

USDA Foreign Agricultural Service

GAIN Report

Global Agricultural Information Network

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Required Report - public distribution

Date: 12/7/2011

GAIN Report Number: Biofuels 2011

Ecuador

Biofuels Annual

Ecuador 2011 Biofuels (Biodiesel, Biotethanol, Biomass) Sector Policy Development and Outlook

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Report Highlights:

Ecuador's executive branch of government, through President Rafael Correa himself, has been very keen on speaking up about the need for a biofuels policy and programs. However, despite the interest of the private sector as well, no biofuels policy exists at the moment and pilot projects undertaken by the Government of Ecuador have not been successful although projects undertaken by Ecuador's private sector using palm and jathropha oils appear to be more promising.

Post:

Quito

EXECUTIVE SUMMARY

Thanks to its geographic location, Ecuador has an advantage in agricultural production that could be used for biofuels and renewable energy. Ecuador's private sector has shown a strong interest in investing in biofuels production, mainly in response to high petroleum prices in recent years. Despite the fear that the government might set lower than optimal market prices, companies have been encouraged to produce bioethanol and biodiesel in response to developments in the domestic and international markets. At the moment, there is not a clear picture of what the regulatory environment of the biofuels sector will look like in the long term. Lower petroleum prices, combined with the uncertainty in the regulatory regime, have resulted in the private sector not further investing in biofuels development.

There are several agricultural crops that could be destined to the production of biofuels: sugarcane, African palm, and jathropha although domestic consumption of bioethanol and biodiesel is practically non-existent at the moment. There have been sporadic exports of biodiesel produced from African palm in the past, when petroleum reached record-high values. Production of biodiesel from jathropha grown in non-utilized arid lands seems particularly promising.

U.S. government agencies have been working with the Government of Ecuador, as well as with private firms, in the assessment of the potential of Ecuador's biofuels sector. Ecuador is a member of the U.S. initiative Energy and Climate Partnership of the Americas that aims at assisting countries in the Western Hemisphere to reduce their greenhouse gas emissions and improve economic growth.

POLICIES AND OVERVIEW OF THE SECTOR

Ecuador's geographic location and weather give it a natural advantage in agricultural production as crops can be grown throughout the year and luminosity is constant (12-hour days). Ecuador's executive branch of government, through President Rafael Correa himself, has been very keen on speaking up about the need of a biofuels policy and programs. However, despite the interest of the private sector as well, no biofuels policy exists at the moment and pilot projects undertaken by the Government of Ecuador have not been successful. Projects undertaken by Ecuador's private sector using palm and jathropa oils appear to be more promising. Because the development of a biofuels project requires heavy investments in research and development, from agricultural practices to refining of the raw fuel, in general the private sector has been willing to invest resources while the public sector has lacked the financial resources as well as the know-how to successfully produce biofuels.

In January 2010, the Government of Ecuador launched a pilot program to mix 5 percent of bioethanol in a fuel blend to be marketed as E5 Ecopaís gasoline in several provinces. The first stage of the pilot project was started in the city of Guayaquil, Guayas province. The goal was to replace all gasoline sold in Guayaquil with Ecopaís in a period of two years, requiring a supply up to 50,000 liters of anhydrous ethanol per day by 2014 and 1.5 million liters by 2025. Due to high prices of sugar for human consumption, the program has not been fully successful and the levels needed for production have not been reached.

In 2007 President Correa created the National Biofuels Council which was composed of five ministers: Agriculture, Energy and Mining, Finance, Environment, and Industries (today there are six ministers after the split of the Energy and Mining Ministry into the Ministry of Electricity and Renewable Energy and the Ministry of Non-Renewable Natural Resources). Subsequently, a Biofuels Technical Committee was formed to draft a biofuels policy. This Committee could not agree on a biofuels policy framework due to conflicting interests among Committee members. In 2008, President Correa delegated responsibility on all biofuels policy issues to the Coordinating Ministry of Production. While this ministry is in charge of coordinating activities related to formulating biofuels policy, the executing agencies are the Ministry of Agriculture (MAGAP) and the Ministry of Industries.

Ecuador's biofuels policy would fit into a larger policy framework designed to promote the development and use of renewable energies. For instance, Article 15 of Ecuador's Constitution says the State shall promote the use of clean alternative energy with low environmental impact and Article 413 indicates that the State will promote the development and use of renewable energy without threatening food sovereignty.

