**BIOGAS ASSESSMENT PROJECT**

**Site ID: 29**

**Date: August 14, 2022**

**Interviewer:** Thanks for granting us a phone interview. What came to your house today last time but we did not find you. Again, we went to your previous house in Mbwadzulu were the digester was installed, but we found that you had moved to Nankumba, and that’s when we came to your house in Nankumba. I heard you are an extension worker, which is a good thing because most people we talked to were mere beneficiaries. So, we hope to learn more and get a different perspective in regards to biogas. First question, where did the digester originate from?

**Interviewee**: I know that it came from Minister of Energy. At that time, they were implementing a pilot project concerning renewable energy. Therefore, biogas was one component of the project. But, main components of the project were efficient stove and briquette making.

**Interviewer**: So, it was more of an environmental project?

**Interviewee**: Yeah, it was at a renewable energy project, and biogas testing and installation was one part of it.

**Interviewer**: Who designed the digester?

**Interviewee**: Initially, we tried a locally made digester. It was made of a thick ordinary plastic digester bag. Two ends of the digester bag were tied to pipes, one acting as an inlet and outlet. We placed the bag in a shallow hole. So, this one was designed by people from Energy Affairs. Sadly, this one did not work. Then, after a year or so, they brought a different digester. They said it was imported from China, and this one to some extent worked.

**Interviewer**: Who built the digesters? First, let us look at the first digester, and then the second one.

**Interviewee**: It has been a long so I do not know who really built it. However, I remember that the first one was a locally made digester by people from Energy Affairs. I do not really remember when it came, but I think it was 2017 or 2018. And, it preceded the second digester by a year or so.

**Interviewer**: You have said the first one was a failure, what do you mean?

**Interviewee**: It never produced fire; it never worked out. And, I can say what we learnt about biogas that time was a waste.

**Interviewer**: What did you learn? And, why do say that?

**Interviewee**: We learned about its operation; we learned that to work it needs fresh cow manure; and that we were supposed to feed it every morning with fresh cow manure; we also learned that gas move from the digester bag to the pipes, and then to the stove. However, the first digester had a different stove from the second one. The first one had a stove made by local artisans, but the second digester had a stove that looked factory made. It had also other improvements, for example, it had a bottle for gas purification.

**Interviewer**: How long did it take to build the first digester and the second one?

**Interviewee**: It took a day to build the first one. But, the second one took long because the hole took long to dig. However, the task of digging was responsibility of the beneficiary. So, some people hired people to dig for them to speed up the process… In addition, of course, before we commenced any work, we had one-day training. So, we did what was discussed in the training.

**Interviewer**: Okay! What was your role?

**Interviewee**: My role as a beneficiary was to dig the hole for the digester, and to feed the digester daily after its installation. Also, whatever we were doing was exemplary because it was a project for community members to learn and adopt the technology of biogas.

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

**Interviewee**: The first consideration to be chosen as it beneficiary was that the person had the potential to source fresh cow manure. So, the first requisite was that the beneficiary was supposed to have cows. On top of the first consideration, the person was supposed to have interest in the digester and the commitment to feed it. Thirdly, the beneficiary was to be a person who was using firewood or charcoal for cooking. This was not a big issue because every person was expected to be using firewood or charcoal. Thus, because the project was intended to stop people from using firewood or charcoal and to enjoy the benefits of biogas, the beneficiary was supposed to be a charcoal or firewood user at all cost.

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

**Interviewee**: No, I did not know anything. I knew about biogas during the one-day training.

**Interviewer**: I believe many people were eligible to get a digester, so how was the selection process?

**Interviewee:** As area extension workers, we chose an implementation area, and then we engaged the community people to brief them about the project. During the engagement meetings with the community, people were selecting those who they thought would manage the digesters bearing in mind the work that was involved. Of course, we had a limit of beneficiaries. I think in Mbwadzulu 6 people were chosen.

**Interviewer**: Yeah, you are right. I think it was five or six people.

**Interviewee**: Yeah, it was five people. So, I can say the selection process was community led with people considering the work required. In addition, it was more of a self-selection process as some people removed themselves voluntarily saying that they would not manage.

