

# Biogas in Uganda: a new experience

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Biogas may not be new in other parts of the world like China and India, but in Uganda it is – especially among small-scale farmers in rural districts like Moyo. In Uganda more than 90 percent of people's energy needs are met with biomass: Over 60 percent of total wood production is used for fuelwood. This has led to indiscriminate tree felling and there is therefore a need to promote other energy sources like biogas, especially for use at household level. Biogas is seen as a good alternative source of energy for cooking and lighting. It is also a way to make use of animal manure, thereby improving the sanitation of the homestead and providing fertilizer. Biogas also helps improve the health of women involved in cooking because it is smokeless. It saves time that would otherwise be spent collecting scarce fuelwood and it saves money that would have been used to buy fertilizers.

In Uganda, *Kulika Charitable Trust* as well as other NGOs are promoting the use of biogas as an alternative source of energy, especially among farmers who have zero grazing units with Friesian cattle or exotic goats. Kulika selects practicing farmers and trains them in organic agriculture and farmer-to-farmer extension. These farmers become Key Farmer Trainers in their communities and are expected to practise what they have learnt so that other farmers will become interested to seek more knowledge and skills. This approach has been effective and is slowly spreading. So far, at least six biogas plants have been established by Kulika and these plants have become focal points for training other farmers interested in biogas.

## Managing a biodigester

Prerequisites for building a new biodigester are a readily available water source and readily available fresh animal manure, for example a zero grazing unit with at least one or two exotic animals or two to three Zebu cattle. It should also be ensured that the farmer is willing to carry out the necessary extra work.

The biodigester should be sited in a flat place near the kitchen, since the pressure of the tubular type biodigester is relatively low. After construction, the biodigester has to be filled to capacity and six to seven days are needed for gas to start forming. Once the biodigester is working normally, it should be fed regularly with about 19 kg of dung per day. Overfeeding should be avoided, as this can stop gas formation. The dung should be mixed with water before feeding, and checked for stones or other unnecessary materials.

The dung is then mixed thoroughly with water in the appropriate proportions. This varies depending on the animal (Table 1). Goat or sheep droppings can also be used, but these should be crushed before feeding into the biodigester, since the droppings have a slimy mucous coating that makes it otherwise difficult for the bacteria in the biodigester to access fermentable material.

The mixture is fed into the biodigester through the inlet. The biodigester should be kept full enough so that the level of the mixture is above inlet and outlet pipes. This ensures that air from outside cannot enter the biodigester and that the biogas formed above the mixture cannot escape, except through the gas pipe.

In the biodigester, the organic material is fermented by bacteria, producing biogas and slurry. The biogas is stored in a reservoir and used as source of energy while the slurry is forced into an outlet chamber, from where it can be removed for use as a fertilizer.

**Table 1. Proportions of manure and water to be fed into the biodigester**

	Manure	Water
Zebu cattle	1	2
Friesian (Exotic)	1	1
Pig dung	5	4
Chicken droppings	1	1

Though biogas is safe to use compared to commercial gases, some precautions should be observed:

- The biogas pipes must be inspected regularly for leaks.
- If for any reason the gas stove goes out, the gas tap must be turned off before re-lighting.
- When lighting the gas, the match should be lit before the gas is turned on.
- Finally, rooms in which biogas is used must be well ventilated.

## Results

Approximately 50 - 60 percent of the farmers who established biogas plants have been successful. The farmers experiencing difficulties are mainly those who stall-feed the cattle only morning and evening and let them graze outside during the day, so that insufficient dung is available for the biodigester. Some farmers also find it difficult to feed the biodigester as regularly as required – this is easier if the whole family is involved in the project. Other farmers find the plastic biodigester too delicate – it has to be protected from playing children, stray animals and the sun. Farmers with only one or two animals also experience problems with maintaining the amount of dung required, in particular if an animal falls sick with East Coast Fever and has to be treated, as dung from animals under treatment cannot be fed to the digester.

The farmers that manage the digesters well are happy with the technology, especially in highly populated districts where fuelwood is a major problem. It saves fuelwood and money spent on energy. Farmers who take an integrated approach to crops and animals on their farms are even more successful because they use the slurry to fertilize their gardens, which significantly increases crop yields. They save the money that would otherwise have been used to buy fertilizer and they save the time used to make compost, as the slurry needs no treatment before use.

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