The Central American region continues to depend heavily on agro-exports for foreign exchange, income, and employment. With the growing integration of the region into the global economy, and the negotiation of trade agreements to promote that integration, agriculture will continue to figure prominently in Central America’s development. It is therefore important to ensure that export-led agricultural development follow sustainable practices. Up to now, this has not been the case, though there are some positive trends.

Since 1990, Central American trade with outside countries has increased significantly. Imports, however, have grown faster than exports, expanding at an annual rate of 10.1 percent compared to 8.6 percent growth in exports. Agriculture helps narrow this structural current account deficit, maintaining a significant trade surplus and accounting for roughly two-thirds of exports. Principal agricultural exports include bananas, coffee, sugar, and melon. These and other agricultural exports are projected to continue to grow in coming years. In addition to these agro-exports, maize, poultry, and hog farming are also important agricultural activities.

A recent study assessed the various environmental impacts of the principal agricultural activities in five Central American countries: Costa Rica, Guatemala, Honduras, El Salvador, and Nicaragua. Using a detailed matrix of social and environmental impacts – including soil, water, air, forest cover, biodiversity, land use, employment, and health – researchers examined all aspects of the production, transport, and processing of the seven agricultural products listed above. These results were then compiled to assess the sustainability of current agricultural practices and the likely impacts of expanding demand for certain products due to trade liberalization. Based on this assessment, we discuss the priorities for future negotiations over trade liberalization.

Social and Environmental Impacts of Agriculture

Though there is great variation among the five countries studies, there are enough similarities in their agricultural production to consider them as a regional group. Overall, there are four broad categories of producers:

1. **Small producers**, who have limited and low-quality land and produce mainly for subsistence and for the local market. Most grow maize and other staple crops, and many have small livestock. Few are part of the agro-export chains.
2. Medium-sized producers, who often have contracts with agro-exporters. They produce coffee, milk, poultry, eggs, fruit, and ornamental plants.

3. Agro-industrial firms, which are involved in processing: rice mills, sugar refineries, coffee processing plants, some intensive livestock.

4. Transnational firms specializing in bananas, pineapple, and more recently cantaloupe. These firms control large extensions of land and hire large numbers of agricultural laborers to produce for export.

Based on our research, we identified the following environmental impacts from the agricultural activities studied:

**Bananas** – Bananas remain Central America’s most important agro-export, accounting for sales of US$921 million in 2001, 20 percent of the region’s export earnings. The crop is grown most notably in Costa Rica, but also in Guatemala and Honduras. Production and exports have fluctuated during the last decade, with overall levels remaining roughly what they were in 1990. Principal environmental impacts of banana production relate to soil and water contamination from the heavy use of agro-chemicals, including pesticides, fungicides, and fertilizers. Processing also contributes to severe water pollution. Groundwater is contaminated from chemical runoff. Chemical spraying and processing contribute to air pollution. High chemical use causes some prey-mediated negative impacts on animals. There are some positive environmental impacts from the sowing of trees and bushes to create buffer zones around plantations, to control the spread of plagues. Due to the large number of jobs created in the industry, bananas make a significant social contribution.

**Coffee** – Coffee is the second most important cash crop for the region, bringing in US$835 million in 2001. It is produced in all five countries, with Guatemala, Honduras, and Costa Rica producing the most. Coffee covers the most area of any agro-export crop, and planted area has grown 14 percent since 1990 despite low international prices. There are two distinct cultivation techniques: shade and plantation. Shade coffee predominates in the region, while plantation coffee is most common in Costa Rica. Shade coffee offers many environmental benefits, contributing to soil stability and fertility, helping with water filtration, providing forest cover, and contributing to both plant and animal biodiversity. Plantation coffee, on the other hand, has moderate negative impacts on the environment, due to high chemical use, water pollution, and erosive farming techniques.

**Sugar Cane** – The third most important agro-export is sugar, and production grew nearly 50 percent in the 1990s. The region exported US$399 million in sugar in 2001. Production is concentrated in Guatemala, El Salvador, Honduras, and Costa Rica. Sugar cane cultivation is hard on the environment due to intensive water use for irrigation, heavy pesticide use, and the burning
of harvested fields. The latter practice is very hard on the soil, causing high erosion and compaction. It also reduces biodiversity and contributes to localized air pollution and the emission of greenhouse gases. Sugar remains a very labor-intensive industry, so the industry employs significant numbers of workers. Cane-cutting, however, is one of the more dangerous agricultural activities, and the burning of fields is harmful to workers’ health as well.

