**BIOGAS ASSESSMENT PROJECT**

**Site ID: 43**

**Date: September 29, 2022**

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

**Interviewee:** I do not exactly know where the digester came from. I just know that the project came through the T/A`s [traditional Authority] office to identify people who had goats or cows to benefit from the project. I think here in Nsanama they gave out 10 digesters to enable people to cook without firewood and in the process protect trees and the environment. So, I was one of the 10 individuals who were given the digester because I had cows. People who had animals where chosen because they did not want people to go around asking for manure or buying manure for its easy operation.

**Interviewer:** Oh nice. Who funded it?

**Interviewee:** As for me, I did not attend the meeting; I was just told that they were bringing a digester here because I met requirements.

**Interviewer:** So, you didn’t go to the meeting, but the people chose you still?

**Interviewee:** Yeah, because the people knew that I had cows.

**Interviewer:** How many cows did you have that time?

**Interviewee:** I had six cows

**Interviewer:** Oh, you had. Did you sell them?

**Interviewee**: My cows were stolen.

**Interviewer**: All six?

**Interviewee**: They stole four cows and goats. After that, I decided to sell the remaining cows.

**Interviewer**: What did you do? Did you go to tradition doctors?

**Interviewee**: I did not anything because the thieves who do this use black magic. So, you just waste time and resources doing that.

**Interviewer**: That is true. Who built it? And, how many people came to build it?

**Interviewee**: The people who built it were two, and they said they came from Mzuzu University. First, they did prepare feedstock and assemble the digester. After that, they stayed for long and came back after 2 months, if my memory serves me well. They stayed away for long that the bag got full and I even called them to ask if they would come back and finalize everything. They just told me that I should not worry, they would come, and indeed, they came. When they came they started it up, and they told me how to make feedstock and how to feed it.

**Interviewer**: What was your role?

**Interviewee**: They advised us to dig a 1-meter deep hole and its diameter was also 1-meter. After that, they told us to collect six bags (50 kgs) of cow manure and we did. Then we also sourced one drum (200 liters) of water, which we add to the cow manure for feedstock preparation.

**Interviewer**: Six bags of cow manure is a lot. Did you get all the manure from your cow house?

**Interviewee**: It was all from our cows. And, it was all fresh cow manure because that’s what they advised us.

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

**Interviewee**: That time I did not have tap water here. So, I hired some women to collect water from the borehole.

**Interviewer**: It must be a lot of money. How much did you pay for that?

**Interviewee**: I paid them K1500, I think,

**Interviewer**: When was this built?

**Interviewee**: It has been long, I do not remember.

**Interviewer**: Did you hire people to dig the hole as well for you?

**Interviewee**: I dug the hole together with my child.

**Interviewer**: Oh, you must have persevered.

**Interviewee**: Yeah, we were committed because we wanted the digester so much.

**Interviewer**: You have said you were chosen at a meeting which was held at the T/A’s office. Could you explain to me, what the meeting was like, and how were people selected?

**Interviewee**: Like I said, I was not there. But, I think it was a community meeting, because I do not think the chiefs know every person, who has cows in a community. So, I think people were also called to the meeting, and they chose amongst themselves with the supervision of community leaders.

**Interviewer**: Okay, did you know about biogas before?

**Interviewee**: I did not know about biogas before… But, I think, I heard about it in school. I didn’t really understand it because it was just theory. If it were practical, I would have had a better understanding of it. I fully understood what biogas when it came here.

**Interviewer**: Which level of school? Secondary or Primary school?

**Interviewee**: Secondary.

**Interviewer**: Okay. Though you were chosen, I do feel like you could have denied it, if you wanted to. Why did you accept it to build it here?

**Interviewee**: I accepted it because they explained that the digester is used for cooking. So, I found it very useful. And that time it was not easy to source firewood, and even when we got the firewood, we were only using it for a very short time. I also saw that it was easy to cook on biogas since everything is within and it’s fast, and easy to ignite the fire on biogas. Again, I also considered the fact that the government advocating against cutting trees, so if the same government had brought the digesters as an alternative, then it was only fair to accept the digesters in order to conserve the environment. So, the introduction and adoption of the digesters in a community like this is helpful and needful to the environment.

