# Turning Waste into Energy and Fertiliser

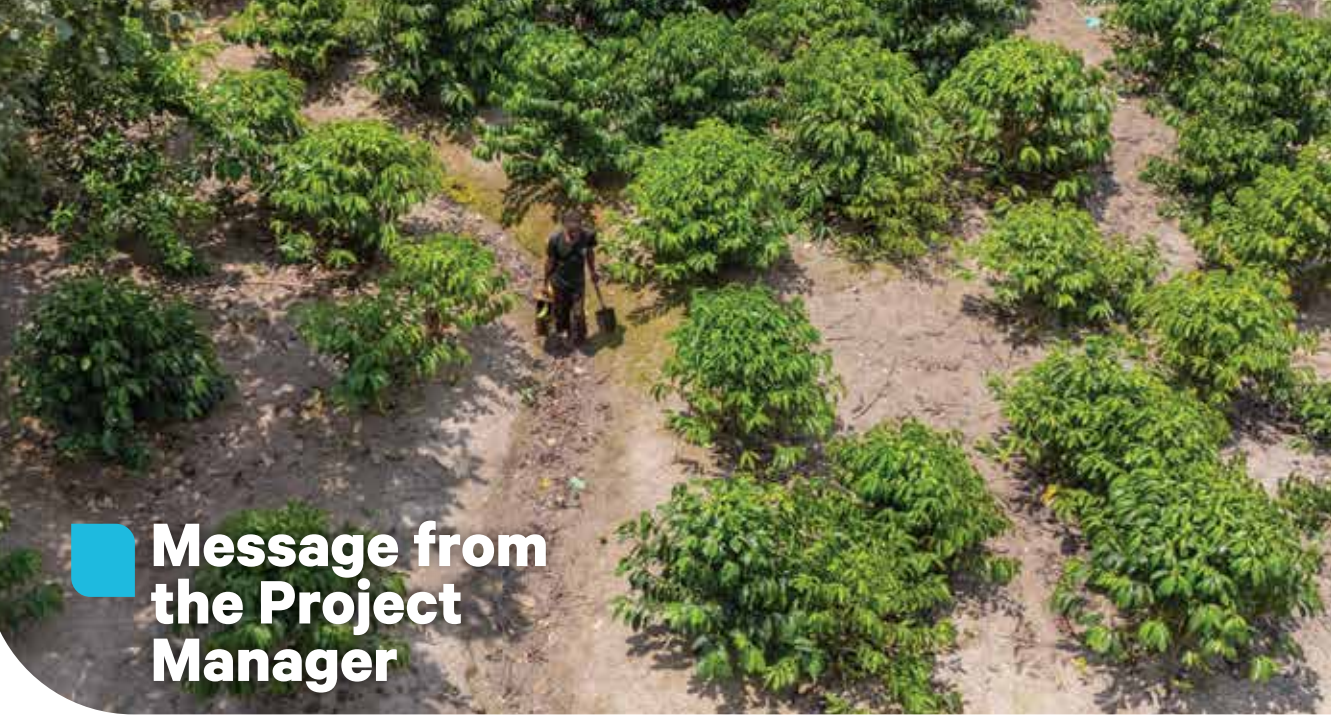
## Stories of Change from the African Biodigester Component Uganda

September 2025

African Biodigester Component (ABC) Uganda

# Contents





# Message from the Project Manager

2025 marked a pivotal moment for the African Biodigester Component (ABC) Uganda. Building on the lessons of the past years, the programme has deliberately repositioned itself to foster a sustainable, market-driven biodigester sector anchored in systemic transformation and strengthened public–private partnerships.

The first half of 2025 was not without its challenges. The withdrawal of a major subsidy for prefabricated biodigesters presented affordability constraints for farmers and strained the capacity of Biodigester Enterprises (BEs). This resulted in a slowdown in adoption and temporarily stalled market growth. Yet, out of these challenges, new opportunities have emerged. We have worked closely with financial institutions, SACCOs, and government partners to create alternative financing pathways.

