Event Summary

Climate Change and Food Security in Central America: Case Studies in Adaptation

June 19, 2014
San Salvador, El Salvador

Central American countries are among the world's most vulnerable to the effects of climate change; this vulnerability includes impacts on agriculture due to changes in rainfall and the increased intensity and severity of extreme weather events. Food security is already tenuous in a region where the agricultural sector is largely composed of small farmers, with climate change and variability increasing the challenges faced by national governments, regional organizations, and farmers themselves.

On June 19, 2014, the Latin American Program of the Woodrow Wilson Center, in coordination with USAID/El Salvador and the Comisión Centroamericana de Ambiente y Desarrollo (Central American Commission on Environment and Development, CCAD), convened a group of experts and practitioners to discuss climate change adaptation and food security in Central America. As part of the seminar "Cambio Climático y Seguridad Alimentaria en América Central: Casos de Estudio de Adaptación" (Climate Change and Food Security in Central America: Case Studies in Adaptation), representatives from NGOs and government ministries in eight different countries gathered in San Salvador, El Salvador, for a wide-ranging discussion that included a focus on gender roles and impacts and related issues of population dynamics.

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Participants included representatives of the Sistema de Integración Centroamericana (SICA): Manuel Jiménez Umaña of the Consejo Agropecuario Centroamericano (CAC); Víctor Ramírez of the Centro de Coordinación para la Prevención de los Desastres Naturales (CEPREDENAC); Patricia Ramírez of the Comité Regional de Recursos Hidráulicos (CRRH); and Christa Castro Varela of the Comisión Centroamericana de Ambiente y Desarrollo (CCAD). Sandeep Bathala of the Wilson Center presented on women's roles in climate change adaptation and food security, including the linkages between these challenges and population dynamics and reproductive health. Nancy McCarthy of Lead Analytics, who has also worked with the Food and Agriculture Organization of the United Nations (FAO) and on the Fifth Intergovernmental Panel on Climate Change (IPCC) Assessment Report, discussed Climate-Smart Agriculture[1] and the importance of conservation agriculture[2] and other sustainable practices to ensuring food security, as well as the challenges to implementing these practices. Jaime López Martínez and José Luis Arellano Monterrosas of the Instituto Nacional de Investigaciones Forestales Agrícolas y Pecuarias and the Comisión Nacional del Agua in Mexico (respectively), offered in-depth presentations of their collaborative work on the watersheds (cuencas) of rivers in the Sierra Madre mountain range in Chiapas, Mexico.

Climate change and variability are likely to impact (or are already affecting) each of the axes of food security in Central America—availability, access, utilization, and stability of food supplies. Representatives of SICA discussed the challenges as well as the region's need to address them. According to Manuel Jiménez of the CAC, much of Central American agriculture involves small holder or family-based production, which accounts for as much as 70 percent of internal consumption in the region. These small holders are especially vulnerable to climate change and variability, including extreme weather events and changes in rainfall patterns. Stakeholders in the region are focused on building resilience, fostering rural development, and improving competitiveness to help farmers adapt to the challenges posed by climate change. Participants highlighted the need to

[1] According to the Food and Agriculture Organization (FAO), climate-smart agriculture (CSA) is an integrative approach to address the interlinked challenges of food security and climate change. CSA has three objectives: (1) to sustainably increase agricultural productivity, to support equitable increases in farm incomes, food security and development; (2) to adapt and build resilience of agricultural and food security systems to climate change at multiple levels; and (3) to reduce greenhouse gas emissions from agriculture (including crops, livestock and ¬sheries). A CSA perspective includes local and global as well as short- and long-term considerations. See: http://www.fao.org/climatechange/climatesmart/en/

[2] According to Cornell University, conservation Agriculture (CA) involves a set of soil management practices that minimize the disruption of the soil's structure, composition, and natural biodiversity. CA has proven potential to improve crop yields while improving the long-term environmental and financial sustainability of farming. See: http://mulch.mannlib.cornell.edu/

build greater institutional capacity at the national and regional level as well as to increase investment in rural infrastructure. Speakers emphasized the importance of integrated risk management and disaster response between and among countries, considering the frequency with which extreme weather events cause impacts across national boundaries. Several speakers underscored the weakness of monitoring and forecasting systems in the region and the related lack of reliable data. They stressed the importance of better systems for information gathering, management, and sharing, such as observation networks and the creation of a regional data clearing house. Speakers also noted that budget allocations to the government bodies attempting to address these are small, a problem exacerbated by the lack of long-term planning and financing due to government budget cycles.

