VENEZUELA

Country Note on Climate Change Aspects in Agriculture

This Country Note briefly summarizes information relevant to both climate change and agriculture in Venezuela, with focus on policy developments (including action plans and programs) and institutional make-up.

Contribution of agriculture (without LUCF) to the economy and to emissions in LAC countries
(size of bubble in MTCO₂ of LUCF emissions; axes cross at LAC average)

Contribution of agriculture to the economy and of LUCF to emissions in LAC countries
(size of bubble in MTCO₂ of LUCF emissions; axes cross at LAC average)

Percent of GHG emissions in CO₂ equivalent, by sector (2000)

Source: World Resources Institute http://cait.wri.org

Land use (2005)

Sources:

Note: In the first bubble graph, the total emissions for Uruguay do not account for the positive effects of LUCF (i.e. afforestation efforts). If they are considered, agriculture represents 222% of total emissions. Because of afforestation efforts in Uruguay and Chile, land use change and forestry (LUCF) is not a net contributor to emissions; hence the countries do not appear in the second bubble graph, but are considered in the calculation of the average in the vertical axis.

Note: Employment in agriculture (% of total employment)*; Rainfed cropland (% of total cropland)*; Gini*; Water usage in agriculture (% of total annual fresh water withdrawals)*; Uninsured cropland (% of total cultivated land area)**; Soil degradation (% of total land)***; Risk of extreme weather events (index; annual average 1997-2006)****

Sources: *World Development Indicators 2007, 2000-2007 average; **IADB, IICA, 2002/2003 figures; ***FAO AGL 2005; ****Germanwatch
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Summary

Like most countries in Latin America, Venezuela has submitted one national communication to the United Nations Framework Convention on Climate Change (UNFCCC) with a second one under preparation. Land use change and forestry are the largest contributors to GHG emissions in the country. The emission reduction potential is large and there are several reforestation programs have been initiated. Venezuela is among the few countries in Latin America without a single CDM project, and carbon trading opportunities can be explored. Agriculture is highly vulnerable to weather extremes. A greater emphasis on developing and applying adaptation and mitigation programs, as well as adequate insurance mechanisms can be placed for better management of public resources in light of natural disasters in the agriculture sector.

Working definitions

Agriculture is defined as a managed system of crops, livestock, soil management, forest resources (productive use, goods & services) and water resources (irrigation), including land use and land use change. Climate change encompasses both mitigation and adaptation activities within the agricultural sector. On the mitigation side, the focus is on the potential to reduce green house gas emissions by the different sub-sectors. On the adaptation side, the focus is on the potential to build resilience to climate and to increase the adaptive capacity through sustainable management of agriculture and other complementary factors (e.g. financial instruments). There is no specific time frame used in the country notes. An effort was made to collect the most recent available information on country indicators and policy matters.

Acknowledgments:

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1. The Climate Context

The baseline map provides a visual characterization of Venezuela’s agricultural potential given current environmental constraints and their regional distribution. Around 25% of Venezuela’s land is used for agriculture (22% for pasture and 3% for cultivation), with forestry occupying 54% of the land in the country (WDI, 2005).

Baseline map: Current Major Environmental Constraints related to Agricultural Potential

Source: FAO  Note: For more maps on Venezuela and agricultural resources, go to http://www.fao.org/countryprofiles/Maps/VEN/04/ec/index.html

1.1. Country Projections

According to the First National Communication and to general circulation models, the following climatic changes with relevance for the agricultural sector are to be expected in the future:

a) increases in temperature – it is probable that temperatures will increase by between 1 and 2°C by 2060 according to an intermediate scenario; this would have a negative impact on the biological functions of plants (photosynthesis) and on water movements and nutrients in the soil.

b) decreases in precipitations – precipitation decreases will be noticed particularly in the southern state of Bolivar, where, according to an intermediate scenario, there will be a 20% precipitation reduction by 2060 as compared to the base year of 1990 (equivalent to around 800mm less rain annually). A similar situation will be noticed in the area north of the Orinoco River. Other models show intense precipitation decrease toward the Andes and the Plains of the Piedmont (Piedmonte Llanero).

c) increase of areas with dry climate – it is probable that the areas with dry climate, in general more prone to desertification, will increase from 39% of the total territory of Venezuela to 47% by 2060. This could have a strong negative impact for the agricultural sector.
In recent years (between 1999 and 2005), floods have had the highest human and economic impact in Venezuela – 675,180 people have been affected by floods (9 events) with the cost of damages reaching US$ 3.2 billion. The floods of 1999 alone lead to the killing of 30,000 people, due to landslides in areas of illegal human settlements.\(^2\)