In parallel, our work to strengthen the supply side of the sector is bearing fruit. Fourteen biodigester enterprises (BEs) received targeted business development support, improving their financial management, record-keeping, and marketing strategies. Through Results-Based Financing (RBF) advances, nine BEs were able to continue installations despite market turbulence.

On the policy front, our collaboration with the Ministry of Energy and Mineral Development (MEMD) and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) is ensuring that biodigesters and bioslurry are integrated into national strategies such as the National Biogas Strategy and the Organic Agriculture Bill. These partnerships are vital for building an enabling environment that ensures the sector's long-term viability.

Above all, the stories from farmers and communities inspire us to stay the course.

Looking ahead, we remain steadfast in our commitment to achieving our target of 2,900 biodigesters by 2026, impacting thousands of lives and contributing to Uganda's clean energy and agricultural development.

# Introduction

The African Biodigester Component (ABC), implemented under the Strengthening Entrepreneurial Ecosystem for Clean Cooking (SEE-Clean Cooking) programme aims to support the growth and long-term sustainability of a commercial biodigester sector in Sub-Saharan Africa.

The project is funded by the Netherlands Ministry of Foreign Affairs and coordinated by the Netherlands Enterprise Agency (RVO) in partnership with Energising Development (EnDev). ABC Uganda is implemented by a consortium of partners SNV, GIZ and Biogas Solutions Uganda (BSUL) and with technical support from the Ministry of Energy and Mineral Development (MEMD) and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

This publication presents impact stories from the African Biodigester Component (ABC) in Uganda, capturing evidence of how the project is fostering learning and collaboration within the biodigester sector. The stories highlight how biodigesters are contributing to improved livelihoods across the country, raising household incomes, enhancing health, increasing agricultural productivity, and reducing environmental degradation.

# Thematic Areas

## 01 Demand-Side

- Increase awareness to promote the adoption of biodigesters.
- Improve affordability through tailored credit schemes.