Population dynamics and the role of women in climate change adaptation are gaining greater traction in the climate change adaptation discussion in the region, and featured prominently in the day's discussion. Following a presentation by Sandeep Bathala, event participants broke into small groups to discuss the relationship between population dynamics, climate change, and food security. Population dynamics—including population growth, urbanization, migration, and the age and gender structures of a population—can have major impacts on development and can affect a community's resilience to climate change. Urbanization—especially rapid, disorganized, unplanned urbanization—influences a population's vulnerability and resilience to natural disasters and climate trends. There is often little institutional support for migrants, including those who move to urban areas after natural disasters. In Central America, rural-urban migration is affecting populations in both areas. Migration is often driven by loss of productive land and unequal land distribution, which is exacerbated by a concentration of population in areas where land is most vulnerable to climate change, for example, in coastal areas. Population growth in Central America—determined by fertility, mortality, and migration—also impacts climate change dynamics. Rural populations are growing at a faster rate than in urban areas, often with the fastest growth in the most vulnerable areas. With land in many of these zones losing productive capacity, thereby forcing more rural-urban migration, there is a need to work with rural community leaders regarding education on the benefits of family planning. Women and children, not only in Central America but around the world, are among the populations most vulnerable to the consequences of climate change. Women balance numerous roles in society, especially those related to the food security of the family. For many women, access to reproductive health and family planning services impacts not only fertility but also income, health, education, and rights.

For agricultural communities, strategies for sustainable agriculture are key to strengthening resilience to climate change as well as to improving productivity and income for small farmers. Nancy McCarthy of Lead Analytics discussed applications for Climate-Smart Agriculture in the region. In addition to sustainably increasing income and productivity and improving adaptation to climate change and climate vulnerability, the goals of Climate-Smart Agriculture include reducing agricultural contributions to climate change and improving national food security goals. Climate change trends, including changes in rainfall patterns and extreme weather events, impact agriculture through alterations in watersheds, evaporation, and agricultural yields. Climate-Smart Agriculture seeks to improve sustainability through better land management, conservation agriculture, and agro-forestry practices. It also promotes intensification (rather than "extensification"[3]) of land use.

In Central America as in other regions, however, there are several barriers to implementing Climate-Smart Agriculture practices. First, in order to implement these practices effectively, there need to be more site-specific data. There are also a number of barriers to small holders' adoption of Climate-Smart Agriculture:

1. there is a long time frame (5-15 years) for full implementation as well as delayed benefits;
2. many small-holders don not have formal title to their land or face other threats to land tenure;
3. small farmers also frequently lack insurance or other safety nets in case of a poor harvest;
4. some traditional farming methods may be highly sustainable, but these methods are being lost;
5. Climate-Smart Agriculture has high labor and materials costs, especially high up-front costs;
6. there is a risk of collective action problems arising when some farmers implement Climate-Smart Agriculture and their neighbors do not, but will nonetheless benefit, thereby potentially discouraging others from investing in CSA practices.

In addition to these problems are difficulties with monitoring and evaluation, especially over the long term. Regarding insurance, participants noted a general lack of insurance culture in the region and that where available, premiums may be prohibitively high. What level of insurance should or could be effectively offered (individual versus community),

[3] The term refers to more intense use of existing agricultural lands through increasing yields as opposed to extending the land areas developed and used for agricultural activities.

and what type of insurance would offer small holders the best protection against loss (profit insurance, counter-cyclical, or catastrophic insurance)? Climate Smart agricultural practices are also likely constrained by limited national resources (human and material) and uncertainty over what other sources of funding may be accessible from the international community.

