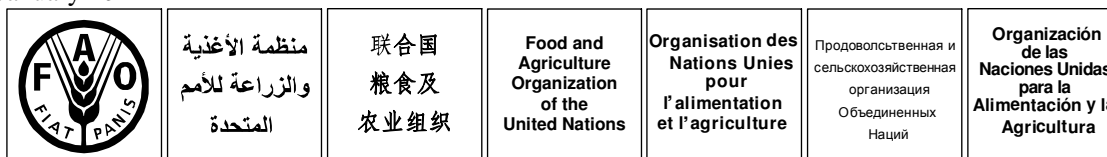


January 2012



THIRTY-SECOND REGIONAL CONFERENCE FOR LATIN AMERICA AND THE CARIBBEAN

Buenos Aires, Argentina, 26 to 30 March 2012

CLIMATE CHANGE ADAPTATION AND MITIGATION TO REDUCE THE VULNERABILITY OF COMMUNITIES AND THE CROP, LIVESTOCK, FISHERIES AND FORESTRY SECTORS

Executive summary

- Their geography and topography make Latin America and the Caribbean acutely vulnerable to climate change. Significant changes in weather conditions are undermining food security because they impact on components of the region's food systems.
- This paper suggests that the Regional Conference should analyze and formulate regional positions on three key issues related to climate change mitigation and adaptation: (1) regional governance and cooperation to tackle climate change; (2) country capacity-building to meet the challenge of climate change; and (3) promoting climate-smart agriculture.
- In each of these key areas, this paper presents specific issues requiring the attention of the Regional Conference.

Suggested action by Regional Conference

This paper suggests that the Regional Conference should review and endorse the following policy positions on climate change mitigation and adaptation in the region:

- Regional governance and cooperation to tackle climate change: (1) facilitate regional dialogue and meetings aimed at defining common positions on agriculture and climate change in Latin American and Caribbean countries; (2) coordinate knowledge-sharing platforms; (3) support the establishment of a funding platform.
- Institution-building to meet the challenges of climate change: (1) develop and enhance national capacity to develop frameworks for action and sectoral planning for climate change; (2) support the economic and social impact assessment of climate variability and change in the crop, livestock, fisheries and forestry subsectors; (3) assist in designing research and innovation programmes on climate change.
- Promoting climate-smart agriculture: (1) support the most vulnerable farmers in sustaining and increasing their production in extreme weather conditions; (2) reduce energy consumption and greenhouse gas (GHG) emissions in agriculture.

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I. Background and aim

1. Food-price volatility and global warming have placed food security and climate change on the discussion table and the global agenda. The region's agriculture faces the dual challenge of tackling climate change impacts while at the same time increasing sustainable agricultural and fisheries production to meet the growing food requirements of a population expected to reach around 808 million by 2050.
2. The aim of this paper is to contribute to formulating Regional Conference recommendations on climate change mitigation and adaptation within a regional perspective of food and nutritional security.

II. Climate change and the crop, livestock, fisheries and forestry sectors in Latin America and the Caribbean

3. Their geography and topography make Latin America and the Caribbean acutely vulnerable to climate change.¹ The increase in extreme weather events in recent years has resulted in a 2.4-fold rise in floods, drought and landslides compared with the 1970–1999 and 2000–2005 periods.²
4. The region is an important carbon sink: it is estimated to hold between 18% and 26% of the world's total carbon stored in forest ecosystems, 11% of the carbon in rangelands and around 17% of that in agricultural systems. The oceans and inland waters bathing the region also capture a great deal of carbon, converting it into biomass for people to use. However, a history of poor management has led to the steady degradation of these natural resources.
5. All this is a source of concern because the region's limited experience of natural-resource and land management, coupled with institutional weaknesses, makes it even harder to tackle climate change impacts.³

Climate change is a reality in Latin America and the Caribbean

6. Available scientific evidence shows that global warming, associated with increasing GHG emissions from human activities, is causing discernible climate change in the form of temperature increases, changes in rainfall patterns, rising sea levels, changes in ocean current patterns and intensified extreme weather events. In addition, glaciers are melting in Andean countries, extreme events are increasing in such areas as the Caribbean, Central America and the tropics and subtropics of South America, and weather events like El Niño are changing.