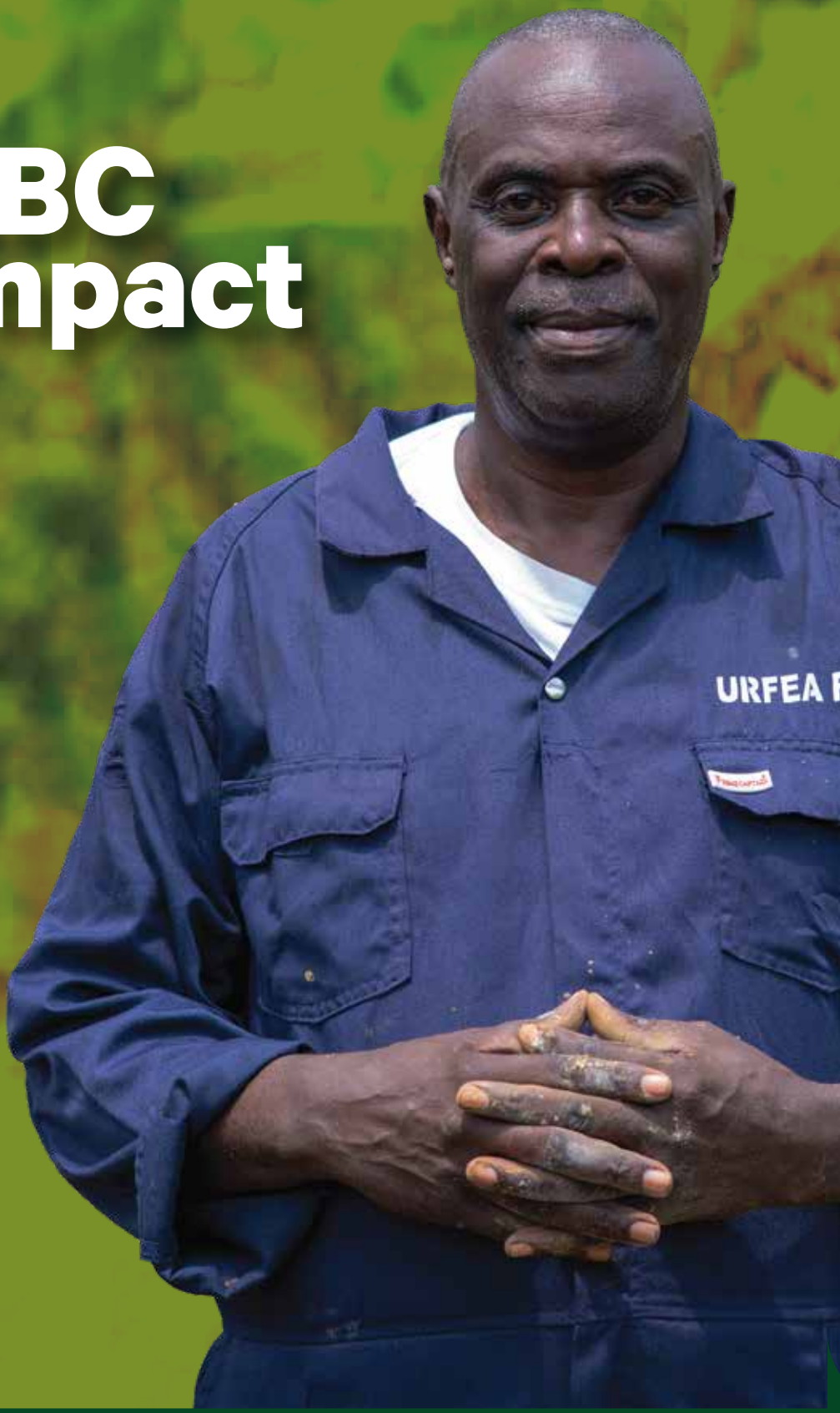
## 02 Supply-Side

- Build the technical and business capacities of BEs.
- Support market entry through advance Results-Based Financing (RBF) and credit linkages.
- Integrate BEs into key agricultural value chains such as dairy and coffee.

## 03 Enabling Environment

- Strengthen the coordination of the biodigester sector stakeholders.

# ABC Impact



# Bioslurry Doubles Yields and Turns Bananas into Millions

Kateera Muhanguzi has nothing but appreciation for the biodigester and its many benefits. Recently, his community was devastated by hailstorm that destroyed banana plantations, the main source of food and income for most families. Trees were felled, and even those that survived produced bananas that ripened too early, before they could be harvested.

But Kateera's story turned out differently.

"We were hit by a hailstorm but because we were using bioslurry, we had something left in the banana plantation and even beans. I didn't make heavy losses because I harvested the bananas early and ripened them for winemaking," he explained.

Other farmers were not as fortunate. Their crop yields had already been poor before the storm struck, leaving them with little to salvage.

For Kateera, however, bioslurry has been a game changer.

> "You can have four matooke plants from just one original plant, which was not possible before we started using bioslurry. The matooke also grows faster and heavier. We used to harvest bunches weighing 20–25 kilograms, but now one bunch can weigh 25–40 kilograms," he said proudly.

## Adding Value to Matooke

Unlike many farmers who sell bananas directly, Kateera adds value by making banana wine, a highly sought-after commodity in his community, especially for weddings and traditional marriage ceremonies.

“We used to get one jerrycan of wine from one bunch of matooke, but now we get two. I sell one bottle of wine at Ugx 10,000 ( 2.4 Euros) Each drum has 300 bottles, and I use five bunches of matooke to make one drum which sells for Ugx 3 million ( 730 Euros). This means I earn about Ugx 600,000 (145 Euros) from each bunchof matooke,” he explained.

In comparison, selling a bunch outright would bring only Ugx 15,000 - 40,000 (3.6 - 9.7 Euros) depending on the season. The difference in value is striking. Today, although he farms on just one acre, Kateera makes wine wortUgx 200 - 300 million

“In just a year, you can establish a matooke plantation. I tell people that even if you have little land, you can grow matooke commercially and make money,” he said. “The good thing is when you have excess

bioslurry, you can sell it, but I normally give it free to my neighbors so I can later buy matooke from them for more wine-making.”

