**BIOGAS ASSESSMENT PROJECT**

**Site ID: 50**

**Date: October 1, 2022**

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

**Interviewee**: We heard that the Village Development Committee (VDC) chair went for training. After he came back from the training, he called us to select people who were interested to get the digester. Apart from that, we do not know exactly where these things came from.

**Interviewer**: So you communicated more with the VDC chair, and he is the one who liaised with project implementers to identify the beneficiaries, right?

**Interviewee**: True.

**Interviewer**: Okay, who funded it?

**Interviewee**: I believe it was funded by a non-governmental organization.

**Interviewer**: What is the name of this organization?

**Interviewee**: We have just forgotten, but they gave us the name.

**Interviewer**: Who built it?

**Interviewee**: The same people who came with the digester bag. It was them who placed the bag in the hole, assembled the pipes and other fittings. Then, they advised us to feed the digester with cow manure and water. Because, the task of preparing feedstock was hard, we hired some women to do the job. After we finished they went and came another time.

**Interviewer**: So, I can see that the process involved the visitors, and you and your people some of which you hired did the job….

**Interviewee**: Yeah, I was the one who dug the hole.

**Interviewer**: Alone?

**Interviewee**: Yeah, alone. I was also responsible for buying bricks. At first, we did not do any masonry work on it because we expected to receive cement from the project implementers. Then, they came and told us that it was our duty to buy cement. So, we gathered sand and bricks onto one place, and when we saw that we could not manage to buy cement, we just used mud to line it the brick wall.

**Interviewer**: Did you line the whole hole?

**Interviewee**: No, we just lined the top of the hole to prevent soil from collapsing into the hole. Then, after failing to buy bags of cement initially, we bought one bag of cement to plaster to the hole after a month or so.

**Interviewer**: Who did the masonry work?

**Interviewee**: I did that alone.

**Interviewer**: You have said you used the one bag of cement to line the top of the hole. How many bricks did you use?

**Interviewee**: I used 150 bricks to line the top of the digester hole and for the digestate hole.

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

**Interviewee**: I bought it from a certain man called [name redacted] somewhere there.

**Interviewer**: How much did you spend on the bricks?

**Interviewee**: I bought each brick at K25, and I bought 250 bricks but I only used 150 bricks.

**Interviewer**: How many people from the installation company came to build it?

**Interviewee**: Two or three people came.

**Interviewer**: On top of what you have mentioned, what other role did you play?

**Interviewee**: I was only responsible for digging the hole, doing the masonry work, and paying the laborers’ to source feedstock.

**Interviewer**: In this community, we have many people and a lot of households. How were you selected as a beneficiary?

**Interviewee**: I was chosen while I was not around. I only got a message that I was summoned to Chief [name redacted] court. When I got there, they told me that they had selected me as a beneficiary of a biogas digester that was part of a pilot of biogas project. Then, they told me that they had chosen me because I am active in community development initiatives and they believed that I could manage it. Therefore, they asked me if I was interested and I told them that I would be interested to own a digester, so that is how I was selected.

**Interviewer**: Is it true that you are active in community development initiatives?

**Interviewee**: Yeah, and that is why they had no doubt that I could manage it.

**Interviewer**: Tell me you activeness in community development initiatives?

**Interviewee**: There are a lot of community development projects that I have been involved in. For example, before the biogas intervention, I volunteered to take part in a tree-planting program that was intended to restore trees in this community. I was very much involved in that, so since the biogas project was also about saving trees, I believe that’s why the chose me.

**Interviewer**: When you were called to Chief [name redacted] Court, you had the freedom to say thanks but no. So, why did you accept to buildit here?

**Interviewee**: I expected to use it for cooking as they promised. So, I thought I would stop going to the mountains to look for firewood. Thus, I accepted it because I expected it to offer me an opportunity to use my cow manure for cooking by simply collecting fresh cow manure and then mixing it with water.

