**BIOGAS ASSESSMENT PROJECT**

**Site ID: 27**

**Date: July 27, 2022**

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

**Interviewee**: The first people who came said the digester was from China.

**Interviewer:** When was it built?

**Interviewee:** We received two different digesters. The first digester we got in 2015 and the second one who got in 2016.

**Interviewer:** Did you get it from the same people?

**Interviewee:** Yeah - Both times we got it through the agriculture office.

**Interviewer:** Who built it first one, and how long did it take to build?

**Interviewee:** The people from the agriculture officer came and told us as they were coming to install a digester here. When they came, they dug a hole, made feedstock for the digester, and then connected the pipes. It did not last long because the people were somewhat not serious. It was not as big as the second one; it was 3 meter long, and half a meter wide. Its hole was one meter deep. The second one was huge, and was made of a high quality plastic digester bag. It was 3 meters in length and width.

**Interviewer:** What do you mean when you say installers were not serious?

**Interviewee:** The way the installers were coming to install it, we thought they were coming just to do some trials. It seemed so to some extent, and I even had doubts if it was going to work as they were installing it. And, it was not surprising to see that it failed; we never even cooked on it once. Of course, it produced the flame, but it was not enough to cook. It produced the flames for 4 months, and then stopped completely. We never cooked on it even once. As for the second one, we used it for a year.

**Interviewer:** So, the first one was for experiment?

**Interviewee:** Yeah, it produced flames, but it never worked. In addition, after sunlight the digester bag got stiff. The pipes were very short too. That was its pipe [points to the pipe]. The second one, to be honest was good. They even gave us spare clips to tighten the pipes when they got loose. We still have the clips. We have four in the house.

**Interviewer:** What was your role?

**Interviewee:** We helped them on every task. For example, when they wanted to make feedstock, we went together to agriculture office to get manure to make feedstock. After, we came back, they showed us how to make feedstock and we made the feedstock ourselves.

**Interviewer:** Who dug it?

**Interviewee:** My husband dug the hole together with the person you are with. All the beneficiaries, 5 of us, we were supporting each other in the installation process like in digging and even preparation of the initial feedstock. In our case, at first, we used dry manure, but extension workers stopped us. They told us that it needs fresh manure.

**Interviewer:** Why?

**Interviewee:** Because fresh manure produces gas faster than dry manure; so, after that we used to feed it with fresh manure. Then, they also taught us how to make feedstock. They said the quantity of cow manure and water should be equal.

**Interviewer:** How were you selected as a beneficiary?

**Interviewee:** They chose us because we had plenty of livestock that time. People with livestock were chosen because animal manure was the primary feedstock for the digester. So, for us cow manure was not a problem because we live near the agriculture office, which has a cow house. In addition, we had many pigs ourselves too. I think we had more than 20 pigs. We also had goats that time.

**Interviewer:** I have two questions on that. First, how did the agriculture office know that you had plenty of livestock? Secondly, how did you know that having manure was a requisite to be selected as a beneficiary?

**Interviewee:** We live very close to the agriculture office [less than 100 meters], so they had to know that we had livestock. In addition, we were supplying them with young pigeons. We were also selling them guinea fowl eggs. So, they were coming here regularly. Even the agriculture district officer [DO] was coming here often to see how we were to manage our livestock. So, I think when they saw that we were doing good in livestock management, they thought we could also manage the digester.

**Interviewer:** Oh, I see. What was the selection process?

**Interviewee:** One extension worker came to tell us that at some point people were going to come to give biogas digesters to the people. But, before this were also involved in another project which were run by the agriculture office as well. For example, I was involved in a training an energy efficient stove-making and briquette-making project. After that project, they came with the first digesters. Around the same time, I was also involved in solar dry project. At the end of the training, the project implementers gave me a vegetable drying machine, which I still have today.

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

**Interviewee:** I learnt about biogas when I was attending the efficient stove and briquette making training. During the training, the trainers did touch on biogas. At that time, I did not even think that one day I was going to own a biogas digester.