1.2. Agriculture-Related Impacts

According to the Ministry of Agriculture, the floods of 1999 lead to the destruction of up to 60% of harvest in some areas, while 35,000 hectares of cropland remained flooded. It was estimated that up to 3,600 rural families have been affected by these floods, with 15% of the total population in shelters being composed of children under 5 years of age and the rest of 85% of women, largely.\(^3\)

Like most countries in the region, Venezuela has submitted only one National Communication\(^4\) to the United Nations Framework Convention on Climate Change\(^5\) (UNFCCC), laying out the actions that the government has already taken and the analytical basis for its policy response to climate change and its commitment to take further actions within an official international framework. The Communication established the First National GHG Inventory with 1999 as its base year, it includes sectoral measures and programs that can be used for the future implementation of the national climate change strategy and includes vulnerability studies as well as mitigation opportunities of GHG emissions by sector.

A Second National Communication is under preparation and scheduled to be completed by 2009.

2.1. National Climate Change Plans, Strategies and Programs

2.2. Agricultural Sector Initiatives

The Ministry of Environment\(^6\) (MINAMB, Spanish acronym) is the national authority on the environment in the country and it oversees Venezuela’s commitments to UNFCCC and other climate change related actions.

3.1. Inter-Sectoral Coordination

3.2. Agricultural Sector Institutions

The Ministry of Agriculture and Land\(^7\) (MPPAT, Spanish acronym) is in charge of the formulation and coordination of the agricultural policy of the country and of the sustainable rural development.

The General Directorate of Watersheds (DGCH, Spanish acronym) maintains the largest climatic, hydrometric and hydro-geological network in the country and is also the technical focal point of the country to the United Nations Framework Convention for the Fight against Desertification and Drought.

The General Directorate for Forests (DGB, Spanish acronym), assigned to the Ministry of Environment, is in charge of the national forest policy of the country. It is a very important institution for future Clean Development Mechanism projects in the forestry sector.

The National Institute for Agricultural Research\(^8\) (INIA, Spanish acronym) performs research in the agricultural sector and is responsible for the network of agro-meteorological stations situated in the main agricultural areas of the country dedicated to the improvement of efficiency in agriculture. It also performs research in climate change and its impact on the agricultural sector.

3.3. Fostering Capacity to Deal with Climate Change

Emissions inventory: To date, Venezuela counts with one National GHG Inventory with 1999 as its base year. The inventory includes information on emissions from agriculture, including land-use change and forestry, providing disaggregated information by type of emission and type of agricultural resource.

Studies related to climate change and agriculture: A series of vulnerability studies have been prepared in preparation for the First National Communication for the water sector and coastal areas, as well as a
study on the climatic variability observed in Venezuela in the 20th century, and a study on vulnerability and current adaptation capacity of the country to climatic variability. The National Centre for Agricultural Research (CENIAP, Spanish acronym) has recently published a study on the geographic variation of climate change impact on Venezuelan agriculture9.

The World Bank published a flagship document for the entire region of Latin America and the Caribbean titled “Low carbon, High Growth: Latin American Responses to Climate Change”10, encompassing information on climate change impacts in the region, on the potential contribution to mitigation efforts as well as a listing of future low carbon-high growth policies.

Venezuela is the 4th largest emitter of CO2 emissions per capita in Latin America, after Mexico, Brazil and Argentina. Agriculture is responsible for 96.1% of nitrous oxide emissions in the country and 28.3% of methane emissions, the majority of these resulting from the enteric fermentation process from farm animals. The land-use change and forestry are responsible for a net absorption of CO2 due to the natural regeneration of vegetation on abandoned land.

4.1. Action Frameworks

4.1.1. Forestry and Land Use Change

Approximately 54% of the total territory of Venezuela is covered by forests, according to the First National Communication. Almost 70% of these are situated south of the Orinoco River, in the Amazon. The land-use change and forestry sector in Venezuela is responsible for the emission of 35.780 Gg CO2 (31% of total) in 1999. However, the change of biomass in forests and the regeneration of vegetation on abandoned cropland lead to the absorption of 50.140 Gg CO2, resulting in a net absorption by the sector of 14.360 Gg CO2.