**Interviewer**: What were your expectations? I can see that you expected to use the digesters for cooking, and to help the government in its quest to protect the environment. Apart from these, what else did you expect?

**Interviewee**: Yeah, I expected the digester to help me save time. When you use firewood, you waste a lot of time in searching for wood. For example, you can leave at 5:00 in the morning and the return at 2 or 3 PM. Thus, if you have biogas, you could use that time to do some other things.

**Interviewer**: You don’t look like someone who would go to search for fire…

**Interviewee**: No, no (laughs). What can we do when we do not have cooking appliances?

**Interviewer**: (laughs) No, I can tell when I see one…

**Interviewee**: (laughs) I don’t look like someone who would search for firewood? But, yeah, that time when the digesters came we used to go source firewood because the charcoal wasn’t common here. And, that time we used to walk a very long distance, that we were resting 3 or 4 times along the way. It was tiresome - tedious!

**Interviewer**: Okay, what did the installers tell you to expect it from the digester?

**Interviewee**: They just told us about cooking.

**Interviewer**: What about using it for lighting?

**Interviewee**: No, they didn't.

**Interviewer**: What kind of training did you receive from the installers?

**Interviewee**: We didn’t receive any kind of special training. But, on the day of commissioning it, they told us a number of things. They told us that when the bag was full, we could drain it through the white outlet pipe. They told us how to switch it on and off. They also told us how to make feedstock, and that we were supposed to feed it every day with one bucket (20 liters) of cow manure and 20 liters of water. They also told us that we could feed it with food waste. And on top of that, they told us not to drop any hard thing, for example, a stone in the digester. So, if it was training, it was just what we were told on the day of commission.

**Interviewer**: How prepared it to run or operator did you feel you were?

**Interviewee**: As a beginner, what they told me on the day of commission I thought was enough, and I didn’t have any knowledge to say this was enough or not enough. So, what I was told that time I thought was enough, and I was confident that I could learn it.

**Interviewer**: Okay, you have told me that you had six cows. How did you cow manure that time?

**Interviewee**: That time I was using cow manure as fertilizer in our fields.

**Interviewer**: How did the manure work? Or, did you add any fertilizer?

**Interviewee**: The soil here seems that it has lost its nutrients, so we add inorganic fertilizer to get strong maize we don’t use the manure solely.

**Interviewer**: You said you started it up with six bags (50 kg) of cow manure and 200 l of water. How long did it take to start up?

**Interviewee**: I think it was after 1 month and some weeks. Like I said, I called them around 2 months from the day they first came here. When they left it, they just closed it up at the outlet and inlet with plastic sheets. So, I think they came to commission after 2 months. And, in those two months, the bag was inflating little by little, and when it was sunny, it was getting full to the extent that we thought the bag would burst. And that’s why I called them, and even though I called them, I was hesitant to make the call because I knew that they knew what they were doing.

**Interviewer**: It takes mostly 2 weeks or so to commission it, so I think 2 months was a lot of time, I think. Did they tell you what took them so long?

**Interviewee**: When I called them, they didn’t tell me why they were not coming. So, I thought that gas production wasn’t complete that time. They only told me not to worry and that they would come at some point.

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

**Interviewee**: When they tried, it produced fire with no problem.

**Interviewer**: Did you manage to cook on it?

**Interviewee**: After commissioning it, the next day we fed it… And we were able to warm water for bathing (15 - 25 minutes) and even cook side dish (30 minutes). But, the fire was not taking long to stop.

**Interviewer**: Like how long was it taking to stop?

**Interviewee**: Maybe enough time to boil water (15 – 25 minutes), but after that, the fire was coming very low and eventually it was dying.

**Interviewer**: Where you able to cook breakfast, lunch and supper on it?

**Interviewee**: If you prepare the breakfast (10 – 15 minutes) you had to wait for the sun to shine to cook side dish of vegetables (8 – 15 minutes).

**Interviewer**: So, you didn’t use it in the evening? You never used it in evening?

**Interviewee**: Yeah, not once.

**Interviewer**: How many people were living in your family the time?

**Interviewee**: Six people … No, eight people!

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

**Interviewee**: It only required feeding with animal manure, food waste and water on a daily basis.

**Interviewer**: How did you prepare the feedstock?

**Interviewee**: We were taking a 20-liter bucket of cow manure, add water, and then mix with hands until suitable slurry was made.