The relationship between climate change and food and nutritional security is clear and calls for immediate action

7. The significant changes in weather conditions are undermining food security owing to their impact on the region's food and fisheries-aquaculture systems. Extreme weather events have increased in frequency and intensity. Drought and increasingly irregular rainfall patterns are already having a

¹ United Nations Development Programme (UNDP), 2007

² Intergovernmental Panel on Climate Change (IPCC), 2007

³ Economic Commission for Latin America and the Caribbean (ECLAC), 2009

direct impact on food production, infrastructure, food distribution, food crisis incidence, livelihood assets and opportunities, and human health in both rural and urban areas.

8. Latin America and the Caribbean have the world's largest per capita reserves of arable land. The region has some 576 million hectares, corresponding to 30% of global arable land and 28.5% of the region's surface area. However, natural resource management and use has resulted in underutilization of these resources, with only 25% currently used. Moreover, the region's soil and biodiversity is in an advanced state of deterioration from erosion, urbanization, pollution and agricultural expansion.⁴

9. The region's water resources have been managed on the basis of hydrologic conditions adopting a broadly hydraulic approach. In the future it is vital for water resource planning to comply with management principles that ensure the integrity of ecosystems and are geared towards climate change vulnerability scenarios. This will be a mammoth task because it involves activities in many different areas, particularly for reducing current vulnerability in floodplains or as a result of land-use changes.

10. Lack of multisectoral planning has led to excessive pressure on fishery resources and aquatic biodiversity, where fishing acts as the immediate economic and food-security shock absorber for rural areas when crop or livestock production go into crisis.

11. Land and water management systems, which define many food production systems, are hard-pressed to cope with unprecedented demand in the region. Climate change will put even more pressure on the region's key production areas. This creates an opportunity for governments and the private sector, including farmers, to be more proactive in promoting the adoption of practices for the sustainable use and management of land and water resources. While they have the potential to expand production efficiently, as well as limiting the impacts on other ecosystems, this will call for profound changes in the way in which land and water resources are managed today. National policies will need to be formulated and institutions adapted to this new reality to make them genuine partners in disseminating knowledge and in implementing responsible regulations on natural resource use.

12. In such a context, good practices in crop, livestock, forestry, fisheries and aquaculture systems can play an important role in both climate change mitigation and adaptation. Agricultural systems must provide a number of key environmental services (including sustainable agrosystem management, carbon sequestration, water resource management, soil protection and biodiversity) and socioeconomic services (including agricultural and non-agricultural production, food supply, and the preservation of traditional knowledge and culture) that not only contribute to climate change mitigation but also enhance the responsiveness of productive and natural ecosystems to climate change. There must be economic incentives for providing such services within a perspective of sustainability.

Institutional progress on climate change in the sector

13. The importance of climate change has been highlighted at various forums of ministers of agriculture in the region, including: meetings of the Southern Agricultural Council (CAS for its acronym in Spanish) (Bolivia, 2009; Argentina, 2011); the Fifth Ministerial Meeting on Agriculture and Rural Life in the Americas (Jamaica, 2009); and the latest FAO Regional Conference (Panama City, 2010). In addition, many countries' environment ministries coordinate national climate change policies.

14. Some of the most important institutional and policy developments at subregional level have included the establishment of a working group on climate change within the Southern Agricultural Council's Agricultural Policy Coordination Network (REDPA for its acronym in Spanish) and the development of a Regional Agro-Environmental and Health Strategy (ERAS for its acronym in Spanish), supported by the secretariats of the Councils of Ministers of Agriculture, Environment and Health in Central America. Similarly, the Andean Community has developed an Andean Strategy on

⁴ International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD): Latin America & the Caribbean, 2009.

