**BIOGAS ASSESSMENT PROJECT**

**Site ID: 18**

**Date: July 25, 2022**

**Interviewer**: First question, where did this digest originate from?

**Interviewee**: Oh, I’m failing to answer.

**Interviewer**: Don’t worry there is no wrong answer. I am simply asking and you are telling me what you know or what you think. So, there no problem saying you don’t know.

**Interviewee**: I don’t have knowledge regarding where it originated from. I’m not aware because the installers came through Machinga District Council. So, I just saw them coming with people from the District Council saying that they wanted to install a biogas digester here. Thus, I can’t say with certainty where the installers came from and where this thing came from. It’s only now that I heard the boss that it came from Egypt, I don’t know.

**Interviewer**: But, when they were installing the digester, you were working here?

**Interviewee**: We just saw them coming – and on the first day, they introduced us to them. Then, they explained how digesters work. But, they did not go into detail. It was just informal, and even the person who is in charge of maintenance of equipment here was not aware of their presence – So, we just saw them coming, and we never really interacted with them.

**Interviewer**: Um-hmm

**Interviewee**: And even when they finished we did not sit down and talk – and that’s why the digester is not functioning now. There was no problem handover. They just built it and left. So it wasn’t a complete process, and with no proper handover. As a result, we just used it for a month - and we had no idea how to maintain it when it malfunctioned. The other problem was that there was no operator responsible for its operation; here at Machinga hospital we have a shortage of cooks. – And since we were using waste matters, food leftovers and manure, we thought it was not healthy to have a person handling the waste and at the same time cooking food. But, if there was a proper hand over with the administration, I think we could have hired a casual to laborer to look after the digester.

**Interviewer**: By any chance, do you know funded it?

**Interviewee**: I don’t know. But people from the District Council are in a better position to answer this question.

**Interviewer**: When was this built?

**Interviewee**: It was in 2021.

**Interviewer**: 2021?

**Interviewee**: Yeah, early 2021

**Interviewer**: How long did it take to build?

**Interviewee**: I think 8 months

**Interviewer**: You mean to put everything in place; the drums, the reactors and the equipment took 8 months?

**Interviewee**: Yeah, it did not take long.

**Interviewer**: Uh-hmm

**Interviewee**: But, it took longer than expected because they wanted to put an extension that could use human manure or any other manure. But, they decided that it was not health and unsuitable for a hospital context in terms of infection prevention. And, that is the reason we only used gas from the reactor that was on this, and not from the other side.

**Interviewer**: So, You mean you only use reactors that use food waste and not human waste?

**Interviewee**: Yeah, yeah.

**Interviewer**: What was your role as Machinga hospital?

**Interviewee**: Our obligation was to be the sole users of the digester, and I don’t know if the administration played any part in regards to money contributions and all that. But, you can get that information from the council.

**Interviewer:** Do you know how you were selected as beneficiary? I mean, we have many district hospitals; we have Mangochi, Zomba etc. How did they choose this hospital?

**Interviewee:** As I said, we were only recipients. The council handled all the necessary things. So, I think the council has information regarding this matter.

**Interviewer:** Before we digester, did know anything about biogas?

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

**Interviewer:** So, it was a new and odd thing for you? I mean, you were like what is this thing….

**Interviewee:** Yeah, and we were very excited because it’s easy to cook on than firewood. With firewood, you need to go to the woods and cut down trees and at the end of the day cause deforestation. Also, you need quite a lot of energy and effort to cook with firewood; you think of the work involved in cutting of wood, moving and igniting fire. While with biogas, once you switch it on you cook without issues. So, biogas is very good

**Interviewer:** Uumh, so what were your expectations?

**Interviewee:** We expected our work to be simple and light. Because, we hoped to stop searching for wood in order to cook– and with the prevailing blackouts, we expected to be taken out of that burden.