**Interviewer:** What did they say about biogas?

**Interviewee:** They said a biogas digester is equipment, which produces gas out of manure. Then , they said the gas could be used for cooking. After that, that is when question started to come. People were like how could people cook using manure. Then, they talked about the processes that are involved to produce.

**Interviewer:** What did they say about the process itself?

**Interviewee:** They said if there is sunlight, mix manure and water in a digester produces gas. The gas is what produces fire for cooking. And, indeed, when it was brought here, on sunny days the day was get like lit was on the verge of burst. We were even scared that the bag would burst when it was full because of sunlight.

**Interviewer**: What were your expectations?

**Interviewee**: (Laughs) when they came they told us that they were coming to install an innovation for cooking I was very keen to see. I remember when I was in school I heard about it, but I did not really understand it because it was theory. So, I saw that an opportunity to learn more about it. I remember I hear this when I was in school but I did not really understand it because it was theory. So I saw that an opportunity to learn more about it. And, honestly, we had high expectations.

**Interviewer**: What subject was this?

**Interviewee**: We have a subject in secondary school called science and technology.

**Interviewer**: What did the installers tell you expect from this?

**Interviewee**: Which installers? The first or second ones?

**Interviewer**: Both.

**Interviewee**: Both of them focused on environmental protection and conservation; they said the digester was brought here to save the environment. They mentioned that if we could use it accordingly, we would never go to the forest to search for firewood again. Moreover, they said we would never buy charcoal again; and we would never cut a tree to make firewood. They even went on to say we would be able to warm water in the morning and even cook food on time the whole time. On top of this, the installer of the second digester, who was a crippled old professor from Lilongwe, cooked rice porridge and we ate. And, in his speech, he mentioned the biogas digester could be connected to a solar system and then power it to produce energy for charging phones. In addition, they mentioned that in the course of feeding the 200-liter digester bag, it would start releasing digestate at the outlet. And, the digestate could be utilized as fertilizer for our crops.

**Interviewer**: How did you make the outlet?

**Interviewee**: For the first digester we did not make a hole. As for the second digester, we made a special hole for collecting the digestate, and when we tried the digestate, we saw that it worked. So, we used to dry and keep the digestate for the coming growing season.

**Interviewer**: Oh, you used the digestate?

**Interviewee**: Yes, we used it. We used it because we were told to try out it. Thus, we used it once, and we saw that it was productive.

**Interviewer**: How much digestate did you try your crops with?

**Interviewee**: It was only 5kg of digestate as it was for experiment purposes only. And, we added water because we were told it is too strong so it wilts maize, if used undiluted.

**Interviewer:** Why then didn’t you proceed to use it after?

**Interviewee:** (laughs) honestly, we did not continue to use it.

**Interviewer:** Why? Were you not satisfied with its performance? Was it tiresome?

**Interviewee:** No, the maize did well - It did well. Maybe, we did not continue because are used to what we were doing. And, they said it is very strong that it wilts maize, so we could not gamble on our maize. That is why we continued with what we usually do.

**Interviewer:** What kind of training did they give you?

**Interviewee:** I did not receive any training. The training I received on biogas came when I was attending the energy efficient stove making and briquette-making training. The trainers did mention biogas during the training because just like efficient stoves and briquettes, it also conserves the environment. So, honestly speaking, I did not receive any special training regarding biogas. The training I received was about efficient stove making and briquette. Biogas was just a subsidiary discussion.

**Interviewer:** So, when they came to install it, what did they say about biogas? What did they say? What did you learn?

**Interviewee:** They educated us on what things to feed it. They said we could feed it with any type of manure, whether it is human manure, food waste, and anything else that decomposes. So advised us take such things and add water to make feedstock. If we took 20 liters of manure, we were also adding 20 liters of water. So we were mixing that with our hands, and then pour the feedstock into the digester. After that, they told us to close the outlet, inlet and gas valve. Then the things would start heating up after 30 minutes or an hour, and we could see the bag inflating. Then, we would start getting gas at the stove and start cook. We could even cook beans, and people were coming to see us cooking. People were surprised and wondered how manure could produce gas for cooking.