The average annual deforestation rate in Venezuela for the period 1990-2000 is 0.4% (218,000 hectares/year)11. Deforestation activities occur mostly illegally and in areas that are not protected. For the period 2000-2005 it is estimated that deforestation activities have decreased due to improved legislation and increased controls. This is reflected in an average deforestation rate of between 0.2% and 0.3% for this period. Most deforestation activities for this period are due to forest fires (affecting a total of 246,241 hectares of forests for the period 2000-2004) and legal agricultural activities as well as illegal wood extraction12.

The First National Communication identifies the development of new forest plantations as a possible mitigation measure for this sector. The total area dedicated to forest plantations in Venezuela was established by law in 1992 as covering 9.1 million hectares with a potential capturing capacity of carbon of 505.45 million tons over 15-20 years, assuming a carbon capturing capacity of forests of 55 tons carbon/hectare.

Misión Árbol13 is an initiative of the Government created in June 2006 aimed at increasing reforestation activities in the country. For the period 2005-2007, around 26,000 hectares of land have been reforested in the entire country under this initiative and the goal for 2007 was to organize 1,900 conservationist committees of volunteers, to create 1,300 greenhouses and to reforest 4,000 hectares with 4 million trees.

4.1.2. Livestock

Livestock is responsible for 27% of total methane emissions in Venezuela in 1999. Of these, 95.8% are attributed to emissions resulting from the enteric fermentation process from cattle, mainly from bovines (92.3% of total) and the rest of 4.2% to handling of farm manure.

4.2. Carbon Trading and Agriculture

Under the Clean Development Mechanism (CDM), developed (also referred to as Annex I) countries can implement project activities that reduce emissions in developing (non-Annex I) countries. Though the CDM is expected to generate investment in developing countries, especially from the private sector, and promote the transfer of environmentally-friendly technologies in that direction, the global share of agricultural sector projects (including afforestation and reforestation) is very small (5.71% of total registered projects

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cial00Se00Only1.pdf
10 World Development Indicators, 2005
11 http://www.itto.or.jp/live/Live_Server/2869/22_Sulbaran.pdf
12 http://www.misionciencia.gob.ve/view/enlacesShow.php?idJ=60
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As of December 2009, Venezuela is among the few countries in Latin America without a single registered CDM project (in any sector). The World Bank has mobilized a fund to demonstrate projects that sequester or conserve carbon in forest and agro-ecosystems. The BioCarbon Fund, a public/private initiative administered by the World Bank, aims to deliver cost-effective emission reductions, while promoting biodiversity conservation and poverty alleviation. In principle, the BioCarbon Fund can consider purchasing carbon from a variety of land use and forestry projects; its current portfolio includes Afforestation and Reforestation, Reducing Emissions from Deforestation and Degradation and the Fund is currently exploring innovative approaches to account for agricultural soil carbon.

Past studies realized in the agricultural sector have concluded that permanent crops will suffer the greatest impact as result of precipitation reductions and temperature increases, as well as pastures with direct negative impact on livestock. This requires an increase of the adaptive capacity of the production systems in the areas mostly affected by climate change.

5.1. Action Frameworks
The First National Communication identified several possible adaptation measures necessary to be introduced in the future, ranging from an integrated management of watersheds and creation of a “water policy” to development of crop varieties resistant to extreme weather conditions such as drought or high temperatures and development of early warning and prevention systems.

5.1.1. Land Management
According to the First National GHG Inventory of 1999, agricultural land is responsible for 96.5% of nitrous oxide emissions from the agricultural sector, mainly from direct emissions due to the application of nitrogen based fertilizers, the added manure or from legumes and decomposing of agricultural residues.

According to national statistics on crop yields for future production, the following yield decreases are to be expected by 2020 due to decreased precipitations: 4.4% decrease for corn, 13.4% decrease for carota and 4.4% decrease for rice. The strongest yield decreases will be noticed in the Western (the basins of Lake Maracaibo and Andes), North-Center-Western part, as well as North-east and Eastern part of the countries, all with increased water deficits of various degrees.

In terms of soil suitability for agriculture, 32% of national soil has problems of fertility or nutrition for cultivated plants, 18% has drainage limitations, 4% has water limitations and aridity and only 2% of the national territory has high quality lands. This could be increased to 4% if irrigation projects were expanded.

The First National Communication identified the following adaptation needs in this sector: i) introduction of crop varieties resistant to intense heat given the future expected temperature increases in the country, to drought and soil acidity and salinity; ii) implementation of no-till agriculture; iii) introduction of organic agriculture; iv) adjustment of the agricultural calendar; v) introduction of good agricultural practices.