The enterprise is also creating jobs. He now employs five full-time workers, and during school holidays, his children support the wine production process.

**Kateera Muhangunzi applies bioslurry to a banana plant at his farm in Sheema District.**

## Neighbours Inspired

Kateera's success has inspired others. In his village alone, 16 people have bought biodigesters after seeing the benefits firsthand.

> "The problem is that biogas is now expensive, but they would all have it if they could," he noted. "My prayer is that everyone gets to see what biogas can do. I have started training and demonstrating so people can learn from me. With more matooke, we can build a wine factory!

Beyond bananas, he also mixes bioslurry into pig feed with excellent results. "The pigs grow more muscle and less fat," he shared. He is now expanding his banana plantation to scale up wine production even further.

## A Breath of Fresh Air

For his wife, Moneth Aryatusinguza, the biodigester has been life-changing in more ways than one. She is actively involved in the farm, feeding the biodigester daily and helping to apply bioslurry to their crops. Beyond boosting productivity, the technology has transformed her household chores. "Smoke used to give me headaches all the time. Now it's all perfect. We have enough biogas for cooking and have never used firewood since we installed the biodigester," she said.

## A Farmer's Future

For the Muhanguzi family, what began as a way to fertilize their crops has turned into a thriving agribusiness that sustains their household, provides employment, and inspires neighbors. Bioslurry not only doubled their crop yields but also unlocked new opportunities through value addition. As their journey grows, Kateera plans to establish a wine factory that will benefit the entire community by creating more jobs, boosting incomes, and expanding market opportunities.

Kateera with the wine, packed in bottles ready for sale.

# From Dung to Dignity: A Biodigester Solves a Farm's Waste Burden

When you visit Pearl Mixed Farm, you are immediately struck by how every member of the household plays a vital role in keeping it running. The farm workers gather dung from the cow shed, one family member carefully mixes the feed, and another takes pride in feeding the pigs. Enock Kagumya beams with pride as he explains how his family tends to the animals whenever they are home from school.

Even though he has a full-time job, the farm is his pride. Named after one of his daughters, Pearl Mixed Farm sits on just one acre, sharing space with the family home. It houses nine cows, a piggery, and an azolla pond a high-protein aquatic plant used in livestock feeding. The family grows coffee, bananas, maize, food crops, and sugar napier for pasture on other plots of land.

Enock had been exploring ways to manage the cow dung, including sun-drying it, but the process would have cost five million shillings (about 1200 Euros). Installing a biodigester, which cost just four million (about 970 Euros), not only solved the dung problem but also provided cooking gas for the household.

Today, waste is no longer a burden at all.

> "I feed the digester with a lot of dung, it comes out in liquid form which is easier to transport. I can easily pack six jerrycans onto a bicycle and take it to my other plantations, which was very hard to do with fresh cow dung. Most importantly, I

**Jenard Ayebazibwe and her family walk back home from their pasture garden**

> “was helped in waste management, and even air pollution has reduced. Even my neighbors would have reported me by now or I would have moved too. So for me, I was already satisfied with waste management alone.”

Enock Kagumya in the cow shed at his home in Isingiro District.

## Free, Nutritious Fertilizer and Feed

As it turns out, the biodigester soon revealed even greater benefits in form of bioslurry, an organic fertiliser and animal feed. With the free and nutritious bioslurry, the results have been clear for his milk production. The farmer uses a slow-release method of adding bioslurry to azolla to increase its growth, which in turn increases milk production.

Jenard Ayebazibwe collecting bioslurry from the slurry pit

Let's say you are producing about five litres a day, when you give azolla weekly for a month, at least the milk will increase by two litres. And the cow looks healthy.

By using bioslurry, he was able cut his feed costs dramatically.

> "Most farmers want it for fertiliser and for feeds, but I am not giving them because I use it on my farm in sugar napier, banana plantations, and coffee. After seeing how mine are doing, I realised it reduces the cost of feeding pigs by 50%."