**Interviewer:** So the training was basically about how to prepare feedstock and which materials could be used as feedstock and not. You are saying you prepared feedstock using bare hands, how did you feel?

**Interviewee:** (laughs) no, only if it were human manure! For human manure, they told us that we could put it directly into the digester using a shovel. As for cow manure, we had no problems. We were simply going to the agriculture office’s cow house to collect cow manure in the morning. It’s became some sort of routine task somehow.

**Interviewer**: You say you were not feeling disgusted, I mean, how?

**Interviewee:** Of course, at first, we had issues; we even used to have minor headaches. But, we became accustomed to it. And of course, we had pigs and if you can compare cattle to pigs, you would see that cattle are better off in terms of hygiene.

**Interviewer:** Why were you not using shovels all the times and then stir the feedstock with a stick or something?

**Interviewee:** Manure in a cow house is mixed. Some are dry and some are fresh. So, to separate the two when collecting with a shovel is difficult, if not impossible. Thus, to collect strictly fresh manure for the feedstock you need fresh manure to use hands.

**Interviewer:** Okay, my understanding is that you did not receive training on biogas. However, at some point you learned about biogas as a subsidiary subject during training on efficient stove making and briquettes. On top of this, when they installers came talk about this when they told you how to make feedstock, what types of materials you can use as feedstock. How prepared to run or operate the digester did you feel you were?

**Interviewee:** Of course, yes. After the installers went, we stayed there for a month without doing anything to the point that the bag deflated. We did not do that because we abandoned it, no, we did that on purpose. We wanted to see if what the installers told us would work. And, if it did not work, would have called them because they left us their numbers. But, when we restarted it ourselves it worked, and it was even worked during the rainy season. During rainy season, when we saw that no sunlight, we were feeding it even more. Because the bag was full of feedstock, the pressure in the bag was high, and it was always inflated. People were even asking how we were able to make the bag inflated during rainy season. So with gas we could cook porridge and boil a fair amount of water [30 minutes – 45 minutes], and then it would deflate and stop working. But, things in summer were better. I could cook fast, for example, even when there was a funeral service around the community, people would ask how I managed cook fast…. And, to ensure that it was working effectively, they told us to check the gas connector whenever we saw that the bag was deflating oddly. So, sometimes we could find it leaking. Then, we would try to glue it with super glue or with seal tape. To troubleshoot a gas connector, they told us to mix water with soap to create foam. Then, they told us to pour the foam on the surface of the bag or gas connector to detect a leak easily. It was something similar to what people do when fixing bicycle tubes.

**Interviewer:** How did you meet your energy needs before the intervention?

**Interviewee:** I was using firewood.

**Interviewer:** Charcoal

**Interviewee**: Sometimes, yeah. But, very rarely.

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

**Interviewee**: From those mountains.

**Interviewer**: Oh, that is far.

**Interviewee**: Yeah, it is very far.

**Interviewer**: If you leave at this time, 12 noon, what time would you return?.

**Interviewee**: It takes about 4 hours to go there, find wood and come back. So, we could be here at 4 or 5 PM.

**Interviewer**: It is really far.

**Interviewee**: Yeah, and it is not as if you go there you find the wood at one point. You search around… The mountain looks like it is not far from here but it is far.

**Interviewer**: Yeah, to see a mountain like that it means it is far.

**Interviewer**: You told me you had many livestock. But, I’m not seeing it hear?

**Interviewee**: I have two school going children and my husband is away, he`s in South Africa. So, I sold the livestock to make ends meet.

**Interviewer**: Pal, you need to work hard - do not play at school. Mom sacrificed the livestock for your get education, so you need to work hard!

**Interviewee**: Yeah, he is form 4 [last grade of secondary school]. We are just waiting for his final exams. They are starting next month, so we will see soon, if it was worth it to sell the cows.

**Interviewer**: Oh, nice. Good luck.How did you manage feedstock before the intervention?

**Interviewee**: We used it as manure. We were basically getting manure and food waste, and then put it in a sack bag and line with a plastic bag and store it until the sack bag got eaten. We were also adding ash to the mixture…. Also, people were coming to collect manure from the cow house to use as fertilizer for their maize and vegetables.