Although Ecuador's constitution encourages the development of renewable energy sources, in reality there exists lack of specific legislation and regulations of biofuels development and production. Authorities have focused their efforts on including the topic in several white papers. For example, Ecuador's National Energy policy addresses the need to diversify the national energy matrix noting that the GOE will encourage energy generation from renewable sources and promote research for the use of alternative renewable energy, especially from geothermal, biomass, wind, and solar sources. In

In addition, the National Plan of Good Living and the Agenda for Productivity, Diversification and Productive Transformation also provide economic incentives, such as tax benefits, to promote the formation of new firms in the bioenergy and biofuels sectors. The GOE has also identified biomass energy as an important component in its efforts to diversify Ecuador's agriculture/industrial base and to increase the country's generation of renewable energy.

ECUADOR'S POTENTIAL TO DEVELOP A BIOFUELS INDUSTRY

Due to Ecuador's natural advantage for agricultural production, both the public and the private sector have engaged in a series of pilot projects to develop a biofuels industry. In the private sector, a few projects have culminated in adequate levels of domestically produced biodiesel that has been exported to foreign markets. It is interesting to notice that the lack of an overarching biofuels policy and specific regulations, combined with the Ecuador's natural comparative potential, have triggered the development of pilot projects. However, in the long-term, the future of the biofuels sector is not clear.

Government of Ecuador's Interest in Developing Biomass-based Energy

There are few projects that the Government of Ecuador has identified as potentially feasible. These projects are considerably ambitious and require technical expertise which is currently lacking in Ecuador's public sector. A summary of the most relevant ones is included below.

National and Local Government's Projects

Project Name	Provinces	Estimated value (US\$)	Description
Bioethanol Ecuadorian Sovereignty Project	Several provinces. First stage: Guayaquil, Guayas	160 million	National project in cooperation with the Government of Brazil that seeks to install a plant for 150,000 liters of bioethanol per day
Zapotillo	Loja	140 million	Government-sponsored project in pre-feasibility stage for the production of 300,000 liters of bioethanol per day in an area of 7000 ha.
Provincial Government of Sucumbios	Sucumbios	13 Million	Provincial government project that seeks to produce 40,000 liters of ethanol out of sugarcane planted in 2,500 ha.

There are many sources of biomass fuel available in Ecuador, including biomass derived from the production of rice, corn and sugarcane. The following table shows some

examples of biomass fuels the Ecuadorian government has been investigating:

Biomass Sources in Ecuador

Product	Byproducts	Percent	MT
Rice	Husk	22.50	191,250
	Broken rice	5	42,500
	Rice flour	8	68,000
	Impurities	1.50	12,750
	Milled rice	63	535,500
	TOTAL		850,000
Corn	Cane and cob	68	340,000
	Impurities	1	5,000
	Corn	31	155,000
	TOTAL		500,000
Sugarcane	Tops and leaves	32	176,000
	Bagasse	36	198,000
	Other residues	11	60,500
	Sugar and sugar products	21	115,500
	TOTAL		550,000

Note: Figures are annual as reported by Ecuador's Ministry of Agriculture

In addition, the Ecuadorian government through its Ministry of Agriculture (MAGAP) has determined volume, physical and chemical qualities of the following agricultural products:

Palm Kernel Shell: Palm oil processing plants are located in the area between Santo Domingo de los Tsáchilas and Quinindé.

Approximate annual volume: 50,000 MT

Physical-chemical properties:

- Calorific value: 16.8 GJ / kg
- Humidity 12%
- Ash 2%

Wood Chips: Sawmills are located in Quevedo, Los Rios in the coastal region and in the southern provinces.

Approximate annual volume: 20,000 MT

Physical-chemical properties:

- Calorific value: 13.5 GJ / kg
- Humidity 20%
- Ash 0.5%

Rice husk: Rice mills are located in the coastal provinces of Guayas and Los Rios.

Approximate annual volume: 20,000 MT

Physical-chemical properties:

- Calorific value: 15.0 GJ / kg
- Humidity 20%
- Ash 20%

Sugarcane bagasse: Located in Guayas and Los Rios

Approximate annual volume: 100,000 MT

Physical-chemical properties:

