**BIOGAS ASSESSMENT PROJECT**

**Site ID: 15**

**Date: July 21, 2022**

**Interviewer**: First question, where did this digester come from?

**Interviewee**: We got this from a company called Ecogen. They initially distributed flyers of their products and then they came to market their products here. Therefore, after they marketed their product we were interested and thought about trying a digester…. So, yeah, we got it from Ecogen.

**Interviewer**: So, they marketed it and that is when you got interested?

**Interviewee**: Right!

**Interviewer**: How did they market the digesters? Was it in the newspaper or something?

**Interviewee**: No, it was not in the newspaper. They came at our cow owners group, and discussed about biogas. They mentioned that it is a technology that produces gas for cooking as well as fertilizer, and that’s the reason that got us interested [visitor interrupts]

**Interviewer**: You can go attend to the visitor… So, it came from Ecogen. Do you know who designed it?

**Interviewee**: It is Ecogen. They brought everything. They only asked to choose the size of the digester that we wanted… They have all sorts of sizes – and that time they had digesters smaller than this one. So, after we chose the digester they advised us to dig two holes, and then they promised us to come later to install it.

**Interviewer**: How many people were involved in digging? And, how long did it take?

**Interviewee**: It took a considerable amount of time to dig the holes because it was summer and the ground was dry that time. Four people dug the holes and it took them about one week, because as I said the ground was dry and rocky too. In addition, the installer came with people, who helped us to dig the holes; and that is the reason we finished the work faster than expected.

**Interviewer**: How many people from the installation came?

**Interviewee**: They came four people, but only three people were involved in the work: two boys and one girl.

**Interviewer**: You are saying the installers had different sizes of digesters; and they even had smaller ones, so why did you choose this size?

**Interviewee**: We considered the quantity of cow manure we generate, because owning a digester depends on how much cow manure you can generate, so since we have a lot of cows we settled for a bigger digester. Moreover, we wanted to get more fertilizer and gas without wasting any cow manure, so we settled for a bigger digester.

**Interviewer**: How many cows do you have?

**Interviewee**: We have six cows.

**Interviewer**: I understand you learn a lot about biogas when Ecogen came to your milk group…

**Interviewee**: Yeah, SHMPA [Shire Highlands Milk Producers Association]

**Interviewer**: Before that, did you know anything about biogas?

**Interviewee**: I was only hearing about biogas on radio, and I saw it on their [Ecogen] flyer. But, then we were not paying much attention to all that. We became interested and attentive to the radio messages after Ecogen came. So, we learned that manure could produce gas for cooking and fertilizer from Ecogen at SHMPA.

**Interviewer**: So, how many people were you there?

**Interviewee**: There were many women, I understand. Maybe, 500 people in total, but I was not there.

**Interviewer**: How many people got the digesters out of the 500 people?

**Interviewee**: I only know, four people, if not three, from this side [Mpemba]. And, it is not as if the others did not like biogas, no. But, there were three or four reasons that made them not to buy the digesters. First, some people did not believe that cow dung could produce gas and fertilizer via the digester. Therefore, they were skeptical as such, they preferred to observe and learn from their colleagues. Also, when Ecogen mentioned the price of the digesters people found them expensive, and people even thought they could not afford the cheaper small bag digesters. But, I believe the people found the price high because they did not consider their monthly expenditure on cooking – they could not see that – they only saw the figure of K600000, and thought it was high. So, the fact that people were not sure about the gas and fertilizer and its price that is why most people did not buy the digesters. But, now many people want this thing in their homes, because they have seen how useful this thing is. And, many people we have seen and heard, that would like to own biogas ask us if it’s possible to pay in installments–so that’s the number one questionwe receive from people who come from various place to appreciate it. People who come here to appreciate it even think that with the amount of cow manure they generate, they could be making a lot of money from the digester by selling the manure.