**Interviewer**: Were you selling?

**Interviewee**: Ah, no.

**Interviewer:** Why?

**Interviewee**: You know friendship. We were also going to their gardens to ask for vegetables.

**Interviewer**: Oh, I see. Let us talk how your digesters worked. We will focus more on the second one, but I will also ask concerning the first digester. How much feedstock did you start the digesters with? Take me through both the first and second digester?

**Interviewee**: For the first one we used 2 buckets (20 liters) of cow manure. I remember that time we gathered dry manure and we were told by the installers to use fresh manure. So, we had to go and collect fresh manure again.

**Interviewer**: How long did it take the first digester to start?

**Interviewee**: The bag started inflating after the second day. It fully inflated after 4 or 5 days. So it took 5 days to start up. After 5 days, it started producing fire and it somewhat worked. After that, we used it.

**Interviewer**: How long did you use the digester before it stopped?

**Interviewee**: It took four months like I said. But we were not using it regularly; We were using it here and there.

**Interviewer**: What do you mean here there?

**Interviewee**: If we cooked on it, it was taking another week to cook on it again. So we were waiting for a week for it to pick up again. The first digester had bigissues. It was different from the second one.

**Interviewer:** What caused the first digester to fail?

**Interviewee**: It become tiresome; we could feed it, but the bag could not get inflated and could not get fire. At first, it produced fire, but after a short time the intensity of the first started diminishing up to the point of stopping completely. We kept on feeding it but nothing happened. Then, we decided to take it out to protect it from thieves. Since, we were also hoping that the installers were going to come back and some point so we wanted them to find it in a good state.

**Interviewer**: So what was the problem?

**Interviewee**: We do not know what went wrong. The production of gas started diminishing after short time, and it eventually stopped completely. So we were expecting the installers to come and fix it, and then tell us what was the problem. So, we took out bag because a lot of people showed interest in it, so we thought that they could come and stole it.

**Interviewer**: Let us talk about the second one. We will talk about it at length because it is what we knew of and it is what you had more time with. Let us talk about how it worked. Before starting using it, how much feedstock did you feed it with to start it up?

**Interviewee**: we started by pouring 4 buckets of pure water into the digester. For this one we did not use 20 liter buckets instead we use the 40 liter buckets. Then, I collected 4 wheelbarrows of manure from cow manure. I did not make the mistake of collecting dry cow, because I had learned from the first digester that it needs fresh manure. After collecting the manure, we started mixing it with water in 20-liter buckets. We were adding a very small amount of water because the manure was already semi-liquid.

**Interviewer**: How long did it take to start it up?

**Interviewee**: We started feeding it in the morning. And when we woke up the second day we found the bag standing. The bag did inflate fully though. In the evening, it started making sounds like something was boiling in it. The following day, it was a very sunny day so the bag got fully standing. It was after five days that we started using.

**Interviewer**: How did it work after commissioning? I mean, how much cooking time, did you get?

**Interviewee**: We did not fully use it because you wanted to test it.So we were sometimes just putting a pot of water. Then, we would find out that the gas was finished before even the water boiled. And they said that every time we were cooking we needed a bucket of feedstock to replenish the gas that was being lost…. So it was going off even when we were cooking. Thus, every time we cooked, we made feedstock so that we could not run out of gas. It was more of boosting the fire just as we do with firewood.

**Interviewer**: Were you putting a bag of sand on top of the digester to boost the fire?

**Interviewee**: No.

**Interviewer**: So you never put a bag of sand or step on it to boost fire?

**Interviewee**: No, but at the end when it started producing very little gas and saw that gas was depleting fast in the bag, we started putting a stone on top of bag the boost the fire.

**Interviewer**: Who told you to do that?

**Interviewee**: We thought on our own that if less gas is coming out, we needed something on top of the bag to exert pressure.