Climate Change (EACC for its acronym in Spanish), with specific actions for agriculture. A number of regional programmes and bodies are also conducting projects and studies aimed at improving climate change adaptation in the region, including: the Latin American and Caribbean Initiative for Sustainable Development (ILAC for its acronym in Spanish); the Meso-American Biological Corridor initiative; the Caribbean Community Climate Change Centre (CCCCC for its acronym in Spanish); and the Latin American Carbon Programme (PLAC for its acronym in Spanish). However, in general, still greater efforts and coordination are required to integrate the agriculture and forestry sector more fully into a “green economy”.

15. Some countries have also begun to set up sectoral committees within agricultural sector institutions (e.g. Chile) in order to address this issue, while others have prioritized climate change in their ongoing agricultural policy discussions (e.g. Costa Rica), and yet others have established climate change offices as part of the agricultural sector's structure (e.g. Uruguay, Mexico).

Uneven changes in Latin America and the Caribbean

16. In recent years, hurricanes (Caribbean and Central America), floods (Ecuador, Peru, Colombia and Venezuela), drought (Southern Cone) and frost (Andean countries) have been getting worse and a number of events have affected different countries to varying degrees. A similar pattern is expected in the coming years, where climate change impacts will not be uniform throughout the region.

17. For Caribbean small island states, climate change vulnerability is exacerbated by their particular circumstance of heavy dependence on a narrow resource base and acute susceptibility to natural disasters, scarce land resources and limited human resource availability. These and other factors make climate change an enormous challenge for these countries.

18. In contrast, some studies have shown that southern areas of the Southern Cone might actually benefit from higher average temperatures in the region, as they would extend the growing and biological season of many species, improving their productive capacity.

19. Policies and programs for climate change mitigation and adaptation should promote the adoption of best practices developed as part of a watershed-management approach because most watersheds are transboundary in nature.

III. International agreements and negotiations

20. The main outcomes of the 17th session of the Conference of the Parties of the United Nations Framework Convention on Climate Change (Durban, 2011) impacting on the agricultural sector are: (a) the establishment of a second commitment period under the Kyoto Protocol; (b) the adoption of a Long-Term Cooperative Action (LCA) under the Convention; (c) the start-up of a new process towards a legally binding agreement on all parties to the Convention and (d) the launch of a Green Climate Fund.

21. *Adaptation:* All decisions regarding the implementation of the Cancun Adaptation Framework have been approved.

22. *Mitigation:* The definition of the mitigation target for developing countries recognizes economic and social development and poverty eradication as key priorities. It also acknowledges the diversity of mitigation actions and sets out the main points concerning nationally appropriate mitigation actions (NAMAs), including the need to develop general guidelines for the domestic measuring, reporting and verification of internationally and domestically supported mitigation actions.⁵

⁵ FAO, 2011, Internal Brief from the 17th session of the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC COP-17) in Durban.

IV. Conclusions and recommendations to guide Regional Conference discussions

23. Climate change is apparent in Latin America and the Caribbean, with a growing number of extreme weather events impacting on food production, food security and livelihoods. In response, many cooperation agreements have provided a platform to coordinate and build cooperation on developing measures and policies for tackling climate change.
24. Countries should strengthen their institutions and foster initiatives for regional and subregional integration to promote the incorporation of climate change mitigation and adaptation into countries' agricultural policy (CAN, CARICOM, UNASUR, MERCOSUR, CAFTA and ALBA⁶). They should also foster and facilitate South–South cooperation among countries in the region, in such areas as vulnerability mapping, the design of management policies and tools, climate monitoring systems, and research and development on innovative solutions for tackling climate change in the crop, livestock, fisheries and forestry sectors.
25. At the country level, even though national efforts have focused – and continue to focus – on current climate variability and to adaptation to projected changes, the potential impact of climate change depends on trends in GHG emissions, which in turn determines the speed of the expected changes and hence the room for manoeuvre. Not only do Latin America and the Caribbean and their agriculture have the potential for mitigating GHG emissions, their joint efforts to reduce emissions will in turn determine the feasibility of adaptation.
26. This paper suggests that the Conference should formulate regional positions on three key issues: (a) regional and subregional governance and cooperation to tackle climate change; (b) institution-building to meet the challenges of climate change; and (c) promoting climate-smart agricultural and forestry production. Country policies, particularly in relation to climate change adaptation, must be tailored to addressing the major changes anticipated in each subregion.

