**BIOGAS ASSESSMENT PROJECT**

**Site ID: 56**

**Date: November 13, 2022.**

**Interviewer**: Where did the digester originate from?

**Interviewee**: It came with Ecogen. What happened was that Ecogen came to our cow farmers group and briefed us about the digesters. That time, I wasn’t at the meeting but my wife was there. So, when she heard about the digester, she became interested and asked me to get one. So, we got one, and here in [location redacted], we are the only ones who have this. It could have been disappointing for them to come here and not get even one single customer. So, after that, they came and they advise us to dig holes for the digester.

**Interviewer**: How much did the digester cost?

**Interviewee**: The cost of the digester is K850000, and the money is supposed to be paid within 2 years.

**Interviewer**: Who built it?

**Interviewee**: To construct a digester you need 2 holes, and I’m the one who dug the holes. As for other work, for instance, its installation, Ecogen did that.

**Interviewer**: How many people from the installation company were involved in its installation?

**Interviewee**: There were three people, female and 2 males.

**Interviewer**: How long did it take you to dig the hole?

**Interviewee**: I started digging the hole at 4:00 PM after knocking of from work, and then I continued the following day to finish at 11 AM.

**Interviewer**: Oh, that was some work

**Interviewee**: Yeah, it was a lot of work.

**Interviewer**: Apart from digging, what was your other role? And, who was responsible for making the first feedstock?

**Interviewee**: On the first day, they showed us how to do it, so they were responsible for making the feedstock. But, after that, I was responsible for making the feedstock and feeding it.

**Interviewer**: Did you know about biogas before?

**Interviewee**: No, I knew everything about biogas because of them.

**Interviewer**: I believe your cattle group has a lot of members, so could you take me through the meeting you had with Ecogen? What did they say? And, why didn’t the other cow owners get the digesters?

**Interviewee**: On that day, there was a meeting of cow farmers, so they took advantage of that and they came to discuss about their digesters. And, they also came with a biogas storage bag to demonstrate their product. So, at the end of their demonstration people ate nsima with side dish. And, on that particular day, they were over 50 people. After their presentation, the people become interested in the digesters, but people were put off by the price of K800000. So, nearly all cow farmers thought the price was too much and it didn’t get the digesters. I think my wife only accepted it because she knew that I’m a cow farmer, and I’m also employed. So, I accepted her request because I thought it was going to her help. Now, I think we made a mistake. But, since we already got it, and we can’t return it, we will do anything to make it work – and the only consolation now is that we get our cow manure from it – and we make compost from it.

**Interviewer**: So a lot of people liked it but they were put off by itself price?

**Interviewee**: Yeah, when we started using it a lot of people came and they liked it. I remember four people asked me to give them the number of the installers so that they could also be installed one. But, when they called the installers they were told that they needed to pay a deposit of K200000 and also that the price of the digesters had risen to K900000 or K950000. So, they told them that they could not manage, and that’s why they did not get it. Now, I understand that the price of it is over K1 million, and that’s not something that a farmer can manage.

**Interviewer**: My understanding is that you expected to use it for cooking and as well as a source of fertilizer. Apart from this, is there anything else you expected from it?

**Interviewee**: My biggest expectation as a farmer and as a villager was that my wife was going to use it for 3 hours cooking, and that’s a lot of cooking time. So with that I anticipated that my wife would be using it in the morning, in the afternoon, and in the evening for cooking. But, now that’s not the case. Now, it’s not possible for her to cook nsima and side dish (1 hour – 1 hour and 30 minutes of cook time). The other thing was that I expected it to provide us with fertilizer, and that’s what attracted me most about it, because we live in a village and we can’t do anything else apart from farming. From this, I also expected to supply other community members with his fertilizer at a certain price. So, those were my expectations!

**Interviewer**: You are saying you expected to get three hours of cooking time but that’s not the case. How much cooking time are you getting from it now?

**Interviewee**: I’m only getting 30 minutes, and after that, it goes off. And to get that you also need to put a bag of sand or stones on top of the digester bag to force the gas out of the bag.

**Interviewer**: Oh, sad. How did you meet your energy needs before the intervention?

**Interviewee**: She was using firewood and charcoal. And now it’s not like things have changed, I still use firewood and charcoal because we are getting very limited cooking time.

**Interviewer**: Where do you get firewood?

**Interviewee**: We have trees but they are not enough to get firewood from everyday. So, we buy firewood from wood vendors of Mulanje, who usually sell firewood in Blantyre.

