

Electric Cooking Outreach (ECO) Follow Up Study: Morogoro Municipal, Tanzania



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September 2023

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Executive summary

This report presents the findings from a follow-up study to the 2021 MECS Electric Cooking Outreach (ECO) challenge (ECO) pilot study in Morogoro Municipal, Tanzania, which aimed to see whether communities were willing to use and pay for the use of eCooking on a sustained basis. An electric pressure cooker (EPC) was the appliance trialled. Carried out one year after the ECO pilot, the aim of the follow-up study was to assess the longer-term impacts of the original ECO pilot on community cooking practices for both ECO participants and non-participants and the ways in which the ECO pilot studies could serve as launch-pads to 'out-scale' eCooking in the community and its surroundings. The ECO follow-up study was conducted in the same areas as the original ECO pilot and is part of the Modern Energy Cooking Services (MECS) programme.

The study used several research approaches. As with the previous ECO study, cooking diaries were used, carried out for two weeks with ten of the 50 households from the ECO pilot. To obtain a wider sample of ECO participants, the less intensive indicative cooking diaries study and survey was carried out in a single face to face visit with 30 households which were part of the previous study. In addition, a household survey was conducted with 50 non-participant households to better understand if the ECO pilot study had had a wider influence in the community. Non-participants were randomly selected from the community of study and surrounding areas. The surveys and cooking diaries addressed the key questions on the long-term impacts of the ECO pilot project. Cooking records were uploaded and kept on kobo Toolbox, downloaded to excel sheets, with the analysis carried out using SPSS software.

Key findings from the ECO follow-up study show that the participants of the pilot study have continued to use the EPCs provided during the ECO pilot study. The study revealed that 22 (73.3%) of the participants reported using their EPCs more than during the pilot study while 7 (23.3%) use it the same as before. Only one household said they now use the device less. The proportion of dishes cooked on electricity was found to have increased from 33% (ECO pilot) to 50% (follow up study). The increase in eCooking led to a decrease in the use of charcoal (from 40% to 34% of dishes) while LPG use more than halved (from 23% to 10% of dishes). Firewood use slightly increased from 4% to 5% of dishes. The proportion of meals (which may include more than one dish and more than one cooking fuel) involving eCooking had also increased, with eCooking used in 61.1% of meals compared to 37.4% at the end of the ECO pilot. It was observed that the use of EPCs has become common among the households and the increased use suggests the community has accepted electricity as their main fuel. This was also evident from the EPC being used on average more than three times a day while other appliances are used only once a day or once a week.

The provision of repair and maintenance training to local technicians under the original ECO pilot also appears to have been an important factor in maintaining the sustained use of the EPCs. Households reported paying for aftersales services, facilitating long term use and supporting business opportunities for repair technicians. There were also some changes in gendered cooking practises, with 6 households (20%) reporting male household members had started cooking with the EPC.

The ECO project also appears to have had a positive impact on non-participants perceptions of the EPC. Nine of the 11 eCooking appliances bought by non-participants following the ECO project were EPCs, while 27 (90%) of the non-participants expressed an interest in buying an EPC, far more than any other eCooking appliance. As only 2.4% of households in the wider study area were using eCooking before the ECO pilot and none were using EPCs, these findings suggest the ECO project has had an

impact in raising awareness, with community member-to-community member awareness raising particularly impactful in shaping perceptions.

However, non-participants were found to still have concerns about eCooking more broadly, indicating further sensitisation efforts are required. The low ability to buy additional appliance was also expressed as a major concern due to seasonal income and other social economic aspects. Providing finance through an MFI proved challenging in terms of making follow-ups to customers to make repayments.

Several opportunities were identified to build on the increased awareness and usage of eCooking generated by the ECO project and use the project as a platform for wider uptake in the community and surrounding areas. Recommendations included local promotional activities (including on social media), maintaining the supply of quality appliances and repair and maintenance in the local area, and developing and operationalising financing models through MFIs and cooperatives to help address the upfront costs of appliances.

The sustained use of eCooking and acceptance of electricity as primary fuel for cooking catalysed by the ECO pilot study has contributed to long term impacts which are associated with the use of electricity for cooking. This includes financial savings and improved health of family members. The follow up study highlights the potential for the ECO pilot study to serve as a launchpad towards increasing localised uptake (or out-scaling) of EPCs in the community. Key lessons can be drawn from the project and applied to other locations to further extend impacts.

The findings of this report will be disseminated and shared with stakeholders such as research bodies, financial institutions, different clean cooking programmes, government officials and clean cooking alliances. It will help to showcase how significantly eCooking can impact community lives.



1.0 Introduction

About 85% of households in Tanzania depend on non-sustainable and unclean energies for domestic cooking and heating. In order to promote use of clean energies, in 2021 SESCOM in collaboration with TAFORI, Nexleaf Analytics and Loughborough University piloted a study on MECS Electric Cooking Outreach (ECO). The pilot study was carried out as part of the MECS Electric Cooking Outreach (ECO) challenge fund and it demonstrated that people can cook a significant proportion of their menu on electricity on a sustained basis and provided important insights which have helped to develop the beginnings of local electric cooking (eCooking) supply chains.

Various studies have observed that whenever communities are provided appliances or technology as part of a project intervention, the tendency is for limited continued use after the project ends. In order to understand the post-project impact of the ECO pilot study on the community and the surrounding areas, the ECO follow-up study was designed. It was tailored to capture the valuable findings through assessments on what have been the longer impacts of the ECO pilot study on community cooking practices for ECO participants and non-participants, and ways in which the ECO pilot study could serve as a launch pad to increase locally (or 'out-scale') eCooking in the community and its surroundings.

Among the factors which the follow-up study focused on were changes in cooking practises, type of fuels and devices used, whether there were additional cooking devices purchased by households and interest to add eCooking appliances among the ECO participants. The study also examined the impact of the introduction of eCooking appliances into the community on households that were not part of the ECO pilot study. Moreover, the research centred on understanding non-participant views of eCooking and whether the ECO pilot study has led to these views changing through awareness raising. Opportunities and challenges to increase out-scaling were also assessed.

On this basis, this report narrates the key findings of the study through data collected from both ECO participants and non-participants by experienced enumerators using various methods including cooking diaries. Through analysis, various useful findings and information from the key themes on the main research questions (see section 1.1) were revealed.

1.1 Project Aim and Research Questions

The ECO follow-up study aimed to understand the longer term impact of the ECO pilot study carried out over one year before. To address this aim, the study had two main research questions:

- i) What have been the longer-term impacts of the ECO pilot studies on community cooking practices for both ECO participants and non-participants?
- ii) What are the ways in which the ECO pilot studies could serve as launchpads to “*outscale*” eCooking in the community and its surroundings?

The two main research questions had several other key sub-questions which were used to deeply assess the situation of the users of the eCooking appliances from the end of ECO pilot project up to the follow-up period. These sub questions have been used to introduce sections in this report.

1.2 Project Area

The ECO follow-up study was conducted in Morogoro Municipal, Tanzania in the same community area and neighbouring areas where the ECO pilot was carried out. Morogoro is among the regions in Tanzania with high consumption of charcoal as it has high influx of people due to its location as it is situated between Dar es Salaam and Dodoma cities.



2.0 Methodology

In order to undertake this follow-up study, different approaches were used based on the information was required from a specific group.

- Group 1: The indicative cooking diaries study and survey was carried out with 30 ECO pilot study households to address the key questions for Research Question 1. The indicative cooking diaries study was carried out in a single face to face visit by the enumerators whereby households were requested to generate a menu for two typical days describing dishes cooked and devices were used. The tools for the data collected were provided and this was based on the participant's recall and self assessment.
- Group 2: The detailed cooking diaries cooking diaries were conducted with ten households for the period of two weeks. These houses were selected among the houses that participated in the original ECO pilot study. The cooking diaries were undertaken to provide quantitative evidence to support the findings from the indicative cooking diaries study and survey. The approaches used in the transition and end line phases of the original ECO pilot study were also replicated in the follow-up study.
- Group 3: A survey was conducted with 50 non-participant households which were randomly selected from the community of the study and surrounding areas. This was done to address the key questions for Research Question 1 on the long-term impacts of the pilot project.
- Data analysis. For each group, the data was uploaded into the kobo Toolbox and then downloaded into an excel worksheet. SPSS software was used for analysis from the surveys and cooking diaries. The analysis was used to prepare reports and presentations and draw conclusions and recommendations.

3.0 Results and Discussion

- Research question 1: What have been the longer-term impacts of the ECO pilot studies on community cooking practices for ECO participants and non-participants?

Part I: ECO participants

- Primarily informed by the 30 indicative cooking diaries and the 10 detailed cooking dairies.

3.1 Are ECO participants still using the appliances?

- Research sub-question. Are ECO participants still using the eCooking appliances provided? Are they using them more/less and why? Have there been any changes in how the appliances are being used (e.g., type of dishes/meals cooked)? How has the cooking fuel stack changed (including % of dishes cooked per fuel)?

During the follow up study, it was observed that all forty (group 1+2) selected participants still have their electric pressure cookers which were provided during the ECO study, all the appliances are working, and they have been used on a daily basis to cook different dishes for their respective families. They expressed how they have seen the difference in the performance of the EPCs they were given compared to other brands which they have seen in some of their relatives. The EPC provided to the ECO participant houses won an award from the Global Leap Award of year 2020, where its specification is available online in the Buyers Guide ([Link](#)). These findings highlight that the appliances provided to ECO participants were of high quality and imply that the appliances have been well taken care of, and that households have found cooking with electricity affordable.

How often do you cook in General?

It was the interest of the follow-up study to find out how often does the family cook. It was reported that families cook differently depending on the level of income, season, type of dishes. Based on the data from Figure 1, it was observed that 22 households (73.3%) of the group 1 households cook three times a day, while 4 households cooks once a day and 4 other households cooks twice a week respectively. It was observed that the number of cooking also tells the ability of these families to pay for the energy used, while most of them preferred eating freshly cooked foods.