**Interviewer**: Didn’t it feel disgusting or gross to mix the feedstock with hands?

**Interviewee**: Yeah, I was doing that because there was no other alternative. But, I was wearing plastic bags to protect myself from pathogens. And, my children were murmuring about preparing feedstock all the times. They were not pleased at all to handle cow manure on a daily basis. They were always asking me if there was another alternative to prepare the feedstock. So, I was just encouraging them to persevere. I was also telling them that if they stopped feeding it, then it would fail and damage other people’s property. So, we tried our best to feed it all the times.

**Interviewer**: So, who was feeding it? The boys?

**Interviewee**: I was also supporting them.

**Interviewer**: How many boys?

**Interviewee**: Two boys.

**Interviewer**: You are only saying the boys had issues with feeding it. How did you feel yourself about feeding it?

**Interviewee**: It was a lot work. It was heavy. Feeding it daily wasn’t ideal. It could have been better if they had advised us to feed it twice a week or once a week. Still, we had no option, but to do it because we felt like if we didn’t feed the digester, it would stop break down.

**Interviewer**: How long did you feed it?

**Interviewee**: To tell you the truth the digester didn’t last very long. I can say I used it for 2 months. After it stopped, I called them, and then they just said they would inform the installers to come and fix it. And, they never came.

**Interviewer**: Did you call again to follow up?

**Interviewee**: No, I didn't. After sometime, I don’t know if they told you yesterday when you came, thieves came and damage it. And, I even report the issue to police. This happened around the same time they stole my cows, so I think it was same people. I think, they had come again to steal the remaining cow, but when there saw that, there was no cow they just damaged the bag out of anger.

**Interviewer**: (laughs) yeah, it could be the same people… some people are evil. What were the maintenance requirements?

**Interviewee**: They did not tell us what to do in case of a failure. That’s why when it malfunctioned I called the installers. And, when I called them, they didn’t tell me what to do. They just told me that they would inform the people who installed it to assess and fix it. So that makes me think that maintenance was in the hands of the installers.

**Interviewer**: I’m confused, whose phone numbers were left here? Whom did you call?

**Interviewee**: Two different groups of people worked on the digester. The first group was two people who came to install it, and the other group was of five people from Lilongwe who came to commission it. So, I think I called the people who commissioned it, and they told me that they would inform the people who installed it to come and fix it. I waited for them to come, but they never showed up. But, I also received another group of people who, I think we were monitoring all the digesters in my Malawi, because they said before here there were in Mangochi. If I’m not mistaken, I think it was six people and they came in two big cars. They asked me a number of questions, and I basically told them how it stopped working and how it was stolen.

**Interviewer**: You said it worked for 2 months; did it meet your needs in those 2 months?

**Interviewee**: No! Of course, it was producing gas, but sometimes when I wanted to cook it wasn’t producing the gas. So, I was finding myself igniting and cooking on firewood. Thus, it worked, but it didn’t reach the level I expected or hoped for.

**Interviewer**: What was your wish and expectation?

**Interviewee**: To use it in the morning, afternoon, and at night.

**Interviewer**: Okay, what were the challenges?

**Interviewee**: The biggest challenge I had with the digester was feeding it. It was tiresome work. Of course, feeding it to start it up was intense, but I kind of accepted it because I know it’s not always easy to start up anything in life. It was very hard to make feedstock of six bags (50kg) of cow manure and a drum (200 liters) of water, but I accepted it. What was not acceptable to me was the fact that I had to feed it on a daily basis. I even asked the installers, if it was possible to rest for at least a day or two. They said no, feeding was supposed to happen on a daily basis to produce gas. And, the hard part that time was that I didn’t have a tap of water here. So, I was going to the borehole to get water and that wasn’t easy. Also, preparing the feedstock itself wasn’t easy.