**Interviewer**: Between going around searching for firewood and preparing feedstock to get flame for cooking, which one is better for you?

**Interviewee**: It was better to prepare feedstock to get fire because the feedstock was gathered within from my cow house. Also, biogas is better since it does not damage the environment.

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

**Interviewee**: No, I did not know anything about biogas.

**Interviewer**: You have told me how you were introduced to biogas at the chiefscourt, could you please take me through your first encounter with the project implementers. What did they tell you?

**Interviewee**: The first time when they came, they parked their car here because the road was accessible that time. So, that time they told us that we needed to work hard so that the digesters would work and help us. Then, after installation, they encouraged us that if the digesters worked, they would make some improvements. They said that as it continues working it starts producing more gas that we could use it for other purposes like charging phones, lighting, and as a source of power for TV. So, we were very excited about it. Then, I started visiting other beneficiaries to see how they were doing, and to see if I was doing things as I was told. Then, I found out that I was doing the same. And, even when my digester started misbehaving, I was going to them to see where I was doing wrong… The first problem we had was that gas started leaking at the gas connector. Then, we glued it up with an adhesive and it worked. After the digester had worked for some time, the gas pipes developed tiny cracks, so gas started leaking. As a result, we could not get flames at the stove.

**Interviewer**: Okay, so they told you that you would be using the digester for cooking, and if it worked well and started producing enough gas, you would be using it as a power source for your appliances as well as for lighting. Apart from these, what else were you told to expect by the installers?

**Interviewee**: That was all I was told.

**Interviewer**: What kind of training did you receive?

**Interviewee**: Ah, we did not go for training.

**Interviewer**: Then, how were you able to use it?

**Interviewee**: We were just doing what they told us during installation. At first, they came with the digester bag, placed in the hole, and then assembled it. Then, we fed and closed it, and the digester bag got full after sometime. Then, they came again to assemble the green pipe, the two bottles and the stove. Then, they commissioned it, and it produced flame. So, when they were commissioning it, they showed us how to turn it on and off.

**Interviewer**: You are saying you did not receive training, but you were just told one or two things, for example, how to switch it on. How prepared to run or operate the digester did you feel you were? And, did you feel that it was enough?

**Interviewee**: A proper training was needed. A proper training would have given us confidence and knowledge to know where we could get the spare parts once replacement of parts was required. It could have also given us the knowledge and skills to diagnose problems, and then solve them. So, I believe we would have gotten these kinds of skills through training only.

**Interviewer**: Okay, how did you meet your energy needs before the intervention?

**Interviewee**: Before the Intervention, we used the trees we planted around as firewood for cooking. So, we simply cut a tree, chop it up, dry it, and then use it as firewood. Also around this time, our women go to the fields, gather dry pigeon peas plants, and use it as firewood for cooking.

**Interviewer**: At that time, did you have any livestock?

**Interviewee**: Yes, at that time, I had pigs and cows. I had a brick fenced animal housethen, but it collapsed after heavy rains.

**Interviewer**: I can also see that you have chickens.

**Interviewee**: Yes, I have chickens, and even guinea fowls. And, even that time, I had them.

**Interviewer**: Do you think you were chosen because you had livestock?

**Interviewee**: It could be.

**Interviewer**: How did you manage your animal manure?

**Interviewee**: We gather pig and cow manure onto one place. After some time, we collect and use the manure as fertilizer for our crops. We also do the same with chicken and guinea fowl manure. We simply sweep the animal house and place the manure in a sack bags. Then, before planting crops, we apply the manure as fertilizer in our fields.

**Interviewer**: Does it work? Or, do you add inorganic fertilizer?

**Interviewee**: It works okay. But, of course, we add a little inorganic fertilizer as well.

**Interviewer**: How many pigs and cows?

**Interviewee**: I had 5 cows and 7 pigs.

**Interviewer**: That is a lot. Let us talk about how it worked, but before that let talk's about how it was installed and commissioned. At first, you were told dig a hole and you did, and then they brought the digester bag. Was the digester hole dug on the same day you were given the digester bag?