- Calorific value: 12.0 GJ / kg
- Humidity 10-60%
- Ash 10%

Ecuador's Private Sector Identified Initiatives to Develop Renewable Energy

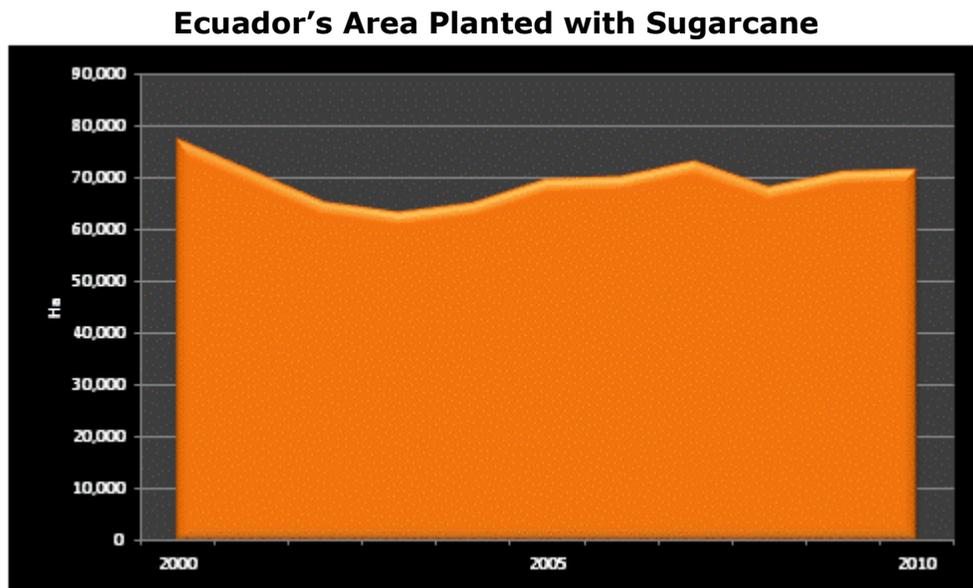
Project Name	Provinces	Estimated value (US\$)	Description
ECUANOL (Ecuadorian Bioethanol) Production of bioethanol based on sugarcane and sweet sorghum	Azuay, Oro	63.3 million	Ecuanol promotes the planting of 17.000 ha of which 7000 would be sugarcane and sorghum the remaining 10.000. It aims to produce 250,000 liters a day in two distillation plants.
The alternative energy Yunguilla Valley Project	Azuay	7.1 million	Project for the production of bioethanol with a 3900 hectare agricultural production and daily production of 70,000 liters of bioethanol
Iancen, bioethanol	Imbabura	32 million	In the northern part of Ecuador, Iancen Sugar Mill seeks to produce 100,000 liters of ethanol per day and co-generate 6 MW. Sugarcane crops needed would be 3000 ha.
Zarate Garcia	Guayas	70 million	Proposed planting of 5000 hectares in the area of El Empalme. The project could produce about 150,000 to 200,000 liters of bioethanol per day.
Biodiesel from Castor oil plant, Torres Perez	Manabí	4.7 Million	Production of biodiesel made of castor oil plant. It would produce 6,000 liters per day in an area of 900 hectares.
BANAENERGY	Santa Elena	14,27 Million	Production of sweet sorghum as raw material for the production of ethanol, 30,000 liters per day, in 1200 ha
Asociación de Desarrollo Integral Integral	Imbabura	2.35 Million	Production of 12,000 liters of bioethanol per day from sugarcane planted in 450 ha.
Biodiesel Ecuador	Loja	4.9 Million	Production of 5,000,000 gallons per year of biodiesel from castor oil plant and jathropha.

BIOETHANOL AND BIODIESEL

BIOETHANOL

Production

According to MAGAP, in 2010 there were about 79,000 ha planted with sugarcane, of which 71.4 were harvested. Most of the crop will be used for sugar for human consumption. There is an installed capacity to distill 185,000 liters of alcohol per day, of which only 20,000 liters per day are used for bioethanol. High prices of sugar for human consumption, domestically and internationally, are the reason low amounts of sugarcane have been used for bioethanol production.



Source: MAGAP's database and FENAZUCAR

Consumption

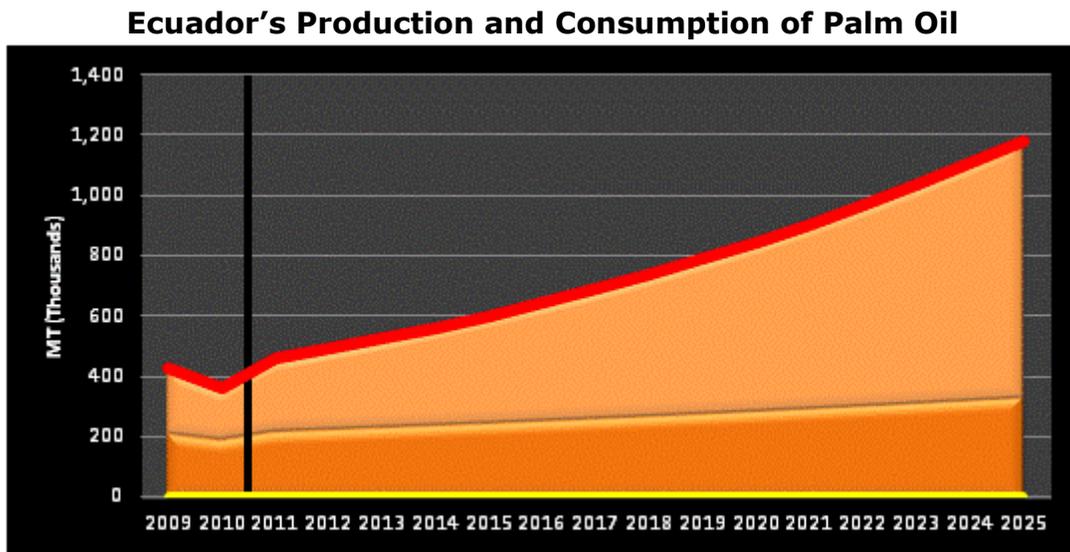
Except for very small amounts consumed by the Government of Ecuador's pilot project in the city of Guayaquil, ethanol consumption is negligible.