**Interviewer:** Why did the installers tell you to expect?

**Interviewee:** Like I said earlier on, there was no handover. If there was a proper handover, as it was supposed to be, I think we would have been clear on what is it all about. Even now, if you can go to the administrator, I'm sure he can’t tell you anything regarding this digester; He doesn’t know anything about this as well. The installers were simply coming and going. And I don’t know if the person from the council who was usually coming with them is still at the council. I don’t see him around.

**Interviewer:** How many people were coming to build this?

**Interviewee:** I cannot recall the exact number.

**Interviewer:** Just an estimation…

**Interviewee:** It’s hard because I wasn’t involved in the building process. I was only seeing them coming and working on it. But, I think I was seeing six or seven faces.

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

**Interviewee:** It was one day training, but I can’t really say it was one-day training; the session was only for hours. I think the training was for 2 or 3 hours, and it only focused on operation issues.

**Interviewer:** OK, what was the training like? What did they say about its operation?

**Interviewee:** As I said, we used food leftovers as feedstock. So, we take leftovers to the sorting area to sort and remove unnecessary waste. Then, we were advised to switch the machine to break down waste. From there, we were getting the crashed material, and then placed it in the inlet.

**Interviewer:** Okay, so the training was only for a day and was on the operation. Did they touch on maintenance?

**Interviewee:** During the in-service training, there was a certain person who was so much interested in the digester. He asked about feedstock preparation, I think they told him about feedstock preparation.

**Interviewer:** (Laughs) you were not interested?

**Interviewee:** (laughs) everyone was. But, he was just on another level.

**Interviewer:** Is he around?

**Interviewee:** Yes, he is. But, I doubt if he is on duty today.

**Interviewer:** How many people attended the 3-hour training?

**Interviewee**: It did not last for three hours. We were about eight people

**Interviewer:** So the training was about feedstock preparation, sorting, and how to switch it on and off?

**Interviewee:** Definitely.

**Interviewer:** How prepared to run or operate the reactor did you feel were? Did you feel that you could operate it?

**Interviewee:** Mmh**,** no, and we thought that we were going to have a proper training afterwards. We expected people from our maintenance department to go for training at least.

**Interviewer:** Did it meet your needs?

**Interviewee:** The time it worked, we had no problems with it. And, if we can compare that to firewood, I would say biogas is much faster.

**Interviewer:** So, instead of cooking beans for two or three hours you were taking an hour or so…

**Interviewee:**  Yeah, let me show you the pots [goes to the kitchen]. These are the pot. That pot was for cooking nsima and that one was for side dishes.

**Interviewer:** How long did it take to cook in nsima on this spot?

**Interviewee:** We never cooked nsima on the pot because the stove was not big enough; to cook nsima on the pot, it would have been taking as at least two rounds. But, as for beans, it was only taking us an hour.

**Interviewer:** That is so quick – impressive. Before the digester, what were you using for energy i.e. for cooking?

**Interviewee:** We were using electric cookers, and firewood in case of black out.

**Interviewer:** Electricity from Escom?

**Interviewee:** Yeah

**Interviewer:** Where were you getting firewood?

**Interviewee:** We used to get wood from a place along the main road to Zomba. There is a certain place where people sell firewood along the road. Sometimes, we were buying wood from the woods; sometimes, we used to go into the villages and peoples fields to search for wood.

**Interviewer:** How much wood were you using per month?

**Interviewee:** A truck of wood was costing us around K 150000.

**Interviewer:** Transport inclusive?

**Interviewee:** No, there was a separate cost for fuel and car hire. I don’t know how much it was, but it was a lot – and wood itself is expensive. I mean, one log was costing us K10000.

**Interviewer:** How far is the place where you were getting wood from?

**Interviewee:** It’s far - Dziwe is far distant from here…. The name of the place where people sell wood is Dziwe.

**Interviewer:** Maybe 20 to 50 km from here?

**Interviewee:** I think it is around 20 km

**Interviewer:** I can imagine it was involving. How did you manage your feedstock before the digester?

**Interviewee:** We were just throwing the waste away, just like now; we were simply collecting waste into waste bins, and after some time people were transferring the waste into big rubbish bins.

**Interviewer:** After installation how did the digester work? But before that, how did it take to start after the initial feedstock?