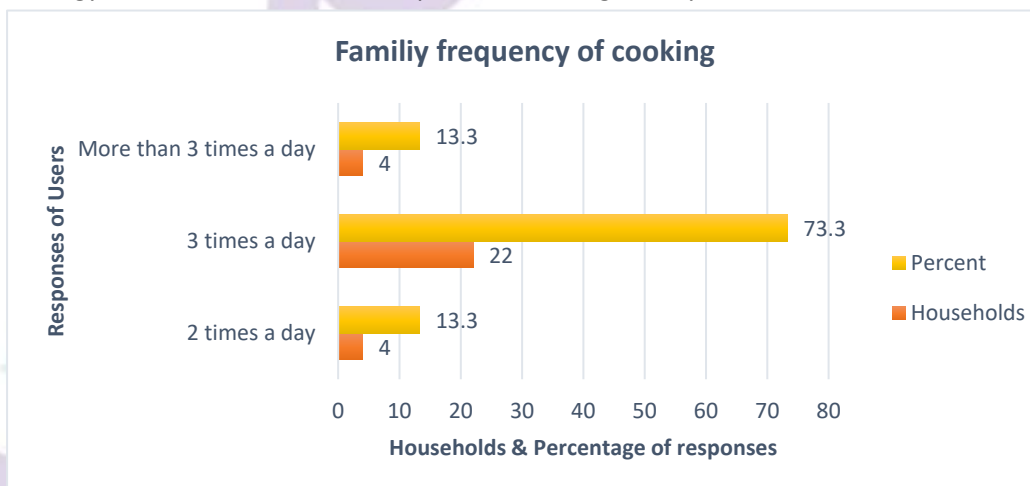


Figure 1: Frequency of cooking at Households

Cooking devices used by ECO participants

Figure 2 compares the proportion of households using different cooking devices in the ECO pilot and follow up study and shows a significant decrease in the use of charcoal and firewood. 60% of households reported using improved charcoal stoves during the ECO pilot, which falls to 17% of households at the time of the follow-up study. The use of traditional metal charcoal stoves fell even further from 32% (ECO pilot) to 0% (follow up study) and use of three stone firewood places fell from 20% (ECO pilot to 3.3% (follow up study) The proportion of households reported using LPG remained consistent at 70%.

The decrease in the use of biomass dependent stoves suggests users may now be more aware of the benefits in terms of fuel cost savings, improved cooking environment, and health which may be attributable to the awareness created during the ECO pilot study.

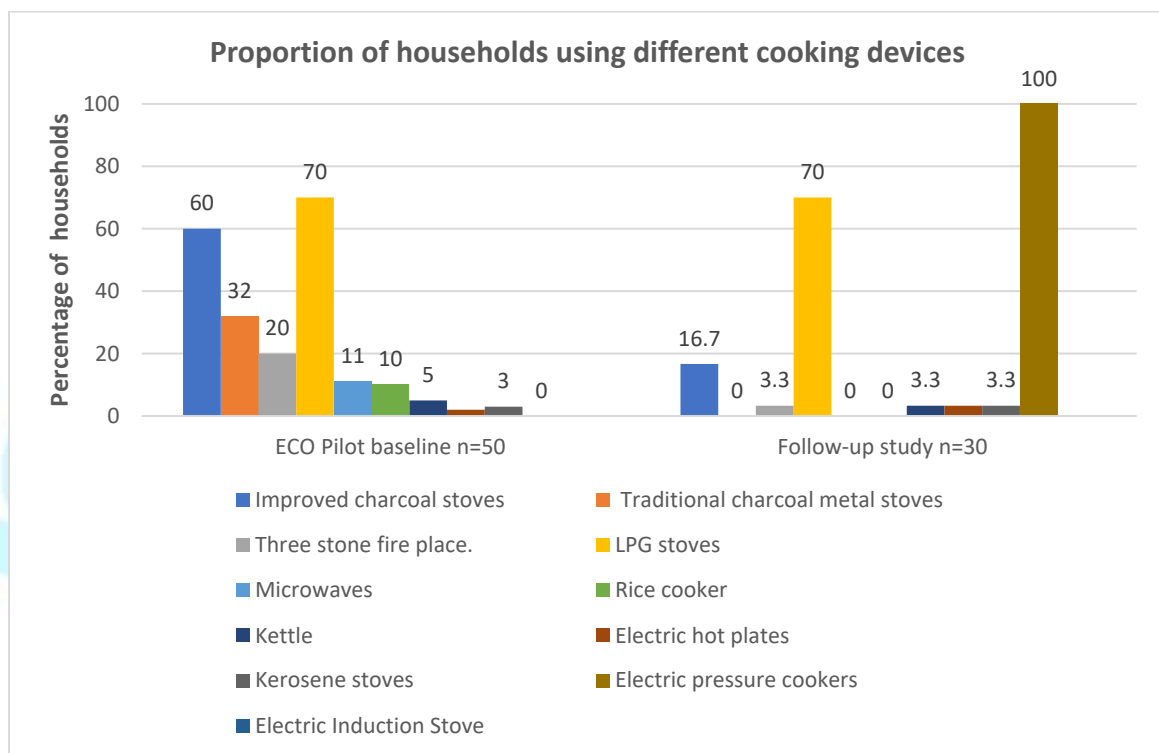


Figure 2: Type of devices used in the households (ECO pilot study n=50 and follow-up n=30)

The tendency of using combinations of cooking devices was also noted during the ECO follow-up study. Figure 2.1 shows that 15 households (50%) use the combination of EPC, LPG and Charcoal stoves in their cooking, 6 households (20%) use both EPC and charcoal stoves while 4 households (13%) use EPC and LPG. The stacking for other devices such as EPC/Charcoal/ Hotplates, firewood and electric Kettle were observed to be used by one family. Overall the findings indicate how electrical appliances are often used in combination with other fuels to cook meals.

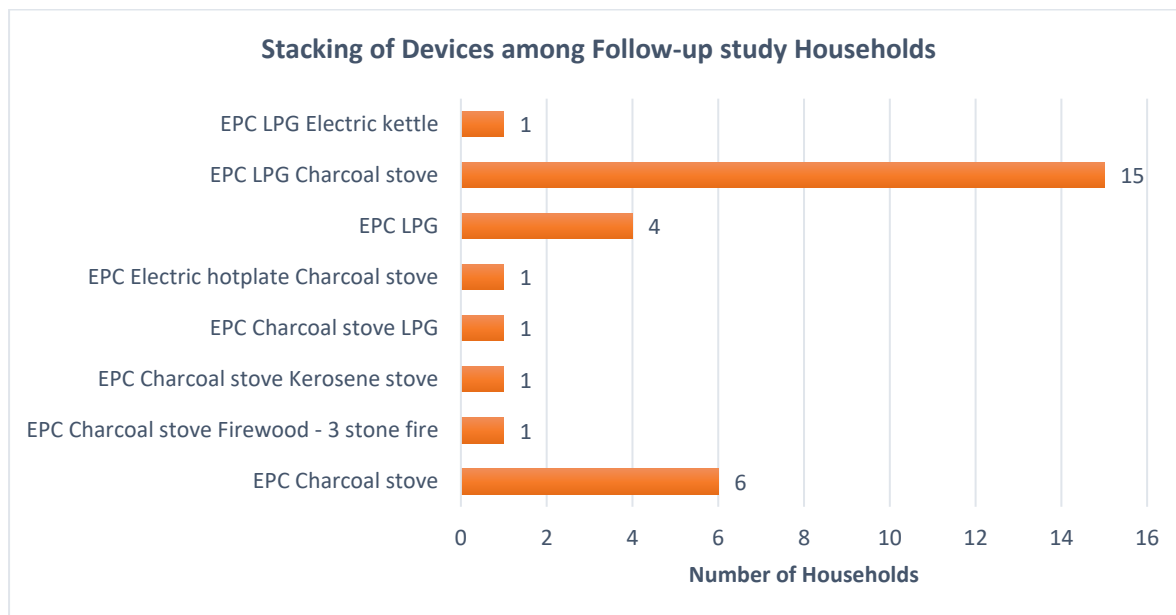


Figure 2.1: Devices stacking at the households (n=30)

Cooking fuel use among the eco-participants

The types of fuels used among ECO-participant was assessed from the ten (10) cooking diaries households. A comparison of the endline phase of the ECO study (phase 4) and the follow-up study shows that the proportion of dishes cooked on electricity has almost doubled from 33% to 50% (Figures 3). The increase in eCooking led to a decrease in the use of charcoal (from 40% to 34% of dishes) while LPG use more than halved (from 23% to 10% of dishes). There was a slight increase in the use of firewood for cooking which rose from 4% to 5% of dishes.

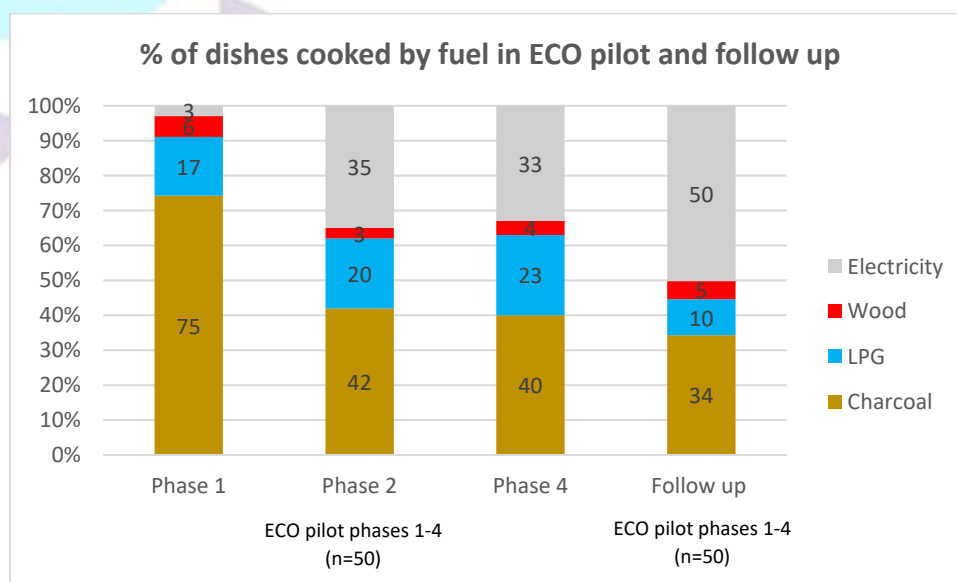


Figure 3: Comparison of fuels used to cook dishes in the ECO pilot study (n=50) and follow up study (n=10)

The fuels used to cook different meals were also assessed. Meal level data often saw combinations of fuels used as different dishes within the meal might be cooked with different fuels. In comparing the

data from the two studies, “Original ECO pilot and follow-up”, figure 3.1 shows the proportion of meals cooked only with electricity has increased from 25.1% (ECO pilot phase 4) to 41.9% (follow up study). Fuels stacks including eCooking accounted for 19.2% of meals in the follow up study which was an increase compared to the 12.3% of meals in the ECO pilot phase 4. These increases have seen the use of fossil fuels for cooking meals decrease. Using charcoal only has decreased from 40.1% of meals cooked (ECO pilot phase 4) to 25.2% (follow up study) while use of LPG only for meals had dropped even more from 17.6% to 6.6% of meals.