**Interviewer**: So was it like the whole community was there?

**Interviewee**: Yes, it was the whole village. For example, Mbwadzulu village chose five people.

**Interviewer:** Okay, okay. But, you were not chosen through that process since you were an extension worker, I suppose.

**Interviewee:** Yeah, yeah after choosing themselves, they decided that one should be installed at the agriculture office to see if the digester really works.

**Interviewer:** (laughs) okay

**Interviewee**: (laughs) Yeah, for others to see, learn, and appreciate if it`s practical. So, it was more like a demo, and in fact, before the beneficiaries were given the digester they learned from that digester.

**Interviewer**: What did the people learn?

**Interviewee**: Basically, they learnt that the digestate is fertilizer. They also learnt how to make feedstock for the digester.

**Interviewer:** So, was it given to agriculture office or to you as an individual?

**Interviewee:** The plan was to install it at agriculture office. But questions were raised that if it was to be installed at agriculture office, then who was going to use it. Then, that’s when they decided to plant it at my house. So, I can say it was planted at my house because they wanted a specific person to feed and use it.

**Interviewer:** So, how many people were there at agriculture office then, and why did they choose you out of all people?

**Interviewee**: (laughs) the other extension workers just said that it should be installed at “the bosses’ house”.

**Interviewer**: (laughs) oh, because you are the boss….

**Interviewee**: (laughs) Yeah, also because out of the two agriculture extensional workers who attended the training, I was the one who was staying closer to the office. The other one was staying in the field at Sawuya. So, I can say I was chosen because I was the one living closest to the agriculture office and who had knowledge about it.

**Interviewer**: What were your expectations?

**Interviewee**: As a charcoal user, I expected to stop using charcoal. So, my biggest expectation was that I was going to start cooking without spending money. So, yeah, that was my biggest expectation.

**Interviewer**: What were you told to expect by the installers?

**Interviewee**: Nothing, that was all. But, personally, I also expected other people to learn and adopt it. In my heart, I did not think the digester was mine, but it was for community and for educational purposes. And, for the second digester from China, the installers said that if the digesters worked more digesters would be given to people at a subsidized price.

**Interviewer**: You said that to be a beneficiary one was supposed to have cow. As an organization or as a person how many cows did you have?

**Interviewee**: Even now, we still have cows, and as matter of fact, every EPA [Extension Planning Area] has cows. That time we had 10 cows.

**Interviewer**: That was a lot.

**Interviewee**: And now we have 14 cows.

**Interviewer**: You talked about training, what kind of training did you receive?

**Interviewee**: At first, we learned about renewable energy in general. Then as subtopics, we learned about briquettes, energy efficient stove making, solar installation and biogas.

**Interviewer**: What did you learn about biogas?

**Interviewee**: Basically, it was about cooking. They told us that when we use biogas for cooking, we conserve the environment, as it doesn’t need firewood. So, instead of cooking using firewood, cow manure that is regarded as waste and useless would be used. After that, we proceeded to install a digester.

**Interviewer**: Okay, so it was more of theory and practical?

**Interviewee**: Yes, it was a bit of both. I mean, after the training, we installed a solar system at Mlambe School in Nankumba. On top of that, we also made briquettes from papers. Then, we also did a small demo on biogas. So, it was both theory and practical.

**Interviewer**: What did you do or learn during biogas practical?

**Interviewee**: We learnt about its installation, for example, how to assemble the pipes and digester bag, and how to make feedstock.

**Interviewer**: How many people attended the training? And, how long did the training take?

**Interviewee**: They got 2 EPAs from Nankumba T/A. There was Mbwadzulu and Nankumba EPA. If I am not mistaken, two agriculture extension workers from each EPA were taken. Also, one community development assistant and forest worker from each EPA was taken. The training was conducted at Nankumba EPA and it was for one week. Our team from Mbwadzulu was transported to Mbwadzulu by installers. At the end of the training, we went to the field to install a digester of the beneficiaries' house. In addition, we installed a solar panel and made briquettes. I remember that time trainers brought equipment, which looked more like a compressor for making of briquettes.

**Interviewer**: So the training was for extension workers and other stakeholders. Did you have training with the beneficiary? Or, did the beneficiaries have any type of training?