Regional governance and cooperation to tackle climate change

27. In the global context, the region is highly vulnerable to climate change impacts, particularly the Caribbean and parts of the Andean region, even though they make a proportionally lower contribution to greenhouse gas emissions than other regions. Several countries in the region have defined their position in international negotiations by giving priority to climate change adaptation and requesting support from Annex I countries (i.e. industrialized countries) for implementing this.
28. Despite the fact that, in international climate negotiations, agriculture has been included in the long-term cooperative actions (Durban 2011), countries remain divided on agriculture issues, especially as regards mitigation.
29. As some of the largest water resource systems available to countries in the region are shared between two or more countries, as in the case of the Orinoco, Amazon and River Plate basins, it is crucial to strengthen institutional cooperation among countries sharing river basins.
30. This paper suggests that the Conference should formulate regional positions on: (a) facilitating regional dialogue on crop and livestock farming, forestry, fisheries and aquaculture and facilitating international negotiations; (b) South–South cooperation and information- and knowledge-sharing on climate change; and (c) supporting the generation of funding sources for climate change mitigation and adaptation and for food production sectors.
- a) Regional dialogue and meetings could help to define common positions on food production and climate change in Latin American and Caribbean countries, with particular reference to preparing and attending Conferences of the Parties to the United Nations Framework Convention on Climate Change (COPs).

⁶ CAN (Andean Community), CARICOM (Caribbean Community), UNASUR (Union of South American Nations), MERCOSUR (Southern Common Market), CAFTA (Dominican Republic–Central America–United States Free Trade Agreement), ALBA (Bolivarian Alliance for the Americas).

- b) **Knowledge-sharing platforms** for the crop, livestock, fisheries and forestry sectors would allow climate and geographic information to be shared, enhancing knowledge on the climate and on assessing the potential impacts of climate change on food and nutritional security (FNS). The regional technical committees – Latin American and Caribbean Forestry Commission (LACFC), Commission on Livestock Development for Latin America and the Caribbean (CODEGALAC for its acronym in Spanish), Commission for Inland Fisheries and Aquaculture of Latin America and the Caribbean (COPECAALC for its acronym in Spanish) and Western Central Atlantic Fishery Commission (WECAFC) – can facilitate such knowledge-sharing in their respective sectors. These actions could be coordinated with existing bodies, including the Global Earth Observation System of Systems (GEOSS) and EUROCLIMA.
- c) Countries in the region could set up a **funding platform** that includes the full range of existing options, extending beyond climate finance alone. There is an urgent need to improve access to carbon funds by the crop and livestock sectors, acknowledging the contribution of crops, pasture and forage to the carbon stock. It is also necessary to increase public and private investment in climate change adaptation in the crop and livestock sectors through partnerships with the various social, governmental, private and international stakeholders in order to increase funding sources.
- d) This paper proposes calling upon the **United Nations Conference on Sustainable Development (Rio+20)**, to be held in Rio de Janeiro from 20 to 22 June 2012, to adopt commitments for strengthening the concept of sustainable development and its implementation based on environmental, economic and social aspects. The Rio+20 Conference would provide a unique opportunity to mobilize the necessary political resources to devise a lasting way out of the global crisis, taking into account its economic, social and environmental aspects.