**Interviewer**: Did the digester ever produce fire for more than 30 minute or 1 hour?

**Interviewee**: No, it never past that.

**Interviewer**: How was the fire dying? Was it dying at once or was gradually?

**Interviewee**: It was always gradual.

**Interviewer**: Did it have a leakage?

**Interviewee**: No, they told me that I should be paying attention to a white bottle, which traps moisture and impurities before gas goes to the burners. They said because digesters produce moist which often accumulates in a white bottle, and blocks the flow of gas. They said when it blocks; I should drain the water from the water trap. So, I paid close attention to that part, but it never filled with water to the point it could have blocked the gas. I believe water never accumulated in the water trap to block the flow of gas because it only worked for a very short time. So, I can say the bag didn’t leak gas and the stove was also good, and even now, it’s still good.

**Interviewer**: So is it that after 2 months it stopped producing gas, so you just abandoned it? OR, you didn’t like it was working?

**Interviewee**: It stopped producing gas completely, and that’s when I called them. Then, they told me that they would inform the installers to come and fix it, but they never came. And, the time between the call and the day it was damaged was long enough that if they could have wanted to come they would have.

**Interviewer**: Like how long was it?

**Interviewee**: It was a lot of months.

**Interviewer**: 2, 3 or 4 months?

**Interviewee**: It was a lot of months, maybe 6 or 7 months. And, it got me thinking that maybe digesters don’t get repaired, or maybe they occupied with other things, or I shouldn’t give up because government things are always followed up regardless of how long it may take.

**Interviewer**: Did you try anything to fix it?

**Interviewee**: The only thing I tried was feeding it because my thinking was that it works after feeding, so maybe if I feed it, it will work. So, I tried to feed it a couple times hoping that gas production would resume, but it never worked.

**Interviewer**: How many times did you feed after it stopped working?

**Interviewee**: I fed it for a week then I stopped after noticing no improvements.

**Interviewer**: A digester produces slurry at the outlet, which can be used as fertilizer. Did you get slurry from your digester?

**Interviewee**: Yeah, it was producing slurry.

**Interviewer**: So, what was the outlet like?

**Interviewee**: They told me to dig a hole for the collection of slurry at the outlet. So, I dug one a small hole not as big as the hole for the digester bag, but I wasn’t lined with a brick wall around it or plastered.

**Interviewer**: Did they tell you that the slurry could be used as fertilizer?

**Interviewee**: No, I wasn’t told.

**Interviewer**: So, you didn’t do anything with it?

**Interviewee**: Yeah, the digester was releasing a liquid, but it wasn’t like it was releasing the liquid on a daily basis, so once it got in the hole it was seeping into the ground.

**Interviewer**: Wasn’t it harboring mosquitoes?

**Interviewee**: No, it wasn’t.

**Interviewer**: Was it producing any odor?

**Interviewee**: No, it wasn’t.

**Interviewer**: Did you have problems with it?

**Interviewee**: No, I didn’t as it wasn’t a lot, and was always seeping in the ground.

**Interviewer**: Have you seen something like this?

**Interviewee**: No.

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

**Interviewee**: Yes, the information would have helped. I believe anything that is manufactured in a factory can be fixed. So, if I was trained or given this kind of information, I would have been able to fix it. What I needed that time was information to enlighten me how to act in a case of a malfunction, and I wouldn’t have bothered to call the installers. Or, I would have called them after failing to fix it myself according to this information. So the same way I was trying to feed it like I was told, I would have also been doing what this information stipulates.

**Interviewer**: We are going towards the end of our interview. We are in September of 2022, if the installers can call you today to inquire about the current state of your digester, what would you say?

**Interviewee**: I would tell them what I'm telling you today that the digester stopped working. And after that, some people tore the digester bag. I can’t really figure out what they thought was inside the digester bag though. I think they thought that it had something valuable in it. They were tricked by the fact that it was inflating, so the thought something special was in it.

**Interviewer**: What did you do with the things that were inside the bag?

**Interviewee**: It looks like some slurry that had no odor, so we just left it in the hole.

**Interviewer**: It’s good fertilizer.

**Interviewee**: Oh, we just left it in the hole. I think you are right; it is fully processed fertilizer from manure. But, they didn’t tell us that it is fertilizer.