BIODIESEL

Production: African Palm

The total area planted with African palm in Ecuador is 240,000 hectares, with about 200,000 ha currently being harvested. Ecuador could potentially plant up to 760,000 ha of African palm according to Ecuador's Association of African Palm Growers (ANCUPA). Ecuador's private sector has the capacity to refine palm oil into biodiesel. This has been done in the past few years when oil prices reached record highs.

Based on projections from the sector in terms of production, domestic consumption and export surplus of red oil, the surplus could grow significantly and reach more than 850,000 tons of red oil in 2025.



Source: U.S. Agency for International Development, Ecuador

Production: Jatropha

Jatropha's yields are lower than those of African palm, although it is considered an alternative to African palm due to the large amount of unused arid land where it can grow. Ecuador's private sector has identified the most suitable areas to plant this crop; however current profit estimates are not optimal yet. Research is ongoing to utilize all sub-products of converting jatropha oil into biodiesel to increase profitability. There are currently about 700 ha planted with jatropha to be used commercially.

La Fabril is the only group in Ecuador producing biodiesel out of palm oil and jatropha. This group could potentially process up to 50,000 hectares planted with African palm and jatropha. Other palm producers interested in producing biodiesel are DANEC, Ales, and ANCUPA

Consumption

Local consumption of biodiesel is non-existent at this time. However, targets have been set to blend biodiesel and introduce it to the market progressively from a 3 percent mix requirement in 2014 to 17 percent by 2024.

U.S. GOVERNMENT AGENCIES ACTIVITIES

U.S. Agency for International Development

In 2009, USAID began a project with the Coordinating Ministry of Production to elaborate a comprehensive biofuels policy for Ecuador. In July 2010, USAID received a draft report produced by the Coordinating Ministry of Production. Execution will now fall to the Ministry of Agriculture and the Ministry of Industries. The report discussed biofuels policy and implementation, noting the need to increase the technical capacity within MAGAP to successfully implement a new biofuels policy.

U.S. Department of Agriculture (USDA) and U.S. Department of State

Energy and Climate Partnership for the Americas (ECPA)

USDA, with funding of the Department of State is working with the Government of Ecuador and the private sector in the identification of agricultural biomass as a sustainable source of renewable energy. This program will provide countries such as Ecuador an opportunity to reduce greenhouse gas emissions and improve their economic growth, two key goals of the ECPA.

Ecuador was seen as a strong candidate for USDA’s ECPA biomass initiative because of its existing biomass resources, geographical advantage due to its location in the equatorial zone, its evolving policy framework, and its high level of interest.

Ecuador’s ECPA Activities

DEMONSTRATION PROJECT THEME	SCIENTIFIC EXCHANGE SUBJECT AREAS OF INTEREST	U.S. STUDY TOUR SUBJECT AREAS OF INTEREST
Increasing the economic feasibility of	Advances in Jatropha use for energy	Use of sugar cane

biodiesel production from Jatropha by identifying the economic benefits of Jatropha co-products	and production of co-products; Florida International University was identified as a possible institution Economic and technical feasibility of water hyacinth as a biomass to be used for power generation	bagasse and other biomass for electric power generation.
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PROSPECTS

At the moment biofuels and agro energy has become an issue of national interest because of Ecuador's new constitutional mandate to replace Ecuador's current energy matrix with energy produced from renewable resources.

Most key players would seem to have the intention to bring this sub-sector to the next level. However, while the rules of the game remain unclear —particularly regarding a pricing scheme that would not jeopardize profits and defines if the GOE will have a role in setting up prices and if so how the price system will work—considerable private long-term investments are not likely to occur.