Institution-building to meet the challenges of climate change

31. As mentioned earlier, progress has been made in the region in terms of incorporating climate change into national agricultural agendas. However, there remains a need to develop and enhance countries' technical capacity for improving prospective aspects (assessing impacts, vulnerability and agricultural adaptive capacity), as well as for designing frameworks for action and sectoral planning for climate change. Given the local impact of the observed effects of climate change on the region, especially drought and flooding, it is particularly important to build local government capacity in the areas of rural development, food security and natural resource management.

32. This paper suggests that the Conference should formulate regional positions on three aspects for strengthening institutions: (a) developing and enhancing capacity to develop frameworks for action and sectoral planning for climate change; (b) support for the economic and social assessment of climate variability and change impacts on crop and livestock farming, fisheries and forestry; and (c) design of research and innovation programmes on climate change for the crop, livestock, fisheries and forestry sectors.

33. In particular, countries could focus their actions on:
- a) Capacity-building for proper climate risk management, including local governments:
 - land-use planning (hazard and risk maps);
 - watershed management and water management (drought, floods);
 - weather monitoring and early warning systems (extreme weather events, and pests and diseases);
 - strengthening and reforming agricultural extension and technology transfer services (implementation of more horizontal and less vertical extension services, provided by local and municipal governments).
 - b) Developing and implementing innovative tools and incentives for the recovery of degraded cropland and rangeland, improving resource-use efficiency and productivity, promoting climate change adaptation and greenhouse gas mitigation, developing

incentives such as payment systems for ecosystem services and better access to carbon funds by the crop and livestock sector, among other means.

- c) Improving lines of research, innovation and development for climate change adaptation:
 - genetic rescue and selection of crops/breeds adapted to different climatic conditions;
 - biodiversity studies of natural ecosystems;
 - recovery of sustainable agricultural and aquaculture management practices in different climatic conditions;
 - methods of improving water-use efficiency for production in low-rainfall areas.
- d) Improving prospective assessments of climate change:
 - predictive models of specific change scenarios for crop and livestock farming and aquaculture;
 - economic assessments of potential impacts on crop and livestock production;
 - current land use and potential future uses of land;
 - bioeconomic models to promote sustainable crop and livestock production systems in specific ecosystems, based on environmental supply;
 - forest and protected-area management;
 - integrated coastal zone management.

Promoting climate-smart agriculture

34. FAO has been vigorously promoting the development of "climate-smart agriculture", i.e. agriculture that sustainably increases productivity and resilience, reduces GHG emissions and enhances the achievement of development and food security goals.

35. This paper suggests that the Conference should formulate regional positions on two aspects for promoting climate-smart agriculture with crop and livestock farmers in Latin America and the Caribbean: (a) promotion of sustainable practices for the use of natural resources and climate risk reduction; and (b) greater energy efficiency and reduction in agricultural GHG emissions.

- a) Support for the most vulnerable crop and livestock farmers in sustaining and increasing their production in extreme weather conditions by setting priorities for climate-smart practices and actions, including:
 - recovery of degraded areas and soil erosion control and fertility management;
 - plot-level water management and water source protection, and integrated management of natural resources in micro-watersheds;
 - identification of local solutions for agro-climatic risk management and prevention (frost, floods, drought);
 - soil conservation and application of good crop and livestock farming practices;
 - water resource management (improving the efficiency of irrigation systems, increasing water storage capacity, and promoting the protection of water sources);
 - integrated management of crop–livestock–tree systems;
 - access to agricultural health and food safety services;
 - capacity-building for aquaculture.
- b) Reducing energy consumption and greenhouse gas emissions in agriculture by:
 - replacing inorganic inputs with organic inputs and reducing fossil energy use in production systems;
 - intensifying crop and livestock production sustainably to ease pressure on the agricultural frontier and reduce forest conversion;
 - adopting an agrosilvopastoral system to improve the organic content of soils and increase carbon sequestration;
 - integrating aquaculture into traditional farming systems;
 - promoting crop and livestock production systems to simultaneously improve the rural population's food security and increase the supply of renewable energy sources (biogas, biofuels).