**Interviewee**: I was the facilitator for beneficiaries training; so, I was simply telling them what I was told during the training, which was about feedstock preparation and how to operate it. I was also responsible for installation of their digesters.

**Interviewer**: So after the training, how prepared to run or operate the digester did you feel you were?

**Interviewee**: Yes, I felt confident. Of course, the digester did not work, but I feel we were not the problem. The trainers were a problem because they failed to make the digester to produce fire. I think there was a deficiency somewhere. I do feel like the digester was not air tight enough.

**Interviewer**: How did you feel when the installers came to digester and failed to produce fire? And, what did the installers say?

**Interviewee**: As for us, we lost hope and thought that the things do not work. And, it being our vey first digester, it was demoralizing. But, the installers gave reasons why it didn’t work. They said it had too many connections that were connected by flat rubber strips. So, they felt that the connections were not airtight enough. The other thing was that gas was coming to the burners with moist. So, that was making the gas not to light up with flame.

**Interviewer**: Why did the gas produce moist?

**Interviewee**: When I compared the first and second digester, I observed that “dew” like things (moist) appeared at the burners. So, I think moist was making it not to light up. So, maybe the burner or system itself did not have things to control moist.

**Interviewer**: So the first one failed, and they said they were going to come back?

**Interviewee**: Yes, they said they were going to come back, and they did. They said they had come with a new digester that was like big as a 200-liter drum. So, even the design for the hole changed. The hole for the first digester was more like a drain, while the second one was a deep hole like dug well – so they advised us to digging a round 1 meter hole for it.

**Interviewer**: How long did it take to bring the second the digesters?

**Interviewee**: It did not take a year. I think it took about six months.

**Interviewer**: So, when they brought the second one, you were able to make it work?

**Interviewee**: Yeah, it worked. But, as a user, it didn’t really meet my expectations, because I was not able to use the gas the whole day. Best-case scenario, I was unable to breakfast and lunch. In the evening, it did not have gas.

**Interviewer**: How much cooking time did you get in the morning and afternoon?

**Interviewee**: In the morning, I was able to make breakfast for the kids. At noon, I was able to nsima and side dish of beans without problems. So it was a matter of preference at times, sometimes we opted to cook on it in the evening instead at lunch.

**Interviewer**: Why do think you were not able to use it in the morning, at lunch and in the evening?

**Interviewee**: Of course, after installation, they never came back. But, if they had come, I wanted to suggest to them that it needed a storage gas to work the whole day. I think it was not efficient enough because gas was coming from the digester to the burners directly. I am also saying this because I could smell gas around the digester, and it made me think that we were losing gas. So. I think that if we had storage bags, then we could have managed to conserve the gas.

**Interviewer**: I’m curious to know, the first digest that you tried and failed, did you install them in the community as well?

**Interviewee**: Yes, they also installed them in the community.

**Interviewer**: Did they work there?

**Interviewee**: No. But after feeding the digester bags, the bags did get inflated. The only challenge was only that the burners could not produce fire at the stove.

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

**Interviewee**: As for me, I can say I was using charcoal.

**Interviewer**: In a month, how many bags of charcoal did you use?

**Interviewee**: Two bags of charcoal.

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

**Interviewee**: I buy from charcoal sellers who move around.

**Interviewer**: How much did a bag cost?

**Interviewee**: That time a bag of 50kg of charcoal was K2000.

**Interviewer**: How much is it now?

**Interviewee**: Now with the way the price of commodities have gone up it is K5000 or K6000.

**Interviewer**: Okay, you said you use the digester for a certain time, so during that time, were you still using charcoal?

**Interviewee**: Yes, I was. However, I was using less charcoal then.

**Interviewer**: Like how?

**Interviewee**: I was only using one bag of charcoal a month. Sometimes, I was using a bag for one month and some days. Therefore, it was helping especially in the morning as it was faster than charcoal.

**Interviewer**: How do you differentiate cooking on biogas and on charcoal?

**Interviewee**: The food taste is the same. It is just that it is faster than charcoal.

**Interviewer**: What was biggest difference change in your life the time you were using biogas?

**Interviewee**: Cooking with biogas was more like cooking on an electric stove because it’s clean. So, you don’t clean pots after cooking; the pot does get dirty because of soot. In addition, biogas is fast. Within an hour, you do a lot of cooking. You get fire upon ignition. You do not wait for the fire to kindle. So, it was time saving!