**Poultry** – Broiler production has been growing throughout the region, increasing 80 percent since 1991. Guatemala has the largest production in the region. While poultry farming itself has some environmental impacts, processing has significant ecological costs. Farms require a lot of water, straining supplies, while the disposal of carcasses causes significant groundwater pollution. Air pollution is caused by cleaning agents used on the farms as well as chemicals used in the slaughter. In terms of employment, processing is a growing source of jobs in the region.

**Pork** – Hog farming grew about 10 percent during the 1990s, mainly in Costa Rica, Guatemala, and Honduras. Throughout the region, farming techniques vary considerably. The more predominant form is small-scale raising of locally bred varieties in association with other agricultural activities. This has minimal environmental impacts. Intensive hog farming, however, produces most of the commercialized meat and has severe environmental impacts. These include soil and water contamination from wastes, excessive use of groundwater, and heavy air pollution, including extensive emissions of greenhouse gases.

**Cantaloupe** – Along with watermelon, cantaloupe has emerged as one of the more important specialty agro-exports. By 2001, it was the region’s fifth most important agro-export, with US$118 million in sales. While melons are grown using efficient drip irrigation, production still takes a heavy toll on the environment. Soil, air and water contamination result from heavy use of chemicals, including methyl bromide, a highly toxic, broad-spectrum insecticide that contributes to greenhouse emissions. Some Central American countries are considering banning its use. Melon cultivation also has negative impacts on biodiversity, due to high chemical use, including in the washing of the ripened fruit with untreated chlorine, and the use of plastic sheeting to protect plants. The industry creates many jobs, and risks to workers are lowered by the use of modern technology for chemical applications.

**Maize** – Maize remains the region’s most important domestic crop and the population’s most important source of nutrition. Production has not changed significantly in the last decade. Previous expansion contributed to deforestation, as peasant farmers moved onto more marginal lands. Grown on small plots and intercropped with other food plants, the environmental impact is generally positive. Traditional maize is often good for the soil,
prevents erosion, and fosters biodiversity. Burning of fields after harvest can cause some damage.

Worrisome Trends for Sustainable Agriculture

On balance, these findings suggest worrisome trends for sustainable agriculture in Central America. Agro-exports will continue to represent half of the region’s export, with strong projected growth. International demand is growing for crops with a high environmental impact – melons, sugar, pork, and poultry – while the region’s most important export crop, bananas, imposes high environmental costs. Demand is relatively slack for some of the more traditional crops with positive environmental impacts, such as maize and coffee.

Overall, the main problems identified by this analysis include soil, water, and air pollution from high pesticide use, and air pollution from chemical use and from the burning of fields. There are some signs of improvement, including the possible elimination of methyl bromide in melon production, Costa Rica’s recent ban on burning in cane fields, and incentives for the wider use of biological rather than chemical pesticides in coffee and some other fields. There is also some growth in production for specialty markets with organic or other environmental certification.

Governments need to do more, and current international obligations leave ample room for action. While environmental legislation in the region is relatively strong, laws are poorly enforced. There is little training or agricultural extension to promote more sustainable practices, and there are few incentives to adopt such methods. Many of these changes would be either inexpensive or profitable if there were the political will and technical assistance to promote them.

Finally, it is worth noting that environmental standards for agro-exports are contributing to the development of more sustainable agricultural practices. While this is positive, trade negotiators must be careful to ensure that the United States and other developed countries are not allowed to use such environmental standards as technical barriers to trade. This can be productively handled through bilateral cooperation agreements that build on the positive aspects of the relationship between trade, agriculture, and the environment.

The present multilateral trade system contributes to the perpetuation of unsustainable production and is a disincentive for change. The adoption of cleaner methods is left up to market forces. There is no tariff classification for products of cleaner production processes, and many developing countries emphatically reject such a classification and consider certification a technical barrier to trade. Still, such provisions would help contribute to sustainable
agriculture in Central America and they should be pursued with all necessary assurances to developing countries.

This paper summarizes a more comprehensive study, with Randall Arce, Max Valverde, Greivin Hernández, Rolando Zamora and Adriana Campos, and published originally by the Trade Knowledge Network.

The executive summary, in English, is available at: http://www.tradeknowledgenetwork.net/pdf/tkn_trade_sd_agi_sum.pdf

The full report, in Spanish, is available at: http://www.tradeknowledgenetwork.net/pdf/tkn_trade_sd_agi_es.pdf