The increased use of electricity as single fuel and as part of a fuel stack for cooking meals suggests that the community has accepted electricity as their main fuel. The decreased use of other fuels also implies that community has increased understanding of the range of negative impacts associated with use biomass-based fuels/ energy as source of their cooking.

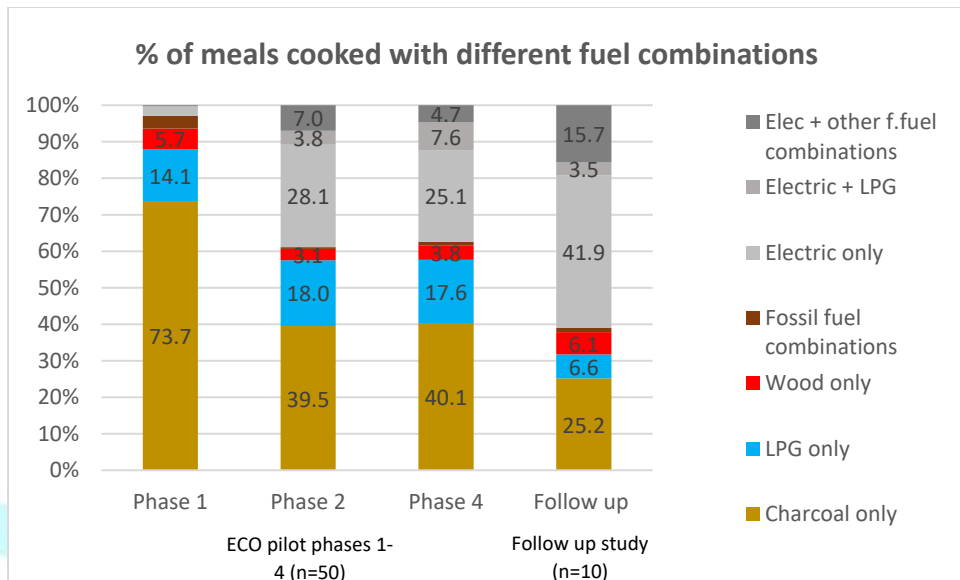


Figure 3.1 Comparison of fuel combinations used to cook different meals in the ECO pilot study (n=50) and follow up study (n=10)

How often are the Devices used?

Figures 4 and 4.1 compare the frequency households used different cooking appliances during the ECO pilot and the follow up study. During the ECO pilot, Figure 4 highlights that LPG stoves was regularly used by 15 households (53.6%) of the while improved biomass cookstoves was used by 27 households (77.1%). The LPG with stove on top was regularly used by 8 (66.7%) of households while basic charcoal cookstoves was regularly used by 14 households (77.8%) Devices like rice cookers, kettle, kerosene stoves and three stone stoves were occasionally used while 2 households (40%) out of 5 which owns the stoves with combination of LPG/Electric burner with grills and one household (3%) which own improved biomass stove never used their devices.

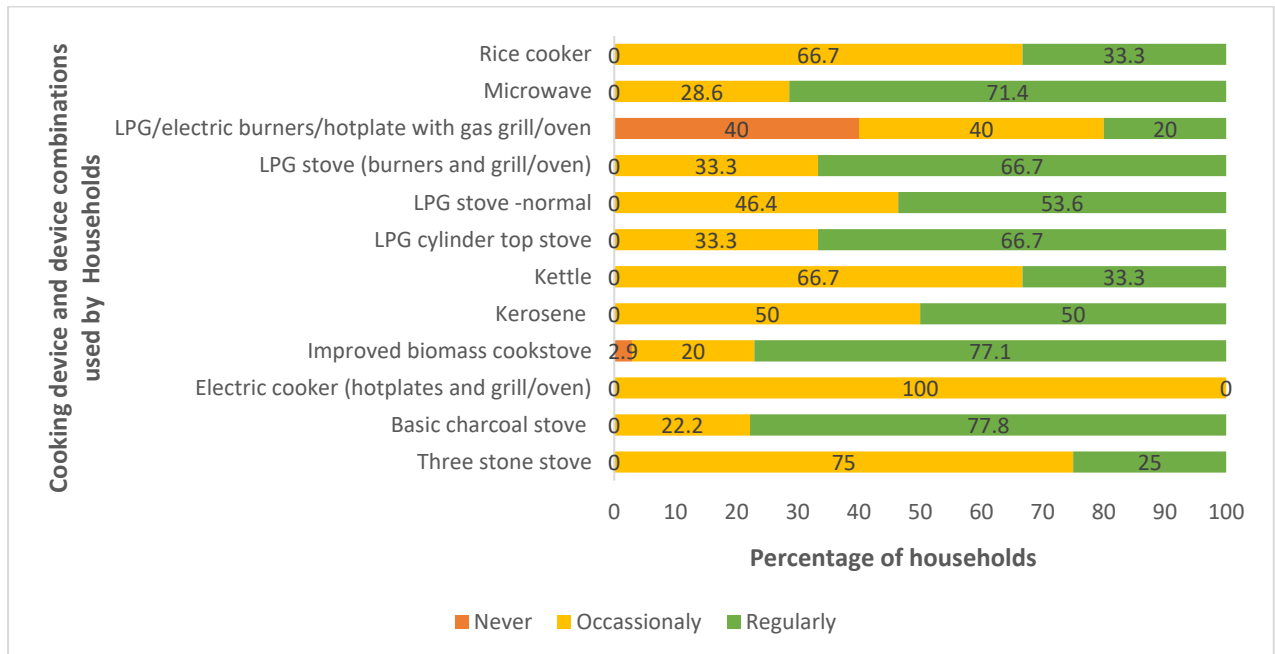


Figure 4 Frequency of cooking device and cooking device combinations used during the baseline of the ECO pilot study (n=50).

Figure 4.1 shows several notable changes in the frequency devices were used in the later follow up study. The data shows that all sampled 30 houses use EPC every day but at different rates. 19 households (63.3%) were using the EPC twice a day while 7 families (23.3%) use it once per day and 3 houses (10%) uses it three times a day. Only 1 family used the EPC more than three times a day. The other main fuels used are LPG and charcoal. LPG is used twice a day by 13 households (43.3%) while 7 households (23.3%) use LPG once a day. Only one household uses it more than 3 times a day. The data also shows charcoal stoves are used by 10 families (33.3%) once a day, while 9 houses (30%) use it a few times a week and 4 families (13.3%) use it 2-3 times a day.

Figure 4.1 clearly shows that EPCs is used more regularly than other appliances. The reasons given included that users continue to use it because of the benefits they have already seen including being fast, safe when cooking and less energy consumption device. LPG is still used regularly but charcoal less so and is rarely used more than once a day. Both fuels tend to be used as back-up when there are electricity outages (figure 7.1). The unregular uses of other electrical cooking appliances such as hot plates and kettles may imply that households have become conscious on the energy consumption of the appliances hence avoiding high bills at the end.

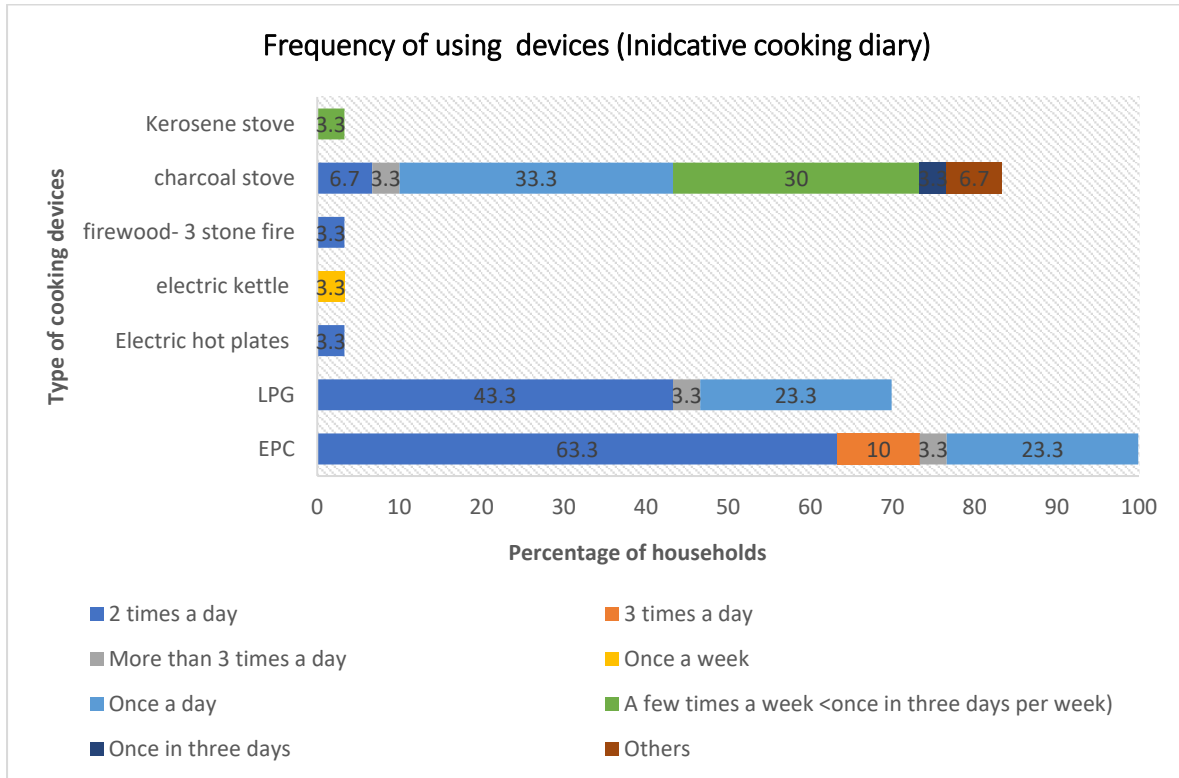


Figure 4.1: Frequency of cooking device use during the ECO follow up study (n=30)

Are you using the Electric Appliance more than during the ECO study?