**Interviewee:** The digester worked on the same day. And after it started, the installer told us to feed it regularly.

**Interviewer:** What did you use to start it up, and what was quantity?

**Interviewee:** Mmh, I don’t know.

**Interviewer:** What were you feeding it? I don’t know if I heard you correctly outside, you said you were feeding it with 20 kg of food waste and 20 liters of water per day?

**Interviewee:** Yeah, But it wasn’t per day; that was simply the ratio of feedstock to water. We were feeding it with four buckets of food waste from time to time.

**Interviewer:** So, you were feeding it four buckets of feedstock and 80 liters of water a day?

**Interviewee:** Yeah, but that was at first. After it stabilized, we started feeding it with two buckets and it was working quite well.

**Interviewer:** Why did you change? Why didn't you maintain feeding it with 4 buckets of water? I’m mean, did you start feeling lazy?

**Interviewee:** As we continued feeding it, some of the feedstock remained intact or unused. So, we were only toping up with only two buckets.

**Interviewer:** So, the digester filled up to the required point… How did you know that it was full? I mean, how did you know that you only needed two buckets?

**Interviewee:** We were peeping through feeding chamber and we could see the feedstock. Also, we used to look at the outlet and we could see the waste was flashed out.

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

**Interviewee:** Only for cooking

**Interviewer:** How much gas was produced? I mean, how much cooking time did you get? Were you able to cook breakfast, lunch and supper?

**Interviewee:** We only cook porridge, side dishes and nsima at this place. Thus, on a good day, we used to cook porridge and side dishes. As for nsima, we used to cook it on electric cooker, or on firewood.

**Interviewer:** How much cooking time were you getting?

**Interviewee:** Beans were taking about 2 ½ hours. If the digester was not properly feed, beans would take up to three hours to be cooked. But, for other side dishes, I’d say it was taking us about 2 hours.

**Interviewer:** How and why could you not feed appropriately? What times? What was the problem?

**Interviewee:** We started using it in December or January, and mostly around that time, there is shortage of food. Thus, when we go into the wards around that time, we usually find little food or food leftovers. As a result, during that time, we had little food leftovers and could not feed it appropriate.

**Interviewer:** Um-hmm. So you always have a shortage of food in December and January… But, how is that even possible? I mean, this is a government hospital…

**Interviewee:** Even so, this hospital does not receive many patients and guardians bring their food too. But, most of all, December and January is a food crisis in Malawi – food supply is scarce. So, majority of guardians who come around in December - March depend on food for the patients provided by the hospital. As a result, they do not waste or throw away food anyhow. For example, if we can go into the wards now, we will find a lot of our nsima leftovers. The patients and guardians prefer to eat food from their homes, and our food is supplementary now. Thus, around this time patients and guardians eat their own food together and a little of our food. But in January and December, you can’t find food just waiting around in the wards.

**Interviewer: (**Laughs) Malawi is rough; life is tough

**Interviewee:** (Laugh heavily) it is.

**Interviewer:** How many patients do you serve?

**Interviewee:** This is a 300-bed facility.

**Interviewer:** You told me there was person specifically assigned to operating it. So, who was responsible for feeding it?

**Interviewee:** At that particular time, we improvised. We have ground laborers, who work at the incinerator. They burn waste two times a day, in the morning and in the evening, so they are usually unoccupied with work. So, within their free time we told them to feed the digester. Then, we tried to liaise with administration to hire a special person to operating it. But, they told us that they had challenges with the budget as there were no funds available. Then, we tried to pick one cook from the kitchen department, but it did happen as we had and still have a deficit of staff in this department. So, this was also a major hurdle in the functionality of the biogas.

**Interviewer:** Did this labourer attend the training?

**Interviewee:** Yes, he did attend the training, I think.

**Interviewer:** How did you perform? Did he complain about feeding with the digester?

**Interviewee:** That is why he withdrew from feeding it because it was a lot of work for him to work at the incinerator, and then come here to feed it.