**Interviewer**: So was it helping?

**Interviewee**: Yeah, it was.

**Interviewer**: How did you use the gas?

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

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

**Interviewee**: It was manure, any type of manure. On top of that, they said any biodegradable thing. So, every dead living organism we collected and put in the digester…. In addition, no metallic thing was allowed.

**Interviewer**: Why?

**Interviewee**: Because it does not degrade and produce any bacteria.

**Interviewer**: How often were you feeding it?

**Interviewee**: We used to feed it everyday.

**Interviewer**: How much feedstock were you feeding it?

**Interviewee**: We used to feed it with a 20-liter bucket of cow manure. To this, we added 20 liters of water.

**Interviewer**: So you weren’t able to cook 3 times a day?

**Interviewee**: Yes, and we were even surprised about it. We used to cook once in a day especially in the afternoon. The bag was deflating whenever the sun was gone.

**Interviewer**: So, you could not cook three times a day?

**Interviewee**: Yes, we could not cook three times a day. However, it was producing very little flames in the evening sometimes. It was not enough to cook something on thought.

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

**Interviewee2**: Mostly it was I. Sometimes, my father would feed it too.

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

**Interviewee**: We were mixing cow manure and water with our hands. We did not use a mixer because it was not breaking lumps in the manure as we wanted. So, we used to break all the lumps with hands till the feedstock was smooth and thick. Then, we were adding pure water to the feedstock.

**Interviewer**: so you were making feedstock of 20 liters of water and 20 liters of manure. To this, you used to add another 20 liters of water?

**Interviewee**: That is correct.

**Interviewer**: So, it was like 20 liters of manure against 40 liters of water.

**Interviewee**: Yeah.

**Interviewer**: Did they tell you to add extra 20 liters of water after making the feedstock?

**Interviewee**: No, but every time we added the water, it was not taking time for the digester bag to get full; it was like every time we added water the digester was making a sound like that of boiling liquid. The bag was inflating as if it was about to burst, and it was scary. For example, if we sat here, we could move out of fear.

**Interviewer**: Why do you think that was necessary? I mean, what made you do that?

**Interviewee**: We just thought that it needed water; not water in the feedstock, but just pure water.

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

**Interviewee**: That was the biggest challenge we faced. We had no spare parts. Therefore, when there was a problem gas connector, we had challenges to fix it. Of course, they said that if it gets disjointed, we could use an adhesive. However, I do not think the adhesive we used was suitable for that, because every time we fixed the issues, it was not taking time to separate. So, I think there was a special adhesive for bonding the gas connector, but we did not know it, and they didn’t give us.

**Interviewer**: What else were you told in regards to maintenance?

**Interviewee**: They said that the digester bag should not be covered in water when it’s in the hole. They also told us not to use water with soap when making feedstock. They told us that we should not use grey water, for example, water collected after cleaning dishes; they advised use that water should come directly from them borehole.

**Interviewer**: Why was water with soap not allowed?

**Interviewee2**: I just think that it affects the production of gas in the reactor. I do not really know what happens in the bag though, but that is what I think. They did not explain how soap affects the digester…. Maybe it is because soap contains chemicals or its foam affects gas production in the reactor.

**Interviewer**: Who was responsible for maintenance?

**Interviewee2**: It was my father. But, if the problem was big, they gave us numbers to call.

**Interviewer**: Which problems did your father solve?

**Interviewee**: We had problems with the gas connector as it used to detach time and again. In addition, the flat rubber ropes connecting the digester bag to the outlet and inlet pipes were constantly being damaged, as they could not stand sunlight. So, we used to buy and replace them frequently.

**Interviewer**: How often did the flat rubber rope take to get damaged?

**Interviewee:** It was dependent on the sun. If it was October, it took about a month or so. Then, gas connector would also detach often. Then, we would go buy adhesive at K400 to seal the connection.

**Interviewer**: You have said it did not meet your needs, right?

**Interviewee**: Yeah, we could not cook, as you wanted; we were only using it one a day.

**Interviewer**: Okay, okay, and when this happened you were using firewood?

**Interviewee**: At night, we were using firewood or charcoal.

**Interviewer**: What challenges did you encounter? I know you have talked many issues, but could you please take me through the challenges?