The follow-up study found that most ECO participant households are using their electric cooking appliances more in comparison to during the original ECO pilot study. Figure 5 shows that 22 households (73.3%) reported using their electric cooking appliances more than during the original ECO pilot study period. 7 households (23.3%) said they feel their use of eCooking appliances is the same as during the ECO pilot while only one household said they use the appliance less.

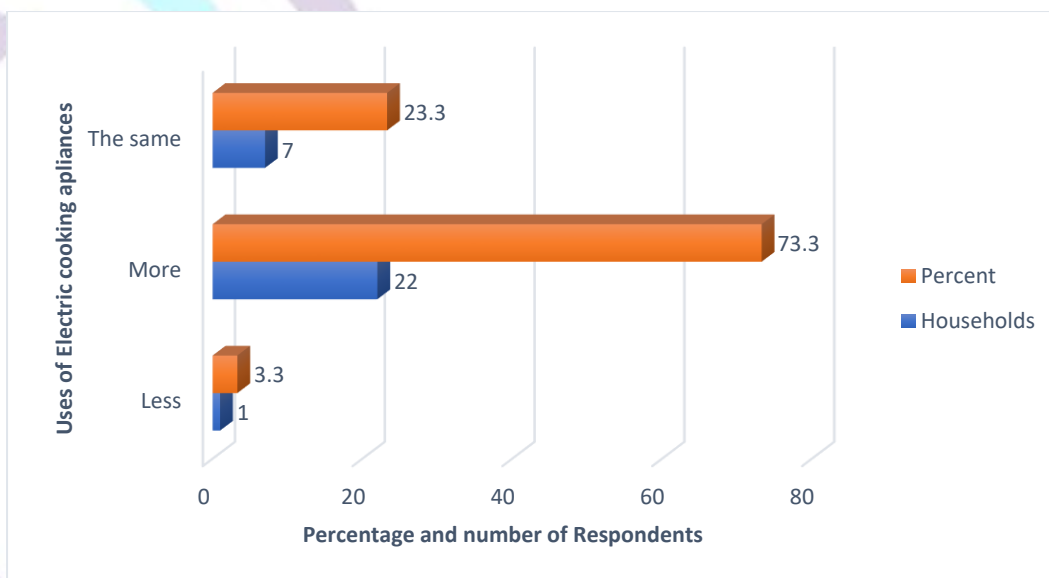


Figure 5: Comparison of use of electric appliance

Types of dishes cooked and fuel used

It was the interest of the follow-up study to know whether there have been changes on how the households uses eCooking appliances since the end of ECO pilot study. The data revealed that for half of the households studied (50%) there has been no changes in how they use these appliances. Their cooking schedules have not changed, some still soak beans before cooking and others said there are food/ drinks such as milk and porridge which they still don't cook or prepare using eCooking appliances. The other 50% of households said there have been some changes. Among the changes were the frequency of cooking hard foods such as makande and beans among the families, testing other recipes like baking and drying fresh vegetables on the e-appliances specifically the EPCs. The main reasons for making these changes were convenience, time saving when cooking, and improved energy and cost savings. Other families expressed their views on the preservation of nutritional value of the food they prepare being among the main reason to the changes on how they use eCooking appliances.

During the follow-up study the assessment of the dishes prepared by the families for breakfast, lunch and dinner was carried out using the indicative cooking diaries data. It was observed that the households have different dishes they cook for different meals. The common dishes for breakfast are Chapati, cassava, porridge potatoes, banana, and boiled eggs. Common dishes for lunch among the studied families includes Rice and Ugali, banana, Kande, fried cassava, Meat, Vegetables, and beans. The data also indicated that common dishes for dinner is rice, banana, meat, and potatoes. It was also observed that there were foods which were common among the dishes cooked for lunch and dinner such as rice, ugali, Leaf vegetables and banana.

The analysis of the follow-up study data presented in Figure 6 shows that EPCs, charcoal stoves and LPGs are equally used by 20-26% of the households when preparing dish 1 of the breakfast. The dishes require frying and boiling, and charcoal stoves is famously used for frying chapati. It was also informed that sometimes the stoves are used parallel to ensure much is cooked for kids and those who go for work early in the morning. The use of EPCs increases gradually from 36.7% to 43.3% when preparing dishes 2 and 3 which requires normal cooking while use of LPG and charcoal stoves decreases by 3.3% for both stoves. The stoves are commonly used for boiling drinks like milk and tea as still there are families which don't believe can be prepared using the EPCs.

The uses of EPCs increased significantly when preparing lunch and dinner while uses of LPG and charcoal stoves decreases at higher rates. The data suggests that the increased uses of these stoves were that dishes cooked involves hard foods like beans and makande and since EPCs cook fast and efficiently the households opted to regularly uses it. For all dishes prepared for breakfast to dinner the uses of firewood -3 stone stove were noted to be insignificant. This may indicate that households are now avoiding using such stoves because they are more aware of the health consequences and inconvenience that are caused for using such stoves. During the original ECO pilot study, the participants of the study also had different dishes cooked with specific and preferred fuels. The common dishes reported were Beans, Rice, Ugali Leafy Vegetables, Daga, Makande, and Porridge.

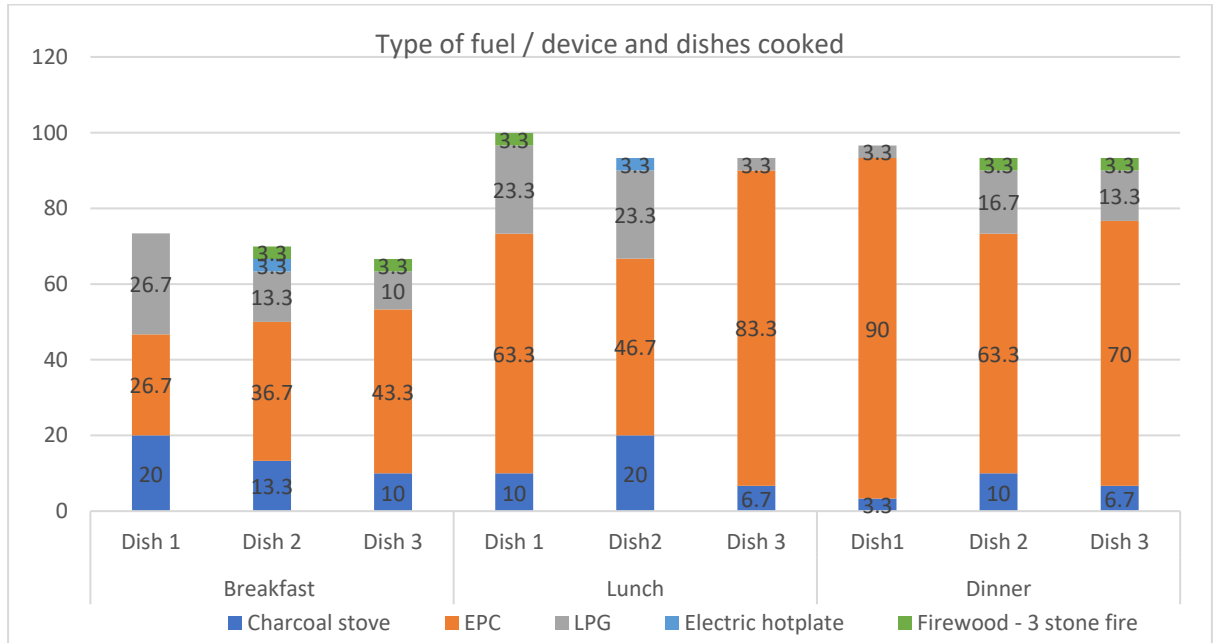


Figure 6: Dishes cooked and type of fuel/device used during follow-up study (n=30)

Power Outages and Frequency

When undertaking the ECO pilot study exit survey, a few outages were reported, typically lasting for few minutes or hours. Since the EPC maintains heat and pressure, people often did not stop cooking with electricity despite these outages. It was also the interest in the follow-up study to understand whether there have been any changes in power outages, how regular they are, and whether they could significantly lead to changes on the use of cooking appliances. Figure 7 below shows that outages happened and 93.3% of the households reported the outages happened few times a week while 76.7% of the household reported the outage lasted for the whole day and times when it lasted more than 2 hours. That was a concern that if the outages are regular, it could negatively impact EPC use and other eCooking initiatives could be in jeopardy.

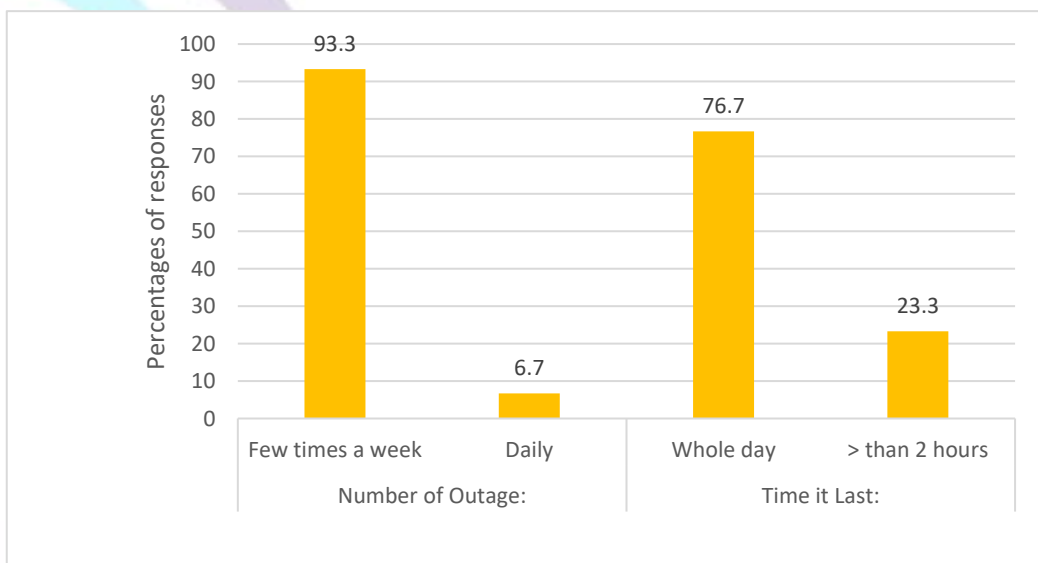


Figure 7: The frequency of power outages

It was also reported that when power outages happen households look for alternatives. Figure 7.1 indicates that when the outages happened 14 households (46.7%) use charcoal and LPG while 10 houses (33.3%) use charcoal as the main cooking options, and 5 households (16.7%) use LPG. The use of firewood was only reported by one household. The findings indicate charcoal is the main backup option for EPCs – the reasons being that users can buy charcoal in small quantities which is affordable to them. This suggests that there is a need of creating awareness on other possible and clean backup power sources solutions (e.g. PV systems) to households who can afford them and the importance of high-quality EPCs which can retain heat better than other cooking devices during outages due to their insulation.