**Interviewer**: In a month, how much firewood and charcoal do you buy?

**Interviewee**: I use one bag of 50 kg of charcoal, and firewood of K10000.

**Interviewer**: How much is a bag of charcoal in Mikolongwe?

**Interviewee**: Charcoal price depends on the season; charcoal is more expensive in wet season than in dry season because it’s hard to produce it in cold season, and also because the demand is high as people use it for warming water. So, we buy a bag of charcoal at K10000, and if you are a good negotiator, you get it at K8000 from the same vendor.

**Interviewer**: From your statements, I believe you have cows. How many cows did you have that time? And, how many do you have now?

**Interviewee**: The time they came, I had two cows. And now I still have two cows. I had 4 cows lately, but I have sold one because I wanted to sort out some issues, and the other one died.

**Interviewer**: How did you manage your manure before the intervention?

**Interviewee**: I have a hole of 3m long, 3m wide and 1m deep. So, I put the manure there. Now, I add effluent on the manure to make strong fertilizer. Then, after everything, we cover the manure with plastic bag for 6 weeks.

**Interviewer**: People say if you want fertilizer go to a shop and get inorganic fertilizer, because manure doesn’t work as fertilizer, what’s your take?

**Interviewee**: Of course, inorganic fertilizer is better. But, I do see change when I use the compost too. And this other time I tried effluent from the digester on my vegetable garden, and it worked quite okay. The beans, mustard, and other vegetables did well, and the other thing is that when you use the effluent you don’t need to apply pesticide. Thus, after we applied the effluent no weevils, armyworms and other pests came near the garden, so it’s good in that regard. And this time around, I'm planning to collect the effluent and dilute it because it’s too strong you can’t use it as come, and then apply it on a separate maize field when I normally harvest two bags of maize to try it out on maize.

**Interviewer**: How much feedstock did you start it with?

**Interviewee**: Initially, because the bag is big they told us to pour 10 drums (200 liters) of pure water. Then, I gathered 5 or 6 bags of fresh manure and started feeding it with slurry of 2 or 3 buckets (20 kg) of fresh cow manure and 4 or 6 buckets of water every day for 10 days. In the morning, I was feeding it one bucket of cow manure. In the afternoon hours, I was also adding one bucket. During the 10 days, I did not miss a day to feed it because it was new and I wanted to do everything right. So, after 10 days, I was told to wait for 5 days, and after 5 days, they came and started it.

**Interviewer**: Where did you get the manure?

**Interviewer**: Before coming, they gave me enough time to gather manure. So, I was collecting fresh cow manure, and then keeping it in the bags. And after that, I managed to get six or five bags of cow manure, which I used for starting it up.

**Interviewer**: Where did you get the water?

**Interviewee**: We have a borehole nearby so I hired people to draw water for us.

**Interviewer**: Like how far from your house?

**Interviewee**: It’s 150 meters.

**Interviewer**: Okay. How did it work after commissioning?

**Interviewee**: The digester started well because we did cook nsima on that day, and the nsima was hot and very tasty – and it was fast. And, biogas in general is it faster than cooking on charcoal or firewood. It’s very good in that regard. And after commissioning, they told us that there was less gas because we had just started, but as we progress, gas production would increase up to 3 hours of cooking hour. So, I dedicated to myself to feeding it and every day before going to work, I was feeding it and after returning, I was also feeding it. And, when I was going away, I was ordering my wife and children to collect fresh cow manure and put it in a bag, so that we would not fail to feed it once. But, now we are getting a little bit lazy because when we put nsima on the stove, it goes off as the nsima is simmering.

**Interviewer**: Have you reported this to Ecogen and what’s their response?

**Interviewee**: When we report to them, they say that we are not feeding it enough…. But, on the day they installed it, they applauded me for me efforts saying they have never seen a committed person like me as I was doing everything by myself without help from anybody. My plan was to do everything by myself and I still feed it myself because I don’t want the kids or a hired worker to mess it up by feeding it with feedstock containing rubbish. So, personally, I don’t agree with the fact that I don’t feed it – I feed it by myself and I know I feed enough. So, right now think it’s not producing gas because thick slurry has settled on the base of the bag. Thus, if the slurry was coming out by an extra outlet, I believe it would work.

**Interviewer**: What usually happens is that the slurry is taken out of the system at the outlet as digestate. Does your bag release digestate?

**Interviewee**: Yeah, it does and I have a hole at the outlet that collects it. And, sometimes, when it’s stuck on the outlet pipe, I take the digestate that’s blocking it, and effluent starts coming out too.