**Interviewer**: Okay, what were your expectations?

**Interviewee**: Our expectation was that our lives would change. I mean, we anticipated that we would stop spending money on some of the things which were buying, for example, firewood and charcoal, and that is K30000 per month. For instance, we use at least three bags of charcoal a month, so you can see that is a lot of money. We expected to save the money, which were spending on fertilizer, and when we considered how high the price of fertilizer has escalated, we thought that we would be saving a lot of money. Also, we expected to stop using pesticides by using the effluent. Again, we expected it to improve milk production – for example, if we were producing 4 liters of milk we expected to produce 8 or 10 liters. Thus, we expected to attain this by mixing effluent with cow feedstock e.g. maize bran or grass and then feed it to the cows, as this greatly improves milk quality and quantity… In regards to using is it as a pesticide, we dilute the effluent with water, and then we apply the diluted effluent on maize to get rid of weevils and other pests.

**Interviewer**: How do you apply it?

**Interviewee**: We normally take effluent and dilute it with water in a bottle or bucket. Then, we drop the liquid at the top of the maze crop, and all the pest goes away. Therefore, effluent is a pesticide as well as an additive for cow feed.

**Interviewer**: How do you make the pesticide?

**Interviewee**: We dilute the effluent every time we want to use it, because it is very strong when undiluted. Therefore, we dilute the effluent in a ratio of 1:2. Thus, if we have 20 liters of effluent we dilute it with 40 liters of water.

**Interviewer**: What do you feed your cow?

**Interviewee**: We feed it with maize bran and grass.

**Interviewer**: How do you specifically make the feed with effluent to improve milk quality and quantity?

**Interviewee**: We add the effluent to the feed. We do not soak or immerse the feed in the effluent. We simply splash or spray the effluent on the feed, so that it does not get watery. We simply splash and the mix feed, and feed it to the cows.

**Interviewer**: I talked to someone who is using effluent as a bio-pesticide. He told me that he adds ginger and paper to make a strong pesticide. Do you do that?

**Interviewee**: No.

**Interviewer**: Okay! Why not? Have you not heard about it?

**Interviewee**: About putting ginger into the effluent?

**Interviewer**: Yeah, about diluting the effluent with water in a ratio of 1:2 as you mentioned, then add ginger or pepper, and then putit in a sprayer, andafterwards sprayit on the maize, vegetables, whatever.

**Interviewee**: No, we have never done that. But, when we dilute the effluent with water, and then apply it as a pesticide it works perfectly – and it is a strong pesticide.

**Interviewer**: Okay, what kind of training did you receive from the installers?

**Interviewee**: When they came to install it, they trained us. On that day, they showed us how to make feedstock and make the feedstock ourselves. It was basic; they simply asked us to put manure in a bucket, and then add water according to a certain ratio. Afterwards, they told us to wait for five days to allow the feedstock to decompose and produce gas. And, on the fifth day, they came and found the bag full. They told us how to start the fire and how to regulate it. Then, they told us to do this and that when it stops to fix it and that whenever there is a big problem we should be calling them.

**Interviewer**: Which issues were you taught how to fix?

**Interviewee**: There are certain times when the digester stays long unused. Since the production of gas continues, it accumulates in the system, and then it turns to water. So, when one wants to use it again, the gas does not come at all or it comes in small quantity, because water blocks the flow of gas. Therefore, they told us that if this happens we should be opening a certain place to remove water in the system. Also, they told us that when it is blocked, water in the cylinder or tube rises up to full, so when we see that, we should know it is blocked. They also told us to unblock it we only need to lift the pipe to make water to flow back into reactor – and, when we do that, it comes back to life again. On top of this, they informed us that this same thing happens at or close to the stove. They said when we see water or moist at the banner, we should take it out, throw the water away, and then replace the burner on the stove. Lastly, they said in the pipes there is something like a cleaning mesh wire pot scourer [filter] which helps to contain foul smell like that of rotten eggs. So, they advised us that when we smell odor like rotten egg odor at the stove, we should know that the filter is broken, and we should quickly replace it.

**Interviewer**: Where did they tell you to get this wire?

**Interviewee**: They said we could buy it on our own.

**Interviewer**: Is it readily available?

**Interviewee**: Yeah - in the markets.

**Interviewee**: If you go to a market, what would you say you want to buy?

**Interviewee**: I will say I want a mesh wire scourer [used for cleaning pots].

**Interviewer**: Oh, so the filter is pretty much a cleaning mesh wire scourer.

**Interviewee**. Yeah, it is similar. It is basically the same.

**Interviewer**: What else were you trained? How was the training? Was it just theory or practical?

**Interviewee**: It was not as if they were fixing it, and they have never come to fix it. They were just explaining like this is what happens, and this is what you do. So, they shared this information during the 5 days when we were waiting for it to start, because they were coming often around that period.

