

Biofuels without competing claims in Mozambique

April 26 2011, by Albert Sikkema

It might not seem the most obvious option to generate energy using biomass in Mozambique, where agriculture barely manages to feed the population. But Wageningen UR researchers concluded the contrary: Small bioreactors can deliver energy as well as more food.

Studies on the pros and cons of biofuels continue to be published around the globe. You can also start by looking at the [farming practices](#) in a region and explore the possibilities they offer. This is what Wageningen UR plant scientists and agro-technologists did in a joint project in Mozambique.

Female farmers in rural Mozambique grow maize and cassava. The maize is their staple crop and cassava is a reserve crop that they can fall back on if the maize harvest is poor. Cassava processing creates large amounts of waste, which is currently just discarded. Yet the cassava skins could be thrown into a fermenter to produce biogas. If the farmers did that, they could cook on the gas instead of on the firewood that they now spend a couple of hours a day collecting. So using biogas could buy them time. Time they could spend processing the cassava.

Soil quality

Another advantage: [fermentation](#) releases all sorts of nutrients in the cassava which makes the waste product a useful fertilizer. And that would benefit [soil quality](#) and with it, productivity. The farmers would

then be able to grow more cassava and maize. A [bioreactor](#) for home use costs 350 dollars, which they would be able to recoup in one and a half years.

These bioreactors are a success in Asia, say researchers Edna Zvinavashe and Wolter Elbersen of Wageningen's Biobased Products. But not yet in Africa. Zvinavashe calculated the economic feasibility of bioreactors in Mozambique and published her assessment in an article in [Biofuels](#) [Bioproducts](#) & Biorefining. One of the conditions for a successful introduction is that farmers should have access to microcredit to fund the fermenter.

Electricity

The researchers also investigated the feasibility of local bioreactors at village level. This kind of installation, which converts cassava and vegetable waste into ethanol and electricity, costs 167,000 dollars. The ethanol can then be exported, and the electricity sold to the villagers who do not have it now. This larger scale option is feasible too, but is much more complex. The ethanol has to go through an extra processing stage to be ready for export and the villages are not yet on the grid.

Even the bioreactor at village level would not pose a threat to regional food security, claims Elbersen. 'There is enough land in this part of Mozambique, it is just that agricultural productivity is very low. Only 20 percent of the 'community grounds' around a village are used each year, while the rest lies fallow to restore the soil fertility. The limiting factor is [fertilizer](#). The reactor would ensure an efficient recycling of fertilizers, making it possible to raise productivity by 20 percent.'

Flexible

This research is part of the Competing Claims programme at Wageningen UR, led by the Plant Production Systems chair group. Elbersen argues for a flexible mixing system for biofuels, so that farmers can produce less biofuels when food prices are high and more when they are low. 'That way bio-energy will actually help to counterbalance the price fluctuations on the food market.'

Provided by Wageningen University

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