**Interviewer**: You said you had 10 cows, so how did you manage your feedstock or cow manure before the intervention?

**Interviewee**: People were coming to collect and use it in their farms - There was nothing else besides that.

**Interviewer**: When you say people, which people are you talking about?

**Interviewee**: The people from the surrounding community were coming to collect and use it in their farms.

**Interviewer**: Okay, I thought it was only for the stuff….

**Interviewee**: No, it was for everyone.

**Interviewer**: Did you sell your cow manure?

**Interviewee**: No

**Interviewer**: (laughs) ah, that’s not common with government workers…

**Interviewee:** (laughs) That [Mbwadzulu] area is different from other areas.

**Interviewer**: Why or how?

**Interviewee**: The people there do not consider it as a valuable thing. They do not know it’s “gold” (laughs). So, I don’t think people can buy it there!

**Interviewer**: How much feedstock did you use to start it up?

**Interviewee**: For the first digester, I don’t think I will be accurate. I think you used five buckets (20 liters) of fresh manure.

**Interviewer**: How much water?

**Interviewee**: I have forgotten the ratio. But, we were just waiting for the feedstock to get to suitable slurry. So, I think added 2 or 3 buckets of water to one bucket of cow manure.

**Interviewer**: And at the end, it did not work at all?

**Interviewee**: Yeah!

**Interviewer**: What about the second one, how much manure and water did you use to start it up?

**Interviewee**: For the second one, we used the 10 buckets of cow manure. To this, we added about 100 liters of water.

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

**Interviewee**: It took three days.

**Interviewer**: Okay, where did you get the water?

**Interviewee**: We had a borehole close to the office.

**Interviewer**: How did it work after commissioning? You mentioned that you used to cook in the morning and at lunch or in the evening…. How much cooking time did you get?

**Interviewee**: I think it was 2 hour of cooking time…. In the morning, we would cook sweet potatoes; boil water for tea – and everything else to do with breakfast. At lunch, we would cook nsima, dish side vegetables or fish. But, if you didn’t feed it, you couldn’t cook… And, this one was releasing digestate at one of the pipes especially in the afternoon. They said the digestate could be used as fertilizer for crops and vegetables. So, at the outlet we dug a hole for digestate collection. Thus, after collecting digestate from the hole we used it at the garden.... So I can say it worked okay….

**Interviewer**: Were people coming to get the digestate as well?

**Interviewee**: No, people were not coming to get the digestate.

**Interviewer**: Why do you think people were not coming to get it? Was it not enough?

**Interviewee**: It looked useless, except for people who knew it. It also looked disgusting and unhygienic to some. It also looked nasty and it gave a certain smell.

**Interviewer**: Is it wrong to say you failed the people in that regard? I mean, the digester was for educational purposes and you were purpose to teach them about the digestate.

**Interviewee**: (laughs) but I tried my best to tell them that it’s fertilizer, it’s just that they didn’t accept it.

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

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

**Interviewer**: How many were you in your family that time?

**Interviewee**: We were five.

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

**Interviewee**: For it to work, it needed to be fed every morning with fresh manure. If it was not fed, it did not work.

**Interviewer**: Only fresh manure from cattle?

**Interviewee**: During the training, they only told us about fresh cow manure.

**Interviewer**: Why was it only fresh cow manure?

**Interviewee**: (laughs) Mmh, we didn’t even ask.

**Interviewer**: So it was fresh cow manure and water, I suppose?

**Interviewee**: Yes!

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

**Interviewee**: Every morning, we used to go to the cow house to collect fresh cow manure. Then, we would you put the manure in a bucket, add water and then mix it. After mixing, we were pouring the feedstock it into the digester bag through a funnel into inlet pipe. Then, the following day we would also do the same. So with that process, we were able to cook breakfast and lunch.

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

**Interviewee**: We used to feed it with a 20 kgs of feedstock and 40 liters of water.

**Interviewer**: Was it daily or after two or three days?

**Interviewee**: It was daily!

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

**Interviewee**: The whole family was responsible for feeding it. If was not around, they fed it because without feeding it they could get gas for cooking.