**Interviewer**: Okay. How did it reach this stage? And in your opinion, what caused it?

**Interviewee**: I don’t know what really went wrong, because when I looked at the equipment, for example, the stove, the white bottle, everything was okay. The green pipe was also okay. But, I suspected that there was a blockage in the green pipe, so gas wasn’t flowing because I can’t say the digester bag because it was full. So, that’s just my guess.

**Interviewer**: Yeah, it could be. How do you meet your energy needs now that the digester is not working?

**Interviewee**: Nowadays I use an electric stove, charcoal burners and an energy efficient wood-stove. The efficient stove was brought here by Plan Malawi, and I have to say that efficient stoves really save wood. With two sticks, you can warm water for bathing and even cook nsima afterwards.

**Interviewer**: So out of all the different methods of cooking, which one do you use more often?

**Interviewee**: I use charcoal more often.

**Interviewer**: How much charcoal do you use in a month?

**Interviewee**: I use two bags of charcoal.

**Interviewer**: How much is a bag of charcoal here?

**Interviewee**: It’s K4000 or K5000. Some sellers even go as low as K3800, but it depends on the quality of the charcoal.

**Interviewer**: How much electricity do you use?

**Interviewee**: It’s hard to estimate because I don’t a specific budget for that. Also, I can really know how much is he spent on electricity in regards to cooking because I use it for other purposes as well, for example, lighting or as a power source for my TV.

**Interviewer**: Do you still get wood where I used to get wood that time?

**Interviewee**: Nowadays we buy wood, because even if we can go to where we used to get wood, we can’t find it now. So, people from far distance that bring the firewood here and sell it to us. I don’t know how they get that much wood, they have their own strategies of finding firewood, I guess.

**Interviewer**: In a month, how much wood do you buy?

**Interviewee**: It depends on usage because I sell thobwa (sweet beer) which I cook on firewood. So, when business is good, I use a lot of firewood. Also, as you know thobwa is seasonal, so in wet or rainy season I don’t sell thobwa. Thus, in wet and rainy season I use a small amount of firewood. So, I can say I use wood of K3000 per month on average.

**Interviewer**: We have about five questions to finish. How much did the reactor cost?

**Interviewee**: I wasn’t told anything regarding that.

**Interviewer**: And, you mentioned that you don’t know who provided the funds for it too?

**Interviewee**: Yeah!

**Interviewer**: Did you contribute anything in kind?

**Interviewee**: I can say I only spent money on women who helped me in collecting water.

**Interviewer**: So, it’s only the money?

**Interviewee**: Is it worth saying that you gave a visitor like you food?

**Interviewer**: Oh, cooked for them?

**Interviewee**: No, I just bought them soft drinks. So, I think it's not proper to say I gave them that, because I had a choice to give them or not. But , then you look at the money I spent on labor that was mandatory, I couldn’t have done otherwise

**Interviewer**: You have said it was you and your son who dug the hole, right?

**Interviewee**: Yeah.

**Interviewer**: Was the hole lined with plaster or brick wall?

**Interviewee**: No, it wasn’t in lined.

**Interviewer**: Did they talk about lining it.

**Interviewee**: No, they didn’t. I just dug the hole and when it was placed and full, it fitted perfectly.

**Interviewer**: What special items had to be imported from another country?

**Interviewee**: They didn’t say anything about that. But, maybe they did at the community meeting when they were selecting the beneficiaries. I think it’s at the community meeting where people have learned about where it came from, who funded it and all that. I believe that information was shared at that meeting. So, I think when they came here they thought I had learned everything at the meeting, and that’s why they just went straight to business.

**Interviewer**: I totally agree, I think a lot was said at the meeting. Do you think you saved any money in the 2 months you used it?

**Interviewee**: If I saved money, then it`s just a small amount because even when it was working, I was still using the other methods. So because it was producing gas for a very short time, I was still using charcoal and firewood all the times.

**Interviewer**: What was the biggest change in your life the time you had biogas?

**Interviewee**: The first thing I do everyday after waking up is boiling water for bathing, and then I go for players. So, I wake up around dawn to ignite charcoal and it takes a long time for the fire to get intense. But, with biogas, it was taking a very short time to boil the water for bathing. It was so fast and it made me feel so good. And if the digester that was being used that time, it was often for that purpose.