**Interviewee**: The first one was the continuous failure of gas connector.

**Interviewer**: How did that problem manifest?

**Interviewee**: We were told that if we see the digester bag deflating fast than usual when it was full, then we should know gas was leaking at that particular connection. I remember when that happened the first time, we glued the connection with an adhesive and it worked. I think it only took two months before it happened again.

**Interviewer**: What other challenges did you face?

**Interviewee**: The second problem was that we were making feedstock with some sort of fear. We thought that after installation, they were going to give us gloves for feedstock preparation. But, they didn’t, so some people were saying handling manure with bare hands causes physical damage. Some were saying manure contains pathogens. Therefore, we were nervous that pathogens would enter our bodies through the fingernails, and causes diseases. So, these were the three problems we encountered.

**Interviewer**: When you had the issue of the at the gas connection, did you try to fix it yourself or did you call first?

**Interviewee**: We called first and they offered that solution of using an adhesive to bond it. And, they asked us to inform them if it didn’t work, so that they could come.

**Interviewer**: When it failed again, did you inform them?

**Interviewee**: Yeah, they came and bonded the connection with an adhesive different from us. That is why I said they had the materials for maintenance, but simply did want to give us.

**Interviewer**: What adhesive did they use?

**Interviewee**: The adhesive was contained in a certain metallic tube, cooper-like. And, when they used it lasted for sometime; and it was the same adhesive they used the first time during installation.

**Interviewer**: How long did it take that time?

**Interviewee**: It took 4 months or so before detaching.

**Interviewer**: How long did it take them to come when you reported the problem?

**Interviewee**: When we called them that it was broken down that it didn`t take long to come. It did not take a month. I think it took two weeks.

**Interviewer**: When was the first time the gas connector malfunctioned? In addition, how many times did it fail?

**Interviewee**: I cannot really remember. I think it was after 3 months, but it didn’t go more than 5 months.

**Interviewer**: How, many times did it fail?

**Interviewee**: 4 times, I think.

**Interviewer**: What about the rubber strips?

**Interviewee**: We started having issues after 6 months; and it was a big problem in summer because of the sun.

**Interviewer**: (show table of interventions) have you seen something like this? What do you think about this kind of information, and do you think it would have helped you?

**Interviewee**: We have never seen it.

**Interviewer**: What do you think about this information and do you think it would have helped in your case?

**Interviewee**: It would have helped us a lot, and this thing would not have broken.

**Interviewer**: How and why?

**Interviewee**: We could have known what to do if there was a problem.

**Interviewer**: So, you did not know what to do?

**Interviewee**: Zero (laughs)

**Interviewer**: So, if you had the information, we would have been talking a different story today?

**Interviewee**: We would have asked you to wait for lunch, just like with the person who installed it.

**Interviewer**: (laughs) it that true?

**Interviewee**: Yeah, and they told us that it has a 5-year guarantee. But, we only use it for a year. So, it was going to expire this year.

**Interviewer**: Okay, we are going towards the end of the interview. How would you describe the current state of your digester today? If the installers call you today and ask about the digester, what would you say to them?

**Interviewee**: we would tell them that the digester is dead - It is dead. But, we still have some of the equipment.

**Interviewer**: (laughs) it is “dead?”

**Interviewee**: (laughs) you laughing? (Laughs). We would tell him it is dead, but we still have some of the equipment.

**Interviewer**: What equipment do you have?

**Interviewee**: It’s what we have here.

**Interviewer**: It is the stove, the bag, and the bottle. Just one?

**Interviewee**: We had 2 bottles, one was green and the other was white. I remember one was placed in the kitchen. It had some stones in it. So, the white one is lost.

**Interviewer**: What were the bottles for?

**Interviewee**: They said it was for purifying the gas. The gas contains moisture when it is coming from the digester. So, to remove water from the gas, they use the stones in the bottle. The other one was where water was accumulating. So after some time, we used to take out the water from the bottles.