**Interviewer**: Did it ever happen that you failed to get gas because you didn’t feed?

**Interviewee**: Yes, some day they felt lazy to feed it, and it did not work. This other time, I moved for two days and they did not feed it. I do not know what made them lazy not to feed it. So, the bag collapsed completely. So, it took us another 10 buckets of manure to feed it and start it up, as we did in the beginning. It took 3 days to pick up. But, yeah, the digester bag was always inflated when it was fed.

**Interviewer**: You said this other time you left, they didn’t feed it, why? Is feed it challenge?

**Interviewee**: Of course, it’s hard work. But, when you consider the benefits, it’s worth feeding. So, for someone who is lazy and not committed it’s a very tough job. It also needs someone who doesn’t get easily disgusted because it’s not a pleasant thing to handle manure…. So, in general, it’s very hard to feed it on a daily basis.

**Interviewer**: Aah, can some feel disgusted with cow manure?

**Interviewee**: Of course, yes. It’s not easy for a person who is not used to cow manure to make feedstock. Fresh cow manure is generally gross. And, it’s better to handle goat manure than cow manure. Also, when you are handling it you use hands, so it’s not pleasant.

**Interviewer**: Oh, yeah. I have heard people used bare hands.

**Interviewee**: Of course, we were using hands. We used to mix with bare hands.

**Interviewer**: Didn’t community health personnel feel that it was not health? How did you feel?

**Interviewee**: There is always conflict of messages, you know. Everyone is saying their own thing to advance their agendas. Personally, I didn’t feel gross. I was okay with that. And, I believe the people who were doing it, had no problem with it, because if they had a problem with it, they wouldn’t have been doing it altogether. Also, they could have denied the digester in the first place.

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

**Interviewee**: Maintenance in terms of?

**Interviewer**: Keeping it running, solving issues, and preventing breakages….

**Interviewee**: Ah, the main issue was feeding. Its maintenance hinged on feeding.

**Interviewer**: Didn’t you think that one day it was going to malfunction? If you did, how were you supposed to handle the issue?

**Interviewee**: I think we didn’t discuss that part. I remember, when we started using it, they came to follow up, and they stopped following up. But, we did talk on the phone once when a pipe that was carrying gas from the digester to the stove started leaking. I asked them what I was supposed to do, but they didn’t come. They just told us what to do. Then, we found a way of tightening the part, which was leaking with a flat rubber strip.

**Interviewer**: So they didn’t tell you where to get spare parts, and let alone how to solve issues?

**Interviewee**: No, they didn’t.

**Interviewer**: I mean, if it failed, what would have happened?

**Interviewee**: Like I said, after installation, I just felt like it could not develop any fault.

**Interviewer**: (laughs) how? Why do you think that?

**Interviewee**: After installation, we couldn’t think of anything else, but that it was working… I remember, when the digesters were working a Cabinet Minister came and visited the beneficiaries to appreciate the technology…. It’s just that our mind was that once you feed a digester, you don’t get any other problems.

**Interviewer**: Oh, a cabinet minister came?

**Interviewee**: Yeah, it was a big thing!

**Interviewer**: Who was the Minister that time?

**Interviewee**: I have forgotten the name. But, I remember that it was during Peter Muthalika’s era.

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

**Interviewee**: Yeah, it didn’t meet my energy needs.

**Interviewer**: What are your energy needs?

**Interviewee**: To cook in the morning, afternoon, and evening. So, with this one, I wasn’t able to cook in the evening.

**Interviewer**: And you feel like if you had a storage bag, then things could have worked out?

**Interviewee**: Yeah, that’s what I think. I mean, I could tell that the digester was losing gas by the smell that was around the bag too. And, they even told us that, if we smelled an odd smell, we should know that the bag was leaking. We checked all the pipes and connection, but they were all okay…. But, I feel like the bags was coming from somewhere around the bag.

**Interviewer**: You knew that to meet your energy you needed gas storage bag. Why didn’t you ask for a storage bag? Or why didn’t you buy one?

**Interviewee**: I learned that after it stopped working. A friend of mine came and told me that he saw a similar digester in Zambia, but it had a storage bag for storing gas. He went on to say that, people do sell the gas. And, that’s when the idea of a storage bag came. But, initially I thought that everything was “normal”.