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

**Interviewee:** We have our own maintenance personnel [name redacted]. But, as I said, everything was done through the council, so our maintenance personnel were not incorporated in this - he did not attend the training or an workshop, I don’t know what to call it. So, if our maintenance supervisor was not involved, it was hard for us to repair it in case of a malfunction.

**Interviewer:** How long did this thing work?

**Interviewee:** We used it for a month. I think 2 months. And, we did not use it daily. We only used it in case of power cut.

**Interviewer:** Why were you not using it full time?

**Interviewee:** We are used to electricity, plus we did not like the idea of cooking side dish only. Like I said, the pots that were meant for the digester stove were not big enough to cook nsima on at once – The pots were small and that is why we were using it for cooking side dishes; our big pots we use to cook nsima couldn’t fit on it.

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

**Interviewee:** We had a problem with an operator. Also, the machine stopped once when a cloth blocked the machine as feedstock mixed the cloth in the sorting or crashing parts; but we remove it.

**Interviewer:** Who removed it?

**Interviewee:** One cook removed it. We have a cook who is skilled in fixing electrical gadgets. So, he simply switched off, and removed the cloth.

**Interviewer:** And, it worked after?

**Interviewee:** Yeah.

**Interviewer:** Okay, how did it stop? Did it stop at once or gradually?

**Interviewee:** No, we just abandoned it. Like I said there was no person specifically assigned to this. As a result, there was no one to manage it; this happened because there was no handover. If there was a proper handover, the administration would have sourced a biogas operator. The person who we improvised was coming to me complaining about working on two jobs. Then, I would go and report the issue to the administration, but they ignored my calls because they didn’t understand its dynamics, its origin as well as its outcomes – its importance.

**Interviewer:** Why do you think there was no proper handover?

**Interviewee:** (Laughs) Eeeh, that’s a big thing. The bosses know!

**Interviewer:** (Laughs) okay - okay**.** So you said you only used it for a month and stopped because there was no operator to manage it. Do you think if there can find an operator and start feeding it, do you think it can work?

**Interviewee:** If the installers can come and assess it, and feed it after, I think it can work. But, I'm very sure before we abandoned it, it was working.

**Interviewer:** Did you communicate with the council about this?

**Interviewee:** The people from the council are aware of this.

**Interviewer:** How did they know?

**Interviewee:** I don’t know how, but I’m hundred percent certain that they know that it’s not working.

**Interviewer:** Why do you think they didn’t intervene?

**Interviewee:** In a true sense we did not work with them, so they can't come or follow up on us like we worked together. And like I said, there was no proper handover.

**Interviewer:** Have you seen this, and what do you think of this information? Do you think it would have helped you?

**Interviewee:** The information is crucial because it can give clues to its operation and maintenance – it can help people know what to do in case of a malfunction.

**Interviewer:** Okay, how would you describe the current state of this digester?

**Interviewee:** It's 50-50.

**Interviewer:** What do you mean, it’s 50 - 50?

**Interviewee:** I mean, if the installers can come and start it again, I think it can work. I’m saying this because the digester never got broke. But I’m not sure, if it can stay for a long time unused and then work again. I’m sure the installers can know this. It’s like a car – when a car stays idle for months or years you cannot just start it. It needs a mechanic to make an assessment, apply oil in some parts and do other things are like that. Even after that you can’t just get the car on the road; you sit and wait for the sound of the engine; and that’s when a decision to move. So it’s like that, we need someone knowledgeable to come to assess and revamp it before using it.

**Interviewer:** Clear, how did it reach this state? What caused it? Is it solely because there is no operator?

**Interviewee:** It’s only that! It’s as it is right now because there always no operator. I also think it’s in this state because there was a shortage of food and feedstock.

**Interviewer:** So you can’t solely blame the handover?

**Interviewee:** Handover is important. Handover is really important.

**Interviewer:** How important is it to the functionality of it?

**Interviewee:** I’ll give you an example, I’m in this office as a kitchen head, imagine if they can just bring someone from school or some office to work as a kitchen supervisor here. Where will that person start from?