**Interviewer**: How many people do use the gas?

**Interviewee**: We are five.

**Interviewer**: What were the operation requirements?

**Interviewee**: First, they advised me to feed the digester on a daily basis, and that the feedstock should not contain any plastics or stones. And, that’s why I feed it myself because I don’t want any shortcuts in feeding, so that’s why I don’t allow my children or anyone else to feed it.And, since I started not even my wife has fed it. I do everything in an organized manner and according to the installers’ instructions in terms of preparation of feedstock. And, other thing is that the digester bag needs to be placed where it should be exposed to the sun. So, we did that when we were installing it, and now I do everything as I was taught.

**Interviewer**: How do you prepare feedstock?

**Interviewee**: Every morning, I go to the cow house to collect one bucket of fresh cow manure in a bucket. Then, I add two buckets of water and then mix the feedstock thoroughly. As I’m mixing the feedstock, I try as much as possible to remove grass and small stones or sand, which is found in a cow house. After seeing that the slurry is thoroughly mixed, I open the inlet pipe, feed it, and then clean the buckets.

**Interviewer**: Do you have a mixer? How do you mix it?

**Interviewee**: Honestly speaking, I have gloves from my work, but I use bare hands in mixing the feedstock in a bucket.

**Interviewer**: Why do you use bare hands?

**Interviewee**: It is because when they installers came they didn’t advise me to use gloves, and even themselves didn’t use gloves the first time they prepared feedstock. Moreover, cow manure can be handled because we see that it eat grass and maize grain, so it doesn’t feel gross to handle it.

**Interviewer**: How often do you feed your digester?

**Interviewee**: I feed it once or twice daily in a ratio of 1:2. But now I’m becoming a bit lazy because of its performance.

**Interviewer**: How did you manage to gather five bags of cows and even feed it every day with at least a bucket of fresh manure with only 2 cows? Is feedstock not a challenge to you?

**Interviewee**: During the day, I advised my wife to collect fresh cow manure every time a cow poops, so by the end of the day we collect ¾ of a bucket [15Kgs]. And, you should know that cow poops little in the daylight unlike in the night. So, in the morning, I collect one bucket and a half-bucket (30kgs) of cow manure. Of course, sometimes these days I don’t collect in the morning, so I take the dry manure to my pit for composting. So, the secret of having enough manure from cows is feeding. If you feed your cows frequently and enough, you get a lot of manure.

**Interviewer**: So you feed your cows adequately and frequently?

**Interviewee**: Yeah, I have a worker who feeds it. And, every time I’m coming from the office, I also get cow feed. Plus, also ask my son to gather feed for the cows too.

**Interviewer**: Okay, what are the maintenance requirements?

**Interviewee**: One time the gas valve, close to stove got damaged as my child was trying to use it. After that, I took some pictures, and then went to Limbe Market [The biggest market in Blantyre] to buy it, but I didn’t find it. Then, I reported and sent the installers the picture, and they came to fix it, but didn’t charge me anything.

**Interviewer**: Oh nice. Did they give you a service warranty?

**Interviewee**: Yeah, it’s for 2 years.

**Interviewer**: Great! You are saying it doesn’t meet your needs. Tell me about that one.

**Interviewee**: It’s not meeting my needs. My wife is here with me and she can agree with me on that. [Hands over the phone to her]…. Yeah, it’s not meeting our needs. But, when we feed it, we do manage to prepare breakfast (10 – 20 minutes) and then cook light side dish that doesn’t need a lot of heat, for example, vegetables, eggs and fish (10 – 20), and sometimes we do manage to cook nsima in the afternoon –but this is very, very rare.

**Interviewer**: Okay, that’s very nice. What challenges have you been facing since it was installed?

**Interviewee**: I’m not facing any challenges.

**Interviewer**: So it’s only that you’re not getting enough cooking time?

**Interviewee**: Right! That’s the only issue.

**Interviewer**: You are telling me that it had an issue with the gas valve. How long did it take the gas valve to get broken?

**Interviewee**: It took some time – it took some months.

**Interviewer**: Maybe 4, 2 or 9 months?

**Interviewee**: It was exactly 6 months.

**Interviewer**: When you reported the issue, how long did it take them to come?

**Interviewee**: The installers stay in Lilongwe, so when I reported the issue they told me that they would send someone to come, and if they fail to find someone they were going to come themselves. Then after three days, they called me that someone was coming from Poly to fix it, so that’s how it was fixed.

**Interviewer**: How did you know that the gas valve was broken?

**Interviewee**: Gas was leaking on that part.

**Interviewer**: So before that, you went to Limbe to find a spare part by yourself, but you were not successful in your attempt….

