LATIN BRIEF

3/2016
LATIN AMERICA AND THE CARIBBEAN DIVISION

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

In Cuba, the SDC is promoting renewable energies: "THE BIOGAS PLANT IS THE HEART OF MY FINCA"

Cuban smallholder farmers take advantage of biogas plants to dispose of their pig slurry and generate gas for their own use

Cuba wants to reduce its dependence on fossil fuels, in particular oil and gas. By 2030, around one-quarter of its energy should come from renewable sources. The SDC has been supporting a number of pilot projects since 2009. The project to install biogas plants for small farmers is the most advanced, while the project to produce biodiesel from an oleaginous plant not fit for human consumption, Jatropha curcas, is currently in the test phase.

Things are no longer the same on the farm of Jesús Domínguez in the fertile Matanzas province. He inherited the family farm five years ago and started a new life with his family. They initially used the former stable as their temporary home. Domínguez took advantage of the government's new agricultural policy of encouraging private producers alongside cooperatives to help improve food security in Cuba. Domínguez first planted vegetables and sold the fruit grown in the old orchards. He was also successful in breeding a few pigs. Sales were excellent, as pork is a regular item on the menu of every Cuban family and people are standing in line for pork.

Very soon, Finca Godines was a booming pig-fattening farm. Domínguez currently feeds more than 500 animals. He sells most of the pigs that are ready for slaughter to a cooperative in the vicinity, from whom he also buys 70 percent of his feed requirement. He prepares the remainder of the feed in his own kitchen. This operation has been made possible by the installation of a simple biogas plant which delivers enough energy in the form of methane gas to run a gas stove. As his finca is not yet connected to the public grid, Domínguez cannot rely on electricity. When running at full capacity, his own plant produces 64 cubic metres of gas, which is enough to supply

In the past few years, 170 biogas plants were commissioned on Cuban farms

the household and cook the food for the pigs. His successful fattening business meant that he could buy materials to build his own home. He and his wife did the work themselves, and their new home made from cement and coloured bricks will soon be finished. Biogas will not only provide them with light, but will also run the fridge and stove.

Domínguez has big plans: he wants to double the capacity of his pig-fattening farm to 1,000 animals. Running mainly on slurry produced from pig dung, at full capacity his current biogas plant can handle the manure of 500 animals. Domínguez is considering building a second plant with a similar capacity.

Renewable energy in rural areas

Domínguez can rely on the support and advice of the agricultural research institute Indio Hatuey (EEIH) in Matanzas province where the SDC has been sponsoring a project since 2009 promoting the production of renewable energy from biogas throughout the island. "By 2030, we want to produce around 24 percent of the energy for our country from renewable sources", says Giraldo Martín, Director of the EEIH research institute. Biogas is promoted by the Cuban government as an environmentally friendly alternative to fossil fuels, in particular oil and gas. The strategy adopted by the highest echelons of government explicitly recognises the importance of finding renewable energy sources for the rural areas.

But there is still a long way to go before this goal can be reached. Statistics show that at the end of 2015, the Caribbean island covered only a modest four percent of its energy requirements with solar, wind and biogas plants. According to a rough estimate, the biogas plants installed to date only generate electricity equalling some 3,500 barrels of oil. "If many more fincas switch to biogas, the demand for electricity will drop substantially, which will boost our energy independence," says Martín from the EEIH. For him and his team, the sustainable generation of energy from biomass is closely linked to the production of food.

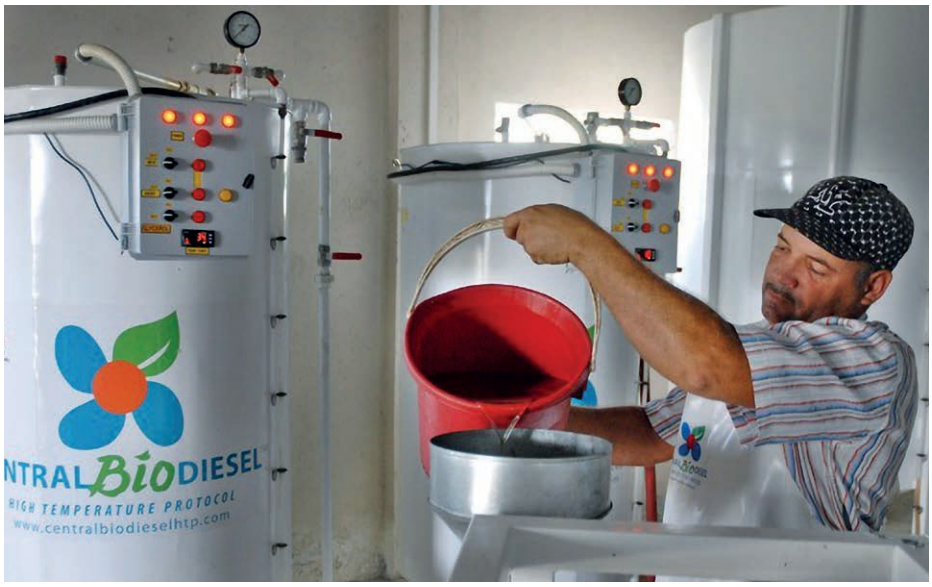
Environmental protection with closed loops

At the research institute, Jesús Suárez has been researching the benefits of biogas plants for many years. It is important to him that the entire biogas cycle on a finca is a closed loop. Animal manure forms the basis. The gas is used to operate the stove, fridges and gas lamps, and can also be converted into electrical energy to run the pumps needed for agricultural irrigation.