**Interviewer**: What challenges did you encounter? You have talked about as it used to smell and you thought it was leaking gas. So what other challenges did you face?

**Interviewee**: We also had a problem with the smell of the slurry, which was coming out at the outlet. It had a bad smell. So, I think the distance between the digester bag and point of use should have been long enough. The other challenge was feeding it. It wasn’t easy to feed it with fresh cow manure. I remember my friend who went to Zambia told me that it’s possible to feed it with food waste. But, the installers didn’t tell us that. They only mentioned fresh cow manure. So, it’s was somewhat unhygienic to handle fresh cow manure.

**Interviewer**: Why was the digestate producing smell when it is not supposed to be like that?

**Interviewee**: I think that as we were feeding it some of the new feedstock was overflowing, so that’s why it was producing smell.

**Interviewer**: How long did the second digester take to stop working?

**Interviewee**: It took about 5 months.

**Interviewer**: How did it stop?

**Interviewee**: Gas production started to decrease with time. After some time, we could only prepare breakfast and side dish of vegetables. It could not produce enough gas to cook nsima. And, it was going off as we were cooking. We noticed this around the same time we found out the gas was leaking from the pipe. Then, we tighten the part that was leaking gas and it work for a short time. Then, it eventually stopped. After it is stopped working, we also stopped feeding it right away because there was no point of feeding it. Since that time, we never talked with the installers.

**Interviewer**: So after it failed in 5 months, didn’t call the installers?

**Interviewee**: It wasn’t as we were talking with them directly. The numbers we got were for the district environment officer from the district council. So, when I called him he was like people from energy affairs were going to come at some point, but they never came. So, he was simply relaying information, and he’s the one that told us that the people from energy affairs suggested that we should tie the part, which was leaking with flat rubber strip. Then, after some time we gave up and abandoned it when we

**Interviewer**: So you were communicating with the person from the district assembly, and not the installers?

**Interviewee**: Yeah, we were communicating with the person from the district council. He was like the focal person for the project.

**Interviewer**: So, he was also communicating with other people above him?

**Interviewee**: Yeah

**Interviewer**: That was a challenge too.

**Interviewee**: Yeah. I also heard that they installed one in Mangochi. I don’t know if you know if it is still working.

**Interviewer**: Yeah, we followed up on that too before coming here. It’s also not working; it failed some time back too. It’s bad! Moving on, have you seen something like this [table of intervention]?

**Interviewee**: No.

**Interviewer**: What do you think of the information and do you think it could have helped in your case?

**Interviewee**: Yes, it would have helped us a lot. The problem is that we were only relying on the information that was given to us through the training. And in all honesty and sincerity, it wasn’t enough. There was nothing we learnt regarding maintenance. But, as you can clearly see, it’s important. So, I believe this information, which is touching on maintenance, would have helped a lot. In addition, when we looked at the first digester, it was obvious that the accessories could be found in the local market. But, for the second digester from China, we had no idea where we could access the accessories. For example, the pipes, I have not seen one like that on the local market.

**Interviewer**: Why didn’t you asked them about where you could get the accessories for the second digester?

**Interviewee**: They told us not to worry because they were in the process of testing the digesters from China. So, we thought that at some point everything was going to be made clear.

**Interviewer**: I see. What’s the date today?

**Interviewee**: It is 14 August.

**Interviewer**: Okay, How can you describe the state of your digester on 14th of August 2022?

**Interviewee**: Ah, it’s dead.

**Interviewer**: Is there hope that it can be revamped?

**Interviewee**: No, it can’t be revamped. I mean after the digester failed, the rains started. As a result, soil was collapsing into the digester and the hole itself was covered in water. And, soil in Mbwadzulu is clay like, so after the place dried up, it buried the digester bag, as the hole since it was not lined. So that was the end of it. I think this couldn’t have happened if the digester was working. I mean, it wouldn’t have been possible for the bag to get buried when it was full of air. So, once it got buried that’s the end of it!

**Interviewer**: Okay, I remember the time we came to your house, we tried to locate it but could not see it.

**Interviewee**: Yeah, I hired some people to remove it. So, I used the digester bag to make a roof structure for my pigeon house. As for other accessories, I returned them to the agriculture office.