**Interviewee**: I believe I dug the whole for 3 days. Then, they came with the digester bag, which had two openings. Then, they fitted a white pipe on each end of the digester bag opening, and then tied it with rubber strips. After that, we placed the digester bag in the hole. Then, they advised me to dig another hole at the outlet for collecting digestate. They said that the digester would be release digestate on its own at the outlet as I keep feeding it. Then, they left as I was digging the hole for the digestate.

**Interviewer**: Okay, how much feedstock did first charge it with?

**Interviewee**: I started it up with 6 bags (50kg) of fresh cow manure.

**Interviewer**: Where did you get it?

**Interviewee**: I got all the manure from my cow house. I remember they gave us 3 days to prepare and gather the manure. So, after grazing the whole day, we would goto the cow house every morning to collect manure because that is when you get a lot of manure. I believe we got 2 bags of fresh manure a day.

**Interviewer**: So you got all the six bags from you cow house?

**Interviewee**: Yeah.

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

**Interviewee**: We are lucky today that we have a borehole close by. But that time the borehole was very far from here. I think it was approximately 2.5 kilometers from here. So, to make sure that we did the job in time we hire women to draw water for us. I think we collected a drum (200 liters) of water, but when we started preparing the feedstock, we found out that the water was not enough. So, we hired extra workers to do the job and to show the installers that we were committed by meeting their request. We hired many women, and we feed the bag with a lot of water.

**Interviewer**: How many people did you hire?

**Interviewee**: The first time, I paid the women K3000. The second time, I hired eight women and they used those 40 liters buckets to carry the water, and they were drawing water as we were preparing the feedstock. I agreed to pay the women K1, 000 each after the work. Because, it was very sunny and I wanted them to do the job as fast as possible, I paid them more than usual. So, in total, I paid the women K11000 for the water that was used.

**Interviewer**: How much water was that?

**Interviewee**: The first time it was a drum (200 liters). The second time it was difficult to count because we just agreed that they should collect enough water to make suitable slurry, so they were simply adding water to the cow manure without counting. But, they collected more than two drums (200 liters) of water the second time. It was a lot of water.

**Interviewer**: I can imagine. How long did it take to start up?

**Interviewee**: It took the installers a month to come and finalize the installation. But during that time, the bag got full. So, when they came and installed the remaining equipment, the digester worked.

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

**Interviewee**: After commissioning, it produced strong fire, and it worked very well for 2 weeks… On the day of commissioning, they told us to feed it with a bag of fresh cow manure everyday. So, we used to feed it with a bag of cow manure, and my wife was the one who was responsible for collecting water.

**Interviewer**: How much water were you adding to the cow manure?

**Interviewee**: 2 buckets of that bucket there.

**Interviewer**: I think that is a 40 or 60-liter bucket.

**Interviewee**: Yeah, so we were mixing 2 buckets of water with a bag of cow manure, and then we were feed the digester in order to make it produce gas daily.

**Interviewer**: You said during the first two weeks, it worked it quite okay. How much cooking time did you get in those 2 weeks?

**Interviewee**: During the first two weeks, I was able to prepare breakfast in the minutes [15 – 30 minutes] with it. I was also able to cook nsima and side dish on it [1 – 1 hour 30 minutes]. In the evening, it was producing very little gas so my wife was not using it, because she thought it was taking very long. Thus, in the evening we were using firewood to cook things fast – The fire was just too little in the evening.

**Interviewer**: So in the first week you were able to prepare breakfast and lunch?

**Interviewee**: Yeah, and I was even able to warm water for bathing too.

**Interviewer**: How much cooking time did you get after 2 weeks?

**Interviewee**: After 2 weeks, we saw some changes. When we made feedstock and fed the digester, we saw that we were not getting enough gas. When I tried to analyze it, I saw that it was leaking gas at the gas connector.