## New Ventures from Surplus

Bioslurry also sparked innovation.

It helped me start the pig farm. I started it because I realised I had free food," he says.

The bioslurry boosts pasture too.

"Bioslurry helps me grow pasture very fast, in 40 to 45 days. Even in dry seasons like now, we have the pasture. Because bioslurry is liquid, when you add it to pasture, it keeps growing even the dry seasons."

With better feed, his cows are now high performers. With the increased bioslurry and better feeding for the cows, they milk about 80 to 100 litres daily from three cows. That is high production compared to other farmers without bioslurry, who would average 50 litres on a good day.

The biodigester also brought relief at home. While you need money to get a biodigester, the benefits are greater.

"Yes, I put in money, but we used to use firewood, we no longer buy any. We now cook using biogas."

### Innovating Through Challenges

Water scarcity is a daily struggle in Isingiro District. Yet even here, solutions emerged.

"When you become oppressed, you are forced to find solutions. This side we have a problem of water, and we had to preserve the animal urine which we use to mix the dung. This gives us even much more gas than if we mixed with water."

The azolla pond being fed with bioslurry in sacks. The azola if a high protein feed for cattle.

Beyond raw milk, the family makes ghee for sale and even produces banana wine from their bananas.

"We don't stop at milk production," he says with a smile. "We are adding value."

It helped me start the pig farm. I started it because I realised I had free food," he says.

## A Farmer's Verdict

Kagumya first learned about biogas and bioslurry at a farmers' seminar, where he met the African Biodigester Component (ABC team). They told him about the cost and the advantages of biogas and he bought the biodigester a year later in 2024.

Praise Ahumuza and her mother mixing bioslurry in pig feed.

Looking back, he says the investment has been worth every shilling.

"For me, I was already satisfied with waste management alone. But now, I am enjoying surplus benefits."

What started as a solution to a waste management crisis has turned a small mixed farm into a model of efficiency, cutting feed costs, boosting milk yields, powering the household, and inspiring new ventures.

# A Woman's Dream: Driving Innovation with Bioslurry Value Addition

Staff of the African Biodigester Component (ABC) first met Merab Manige when she was attending a meeting with a group of women farmers who were learning about biodigesters. A technician specializing in microbes, breeding, and food systems, Merab immediately saw a new opportunity in what many considered waste.

She observed that her neighbour, who owned many cows and a biodigester, often had bioslurry overflowing onto the road. Seeing it as a wasted resource, Merab sought and received his permission to utilise the bioslurry.

Merab worked from her home in Gayaza, a suburb of Kampala. It is here that she also grows mushrooms. She began with the little resources that she had and says tt wasn't an easy start.

She partnered with colleagues at Makerere University's College of Natural Sciences and Agriculture to make a more concentrated fertiliser out of bioslurry that is easier to transport and sell widely. Today they are still in the pilot phase but the product, "Yange", is showing a lot of promise.

Moses Kipkemboi, one of her business partners, added: “When we started we were approaching it from a waste management angle. When we saw there was room for us to add value, we were very interested. We actually saw that we had a team that can concentrate this fertilizer because it was very heavy. So we decided to concentrate and pack it into smaller quantities.”

The process is highly technical and labor

Merab Manage shows one of the products, the concentrated organic fertiliser made from bioslurry specifically for mushroom growing.

intensive. “Product formulation is sophisticated and most of the microbes we add in are expensive to concentrate. The microbes are also organic and extracted from plants,” Merab explains. The team adds eight microbes rich in nitrogen and phosphorus to the raw bioslurry, then mixes in plant extracts to remove the smell. “The process takes about 14 to 30 days. The challenging part is the filtration because we do it manually, it takes a lot of time. We don’t rush this process, we give it time.”

After filtration and further microbial enrichment, the product is tested in the lab to ensure safety and to determine nutrient content. The results so far are promising. “We’ve been testing for about seven months now and have amazing results for matooke farmers, coffee farmers, soya bean, and sugarcane farmers. We are also trying out another product for bio-palms only,” Moses said.

