



Promoting domestic biogas among small farmers in Rwanda



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In Rwanda, traditional fuels account for around 85% of overall primary energy consumption. Over 90% of all households use wood or charcoal for cooking, which is causing systematic deforestation on the hills. The country is facing a traditional fuels deficit of over 4 million m³ per year.

In order to address this problem, the government initiated the National Domestic Biogas Programme in 2007 to support around 110,000 farmers with bio-digesters. Biogas is considered to be one of the fuels with the absolute lowest impact on the climate and environment, making it one of the most climate-friendly fuels. However, adoption of domestic biogas technology by farmers has been slow. Farmers lacked information and income, and biogas technology was not among the households' top priorities.

In 2013, Vétérinaires Sans Frontières Belgium and its local partner IMBARAGA decided to support this national programme with their own projects centred on green energy and livestock. Since 2014, they have been operating in four districts of the Southern Province: Huye, Nyanza, Ruhango and Nyamagabe.

What Vétérinaires Sans Frontières Belgium does

In collaboration with our local partner IMBARAGA and local authorities, we have developed an approach that focuses on awareness and training.

We start by organising **awareness-raising sessions** for farmers on the benefits of biogas. Our team then visits interested farmers to see whether they meet the **requirements for joining the programme**:

- they have at least 2 cows kept in permanent housing (no grazing),
- continuous access to water,
- willing to contribute with locally sourced building materials,
- able to make a complementary, unsubsidised financial contribution,
- motivated to learn and provide ongoing maintenance of the bio-digester.

Administrative support

If they fulfil these criteria, we help the farmers to apply for government subsidies and mobilise their personal contribution. They also benefit from our agreement with a local microfinance institution, which offers **reduced interested rates** in return for the guarantee funds that we provide.

Biogas production

We promote two types of bio-digesters:

- **Fixed-dome model**: underground construction made of red bricks,
- **Canvas model**: made of solid plastic.

Both are fed with cow dung, human waste (from latrines) and some water (which can be replaced by cow urine). These are converted into biogas (methane) by means of anaerobic digestion.

The biogas produced is piped to the kitchen and used in a simple gas oven. The digestion residue, called **bio-slurry**, is removed and used as organic manure to **fertilise crops**.

Construction

We provide 10 sacks of cement (worth about €105) for the fixed dome or a subsidy of €52 for the canvas model. We supervise the construction and installation of the biogas digesters with local construction companies. We also train local masons to repair faulty bio-digesters (including those installed before our intervention).

Training and follow-up

Our teams train families in **biogas use, maintenance of the bio-digesters and the use of bio-slurry**. We provide very regular monitoring at first to make sure they have understood how to use biogas efficiently.

At the same time, we train biogas beneficiaries in **cat-tle management** (animal production, hygiene and animal health). This is particularly important as the success of biogas depends on the health of the cows, which are the source of dung. We also link up farmers with our veterinary network.

Results

Between 2014 and 2020, we built or installed a total of **528 domestic biogas plants**.

Since November 2017, we have also repaired **118** non-functional bio-digesters which were built previously by other partners.

Benefits to the farmers supported

Environment

- There is an **83.2% reduction in firewood consumption** per household. Using biogas for cooking contributes to reducing pressure on local natural resources and prevents local deforestation.
- Thanks to bio-slurry (waste by-product), farmers **no longer rely on chemical fertilisers**.

Health

- 100% of the farmers (especially women) using biogas have found that **respiratory and eye disease have been greatly reduced**.
- Overall **family hygiene** (especially in the kitchen) has **improved considerably**.
- The use of bio-slurry **increases crop production**, which improves their **food security** and results in better health overall for the family.

Gender

- The use of biogas encourages a **fairer distribution of labour between men and women**. 60% of male beneficiaries now do the cooking, which was not the case before.

Savings

- Supported households **save about €12.50 per month**, or €150 over a year. Over the lifetime of a bio-digester (25–30 years for a fixed dome and 15–20 years for the canvas model), families save about €3,750 and €2,250 respectively.

Education and social status

- Unburdened from the wood chores, beneficiaries (especially women and children) have **more time for other activities** (economic activities, study etc.).
- The **social standing** of beneficiary farmers in their village communities is strengthened.



Key figures

528
bio-digesters
installed between
2014 and 2020

-83,2%
reduction in firewood
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per household

€150
annual savings
per household

i.e.
€2,250
savings over
the lifetime of a
canvas bio-digester

or
€3,750
savings over
the lifetime
of a fixed-dome
bio-digester



Lessons learnt

The success of our project demonstrates that small farmers can benefit from biogas technology. However, it is necessary to combine this with the **complementary expertise of committed stakeholders**. There are also three crucial elements to deal with:

- **Awareness-raising is the key to success**. This must be done by a trained team to increase the number of farmers who agree to participate in the programme.

As biogas technology is new to many Rwandans, it is necessary to **provide enough information** to farmers (about the requirements, maintenance, costs and benefits) to allow them to **make informed decisions**. We have also found that farmers living near non-functional bio-digesters are difficult to convince to join the programme. The repair of these bio-digesters is therefore essential before raising awareness among new farmers.

- **Training beneficiaries in the use and maintenance of the digesters** and supporting them during the critical stage of feeding (between the end of construction and the start of gas production) allows them to succeed with bio-digester maintenance.
- The **financial participation of farmers** is essential to increase appropriation of the technology. Facilitating their access to credit at reduced interest rates is an efficient tool for this. This requires a good partnership with a local micro-finance institution. However, small farmers with low incomes will still need direct support from the government or other partners to be able to install a bio-digester.

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