5.1.2. Water Use
In Venezuela, 94.3% of agriculture is rainfed and only 5.7% is under irrigation, making this sector very vulnerable to climate variations. The main irrigated crops are rice, cereal, sugarcane, vegetables and fruit. Of the total area under irrigation, 80% is done by surface irrigation, 16% with sprinklers and 4% using local irrigation.

The First National Communication identified the following adaptation measures needed in the water sector: i) the creation of a Water Policy; ii) introduction of incentives or fines, by case, to guarantee the proper use of water; iii) zoning of areas protected for being sources of water; iv) organization of rural communities to achieve an improved water management.

14 http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByScopePieChart.html
15 http://cdm.unfccc.int/Projects/projsearch.html
17 http://unfccc.int/resource/docs/natc/vennc01.pdf
The National Action Program of the Convention for the Fight against Desertification and Mitigation of Drought defines a set of objectives and actions where the climate change component could be easily introduced.

The Program for Soil and Water Conservation facilitates the participation and environmental education of rural communities in the country, through the implementation of mechanical and cultural practices favoring the conservation of the environment. The educational process includes the adequate handling of chemicals used in agriculture, contributing to an organic agriculture.

5.2. Social Aspects and Interventions

Many people in rural areas derive their livelihoods from agriculture and can be disproportionately affected by changes in climate.

About 12% of Venezuelans reside in rural areas, where more than 70% of the population is poor. Small farmers are largely responsible for most of the agricultural production in Venezuela. As they live primarily in rain-fed or dryland areas, their output and livelihoods are highly vulnerable to climate variability and change. Over the past few decades, government subsidies supported agricultural production and consequently, the government decided what was produced and where money was invested. A collapse of agricultural credit institutions in the early 1990s severely constrained farmers' ability to access financial support services.

More than 12,000 Communal Councils and more than 7,000 Committees of Social Protection and Equality have been formed at the national level. In addition, more than 20,000 children living in extreme poverty have been incorporated into the Sistema de Orquestas Infantiles.

The Mission Che Guevara (formerly called “Vuelvan Caras”) provides both technical education in fields like agriculture, tourism or construction, and information on what a Social Economy is about. Between March 2004 and August 2007, over 670,000 people participated in this program. More than 3,000 of these organizations pertain to the agricultural sector.

Venezuela’s Women’s Development Bank (Banmujer, Spanish acronym) is the only state-sponsored women’s micro-credit bank in the world. Founded on March 8, 2001, Banmujer has successfully helped women break the cycle of poverty and adopt a new economic model of cooperation instead of competition. In contrast to most Banks, rather than doing business from a centralized office, employees of Banmujer (mostly women) regularly travel to rural communities to help poor women develop loan proposals. Furthermore, in addition to developing loan proposals, regional employees of Banmujer offer women “non-financial services” such as training focused on basic business and good management principles. This prepares the clients of Banmujer to develop their strategic thinking skills, wisely invest their loans and manage their enterprises. Banmujer also offers workshops on broader issues such as women’s health, leadership, community organizing, and prevention of domestic violence. Thus far, more than 100,000 women have received training from Banmujer.

5.3. Insurance Instruments

Agricultural insurance was first introduced in Venezuela in 1998. There is no type of government support for the development of the market. Agriculture insurance is offered by six private companies and all the policies are MPCI. A total of 18,000 ha of cropland are insured, representing the equivalent of 0.5% of total cropland. There are a total of 5 risks covered (drought, floods, fire, wind and lightning) for a total of 12 crops (rice, beans, sugarcane, onions, soybeans, corn, potato, tomato, oil palm, bananas, wheat and barley).

19 http://www.minci.gob.ve/noticias/1/5020/minpades_mejora_calidad.html
20 http://www.embavenez-us.org/factsheet/socialjustice.pdf
23 http://www.venezuelanalysis.com/analysis/918
About Country Notes on Climate Change Aspects in Agriculture...

The Country Notes are a series of country briefs on climate change and agriculture for 19 countries in Latin America and the Caribbean region, with focus on policy developments (action plans and programs), institutional make-up, specific adaptation and mitigation strategies, as well as social aspects and insurance mechanisms to address risk in the sector. The Country Notes provide a snapshot of key vulnerability indicators and establish a baseline of knowledge on climate change and agriculture in each country. The Country Notes are the beginning of a process of information gathering on climate change and agriculture. The Country Notes are “live” documents and are periodically updated.

Feedback
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