissions or removals under different economic and development scenarios.
- e. The role of government action in addressing demand-side and market pressures, recognizing that the causes of agricultural expansion are a mix of institutional, market, technological and demographic factors. Competitive bids for agricultural investments could be screened for their compatibility with REDD+. Acre, Brazil offers a model for how to promote best practices and property certification (including payments) for small and large agricultural producers via their Programme for Valuing Environmental Assets. Panama's community environmental business and investment programmes (as an alternative to slash-and-burn agricultural practices), and Costa Rica and Mexico's experiences with payments for environmental services stand out as success stories.
- f. Equity and welfare impacts from REDD through combined 'carrot and stick' approaches whereby forest conservation is enforced, while payments are made for poor farmers' role in reducing forest conversion.

We suggest a deliberate preparation period will be necessary to further test many these approaches and support technical and financial confidence and consensus building. Building readiness and demonstrating feasibility on the ground, and not just at the central level, will be essential to ensure practicable approaches. Support for trial projects linked to policy-making processes is needed. A global MRV framework for AFOLU that is accessible and affordable to developing countries would enable assessment of agricultural expansion and leakage. Platforms for information-sharing and technical convergence will enable early recognition and scaling up of successes.

Contact at CCAFS: Prof Bruce Campbell, Director (b.campbell@cgiar.org)