**Interviewer: (**Laughs) I get you. What are you using now for cooking?

**Interviewee:** We are back to firewood and electricity.

**Interviewer:** What do you do with the feedstock now the digester is not working?

**Interviewee:** We simply dispose of waste in the waste bins. But, we don’t handle and dispose of waste; we have ward attendants that do handle and manage waste. Our job is to cook and serve food.

**Interviewer:** We are going to watch the end of the interview. We are remaining with five questions. Do you know how much it cost?

**Interviewee:** No, I don’t know.

**Interviewer:** Do you think the hospital contributed anything in kind?

**Interviewee:** Maybe - but the administrator can give a precise answer to that.

**Interviewer:** How many people were involved? You said you saw about six to seven people?

**Interviewee:** Yeah

**Interviewer:** What special items had to be imported from another country? I mean, do you think it’s from Malawi? When you look at it what do you think?

**Interviewee:** No, the whole thing is not from Malawi.

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

**Interviewee:** Weimport everything. Do you think we have companies that can make metal fabrications like that? I don’t think so. I don’t think we can make the reactors in Malawi. We don’t have that capacity.

**Interviewer:** Did it help you to save money the time it worked?

**Interviewee:** It saved us money. We spend around K150000 on firewood, but around that time we did not by any firewood. We were saving, and we can save more that K150000 now since the price of everything has skyrocketed, and more so wood is expensive now because it is scarce. But, I can’t say the exact amount because there was no handover. I’m saying this because the digester had a flow meter. With that, we could have managed to gauge how many kilowatts we were using a day, and correlated that to electricity charge to know the exact amount of money we were spending. It could have been important to us to know, and it could have motivated us and even the administration because we could have had a clear picture of how much firewood or electricity money we were saving.

**Interviewer:** Yeah, that’s very important. What was your biggest change you notice the in your life or work the time it worked?

**Interviewee:** It is substantially reduced the workload on our cooks. Secondly, it helped us to save money – wood is expensive. Also, it was fast to cook on.

**Interviewer:** Who is responsible for sourcing wood?

**Interviewee:** It is the cooks. The administration just hires the truck. So, usually, it two cooks who go and search firewood with the truck owners.

**Interviewer:** Itsounds like a lot of money and a lot of time. Don’t you think it could have been better to use the money to hire an operator?

**Interviewee:** Yeah, and that was not the only problem. In the past, we used to give out tender firewood suppliers, but we had many issues with them. They were complaining sometimes that they were going the whole year without supplying us with wood. Then, we decided to take out the tendering thing. Also, we are a government institution and it doesn't look good for us to do things that the government is speaking against. We cannot be doing illegal things officially. So we decided to stop making contracts and supporting individuals who cut trees carelessly. But, we still buy and use firewood when there is no electricity. And, we do have struggles with the forest department when catch our trucks full of firewood. They do seize or hold the trucks thereby leaving patients suffering. Some forest officers just let us go out of pity. But, it’s always a tussle with the forest department.

**Interviewer:** Do you pay fine?

**Interviewee:** No way. We are just one big family.

**Interviewer:** So, you always pass!

**Interviewee: (**Laughs) But with struggles. We also struggled to transport firewood during the rainy season; the truck used to skid on wet dusty roads, so it took more time. An hour journey takes 3 or 4 hours.

**Interviewer:** (Laughs) Tough! What is your opinion of biogas?

**Interviewee:** Biogas is good, like I have said. The time we used it, we saved a lot of money. I would like to urge my bosses to find an operator and revamp the biogas. But before that, there must be a proper handover with the installers. I’m sure with that it can work – This thing failed because there was no proper handover, and also because they didn’t an operator.

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

**Interviewee:** We have used all over interventions and that is why we are using electricity. There are three cooking ways we can use, and that is; firewood, electricity and biogas; It is only sad that biogas didn’t work, and that’s why we are using firewood and electricity.

**Interviewer:** Thanks, any last words.

**Interviewee:** There is nothing else. Just thanks for coming.

**Interviewer:** Oh great. Thanks for your time.

**Interviewee:** Thank for coming too.