**Interviewer**: So after 2 weeks, gas started leaking at the gas connector. What did you do after?

**Interviewee**: I reported the issue to the person who was coordinating the program here. Then, he sent a person who sealed the place with an adhesive. Even then, I noticed that it was not working as before.

**Interviewer**: Who is the person who fixed it?

**Interviewee**: I do not know. But, it looked like some one from the community.

**Interviewer**: How much cooking time did you get after that?

**Interviewee**: After that, we could not use it before 11 AM, even if we fed it early in the morning as we were told in the first place. So, we were only able to cook nsima [25 – 35 minutes] and boil water for bathing [15 – 20 minutes]

**Interviewer**: So after that, you could not prepare breakfast and supper, you would only use it around noon?

**Interviewee**: Yeah

**Interviewer**: How long did it take to stop working?

**Interviewee**: We used it close to 5 months.

**Interviewer**: So in 5 months, you were able to cook nsima and boil water [30 – 60 minutes]?

**Interviewee**: Yeah, I was able to cook nsima or side dish and boil water [30 – 60 minutes]…. I remember I asked where the gas was coming from. So, I was told some organisms in the manure produce the gas.

**Interviewer**: Okay, how long did it take for the person who fixed it to come after you reported to person who was coordinating the project here?

**Interviewee**: It took more than a week. It was one week, I think.

**Interviewer**: So after 5 months it completely stop?

**Interviewee**: Yeah

**Interviewer**: How did it stop?

**Interviewee**: After feeding it, and the bag was getting full. And, when we wanted to use it, we were opening gas valves, and then we got gas at the stove. But, after 5 months, we stopped getting gas at the stove even after feeding it as usual.

**Interviewer**: What happened?

**Interviewee**: When we analyzed the pipes, we saw multiple small cracks on the gas pipe. Then, we bought seal tape and sealed the cracks, but it did not work. After this, we realized that we made a mistake by putting the pipe in the ground instead of hanging it in the air. As a result, people were stepping on it instead of avoiding it. But, I blame myself for not removing the pipe on the ground though the installer put them there. I think we should have thought that ourselves. After that, because we did not go for training, we failed to know where we could have gotten the gas pipe, so we left it. Then, we asked the one who was coordinating the project here, where we could find the pipe and he told us that he would report the issue to the installers.

**Interviewer**: Okay, how did you use the gas?

**Interviewee**: It was only for cooking.

**Interviewer**: How many people used the gas that time?

**Interviewee**: We were 7 people.

**Interviewer**: Who was responsible for feeding it?

**Interviewee**: I was responsible for preparing the feedstock. My wife and girl child were simply supporting me in sourcing water though.

**Interviewer**: How did you prepare the feedstock? Did you use a mixer, stick or something?

**Interviewee**: I was using my hands.

**Interviewer**: Did you have any problems with that?

**Interviewee**: I had no problem with that.

**Interviewer**: Didn’t you feel gross about handling manure?

**Interviewee**: No

**Interviewer**: How would do you describe the task of feeding it? Wasn’t it tough?

**Interviewee**: It was not tough. Every morning, I was simply going to the cow house, collect fresh cow manure, mix it with water, and then feed the digester.

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

**Interviewee**: They just told us that we should report any problem and that they would be coming to rectify the problem.

**Interviewer**: Who were you supposed to report to? Who was coordinating the project there?

**Interviewee**: I was told to report to the VDC chair, [name redacted], and it was him who was suppose to report to the ADC chair, [name redacted].

**Interviewer**: So the first time it leaked gas, you reported to the VDC chair, [name redacted] who then reported the issue to [name redacted]?