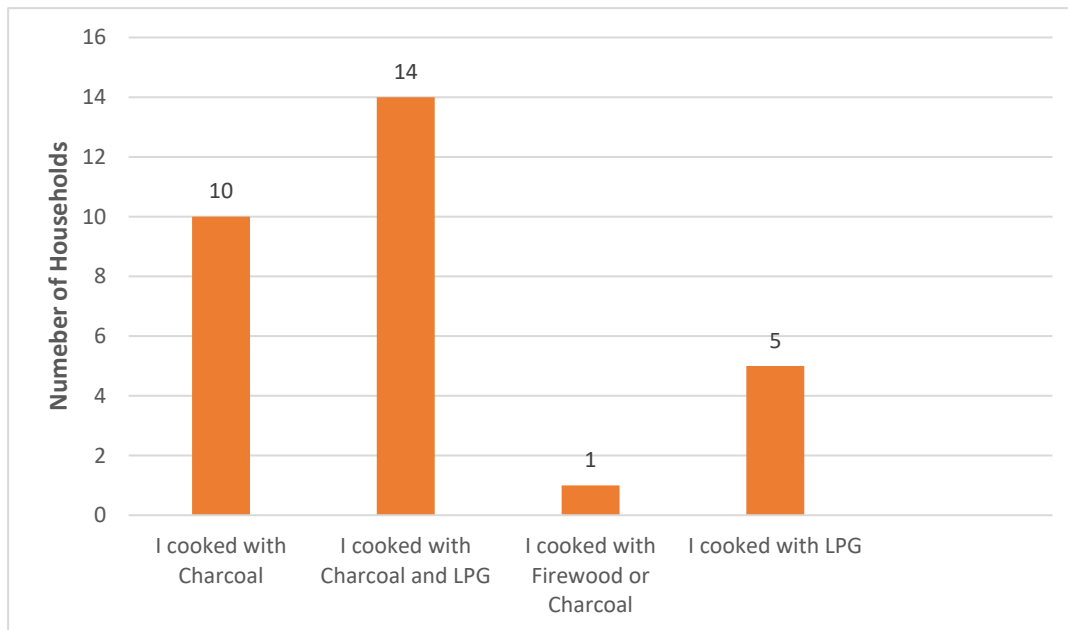


Figure: 7.1 Fuel used during power outage

EPC user experience

The participants' experience on what they like most about EPCs are shown through Figure 8 (ECO pilot) and Figure 8.1 (ECO follow up study). During the ECO pilot, the most common like was 'quick cooking' (32.7% of households) whereas only 23.2% of households reported this like during the follow-up study. Time saving was reported as a like by 28.8% of households during the ECO pilot study but also decreased to 13.2% during the follow-up study but was found not to relate to the technical or efficiency performance of the appliance. Handling and the use of EPC was reported to be easy by 5.8% households during ECO pilot study and slightly increased to 6.6% of the households during the follow-up study. Appreciation of the taste of food in the EPC increased from 3.8% expressing it as like in the ECO pilot to 9.9% of participants in the follow up study. Similarly, appreciation of the cost savings with EPCs increased from 3.8% to 6.6% expressing it as like.

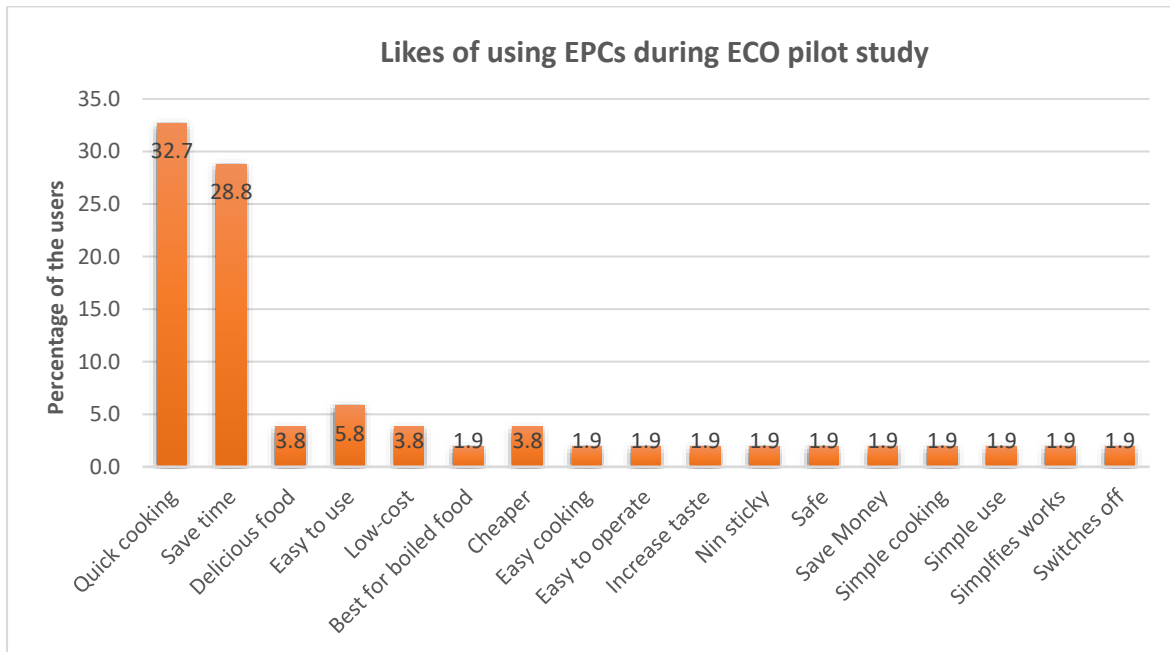


Figure 8: EPC user experiences during ECO pilot study n=50

Both figures also indicated the increase of the reported cases such as EPC simplifying cooking and the safety of the users from 1.9% at pilot study to 6.6% during follow-up study time. This suggests that households are positively acknowledging the design of the EPCs. There are other positive changes which were also reported by households on the type of food cooked and nonsticky character of the EPCs; with an increase from 1.9% at the time of original pilot study to 3.3% during follow-up study. The food and kitchen hygiene and getting extra time for resting or doing other household’s chores were among the new things reported to be liked by households when using EPCs at the time of follow-up study. Both reports figure 8 and 8.1 suggests that there is a developed understanding among the households on what EPCs can do best.

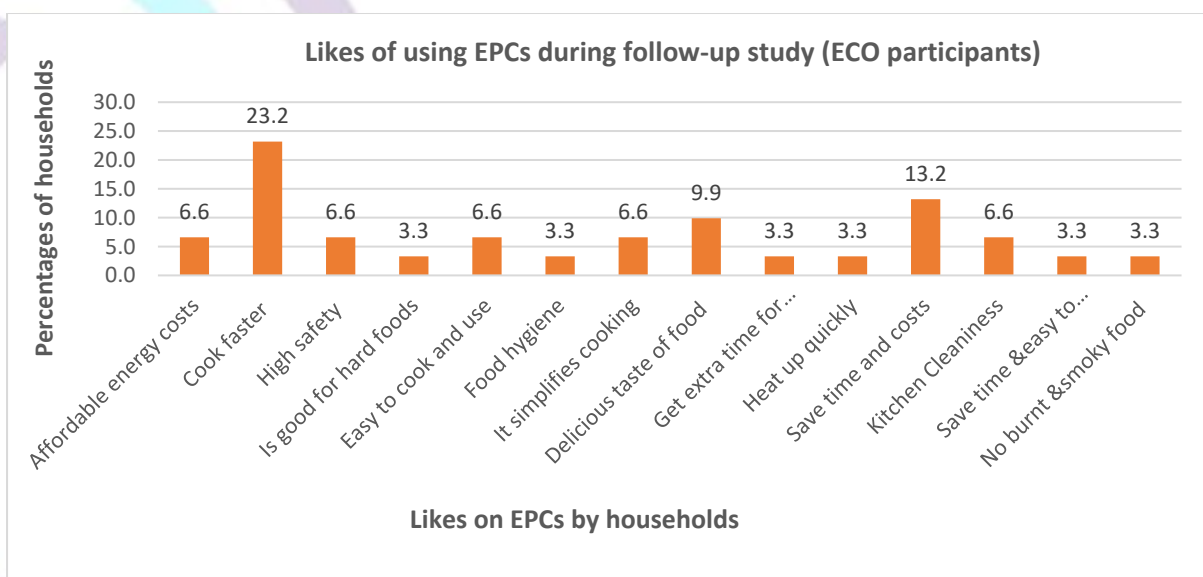


Figure 8.1: EPC user experiences during Follow-up study n=30

The only major dislike about using EPCs reported in the follow up study were power outages and the high cost of the appliance. Other dislikes were only reported by very small minorities. 9 households (30%) reported that they didn't have anything they disliked. During the ECO pilot study there were no reported cases of participants to dislike the EPCs. This was probably because it was a newly introduced technology and everyone was anxious awaiting to learn, use and have a self-experience.