**Interviewee**: How did you feel about the training?

**Interviewee**: We were satisfied with the training, and we felt that we could run the digester.

**Interviewer**: You did not feel that you would have issues operating it?

**Interviewee**: Yeah and when you look at the equipment you just have to be convinced; if you take a look the plastic basin at the outlet, you will be convinced - it’s not like the plastic basins you know, this on is of high quality. You cannot just find it in in any shop. Even when you look at the digester bag, it is not like any other plastic bag, it is a durable plastic bag. Also, they assured us that if any problem arises, we should call them; so we were very confident to run or operate it… And even the pipes, they are not like the pipes you know, and that you cannot buy in Ndirande [in local market]

**Interviewer**: What reasons made you buy the digester?

**Interviewee**: We chose to buy a digester because we wanted to save money as much as possible. As you know Malawi is in a financial crisis, and it is very hard to make ends meet. So, at that time, when we thought about the price of fertilizer that was at K35000 to K40000, we saw that we could not manage. We did not only focus on fertilizer, we also looked at everything, for example, food prices, firewood. Then, we thought we could not manage without the digester; we even thought we could not afford to buy fertilizer for our tomato and vegetable garden. Also, when we thought of maize, it was clear that we could not afford fertilizer and pesticides. For example, last year we had many pests, which caused serious damage, but we failed to buy pesticide. So, that is when we thought of Ecogen and of buying a digester.

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

**Interviewee**: We used firewood and charcoal.

**Interviewer**: Which was your main source of energy between the two?

**Interviewee**: Charcoal.

**Interviewer**: Do you buy?

**Interviewee**: We buy firewood and charcoal.

**Interviewer**: How much were you spending on energy before the digester?

**Interviewee**: K40000 – and that money was enough to use for cooking food and boiling water for bathing.

**Interviewer**: How much are you spending on charcoal and firewood now?

**Interviewee**: Now, we do not keep records of how much we are spending on cooking.

**Interviewer**: Why?

**Interviewee**: We are not spending a lot… Maybe, we are spending K12000 on a bag of charcoal.

**Interviewer**: Before the digester, what were you using as pesticide?

**Interviewee**: At first, when pest manifested our coups, we bought detergent soap, then soak it in water, and then apply it on our crops. Some other time we were buying small fishing, boil it, and then use the soup as a pesticide. So, instead of the pests eating the crop they were consuming the soup. So we were doing that - and even then, it was not effective, as we could not save all the crops; I can say we were only able to save a quarter of the produce.

**Interviewer**: How did you learn those methods?

**Interviewee**: It is what people say and do if they do not use inorganic compounds as pesticides.

**Interviewer**: How did you manage your feedstock before the intervention?

**Interviewee**: At first, we were gathering the manure to use later as fertilizer. Sometimes, farmers were coming to ask for the manure, and sometimes we could just leave it anyhow.

**Interviewer**: In regards to fertilizer, how were you doing it?

**Interviewee**: We were buying expensive organic fertilizer sometimes; in a growing season, we were buying five, six or seven bags of in organic fertilizer, and even then, we couldn’t manage to apply fertilizer to all our crops. So, to cope we were applying inorganic fertilizer added with manure on maize, and on the other side we used to grow crops that do not need fertilizer, for example, bean and soya beans.

**Interviewer**: How big is your field?

**Interviewee**: It is very big, close to one `hectare` [a very big land].

**Interviewer**: Were you selling the manure to the people who used to ask for it?

**Interviewee**: No, we were not, even if we wanted to, no one would buy a bag of 50 kg of cow manure at K1000. People would ask you for K200 a bag and that is nothing if you consider the effort of finding grass and it is not worth selling. So, cow manure before the digester was useless.

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

**Interviewee**: It worked perfectly. And, I can say now its performance is better than it was installed; now, it is better because of the sun, and because we feed it daily – so it is good.

**Interviewer**: How much cooking time did you get after commissioning? Were you able to cook breakfast, lunch and supper?