**Interviewee**: Exactly!

**Interviewer**: The second time?

**Interviewee**: The second time when I noted the cracks I thought I would fix it on my own with seal tape. But, I failed because the cracks were just too many. That’s when I reported the issue to [name redacted].

**Interviewer**: Okay, did you meet your needs?

**Interviewee**: It was working, but the problem I thought was small turned into a bigger problem. So, the main problem I had with is that it didn’t take long to start producing insufficient gas.

**Interviewer**: When you had it, where you still using conventional methods of cooking?

**Interviewee**: Yeah, at first I was able to use it in the morning hours and during lunchtime. But, at evening hours, I was using firewood because my wife thought that the gas that was coming was very little. After sometime, I was only able to use it in the afternoon hours.

**Interviewer**: Is it wrong to say that it did not meet your needs?

**Interviewee**: You are not wrong because I was not able to cook on it throughout the day, as it cooking systemis supposed to.

**Interviewer**: Did you differentiate how it worked during cold weather and hot weather?

**Interviewee**: The experience I had with it is that in rainy season, it was working, but not as in dry season. In the rainy season, rainwater was getting into the digester hole, so we thought that was the reason it was not working as effective as in the dry season.

**Interviewer**: How much cooking time did you get in the wet season?

**Interviewee**: There was not much difference. I remember this other day they came in January or December [rainy season] and they found me in the fields. They called me in, and I started the stove and it produced strong fire.

**Interviewer**: So the difference wasn’t a lot?

**Interviewee**: Yeah – even in rainy season it was working.

**Interviewer**: What were the challenges?

**Interviewee**: The one challenge I had with it is that sometimes I did not have enough cow manure, so I was failing to feed it as directed.

**Interviewer**: But, I imagine that you had the same number of cow or if you had less, the difference was not much.

**Interviewee**: But, there are some times you go in a cow house and you find very little manure, perhaps due to poor feeding. So, it`s not necessarily the number of cows, but feeding that determines the quantity of cow manure.

**Interviewer**: What other challenges did you do face apart from feeding?

**Interviewee**: Maybe the problem I had with the gas connector and cracking of the gas pipe.

**Interviewer**: Did you ever call the installers? I can see on this handover paper you were given 3 numbers of the installers.

**Interviewee**: The people who chose us advised that we should report to them, and then they would report to their superiors, who would then report to the installers.

**Interviewer**: How many times did you report to the VDC chair?

**Interviewee**: Twice. The first time when it started leaking gas at the gas connector, and then when it stopped working.

**Interviewer**: I do not if I have heard you correctly. I recall the first time when you reported they came to fix. What happened the second time?

**Interviewee**: I think the second time [name redacted] came and said he would report to [name redacted]. But, when he reported to the installers they were like they would come.

**Interviewer**: Sure, have you seen something like this [table of intervention]?

**Interviewee**: No.

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

**Interviewee**: Of course, it would have helped us, because we would have been following whatever guidance which ison this paper.

**Interviewer**: How do you meet your energy needs now? You mentioned that you use trees around, right?

**Interviewee**: Yes, when we want to cook these days we use the trees around. As you can see, some of trees are not big enough to be used for building purposes, so we cut them for firewood. Then, we also use dry pigeon peas plants and maize stalks.

**Interviewer**: Do you still use manure as fertilizer for your crops?

**Interviewee**: Yeah, we still do that.

**Interviewer**: We are going towards the end of the interview. How much did the reactor cost?

**Interviewee**: I have just forgotten how much it was, but they told me.

**Interviewer**: K200,000, K400,000 or K1,000,000?

**Interviewee**: I can’t really remember, but it was in hundreds I think.

**Interviewer**: Who provided the money?

**Interviewee**: They mentioned that it was an NGO, but I have forgotten its name.

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

**Interviewee**: No, it is only that I worked on it and paid the workers I hired. I can also think of the bricks and cow manure provided. But, the installers provided most of the things.