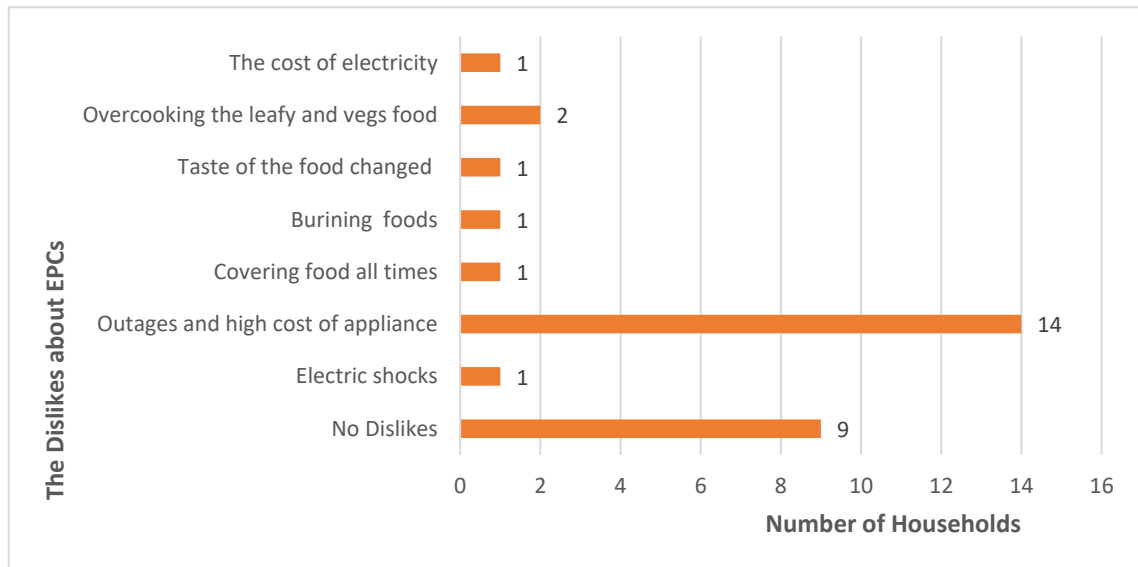


Figure 8.2: The dislikes of using EPCs in the follow up study (n=30)

Willingness to pay higher electricity bills to access eCooking

The participants were asked on whether they will be ready to pay more for electric bills so that they can access electricity for cooking with EPCs. 23 households (76.7%) reported they were ready to pay more, suggesting an appreciation of the value of the services provided by the EPC.

Utensils used for Different Dishes

The use of utensils in the ECO pilot and follow up study was also compared. During the ECO pilot, utensils used included frying pan, sufuria small, sufuria medium and sufuria big (Table 1). The uses of these utensils depended on the type of dish to be cooked. Table 1 shows an interesting trend where the sufuria medium size was consistently used with charcoal stove during phase 1 and 2 while it decreased in phase 4 where small sufuria was mostly used with LPGs stove at phase 2, this was because of some dishes such as rice and porridge preparations. Frying pan was used mostly in charcoal stoves at phase 1 and 2 of the study and on LPG at phase 4 for common dishes such as chapati.

	Equip, Dish 1								
	char Phase			firewood Phase			gas Phase		
	1	2	4	1	2	4	1	2	4
(sum) suf_big	22	23	2	11	4	3	1	9	0
(sum) suf_med	193	221	74	14	26	20	34	106	27
(sum) suf_sm	49	139	63	2	2	3	21	83	32
(sum) fry	50	79	18	0	4	1	13	37	16
(sum) ket	0	0	0	0	0	0	0	0	0
(sum) oth	0	1	0	0	2	0	0	0	0

Table 1: Utensils during ECO pilot study.

During the follow up study, the common utensils used are small and medium size sufuria (Figure 9). The uses of small sufuria accounts for 39% of the dishes prepared. The use of small sufuria also suggests there is preference in using LPG for dishes such as porridge, boiling sweet potatoes but decrease in using firewood leads to reducing size of sufuria from medium to small size as well. Other utensils such as frying pan are used for dishes such as chapati which mostly prepared on charcoal stoves and firewood while dishes that needs bigger size pot are cooked on medium sufuria. Figure 9 also suggests that there are other utensils which were not mentioned in preparing dishes at households.

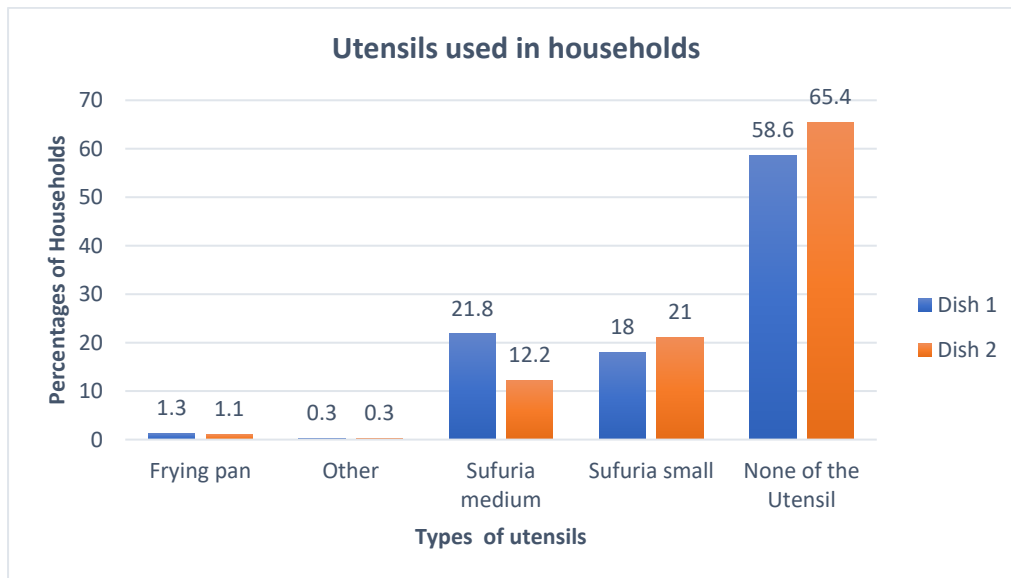


Figure 9: Utensils used during follow up study

3.2 Changes in Cooking Practices.

- Have cooking practices for ECO participants and non-participants changed since the end of the pilot study? How? Have perceptions of eCooking changed? how? Why?

During the original ECO pilot study, the majority of the cooks were women and girls. Men were 8.2% while women were 91.8% of the total number of people who were trained on how to use EPCs. Data was analysed on whether there have been any changes in who cooks in the household since the ECO pilot. Most reported no changes (23 households or 76.7%) but 7 households (23.2%) reported changes, primarily in male members starting to cook (Figure 10). Male members of the households that have started cooking with EPCs rose from 5% of households in the ECO pilot to 20% of households in the follow up study). 1 household (3.3%) reported that other members of the family (house helpers) are now cooking with the EPCs after being trained, suggesting in this household that the previously reported fear that house helpers can cause accidents and other risks has started to disappear. These changes reported in men starting to use eCooking implies that the perception that African men are unwilling to cook may be slowly changing and the introduction of eCooking may have contributed towards more even gender roles and responsibilities at the family level.

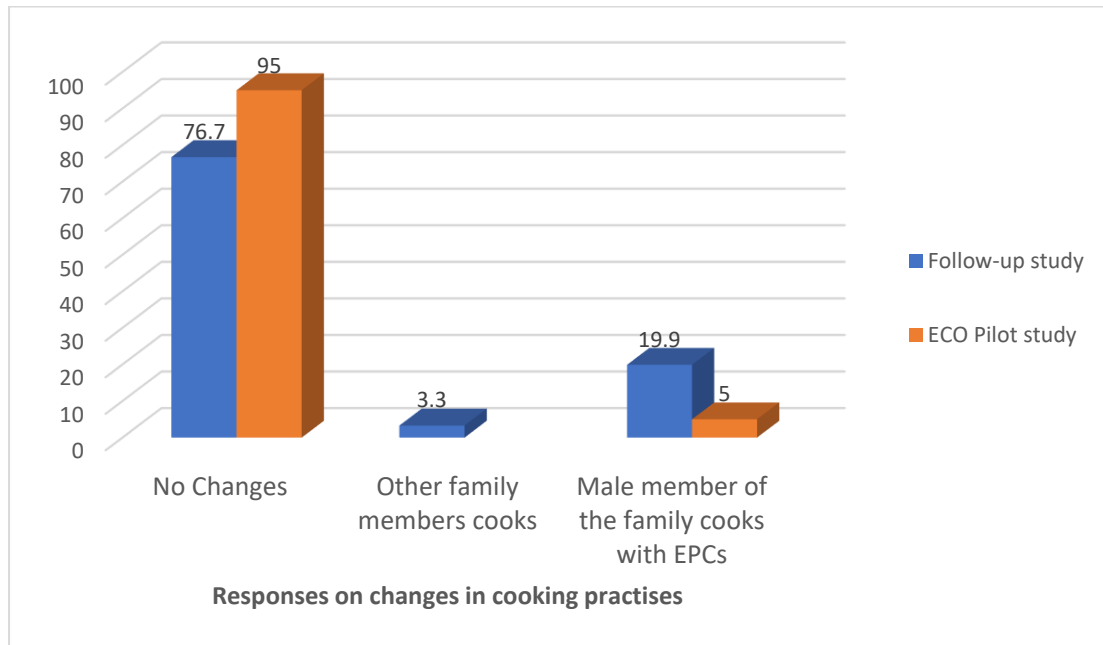


Figure 10: Changes in cooking practises by ECO-Participants (n=30) Vs ECO pilot study (n=50)

3.3 Opportunities and Challenges behind additional eCooking appliance

- Have any ECO participants bought an additional cooking appliance (electric or non-electric) or expressed an interest to do so? What are the opportunities and challenges behind purchasing an additional eCooking appliance device?

Buying additional cooking appliance – ECO participants

The follow-up study assessed whether the ECO participants bought any additional cooking appliance. It was found that none of the ECO participants managed to procure new cooking appliances. However, 10 households (33%) showed interest in buying new appliance in the near future while 20 households (67%) expressed no interest (Figure 11). When households were asked about the type of the cooking appliance they are interested to buy, electric hotplates were the most common answer given (six households or 20%). 2 households (7%) stated they were interested to buy an infrared cookstoves and only 1 household (3%) wanted another EPC, suggesting ECO participants were content with one EPC.