Jaime López Martínez and José Luis Arellano Monterrosas discussed their experience with a project to address climate change, agriculture, and watershed restoration in Chiapas, Mexico. After describing the complexity of the many levels of natural watershed systems known as cuencas, the researchers explained the threats to the health of the watershed in Chiapas, including deforestation and degradation due to changes in land use, urbanization, hurricanes and tropical storms, erosion and sedimentation, flooding, and landslides. Notably for Chiapas and the small countries of Central America, ecological challenges like those of this watershed extend beyond national boundaries, producing trans-border impacts. As highlighted by McCarthy in her discussion of Climate-Smart Agriculture, imported models for addressing the problems of the Chiapas watershed needed to be calibrated for local use, which required extensive and reliable local data.

López Martínez and Arellano Monterrosas offered successful strategies in Chiapas that took into account the socio-economic as well as ecological vulnerability of the zone. These strategies included community organization, erosion control techniques, and the promotion of eco-tourism. Local residents were trained and aided by technology transfer programs and were able to witness directly the benefits of conservation practices. One of the reasons for success in Chiapas was a highly participatory program which involved local communities and built on social capacity. Success is being measured with respect to the amount of land and the number of producers impacted by these programs.

One particular program for forest rehabilitation in Chiapas focused on controlling run-off. Problems facing local communities included deforestation, adequate water supply, firewood shortages, and lowered coffee profits (due to loss of shade). To respond to these difficulties, the team created centers for plant production that nurtured coffee trees that were resistant to coffee-rust disease; new technology was introduced—a stove which required less fuel (firewood); and reforestation programs were implemented.

The Chiapas case served to highlight that some of the communities most vulnerable to climate change also have a great capacity for adaptation. Participants highlighted a

number of additional key challenges in Central America in terms of climate change and food security and also offered recommendations for governments and organizations working to improve resilience:

- Damage to physical and communications infrastructure from extreme weather can have extended effects on livelihoods, especially in more isolated and agriculture-dependent communities.
- The focus of adaptation strategies (including alternatives to existing strategies) should be on the availability of sustainable and complementary resources—physical as well as natural, human, social, cultural, and political[4]. Programs should work to ensure that technology and practices they introduce will be sustainable.
- Institutional strengthening is crucial at all levels and in all countries. Participants noted that institutions are especially weak in rural areas.
- Conservation practices can often be difficult to sustain after initial project funding has run out. One participant from Guatemala cited a successful World Food Program project that has been self-sustaining for twenty years and recommended ex-post analysis to see why this program was so sustainable. Participants agreed on the need to create virtuous cycles that encourage small farmers to continue using conservation agriculture practices after initial funding has expired.
- Building on the Chiapas case, participants underscored the importance of community participation—involving local populations and giving them options for adapting to climate change, rather than telling them what to do.
- Reflecting on the role of women in climate change adaption and food security, participants suggested that women's focus on sustaining their families may create more receptivity to the benefits that can be created through the use of more sustainable practices. Participants also noted that the rural-urban migration in these areas is often predominantly of men, leaving women as heads of households and comprising the majority of laborers in rural communities.
- Participants emphasized the crucial issue of data and the need to find a reliable baseline for measuring the success of climate change adaptation and food security projects.
- In addition to basic data, other unmet needs include physical infrastructure along with trans-national structures for organization and collaboration. Many participants commented on the need for better integration and coordination among similar projects and among those working on food security and climate change issues across the region.

[4] See https://www.wilsoncenter.org/sites/default/files/presentation_jose_luis_arellano_cristal.pdf

- Funding—which is always limited—should be refocused on solving underlying problems rather than dealing with their consequences.
- As a solution to limited funding at an institutional level and limited or unpredictable income at a family level, participants suggested greater diversification of crops and economic activities, including the promotion of agrotourism, and cultivation of niche products such as higher-value organic coffee, for which there is growing demand.

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