> The benefits go beyond crop yields. “For us it is not just about making money, it is about the joy of transforming something seen as waste into something valuable. Also the joy of getting our soils treated. We have been using a lot of chemicals. One of the advantages of this fertilizer is that the enzymes are live and once you apply it to the soil, they interact with the soil and heal the soil.”

Employment creation is another outcome.

“We are about 20–30 people, some casual, and we are open to working with people of like mind to grow,” she said. The team currently buys bioslurry from about 15 farmers with biodigesters, creating a circular economy.

Two products are now in the market: one for general crops and one specifically for mushrooms. The mushroom fertilizer has proven especially transformative. “We have about 1,200 mushroom farmers, and 80 percent are women. Then we add value to the mushrooms and make mushroom flakes which are a healthy breakfast option or snack,” Merab says excitedly.

The initiative is still in the testing phase, but the vision is clear. “At this point we have spent more money than we have made, but later there will definitely be profits. We are testing, by law we are allowed, and farmers in the community are already buying the products,” Moses explains.

Through determination, science, and partnerships, what began as a waste problem on a village road has become a pioneering solution for soil health, women’s economic empowerment, and climate-smart farming.


**Merab showing the mushroom flakes that she makes from mushrooms.**

# How a Biodigester is Improving Agricultural Productivity for a Smallholder Farmer

Frank Musika had always wanted to have biogas. As a farmer, he always made sure to attend trainings and agricultural exhibitions.

I go to Expos and exhibitions and trade shows since I am a farmer. That's how I got to know about SNV and biogas from one of the exhibitions, said Frank Musika.

After attending a biogas exhibition organised by SNV and Biogas Solutions Uganda Ltd (BSUL), Frank didn't need a lot of convincing to purchase a biodigester.

"They told me about Sistema and I got the small one, I paid 1.5 million shillings for it."

With about three acres of land and some additional rented land, Frank's interest was mostly in the bioslurry, an organic fertiliser that is a by product of biogas. Frank currently has planted coffee and grows other seasonal crops such as maize and beans. His wife, Hellen Kyomuhangyi grows vegetables and herbal plants on the same land. Together, they also keep a cow, some pigs and chickens.

"What really counts for me is the bioslurry, and it is doing very well on coffee. The coffee is not yet a year old, I planted in November and started adding bio-slurry. You can see how good it looks. I also use it as animal feed for my pigs and want to start mixing it in chicken feed as well," he added excitedly!

**Frank Musika working on his farm in Wakiso District.**

With just one cow, Frank is able to get enough bio-slurry to use as fertiliser and animal feed for his pigs. While he hasn't quantified the monetary benefits, Frank is sure he has made some cost savings because of using biogas for cooking and bio-slurry as fertiliser.

My wife doesn't have to buy fertiliser for her tomatoes anymore. When added onto maize crop, the maize grows very well and then I use the same maize to feed the pigs and poultry," Frank says. "The biogas has also reduced reliance on firewood for cooking, it's because I don't have enough feed stock, if I had enough, the cooking gas would be enough for all my cooking needs.

A retired Clearing Agent, 55-year-old Frank went into full time farming in 2017. Eight years later, he has no regrets about his decision to retire early. From their farm, they are able to get school fees for their three children by selling pigs, hens and milk and tomatoes and herbal oils from the wife's business. Frank adds happily "plus food on the table is assured."

They are planning to get a second and bigger biodigester before this year ends.

I am going to bring other cows, my cow has been producing only bulls and I would sell them off. I wanted to get experience in rearing dairy cows. I will need a bigger biodigester because it is very important,' Frank concluded.

Hellen Kyomuhangi applies bioslurry to a vegetable nursery bed as the husband looks on.

# **Selling Bioslurry by the Jerrycans:** Farmers Rush for Organic Fertiliser

As a veterinary doctor, Dr. David Mugabi was used to delivering calves for his clients. But one day, when a farmer refused to raise the newborn, he had just helped bring into the world, David suddenly found himself not only a vet—but also a farmer.