The results in Figure 11 suggest that despite ECO participants using efficient EPCs and being sensitised trained on the importance of highly efficient appliances, more emphasis is required on clearly understanding the differences between electrical appliances and their specifications when choosing the appliances to buy. Hot plates were the device that families were most interested to buy as an additional eCooking appliance despite using far more energy than other eCooking appliances, such as induction stoves, which also offer the same quick frying facility as hot plates. These findings suggest a need of continuing to create awareness and strengthen the demand side management on how appropriately and efficiently the e cooking appliances can be used.

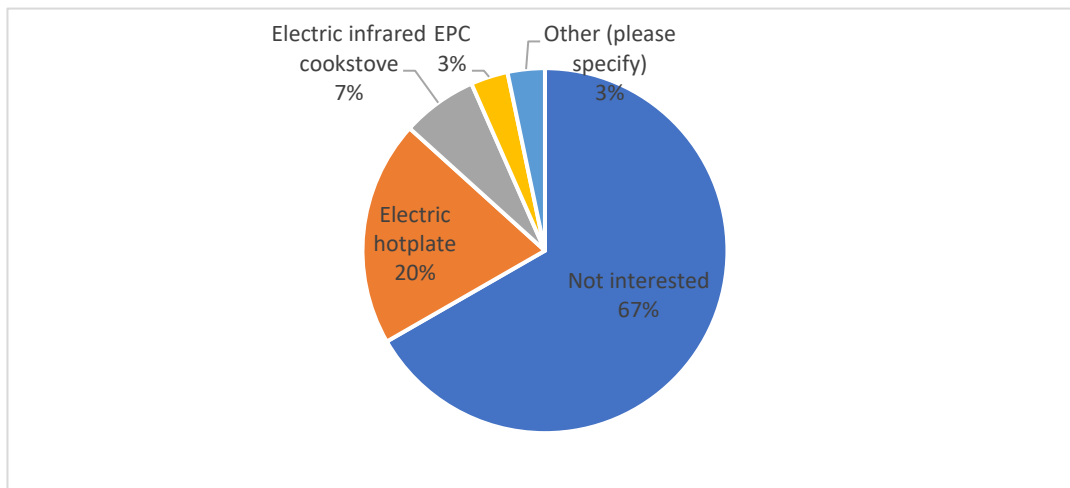


Figure 11: Additional and interest of appliances

Opportunities and Challenges behind purchasing additional eCooking appliances

It was also the interest of the study to know why the ECO participants who reported being interested to buy an additional appliance have not yet made purchases. The main reason given was financial. Most of their income sources are seasonal and their earnings are not enough to settle for households and additional appliances. For women, they said that sometimes the decision of what to buy comes from their spouses, so it depends on the priority of the head of household. Since they have interest, they are putting efforts to raise money for additional appliances.

The expression of the households on the interest to buy appliances and at the same time the financial inability reasons which were given, indicates the need for consumer financing to enable the households to buy the cooking appliances on more flexible terms. This finding suggests developing the financing model initiated during the ECO pilot time should be revived.

3.4 Effects of Reduction of Support from ECO awardee

- What has been the effects of the reduction in the support mechanisms provided by ECO awardees during the initial ECO pilot studies?

Sustained after sales services

The ECO pilot study not only assessed whether cooking with electricity could fit the cooking cultures of the community in Morogoro, but also aimed to ensure the sustainable use of the clean cooking solutions. Due to that several initiatives were taken by the pilot study to train local technicians on repair, maintenance and other after sales services. The project also capacitated the respective households on the use of the EPCs and also identified financing model mechanisms which the households could use to access more eCooking appliances including EPCs. All the initiatives were aimed at ensuring there will be sustainability beyond the ECO studies.

Since the end of the pilot, there has been both positive and negative effects as result of the reduction of the support which was provided during the ECO study. The positive effects have been that the

community and households have been able to continue to use the EPCs, increasing the proportion of dishes cooked on the devices. In addition, despite the pilot study ending over a year ago, the households have managed to maintain the EPCs without the ECO awardee's (SESCOM) support. The capacity building that the households were given with the EPCs has enabled them to comprehend and work on some technical faults. They were trained on how to use, clean, and undertake minor troubleshooting. They were also informed and trained on the safety measures when using or cleaning the EPCs. It was reported that from thirty (30) households participated on indicative cooking diaries only 3 households (10%) reported having minor technical problems.

It is also evidenced that even beyond the ECO pilot study, households which faced technical issues managed to pay for after sales services which included the repair and maintenance, changes of the pressure valves, the fuses, the power cord, and rubber seal of the EPC lid. The availability and use of these services supports the sustainability and long-term use of the eCooking appliances.

The availability of trained technicians and the evidence of them providing after sales services independently as a source of income is positively encouraging the households and other eCook users on the assured services that can support long term use of EPCs. As way of ensuring that sustainable use of the EPCs is granted, training of technicians within the project location under the ECO pilot study was among the activities carried out in year 2020. Three technicians were trained majorly on EPCs since they are involved with repair and maintenances of other electric and electrical appliances hence EPCs was an additional line to their business. The technicians have been supplied with spare parts such as fuses, rubbers seals, pressure valves from SESCOM sales points.

Microfinance institutions

The use of Microfinance institutions around the project area to support more end users to easily acquire and scaling up EPCs adoption at flexible terms was observed to be challenging. The MFI which signed contract with SESCOM (SUGECO) with expectations of making the business rolling out didn't continue with the business at the model agreed. SUGECO was landed 22 EPCs during ECO pilot study so that they sell to their customers but was difficult and challenging for them to make close follow-up to customers to make repayments. It was observed that despite of all the models arranged, failures to collect the repayments suggests that there was a weakness on the SUGECO lending system as there were no tangible security that customers had to provide that could guarantee the repayments.

Budget limitation was another challenge to SUGECO and other MFIs, due to that they cannot make large upfront investment such as purchasing a considerable number of EPCs to lend to their customers in their terms to support their growth. Covering for cost of outreach is a challenge to MFIs due to their sizes and financial capacity which allows them to just service small loans amount. The profit they are making can't make them promote themselves, advertise for their services including the EPC lending opportunities and make their services spread at large. The inadequate budget also limits the diversifications of business models that support a wide range of features and lending's as these requires considerable amount of costs and efforts. Limited skills on running and operating MFIs is a common challenge which lead to inconsistencies in practising and adhering to their lending procedures. By understating the existing challenges facing MFIs and by considering that there is a need to ensure these efforts are scaled up, SESCOM is working and exploring more opportunities to work with different financing agents and economic groups which have regular flow of income so that idea in other business areas can be replicated.

3.5 Emerging Opportunities and challenges regarding the adoption and Uses of eCooking

- What are the emerging opportunities and challenges regarding the adoption and use of electric cooking in the community?

During the undertaking of the follow-up study, it was observed that there have been opportunities and challenges towards the adoption and use of electric pressure cooker in the community of study.

Opportunities and drivers towards eCooking adoption and use

- **Exposure to clean cooking environment:** This has been among the major factors that drive the users to adapt the use of electric cooking appliances. It is because they don't emit harmful gases which assures the freedom from the upper respiratory tracts' diseases, risks of burning foods and cause injuries. This is evidently seen when cooking dishes that requires lengthy boiling. One of the households in the study explained how the adoption of the eCooking has also helped them to transition from unclean cooking environment to cleaner one: “

“I remember before I got this new cooker, my kitchen was very dirty because of the charcoal, and could not clean after cooking every meal as it was tiresome, now if you look at my kitchen a lot has changed and am not afraid of inviting my fellow neighbour to discuss issues while am cooking” (respondent from Kingulwira area).

- **Use of existing domestic energy infrastructure:** Households in the community generally have the required domestic electricity infrastructure to enable uptake of eCooking. It doesn't require any new infrastructure to use the energy/fuel and the appliances. This suggests the long-term potential towards facilitating the growth in the electric cooking space.
- **Use of off-grid eCooking as alternative to national grid:** Use of highly efficient electric cooking appliances could present an opportunity to use off-grid electricity such as household solar PVs, or mini-grid electricity (if there was one). For example, households with solar PV with capacity from 300W could use EPCs because it consumes very little energy and while requiring high pressure. The alternatives can be used as backup especially when there are regular power outages.
- **Employment and business opportunities:** adoption and use of EPCs could create employment, business and income opportunities. Examples are provided below.
 - **Sales agents.** Some households have developed interest in becoming EPC sales agents, taking advantage of the discounted purchase rates available to sales agents.
 - **Technicians** who have been providing after sales services by repairing or assisting the households on technical defaults, or selling the spare parts also earn income that can also help to sustain their families.
 - **Mini-grid operators** introducing the use of eCooking appliances can increase revenues of as the load increases.
- **Savings.** The use of efficient electric cooking appliances is associated with savings in terms of time that is used for cooking (it saves more than 75% of the time), fuel collection, energy saved as the appliance uses little energy which led to cost saving. The savings that are made can be utilised into other important family and business issues.

Challenges towards eCooking adoption and use

- **Low uptake.** Low uptake of the eCooking appliance can be attributed to different factors on supply and demand side of the appliance market chain. According to Shuma et.al 2021, the supply side can affect the appliance acquisition in terms of availability and accessibility (physical and economic). Their report detailed that the market systems are affected by policies and legal frameworks which set the conditions in which and by which markets operate, influencing the existence and functionality of supply chains and thus appliance availability.
- **Power unreliability.** The adoption of the electric appliance has been hindered by regular power outages. In the study, it was revealed the outages affected most of the households which force households to look for cooking alternatives which are expensive as the figure below indicated. The outage discourages and inflict fear to those who have not yet acquired their electric appliances. The fear of the fate of eCooking adoption was also expressed by some participants, that if the power is not enough it may lead into discouragement. According to Clemence & Todd 2022, the use of EPCS to households is increasingly important strategy to stimulate electricity demand as production increases, with projects such as Julius Nyerere Hydropower Station which when in full operation will contributing to a surplus of power that will end the doubts.