**Interviewer**: Why were you removing the water?

**Interviewee**: To remove the water because it blocks the gas. As a result, gas fails to come at the stock.

**Interviewer**: Did it ever occur?

**Interviewee**: No, we were taking out the water frequently.

**Interviewer**: Oh, yeah. That’s a water trap and a sulphur trap. Moving on, you have said that the digester is dead now, but you still have some of the equipment. How did reach this stage? And, in your opinion, what caused it?

**Interviewee**: It is because the problems I have talked about became so regular and annoying. And after it malfunctioned, we called them, but the phone was just ringing. We thought they were busy but they never called back. Then, we just decided to take the digester bag and the equipment out for safety reasons, hoping that one day when they come they should find the equipment it good shape. It is just unfortunate that some of the equipment got damaged, because our house collapsed at some point.

**Interviewer**: You have said that since now it is not working when you want to cook, you use firewood and charcoal, right?

**Interviewee**: Yeah.

**Interviewer**: And now you do not have livestock because you sold them to pay fees and to meet family needs, right?

**Interviewee**: Yeah. But, we still have chicken. We have 3 big ones and 17 small ones.

**Interviewer**: Oh, great. How much did the reactor cost?

**Interviewee**: They told me the figure. I think the whole cost K80000, if not K800000.

**Interviewer**: And all this was provided by an NGO?

**Interviewee**: Yeah, I think so.

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

**Interviewee**: We contributed 4 buckets and a wheelbarrow, which we used to make the first feedstock. I would also say we contributed labour

**Interviewer**: How much labor?

**Interviewee**: For the first digester, it took us only one day, and we even dug without their supervision, as they were not around. We dug it ourselves There was my brother, father and I. The second one, we dug for one day as well. We dug it, while the installers were there as we dug it on the day of its installation. We dug it ourselves. There was my brother, father and I. Nevertheless, two more people from the installers’ side did help us to speed the work. I think, in total we were four or five people. The boss was there, but he was not digging with us.

**Interviewer**: Did you line it with a brick wall around it?

**Interviewee**: I think the first one we plastered. But, the second one we didn`t do any masonry work.

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

**Interviewee**: They provided the cement, and we only provided water and sand. There were no bricks. So, we just plastered the whole hole to prevent moist

**Interviewer**: That was some work!

**Interviewee**: Yeah, but everything was done from us. The three of us worked on the first digester.

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

**Interviewee**: uh, I do not think the pipes are from here; the pipes are not from Malawi. Considering what they said about the pipes that are different from other pipes, I do not think they are from Malawi. I think they said there is something in the pipes, I do not know what it was though, and that the pipes are durable than other pipes. And, it’s true the pipes are durable. You can’t cut the pipes with no ordinary object.

**Interviewer**: So that is what make you think it is from abroad?

**Interviewee**: Yeah, I think it is from abroad.

**Interviewer**: You said you do not buy firewood. You just get it free at the mountains. So, we can’t said it saved you money the time it was working…. It only saved you time and energy, right?

**Interviewee**: Yeah

**Interviewer**: What was the biggest difference in your life the time it was working?

**Interviewee**: The biggest change was sometimes though very rarely we were buying a pack of charcoal. With that were able to cook in the morning, evening, and even keep some. Had it not been for the digester then we could have required two packs. So, we were saving a little something because of the digester.

**Interviewer**: How much was a pack of charcoal?

**Interviewee**: K150, but it is now K250.

**Interviewer**: So you were saving money to some extent…. How often did you use charcoal?

**Interviewee**: It was for only when we had no firewood. So, it rarely happened. Maybe once in 4 months.

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

**Interviewee**: I would be very happy if it could be the revamped. Of course, many people were interested in it too because many people were coming to see it. People were taking pictures of us using the solar dry machine and even the digester itself. So, it was not just helping us here. It was also helping people outside the country. So personally, I can be very happy.

**Interviewer**: If you can talk on how it worked, its props and cons and all that. What would you say?

**Interviewee**: Personally, as a housewife, I would say it was maintaining and restoring my body energy as I was taking little time to cook fast, and was not searching firewood. I was able to do other things as well because it was fast, as its fire was intense. The challenge I faced was that, it was leaking gas at times as such I was getting very little gas at the stove even whilst I was cooking. So, some food would lose taste or texture.