**Interviewee**: Yeah, I took the part out to Limbe as a sample. And, I visited all the hardware shops in Limbe, and it didn’t find it.

**Interviewer**: We are remaining with about five questions. Were you given written information like on a piece of paper regarding common issues associated with digesters, their causes and possible solution?

**Interviewee**: Something like a manual?

**Interviewer**: Yeah, kind of.

**Interviewee**: No, I wasn’t given.

**Interviewer**: What do you think about that kind of information and do you think it would have helped you?

**Interviewee**: Yeah, it’s useful information, and whenever I do have a problem, I would be using it to diagnose a problem and solve it.

**Interviewer**: How do you meet your energy needs now? You are still using firewood and charcoal like you said in the beginning?

**Interviewee**: We usually start off by using biogas, and whenever it goes off work, we continue with firewood and charcoal.

**Interviewer**: And you are still using manure as a fertilizer, right?

**Interviewee**: Yeah.

**Interviewer**: What is your opinion of biogas?

**Interviewee**: I will discuss with the installers to improve its cooking time, so that I can be using it for 3 hours, if not, at least 2 hours; 20 or 30 minutes is not enough. But, I will continue feeding it because I’m getting fertilizer from it.

**Interviewer**: Did you line or plaster the hole?

**Interviewee**: Three days after it was installed, we had rains. So, the water in the hole lifted up the bag. Then, I borrow a water pump, and then removed all the water from the hole. After that, I removed the digester bag and plastered the hole, and placed it back. I did this work alone, and when the installers came, they commended me for the job.

**Interviewer**: Impressive. Last question, if you could have designed your own waste or energy intervention, what would you have chosen instead?

**Interviewee**: [Wait a bit I want to attend to visitors]….When they came they told me that it’s also possible for a digester to produce light, but it needs the pipe to be leveled and straight so it can accommodate one bulb only. And, I would have also appreciated if they had made it possible for us to charge phones at least. That way I can be generating money from people who coming to charge their phones. Then, I can be buying small things like salt for the family.

**Interviewer**: That was my last question; do you have anything to say before winding up?

**Interviewee**: My last words are, biogas is very helpful because it has two or three things that can help a person at a household level; first, biogas makes my cow house clean because everyday I’m forced to collect manure from the cow house and use it as feedstock for the digester. Without this, my cow house was staying for a week or even months without cleaning. As a result, my cows were sleeping in unclean place. The other thing is that biogas assists me in making compost, which I use as fertilizer. So, I’m expecting to improve the soil structure and composition of my fields. The last thing is that with the effluent, pests will not trouble me. I noticed the last time I tried it up, that once I applied the effluent as fertilizer, there was no pest manifestation. So, this will make it possible for me to grow maize and vegetables without inorganic fertilizer and pesticides. Last but not least, the fire we get from biogas is clean and doesn’t dirt pots, unlike when one cooks on firewood. So, it helps us save money because it reduces the buying of soap used for cleaning the pots – So it helps a lot and you can’t see and understand these things unless you have a digester. And, if you can understand it more, you can see that it has more benefits, so we will find out more in regards to its benefits as we continue using it. Also, it helps save money because it minimizes the usage offirewood. For a person like me at one point, I was using K2000 of firewood instead of K10000. And, in wet season, I was only buying the K200 or K300 packs of charcoal, because it doesn’t work efficiently in wet season. So, if it starts working well, I hope to start buying a K2000 bag of charcoal a month.

**Interviewer**: One more thing, you are saying that your digester is not working well, what do you think it’s the problem? Are you not feeding it enough? Doesn’t it have power to work for long? Or, it wasn’t installed properly?

**Interviewee**: When we were starting it off, we did put together 20 kg of inoculum of bacteria to help boost its efficiency. So, after the hole was filled with water, I pumped out some of the feedstock or manure from the bag to take the back out, so that I could plaster the hole. Afterwards, I returned some of the feedstock. I failed to return all the feedstock because I didn’t have enough drum, so I just dumped some of it in the field. So, sometimes I think it did affect the whole setup in the bag.

**Interviewer**: How many drums did you manage to put back?

**Interviewee**: I think it was 5 or 6.

**Interviewer**: Did you notify Ecogen?

**Interviewee**: Yeah, I told them when they came.

**Interviewer**: And, what did they say?

**Interviewee**: They commended me for the job I did, so I presume that they thought it wasn’t a problem.

**Interviewer**: But, you think it`s a problem.

**Interviewee**: Of course.

**Interviewer**: Do you doubt their expertise?

**Interviewer**: (laughs) no.

**Interviewer**: Okay, thanks for the interview.

**Interviewee**: Welcome.