**Interviewer**: In your opinion, what caused it to fail?

**Interviewee**: It failed because there was no maintenance plan. For example, in our case when gas started leaking we could not find a lasting solution, so we stopped feeding it, and it died.

**Interviewer**: We are going towards the end of our interview. We have about five or six questions. How do you meet your energy needs now that it is not working?

**Interviewee**: Now we have reverted to charcoal.

**Interviewer**: And you are still buying from charcoal merchants?

**Interviewee**: Yeah

**Interviewer**: The government has made amendments to the forest law. Now, if you are caught in possession of charcoal, you are guilty of offence and the punishment is 10 years.

**Interviewee**: Oh yeah, I have heard that.

**Interviewer**: Then, how are you going to survive?

**Interviewee**: Yeah, I was talking with someone about that. I think that provision is a good, but I feel like the government hasn’t offered people an alternative. Also, I think LPG gas is not publicized enough. People do not know it. So, they should publicize LPG gas. Still, I don’t think it’s enough. If you look at the LPG gas, it is found at Mangochi Council. So, I don’t think it’s practical for someone from here let alone from Monkey Bay to access the gas. And, you can’t think of cooking on electric, it’s not just practical.

**Interviewer**: (laughs) why?

**Interviewee**: The power outages are just despicable; they go off for more than 8 hours every day.

**Interviewer**: Yeah, it’s too much.

**Interviewee**: So the government should have made LPG gas available before enacting that law… Also, my friend from Zambia told me that it’s possible to build a community biogas plant and sell to the community at a reasonable price. So, I think if they can do that, then they can start talking about charcoal laws. And, let me go back to sensitization, my observation is that those who use charcoal are well to do people. I’m sure if they can publicize LPG gas more people who buy charcoal can adopt it and find it cheaper too.

**Interviewer**: That’s true. How do you manage your feed store now that it is not working?

**Interviewee**: We just get cow manure out of the cow house, and then gather it on one place. Then after sometime, we use it as fertilizer in our farms.

**Interviewer**: Do people still come to get manure from your cow house for agriculture purposes?

**Interviewee**: Yes, they still do. And we are expecting the demand to rise, as people will find it tough to get fertilizer because number of beneficiaries for the AIP [Agriculture Input Program/Subsidy Program] program has drastically reduced.

**Interviewer**: Yeah, it is going to be hard. How much did the reactor cost?

**Interviewee**: They did not tell us.

**Interviewer**: So you don't know?

**Interviewee**: Yeah, I don’t know.

**Interviewer**: Do you know who funded the project? Is it UNDP?

**Interviewee**: I think the project was funded by UNDP. But, initially the project was for Ministry of Energy. Then, later UNDP had a project on climate proofing and took over the project from Ministry of Energy.

**Interviewer**: So the first digester was not UNDP`s?

**Interviewee**: They didn’t mention UNDP. So, I don’t know if they were involved or not.

**Interviewer**: Did you or your organization contribute anything in kind?

**Interviewee**: I can only think of labor for digging as well as cow dung and water.

**Interviewer**: How much labor was involved?

**Interviewee**: I hired three people to dig the hole for the digester.

**Interviewer**: How much did you pay?

**Interviewee**: I paid them K5000.

**Interviewer**: K5000 for all?

**Interviewee**: Yeah

**Interviewer**: Who dug the hole for the first digester?

**Interviewee**: It was ground laborers from the office, who are responsible for feeding the cattle.

**Interviewer**: Oh, you have special people who feed the cows?

**Interviewee**: Yeah, we do.

**Interviewer**: We have 4 or 5 questions to finish. You said you digester wasn’t lined. Was there any masonry work involved?

**Interviewee**: Yeah

**Interviewer**: I have talked to some people and have told me they lined their digesters. Some have told me they told them that they would line the hole with plaster but on the day of installation, the installers did not bring cement and all… What happened?

**Interviewee**: There was no provision like that. They didn’t tell me that. They just said it was better to line it the hole with plaster or a brick wall, and those who had the capacity should do so. But, they said that we shouldn’t worry much about lining it because once the digester bag get full of air it’s hard for water or soil to collapse into the hole and cover it like I said.