**Interviewer**: What do you think could be done to stop all those problems?

**Interviewee**: We need to sit down with the installers and talk about these problems, and see how we can overcome them.

**Interviewer**: Which problems are we talking in particular?

**Interviewee**: Gas leakages and I think the gas we used in its entire lifespan was less compared to the gas we lost at the gas connector. I mean, we used to see heat waves escaping from the joint here when the bag was full.

**Interviewer**: What is your opinion of biogas, my brother?

**Interviewee**: As for me, you can see that I was dedicated and committed to use biogas. So if another opportunity comes to own one or something similar, I would be very happy.

**Interviewer**: What is the future of biogas in Malawi? Is it bright or dim?

**Interviewee**: It is dim especially when you considered how these digesters worked; they are all dead. My wish when we got the digester was that one day we would use it for lighting. I was told by the installer that these things can be connected to solar or an inverter to the produce light. And I was very excited to see it produce light one day. So looking at that prospect today, I see that that cannot happen, and this in general has no future. I feel like we have high expectations of it, which cannot be fulfilled. In addition, we were told that it is possible to connect digester to a connected to pit latrine, but that too did not happening.

**Interviewer:** You seem that you want it again. If someone can give you a digester or let us say, someone gives out 10 digesters today. Do you think in five or ten years we can find them working? If not, what could be done?

**Interviewee**: 5 or 10 years is a talk order. But, if I can get one, I think you can find it working because I know this. But for someone who has never used it, I do not think that could be done. As for us, we know what it needs, what it wants, so we can keep it for long.

**Interviewer**: What do you know now that you think someone who has never used it wouldn`t know that may affect its life span?

**Interviewee**: First, we know how to handle it; we know what it takes to fix it when it breaks down. We know its maintenance. If they come today again, I would tell them to leave spare parts especially adhesive for tighten the joint at the top. And, to be honest, that is its major problem. So, now we know how we can handle that problem on our own. But, still would need materials for that purpose, and not what we improvised. So, we would ask the materials that are made specifically for that purpose, because we now know it. And, I do not think if you can give out to 10 that you can find all them working. I am sure 2 or 3 people would give up because it's not easy to feed it; it is not easy to source water and manure. That time we were lucky because the borehole was at the agriculture office (150 to 200m away). But, now if we need water we get from the lake [700 meters +]. That is a long distance. Therefore, it’s easy for a person to abandon it. But, for us we know its importance so we could hold on to it.

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

**Interviewee**: We would definitely choose something else. We can choose biogas. The last time they promised us that this thing was going to work for 5 years or so. But, we were only able to use it for a year. So, we have fears about its durability.

**Interviewer**: So, which intervention would you choose?

**Interviewee**: We are more than willing to try any other intervention instead of biogas.

**Interviewer**: Clear. So what would you go for?

**Interviewee**: There are energy efficient stoves, briquettes.

**Interviewer**: Why?

**Interviewee**: They help one to save money, and even save the environment. When you put briquettes in an efficient stove, the fire is good. It is just like gas. The air is clean.

**Interviewer**: Last one. You attended a briquette making training, but you still use firewood, why?

**Interviewee**: To make briquettes you need to have certain equipment, and we weren’t given.

**Interviewer**: what are your last words, quick one?

**Interviewee**: Thanks for coming. I know your coming here is for a purpose. For us we can only say we have welcomed you, and if you have any work, whether it is biogas or not, in the future here we are more than willing to work with you. We are not slowing down. However, our plea is when you are coming with an intervention it should be something that has worked somewhere. You should know your product inside out, so that when you say it has a guarantee of 3 or 5 years, it should really be that. In closing, thanks for coming. In addition, if you have a product that you want to introduce in the future, you should do things differently. You should bring spare parts, and teach us about the product, so that we will be in a position to manage it. Thanks.

**Interviewer**: Well spoken. Thanks for the interview!

**Interviewee**: Thanks for coming again. Hope to see you again!