**Interviewer**: We are remaining with three questions. What is your opinion of biogas?

**Interviewee**: My opinion of biogas is that if the digester was stable and reliable, then it would have been a good thing. Also, it could have been better, if digesters the feedstock was different. I didn’t like the use of manure as feedstock. But, all in all, it seems to be a good technology and I was very saddened when it stopped working. And, I was asking myself questions why it failed. I was like did the installers installed it poorly or what really went wrong. I think if the installers had come to assess the digester, then it could have been revamped in two different ways. Maybe it would have started producing strong fire for a long time, or it could have continued producing as it was, but it would have lasted for a long time. To cut the long short story, I liked digester, but I didn't like the intensity of the fire it was producing; the fire was not staying for long, and its feeding procedure is tedious.

**Interviewer**: What do you say it was producing weak gas, what is it because of its design or because of the installers? Why do you think it produced little fire?

**Interviewee**: If they had come to assess it, then we would have known if I was the problem the design or not. If it was the pipes or something, the installers could have told us what the problem was. But, what I can say today is that we did everything according to what they told me, because we wanted it so bad. We believe we understood them very well that what we were doing is what they told me. So, if they had assessed it, then we would have known what the problem was, and it could have done a lot of good to the project. And I don’t even think these things were tested before giving the people here. So, I doubt if these things worked somewhere. And the installers seemed to me that they were learning too.

**Interviewer**: Why do you say that?

**Interviewee**: They seemed to me that they were university students who were learning about biogas and wanted to try them out in the fields. But, I don't honestly think it was people who knew what they were doing, and who wanted to install the digesters for us to use.

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

**Interviewee**: I don’t know which alternative can be used before cooking, so it’s going to be hard for me to chose, because to choose something it means you know the thing. Now, I know biogas can be used for cooking, but I don’t anything else apart from that. So, I might even choose something worse than biogas. So, I don’t know any alternative other than this. But, in my honest opinion, I have to say I wasn’t impressed with biogas in terms of how it performed here.

**Interviewer**: That was my last question. Do you have anything to say? But before that, we have two types of biogas. Some use animal manure, and others use food waste. What do you think of digesters that use food waste solely? Do you think they can work?

**Interviewee**: I think it can be very difficult to operate food waste digesters, because food is left by chance and not on purpose. And, by that nature, they are always in small quantities. I don't know how much food waste a digester may need it, but I just don’t think it can be enough to meet the minimum level. As for animal manure, it was possible because animals do produce a lot of manure, so was a challenge.

**Interviewer**: Do you think it’s not easy to fill a 20-liter bucket with food waste at household level?

**Interviewee**: Yeah, that can even take a week

**Interviewer**: Yeah, or even two months.

**Interviewee**: So, I think those digesters can work in a restaurant setting, but not at the house level. I mean at household level what is left is small piece of nsima, vegetables and other tiny pieces of food, so that’s not enough.

**Interviewer**: In closing, what are your last words?

**Interviewee**: I would like to thank you and the people who donated the digester. It’s sad for us, and for the donors as well because they expected us to use. I don’t think they would give out things which they knew for sure wouldn’t work or work for a very short time. The donors and beneficiaries were on one accord, we wanted to protect the environment. So, many thanks to them though the digesters didn’t work. My second word is for the people who are doing this that they shouldn’t give up. They have already spent a lot of resources to come up with the digesters. So, they need to persist and find better ways of improving them. I don’t think they need to change or make adjustments, if people like me are to benefit from the digesters.

**Interviewer**: Thanks a lot, thanks for the interview. Do you know anyone else who was installed this?

**Interviewee**: No, but the clerk of the TA when he came here, he said they were planning that all the beneficiary they should meet and form a group to share experience and resources. But, that never happened because some digesters didn’t work at all. So, I don't know anyone else who was installed a digester here in Nsanama, because we never seat down as beneficiaries.

**Interviewer**: Okay thanks. Thanks for the interview. I really appreciate your time.

**Interviewee**: Thanks for coming here too, you have got me talking about things of the past, that was wonderful.

**Interviewer**: Thanks.

**Interviewee**: Welcome.