**Interviewer**: Who built it? I mean, how many people from installation organization came?

**Interviewee**: It this it was 2 people.

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

**Interviewee**: When you saw the first digester, you knew they got the bag from PolyPack [a plastic manufacture in Malawi]. But, the second one didn’t look Malawi-like. Also, it didn’t look like they got the accessories from different vendors like the first. It was a set of accessories from one vendor. And, it was even written on the bag that it was from China.

**Interviewer**: Can you say the digester saved you money the time it worked?

**Interviewee**: Yes, it did. But, it could have saved as more money if it worked all day because I would have cut all the spending on charcoal.

**Interviewer**: Can you go to a shop and buy a digester now, and move away from using charcoal?

**Interviewee**: I don’t know where it is sold. Also, I feel like I didn’t really see its benefit. I think I still need to be convinced. Also after acquiring one, I would need additional knowledge and skills on its operation and management. On top of that, I would need the digester bag to be placed farther away from my house because its digestate produces odor, which I found a nuisance. But, I think this may require the pipes to be very long, so it’s better to have storage bags for harvesting gas to be used at the stove. So, for me to buy a digester, all the things I have outlined need to be addressed. I also had a debate about the length of the gas pipe. If I’m not mistaken, the installers mentioned that the pipes shouldn’t be longer than 10 meters. This was a limitation on my part because I felt like the digester bag needed to be at least 20 meters away. I also feel I was lucky because cow manure wasn’t a problem for me. I was having surplus manure. But, without cow manure nearby, then it`s a problem.

**Interviewer**: Okay. Okay, what is your opinion of biogas?

**Interviewee**: As a former user, I would say biogas is good. It’s clean and I can’t say it has any safety concerns. But, I think it needs improvements. Most of which I have mentioned, for example, the burners need to use gas from the storage bags and not direct from the reactor. This is very important because the slurry that comes out of the reactor is a nuisance.

**Interviewer**: You have said it’s safe. Can you elaborate on that please?

**Interviewee**: If you look at charcoal, it’s easy to get burn after stepping or being exposed to hot coal. That can’t happen with a biogas stove because its stove is smart. The gas itself is not volatile, so it’s user friendly.

**Interviewer**: What is the future of biogas in Malawi?

**Interviewee**: I think there is a lot to be done especially on sensitization. Also, I feel like no improvements are being made on biogas digester. If you look at our digesters, they came with a first and second one, but both failed. And when you carefully analyze the digesters, you will see that they had many areas of improvements that needed to be looked at. So, I think a third digester should have come and take into account all the failures of the first and second, and see where we can get. In short, biogas is good but many people don’t know it. I feel like we need to keep on improving the technology, because now we are not there.

**Interviewer**: How can we sensitize people on biogas?

**Interviewee**: First, we need to build reliable digesters then distribute them in school, hospital, so that people should see then. And people have to be told how much money they are saving by using digesters… But now, many people are not using it, because it has lots of issues.

**Interviewer**: What improvements would you want to see?

**Interviewee**: It has to work at least 4 hours so that we can use it in the morning, afternoon and evening. I think this could be done with storage bags. It has to be durable – it shouldn’t last only five months. Lastly, they have to make it in a way we can feed it once a week. The other thing is that the digester bag has to stay at least 20 meters away from the house.

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

**Interviewee**: In regards to energy intervention, I would choose an intervention that would not need money to use, just like biogas. With biogas you only use waste, so it`s very good in that regard because it saves money.

**Interviewer**: So, you need something like biogas.

**Interviewee**: Yeah, something like biogas. Or, even solar technology that can be used for cooking. But, I’m not sure about solar panels that can be used for cooking, because they can cost a lot of money and cannot be attainable.

**Interviewer**: Any last word in regards biogas?

**Interviewee**: Biogas is good. I thank this project because without this project, I would not have known it. But, now that I have used it, I would like to see more LPG gas spots available. I would like LPG gas to be accessible, so that many people can cook without cutting trees.

**Interviewer**: Thanks, for the interview

**Interviewee**: I should be there one thanking you, we have had a good chat.

**Interviewer**: I have to say the same too. Thanks.