Several years later, the AMA Brothers' Project – which is the name of his farm located in Kayabwe, Masaka District along the Masaka Mbarara highway, this calf has since multiplied to 22 cows.

After attending a training by SNV and Biogas Solutions Uganda Ltd (BSUL) and having been linked to a biodigester enterprise to construct the biodigester, Dr David finally got one in 2023.

> "The major reason was the problem with firewood. I had 17 people on the farm and we were using Ugx 20,000 every day to buy firewood. My wife and I sat down and planned to acquire biogas to solve this problem".

With the 20 cubic metres fixed dome biodigester installed, firewood became a thing of the past at the farm.

"Now with biogas, we are not bothered by how much cooking we do, we have more than enough gas. I stopped worrying about the money wasted on firewood,' the vet doctor says as he shows us the past records with firewood contributing a significant amount of expenses. He has not yet repainted the kitchen since the days of cooking with firewood and now uses the blackened walls and ceiling as a teaching moment.

'The amount of soot you see on the walls and roof must be equivalent to the soot in the lungs of the person cooking, usually women," he adds soberly.

'Bioslurry is the Real Blessing ' Much as Dr David acquired the biodigester for clean cooking, today he says the real benefit has been the biogas by product, bioslurry, which he uses as organic fertiliser.

"We are in the dry season but my bananas are doing well. I also use it in my 4-acre coffee farm and for pasture and they are all doing very well," he said excitedly. "Before we got the biodigester, we would apply cow dung in the pasture garden but the cows would not eat the grass well. With

Dr David Mugabi with his farm workers as they add bioslurry into the fish pond. Bioslurry enriches the pond with essential nutrients, promoting the growth natural fish feed and enhancing overall fish productivity

bioslurry, the cows enjoy the napier without the smell of dung because bioslurry doesn't smell."

After realising he had enough bioslurry, ABC staff advised him to get a bigger slurry pit. With the bigger pit, ABC also suggested to him the idea of selling the bioslurry to his neighbours.

"Before people didn't know about bioslurry and would come to buy cow dung from me. I would show them bioslurry and tell them it works even better than cow dung. I started by giving it to them free, after seeing the results, they started buying it."

Every day, he gets 60 jerrycans of bioslurry which is equivalent to 1200 litres of bioslurry. He uses most of the slurry on his own farm and sells the excess, usually over the weekend when many farmers order. A 20 litre jerrycan goes for Ugx 7000 and Ugx 5000 when one is buying in bulk.

As a result, he has added one more staff to work specifically on the bioslurry because it is a lot of work emptying the pit. The money he gets from

the sale of the bioslurry is what he uses to pay and maintain the workers. He is planning to start pumping the slurry directly to the gardens to reduce the labour.

Some of the plastic jerrycans that he uses to store and transport bioslurry for sale and to his farm.

The ABC project continually visits the farm to advise on how to use the fertiliser effectively and Dr David has no complaints.

> "I am so happy, I don't have any complaints with biogas or the bioslurry. Even if I don't sell the bioslurry, I benefit from my farm. The land here was very poor so we still need a lot of bioslurry. Bioslurry is also creating employment for the youth and keeps them engaged productively. If you look at the money saved from not buying vegetables, not buying agrochemicals, firewood and health wise, we are already breaking even!" Dr David concluded.

He also uses the bioslurry to mix animal feed for his pigs, poultry and fish farming. His dream is to see his dairy farm grow from 22 to 100 cows

# Biogas Has Helped Me Keep My Job

Biogas has helped me keep my job. Even if you have other things to do, you can put food on the stove and it cooks well as long as you set the time and heat according to what you are cooking, as long as you don't forget to remove the food. Firewood used to disturb me a lot, it wasn't easy to cook. Now it is easy to cook at anytime you want, sometimes on Sunday I wake up at 5 am and put food on the stove and go to get ready for church and find the food ready before going to church. Also, you don't get dirty, and your kitchen stays clean, unlike when using firewood."

**Aisha Najjita, Mpigi District**















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