"The biogas plant is the heart of my finca," says José Gonzales from the farming village Taguasco, and adds: "Through integration we can make use of all the options provided by nature." Biogas plants not only help to reduce greenhouse gas emissions, but are also ideal for preventing the contamination of the soil caused by intensive pig farming. The Cuban Ministry of the Environment (CITMA) requires pig farmers to dispose of the manure produced by their animals. It is easy for farmers to feed this manure into their own biogas plant, which then produces energy for their local consumption. And the residual waste in the biogas plant is highly valuable as biomass that can be used to fertilise the fields and improve soil fertility or protect the soil from erosion. It also replaces harmful chemical fertilisers.

To date, 170 biogas plants have been commissioned in Cuba in accordance with the technical specifications of the EEIH. They are dispersed throughout the island in 22 municipalities in the Guantánamo, Holguín, Granma, Las Tunas, Sancti Spíri-

Giraldo Martín, Director of the Indio Hatuey research institute (EEIH), explains the advantages of using the oleaginous plant Jatropha curcas to manufacture biodiesel



Cuba's first biodiesel plant was built at Granja Paraguay in Guantánamo province

tus and Matanzas provinces and benefit more than 13,000 inhabitants. The individual biogas plants are built together with the owners of the land, with the latter paying for the labour and building materials. The project provides the technical equipment.

BIOFUEL OR FOOD?

Against the backdrop of climate change and the global food crisis, the use of oil seeds to manufacture biofuel is a topic of heated debate. Not only EU countries, but also emerging countries such as Brazil, Indonesia and Argentina have decided to use oleaginous plants to produce biodiesel as an alternative to fossil fuels.

The use of edible oil to produce biodiesel is not an option for Cuba. "Cuba will never allow the use of food to produce energy. Food is first used for the people, then to feed the animals, and only in the last instance for the production of energy," says Martín.

In their search for non-edible plants to use as raw material for the production of biofuel, EEIH researchers working on a joint project with the SDC discovered the Jatropha curcas plant from the spurge family. This plant is a drought-resistant shrub that grows in areas that are only partially suited to agriculture. It grows wild everywhere on the island. As it contains poisonous substances, the oil is not fit to be eaten.

In Indio Hatuey and the Guantánamo province, 72 percent of the trial fields were reserved for food production while the rest of the fields were planted with Jatropha curcas. The field trials have since been expanded to seven rural communities. To this end, the EEIH entered into a strategic alliance with Grupo Labiofam, a company owned by the Ministry of Agriculture. Almost 450 hectares have been planted with this oleaginous plant, always in tandem with food crops for human consumption.

Integrated production

The trials have shown that the integrated production of biodiesel and food is possible. The first biodiesel plant in Cuba has since started its operations in Granja Paraguay (Guantánamo) and already produces up to 400 litres of biofuel daily for the tractors and machines used by the state agricultural enterprise. The objective is to expand the area under polycultivation to some 1,700 hectares and build another six biodiesel plants by 2024. The experts at the EEIH are optimistic and believe that the production of biodiesel is a viable and ecological alternative to fossil fuels for Cuba. The recipe is simple: diesel oil produced from 200 hectares of Jatropha curcas is enough to cultivate 800 hectares of food crops. Martín from the EEIH agrees that the current production of biodiesel covers only a fraction of the national consumption. "This type of biodiesel production is still in a trial stage. We have to prove to the political decision-makers that our country can expect positive results if biodiesel can replace some of the fossil fuels used in agricultural production," says Martín.

WEEDS PRODUCE ELECTRICITY

Cuban farmers can tell you a thing or two about the problems caused by Marabou weed in their fields and pastures. Marabou weed or sicklebush (Dichrostachys cinerea) is an aggressive thorny bush that grows rampant in open, sunny areas where it crowds out all other plants. In

This family has enough energy to run their fridge and cook thanks to their own biogas plant

Cuba, the Marabou weed covers large areas of land that would be suitable to crop and livestock farming. Researchers at the Indio Hatuey research institute (EEIH) looked for a good way to make use of this unexploited biomass. Their solution: together with wood and solid crop waste, the invasive weed can be used to generate electrical energy.

Energy can be generated by a process known as the gasification of biomass. With the support of the SDC and in cooperation with EMPA in Switzerland, a research institute of the ETH, the first two gasification plants and generators were built at the Indio Hatuey research institute (EEIH) and the El Brujo sawmill in Santiago de Cuba. The 40 kilowatt plant at the sawmill already produces enough electricity to operate the machines during the day.

Gasification plant for the production of energy from biomass

WEEDS PRODUCE ELECTRICITY

Cuban farmers can tell you a thing or two about the problems caused by Marabou weed in their fields and pastures. Marabou weed or sicklebush (Dichrostachys cinerea) is an aggressive thorny bush that grows rampant in open, sunny areas where it crowds out all other plants. In Cuba, the Marabou weed covers large areas of land that would be suitable to crop and livestock farming. Researchers at the Indio Hatuey research institute (EEIH) looked for a good way to make use of this unexploited biomass. Their solution: together with wood and solid crop waste, the invasive weed can be used to generate electrical energy.

Energy can be generated by a process known as the gasification of biomass. With the support of the SDC and in cooperation with EMPA in Switzerland, a research institute of the ETH, the first two gasification plants and generators were built at the Indio Hatuey research institute (EEIH) and the El Brujo sawmill in Santiago de Cuba. The 40 kilowatt plant at the sawmill already produces enough electricity to operate the machines during the day.

IMPRINT

Publisher:
Swiss Agency for Development and Cooperation
SDC
Latin America and the Caribbean Division
Freiburgstrasse 130, 3003 Bern
Switzerland
Cosude.amlat@eda.admin.ch

Photos SDC

Further information
www.eda.admin.ch/deza/en/home/laender/Kuba.html

This publication is also available in German, French and Spanish.