**Interviewer**: You have said you did the digging alone?

**Interviewee**: Yeah

**Interviewer**: You also did the masonry work alone?

**Interviewee**: Yeah.

**Interviewer**: Apart from these, what else did you do?

**Interviewee**: Maybe sourcing cow manure, and then preparing feedstock. There was not any other work besides this.

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

**Interviewee**: When the things came, we did not bother to ask them where the things came from.

**Interviewer**: What is your opinion do you think it is from here?

**Interviewee**: It is not from here.

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

**Interviewee**: The plastic of the digester bag looked thick and very durable. So, I would think it was from abroad. Then, I also think that some of the things were from here, for example, the gas pipe because it did not last long as I expected. Talking of the cost of the reactor, I would really appreciate, if you could tell me the cost of it.

**Interviewer**: Now, some cost K600, 000, some even over a million, but it depends on the size. And, since I don’t know the exact size of your digester I can’t tell you its exactly cost. Did the digester help you save money?

**Interviewee**: Yes, it did.

**Interviewer**: Please explain to me.

**Interviewee**: It helped us save money because, generally, there are certain times we do not cut trees. So we buy firewood from our friends from Mozambique at all cost. I mean, we grow tobacco, so we sometimes use the trees economically and specifically for curing tobacco and construction of barns only.

**Interviewer**: How often do you buy firewood?

**Interviewee**: We mostly use maize stalks and the firewood from within. So, sometimes especially in rainy season we buy, for example, firewood of K2000 and we use it for a month or two.

**Interviewer**: We are remaining with 3 questions. What was the biggest change in your life the time you had biogas?

**Interviewee**: I was very happy to see it working, and if it had continued, I would have been very happy because I could have saved many things, for example, money and trees. Also, if it had continued our lives would have changed greatly because we do not have electricity here. So, if it had continued, we would have had power to use for lights and other electric appliances.

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

**Interviewee**: I can only say that if it had worked for long it would have helped me a lot. But, the problem is that it did not work long.

**Interviewer**: So you think it is useful if it can work for a long time?

**Interviewee**: Yeah, if it works and continues.

**Interviewer**: Why do you think it did not continue?

**Interviewee**: It did not continue because of the gas connector as well as the pipes – Those parts were not durable.

**Interviewer**: Do you think biogas has a future in Malawi?

**Interviewee**: I personally think that it has no future because supply of cow manure is not always constant. There are certain times when cow manure becomes scarce, and you wonder how is that possible even possible when the number of livestock is the same. So, I think many people would fail to manage it because of manure. So, it is not necessarily that you have the cows, but cow manure production depends on cow management, and cow management is not an easy thing.

**Interviewer**: I see. If you could have designed your own energy or waste intervention, what would you have chosen instead? I can see you have solar panels now.

**Interviewee**: I think solar technology is a better option.

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

**Interviewee**: It is because it gets its energy for from something that is ever-present and not difficult to find as we saw with biogas.

**Interviewer**: Where does it get its power?

**Interviewee**: It gets its power from the sun.

**Interviewer**: That’s was my last question. Do you have anything to say before we close?

**Interviewee**: My last word is a plea. We tried biogas and we worked hard to overcome its many obstacles. Now, I would like to ask for a different alternative like solar technology. People are using solar panels in communities and its working. Some people have been given solar panels and we see that they are benefiting. So, for us who managed biogas; for us who handled manure without gloves, but gotten anything, we should be considered. After all the hard work, nothing beneficial happened to us. So, in case of a new intervention, consideration of a new technology should be given to the people who worked for nothing on biogas project as a consolation. In short, the project implementers should consider us with a new technology. And, when they are bringing the technology, they should come directly to the people because there is a lot of politics. I think, they only gave us biogas because others would not have managed. If it was something easy an appealing, I’m sure I would not have got it.

**Interviewer**: I understand you. Thanks a lot for the interview.

**Interviewee**: Welcome. Thanks for coming too.