**Interviewee**: We were able to cook lunch and the boil water afterward (1 hour and 30 minutes)

**Interviewer**: What about breakfast?

**Interviewee**: We were also able to prepare breakfast on it (10 –20 minutes)

**Interviewer**: How do you use the gas? Is it just for cooking?

**Interviewee**: For the time being, the installers have told us that we can only use it for cooking. But, in the future, they will come and assist us to use it for lighting as well. And, that time if we had tap water, then they would have installed a geyser because they came with one that.

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

**Interviewee**: You just need cow manure, water and sunlight.

**Interviewer**: Where is your source of water?

**Interviewee**: We get water from a borehole.

**Interviewer**: How far is it from here?

**Interviewee**: Not far, it is somewhere that side.

**Interviewer**: Not too, close as well. That is like half a kilometer.

**Interviewer**: How many people do use the gas now?

**Interviewee**: Six people.

**Interviewer**: Okay, who is responsible for feeding it?

**Interviewee**: Everyone feeds it – everyone has a duty to feed it. But, mostly the person who looks after the cows feeds it. However, when he is busy I myself I feed it; I feel like it is my responsibility as well - and I know how to make feedstock also.

**Interviewer**: Don’t you feel that it is a daunting task?

**Interviewee**: It does not feel that way because that is our source of energy for cooking, and that is our fertilizer too. And, we feel that the more we feed it, the more effluent and fertilizer we get from it, which we will apply on our crops and even sell as well.

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

**Interviewee**: The source of manure needs cleanliness and well taken care of to maintain it; and it is very necessary to ensure that cow manure does not contain rubbish. Also, the inlet must be covered after feeding to prevent people especially children from dropping unnecessary things in the bag. Further, its feedstock needs to be free from any impurities; if it is cow manure, it has to be cow manure – and things like diaper should not be part of the feedstock. Plastic and other things should also not be part of the feedstock, because such things block digesters. Also, it is necessary to ensure that the surrounding is clean and the free from sharp objects that can pierce the digester bag. And, we need not to allow children or any other people to play around and on the digester bag; also, no one should be play with the fittings and pipes.

**Interviewer**: Why? Is the gas dangerous?

**Interviewee**: No, the gas is safe and cannot cause any accident. So that is only a means of keeping people away from playing with the pipes, or from using sharp objects to cut the pipes, and also to prevent people from twisting the pipe thereby blocking the gas.

**Interviewer**: Who is responsible for its maintenance? Do you share the responsibility with Ecogen?

**Interviewee**: Yes, if it stops working it is the responsibility of Ecogen to fix it. We cannot call anyone else to fix it, even a respectable technician. Besides, we do not know anyone who can fix it.

**Interviewer**: Has it ever malfunctioned and called them?

**Interviewee**: Aaaah, no!

**Interviewer**: Ummh.

**Interviewee**: We have never encountered any problem with it since it was installed.

**Interviewer**: Not even a single problem?

**Interviewee**: One problem is that some people do not know how to operate. So, some people end up complaining that it is not working while it is working quite okay. The digester has a certain part [gas valve] that needs to be turned on to have gas at the stove, but some people do not open the gas at the gate valve, so it doesn’t work – so, it’s just minor confusion. The other challenge comes also when people neglect to feed it.

**Interviewer**: You have told me that you feel that it is your firewood, your fertilizer, so why would you neglect to feed it?

**Interviewee**: You know people, people will always be people – sometimes laziness creeps in.

**Interviewer**: We are going towards the end of the interview. Let us talk about gaps, are you solely using biogas now? Does it meet your needs?

**Interviewee**: Yes

**Interviewer**: You mean you do not use charcoal and firewood anymore?

**Interviewee**: We only use firewood when we choose to use it. But, we are able to cook using biogas throughout the day.

**Interviewer**: What times do you chooseto use firewood? And, why?

**Interviewee**: We do not have specific times. It only depends on the preference of a particular person. In this house, we stay six people and it is not everyone who knows how to use it. So people who don’t know how to use it prefer to use firewood. So, some people use firewood because someone who knows how to operate it is not around – yeah!

