Farms Will Now Produce Biofuels **January 2007**

Innovative project carried out by CIAT to empower small farmers

Coffee pulp is commonly used to fertilize crops, but can you imagine a small farmer taking advantage of this waste to produce fuel for his motorcycle?

The International Center for Tropical Agriculture (CIAT) does envision this possibility and is conducting a pilot-scale project in several areas of Colombia that mainly aims to develop low-cost innovative systems to produce bioethanol (fuel alcohol), biodiesel, and pure vegetable oil that will generate rural employment while protecting the environment by reducing air pollution.

The project's interinstitutional team, under the leadership of CIAT researcher John Loke, has made important advances in the area of biofuels. John is firmly convinced that it is possible to produce biofuels by tapping numerous energy crops of the tropics and their wastes and by involving small producers so that they produce raw alcohol of low purity that will serve as input to refineries that produce high-quality fuel alcohol.

The Federation of Plantain Producers of Colombia (Fedeplátano) also participates in this project, and has already initiated the pre-market production of bioethanol based on coffee wastes in the country's coffee-growing region. Two prototype plants are currently being validated, one in Valle del Cauca and the other in Quindío. Another plant is mobile and can be strategically used to train producer associations anywhere in Colombia.

"The successful management of the prototype plant by Fedeplátano triggered a proposal to set up the same system in Tanzania (Africa)", highlighted Silverio González, the Federation's President. This innovative way of producing bioethanol will be useful for farmer associations in Latin America, Africa, and Asia.

Project activities include the establishment of castor bean (*Ricinus communis*) and *Jatropha curcas*, popularly known as physic nut or the tuba-tuba plant, both shrubs of the Euphorbiaceae family that produce between 1,600 and 3,400 liters biodiesel or pure vegetable oil (also a biofuel) per hectare per year.

This alliance involves farmer groups represented by Fedeplátano in Colombia and producers of *J. curcas* in Tanzania, supported by researchers of CIAT and the Colombian Corporation for Agricultural Research (CORPOICA) as well as by experts of Diligent Energy Systems B.V., a Dutch company that facilitates the access to biofuel production with a farmer participatory approach.

"The production plants proposed are relatively small-scaled; they use renewable energy sources as well as new waste transformation and management techniques as biogas", says Sanna Hogervorst, researcher of the University of Wageningen, who has been involved in the process. One of the new developments is the transportation of raw material in liquid form, facilitating its transfer in regions

with poor road infrastructure.

Over an 8-month period, different yeasts and enzymes that could be used to produce bioethanol from different raw materials have been evaluated at CIAT laboratories. Although sugarcane is a traditional source to produce this biofuel, according to experts it is also economically and technically feasible to obtain biofuel from cassava, sweet potato, banana, and coffee in regions not suitable for cane production.

Several farmer associations have already expressed their interest in this project in view of the low investment costs in prototype plants. Funding was obtained to build two more processing plants, including demonstration-scale plants, and to establish energy crops at CIAT's headquarters in Palmira and at CORPOICA's facilities in Montería, with the support of Colombia's Ministry of Agriculture and Development, the Latin American and Caribbean Consortium to Support Cassava Research and Development (CLAYUCA), and other entities.

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