**Interviewer**: You mean some people don’t know how to use a biogas stove? How?

**Interviewee**: We have people of different age groups, so some are old and they find it difficult to use it. We also have a child who cannot manage to reach and open the gate valve that is located close to the stove.

**Interviewer**: Okay, okay. Has there been any time or day where it has not worked?

**Interviewee**: Ah, no!

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

**Interviewee**: No.

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

**Interviewee**: I cannot speak for anyone else, but as far as I am concerned, I am okay with the information the installers gave me. I feel like I understand it, I know it, and we know what we are doing. For example, we know that when we feed it and open the gas valves and then switch on the stove, it produce flame and we cook.

**Interviewer**: Okay, if this thing could fail today, what would you use for energy?

**Interviewee**: We will return to firewood and charcoal - things will be like theywere in the past.

**Interviewer**: Okay, okay, we are remaining with five questions. How much did this digester cost?

**Interviewee**: I do not know exactly how much we have spent on it. Maybe, we have spent K1.3 million; K1.2 million for the digester and K100000 for other work. For example, the money we paid to the people who collected water during installation phase.

**Interviewer**: Did you pay K1.2 million on the spot, at one go?

**Interviewee**: No, maybe we spent only the K100000 for digging the hole, drawing water and other things. In addition, as for the K1.2 million, we have not settled it yet.

**Interviewer**: What is your installment plan? Are you going to pay the money in 6 months or 5 years?

**Interviewee**: It is a 4-year installment.

**Interviewer**: How many people were involved in digging and how much did you pay them?

**Interviewee**: They were six people, and we paid them K8000.

**Interviewer**: Apart from this work, what other work was involved?

**Interviewee**: Drawing water.

**Interviewer**: How many people did you hire? And, how much did you pay them?

**Interviewee**: We hired four women and each one was paid K5000.

**Interviewer**: You have said when you look at some of the material you know that you cannot find it in Ndirande, do you think it was imported from another country?

**Interviewee**: It seems as everything was imported, starting from the digester bag, the plastic basins, the pipes, and even the stove it’s not something you can find in Limbe – the thing looks durable and it’s very heavy – it’s something that cannot break after failing down – it’s not the stove you see in town – it’s a thing of good quality material.

**Interviewer**: So, but just looking at it you know that it’s not from Malawi?

**Interviewee**: Sure.

**Interviewer**: We are remaining with three questions. You have said it is helping you in saving money; roughly how much money is it saving you in a month?

**Interviewee**: I can say we are saving more than K60000.

**Interviewer**: A month?

**Interviewee**: Yeah, and this time we are only saving money for cooking, and during the farming season we are expecting to save more because we are not going to buy fertilizer and even pesticides. We are also saving money on livestock farming - now we do not need boosters to have health cows to produce large quantity of milk and of high quality too – so you can see that we are saving a lot of money.

**Interviewer**: What is the biggest change in your life now that you have biogas?

**Interviewee**: Cooking is simple now. In the past we used to think about igniting and kindling fire, now we do not. And now when we are late for lunch, for example, when it’s 11:45 AM, we know for sure that we will eat around 12:10 PM – And that’s not far from eating time (12:00)…… and most people this year are concerned about the price of fertilizer. They do not think they will be in a position to buy fertilizer, but if you ask us, we are not bothered about that.

**Interviewer**: We have two questions remaining. What is your opinion of biogas?

**Interviewee**: Biogas is a very good cooking method. The only problem is that it does not work well when there is no sun – it does not produce enough gas when there is no sun. Talking of benefits, I can say it has many benefits some of which we never thought of –now the money we were spending on firewood and charcoal we are using to buy cooking oil and other things.

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

**Interviewee**: I do not think there is nothing else I would choose to replace biogas. In the past, we tried to use cow manure as fertilizer, but it did not fully work out. As a result, we were still adding inorganic fertilizer to make it effective…. You can think of LPG gas, but it is not as good as biogas because with LPG gas you need K30000 a month. Yet, with biogas, you do not need that amount of money. You only need waste, sunlight and water, which are free.

**Interviewer**: That was my last question. In closing, do you have anything to say?

**Interviewee**: I have talked enough so I am good.

**Interviewer**: Thanks for the interview.

**Interviewee**: Welcome.