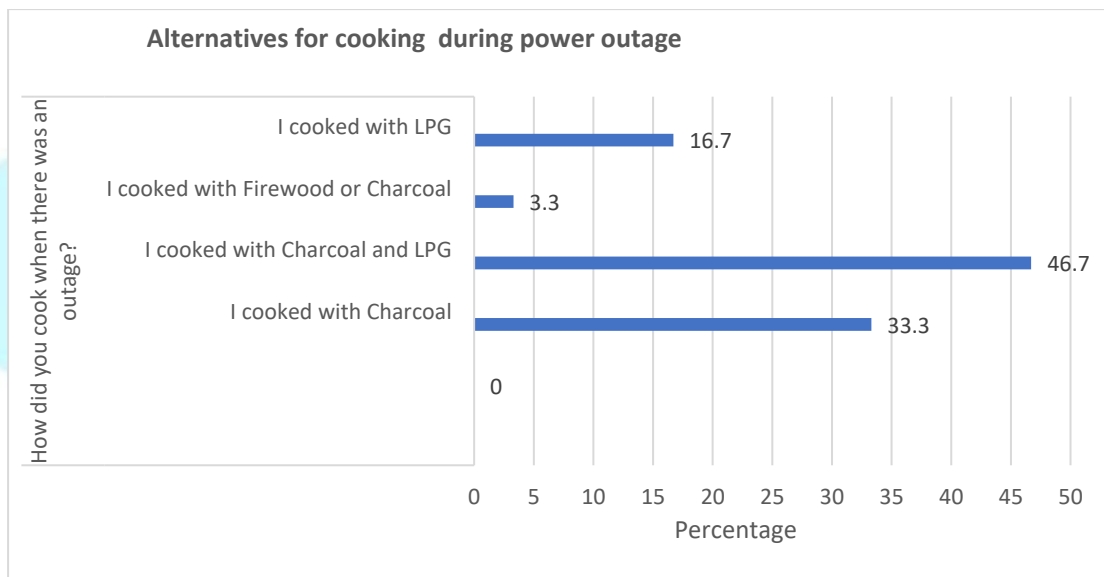


Figure 12: Alternatives during power outage

- **Ability to buy and pay for the appliance:** the data showed that adoption of the appliance is hindered by low purchasing power of most of the households, even though they have shown the willingness to acquire the appliance. The high upfront cost which is a longer investment horizon for poor households is the most significant barrier that affects household's uptake as appliances are expensive. On those grounds there is a need to ensure the appliances become affordable by developing some financing mechanisms such as on bill financing where households can pay for the appliance through their monthly bills, introduce the layaway mechanisms, also provide loans which can have repayment flexible terms from microfinancing institutions. It is important for the government to consider waiving the tax to make the appliance affordable as more than 40% of its costs is pegged on tax.

- **Cultural and behavioural barriers;** these are barriers which are linked to the cooking habits, traditions, cultural appropriateness of the device, and perceptions about the taste of food (smoky food). These issues in one way indicates that the use of the traditional fuels such as charcoal are preferred for certain kind of meals hence it results into fuel stacking. Cooking is deeply embedded in people’s way of life, and is woven into the very fabric of communities, which means that communities are likely to remain more resistant to change than they might be with other innovations. One of the respondents from Lukobe area said that: *“it will take time for our people in Morogoro to change their cultural as they believe cooking food with electricity especially rice won’t taste good like in charcoal”*.
- **Lack of familiarity with high quality appliances and availability of spares.** A sustained use of any product including eCooking is depending much on product quality and longevity, and product reparability, which depends on product complexity and local capacity to do repair and maintenance (Shuma et.al 2021).

 - It is informed that some households have not added appliance or bought new one because they are not familiar and can’t distinguish quality appliance. If the quality of appliances in the market is low it discourages the sustained uses, and a lot of complaints, thus lead into hesitant among the families to adapt and buy and use new technologies.
 - Fear of fire accidents in case of inappropriate use of the cooking appliances, availability of spare parts, perceptions of quality and reparability also effect initial uptake. The inability to guarantee maintenance of the appliances can contribute into low uptake. There is a need of continuous support to increase their understanding.

3.6 Longer terms Impact of ECO pilot study on Community

The implementation of the original ECO pilot study demonstrated that cooking with electricity is a good fit for the cultural processes of cooking for the community of the study as there were no changes in the meals cooked and menus after EPCs were introduced, rather changes on the frequency of the cooking and type of fuels. The impacts have been significant. Based on the data collected in the follow-up study, there has been increased eCooking use driven by reduced expense on their cooking, increased time savings and the overall efficiency of the EPCs.

The other long-term impact of the ECO project is that it has made cooking with electricity become acceptable to the community. The social cultural norms and perception on electricity and cooking has changed because of the awareness and exposure which the ECO project brought at the community. The study area is connected to electricity but only 2.4% of the households were using electricity for cooking before the introduction of the EPCs. The continuous awareness, the good practises and good experience from the ECO participants has conveyed positive impressions and make nine (9) households among the non-participants to develop interest and acquire their own EPCs. The continuous uptake of the EPCs assures a long-term use of electricity by the communities as their prime fuel to cooking.

The ECO project long term impacts have already started to be experienced on the households whereby it has become easy to plan on the chores. The EPC has the automatic timer knob. When the cook set timer, the EPC can continue cooking while the cook continues doing other tasks at house. It has reduced the drudgery to women and girls who mostly cook by significantly simplifying their tasks. It has reduced risks of women exposed to sexual and gender-based violence while collecting fuel on long distances. The drudgery has been reduced though less than 15% of the of households do charcoal/ firewood stacking.

Financial savings is a long-term impact of the ECO pilot as households reported that there has been significant reduction on the cooking fuel costs. The efficiency of the EPC has significantly contributed, and the savings made from fuel are now used to cover other costs in the family. Due to the benefits that have already been experienced by participants and non-participants of the ECO study, 76.7% of the households expressed their willingness to pay a higher electric bill to continue accessing eCooking.

Health issues were also among the factors which signify the long-term impact of the ECO project. The project has contributed much into making the community aware on the harmful and risky from the fuels which they were using. Continued uptake of the EPC can contribute to reduced indoor air pollution to make a sustained community with good health and lesser economic burden due to illness.

Section II: ECO Non-participants results.

- Primarily informed by non-participant survey.

3.7 Non-Participant Changes in Cooking Practices and Perceptions

- Have cooking practices for non-participants changed since the end of the pilot study? How? Have perceptions of eCooking changed? how? Why?

Current cooking practises:

During the follow-up study, 50 non-participant households were surveyed on their cooking practises, including the type of fuels and technologies used. Figure 13 indicates the most commonly used fuels for cooking were charcoal by 92% of the households and LPG by 90%. Electric appliances were used less: EPCs by 18% of households, electric kettle by 18% households, and rice cookers by 4% of households. three stone firewood stoves were used by 12%

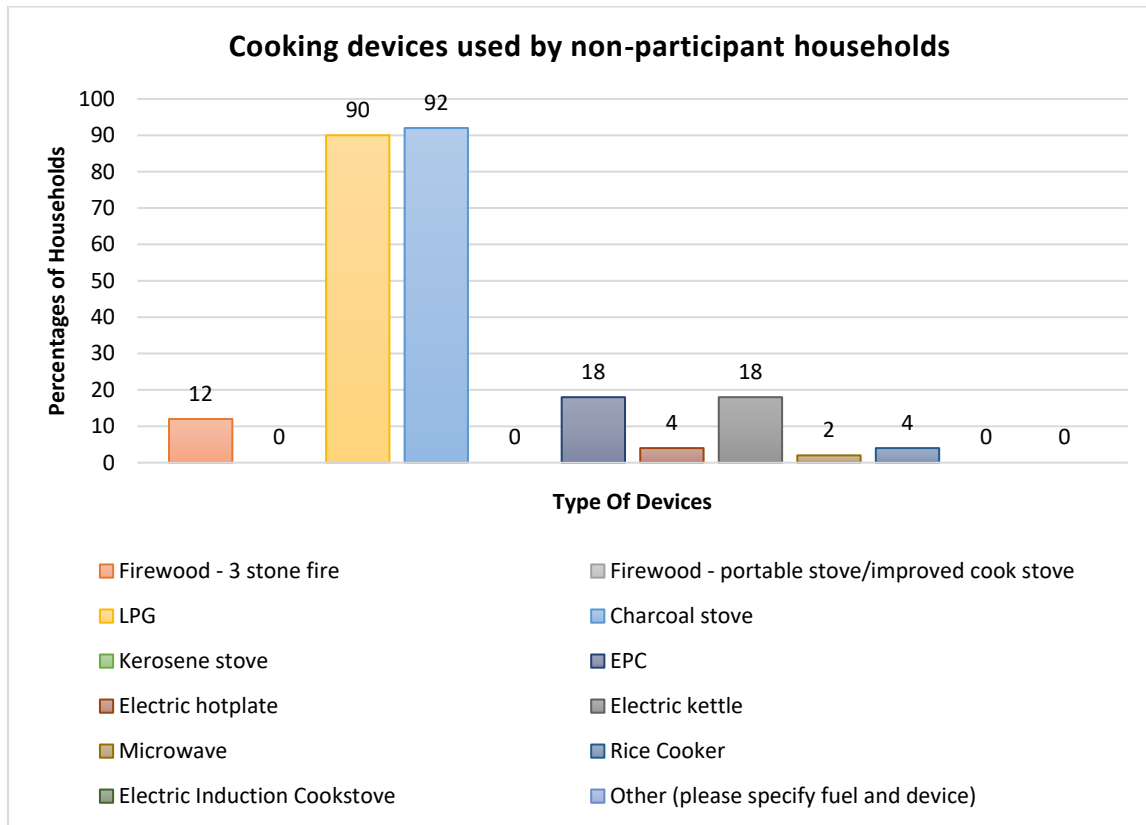


Figure 13: Devices used for cooking in non-participants houses (n=50)

Changes in cooking practices

In terms of changes to cooking practises since the start of the ECO pilot, 41 households (82%) said they had not changed their cooking practises while 9 households (18%) reported they had (Table 2).

Have you changed any of your cooking practices since the ECO project started?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	41	82.0	82.0	82.0
	Yes	9	18.0	18.0	100.0
	Total	50	100.0	100.0	

Table 2: Changes on cooking practices by ECO non-participants (n=50)

The main change reported was the increased use of electricity. Following the ECO pilot, nine households reported purchasing an EPCs, while 1 household purchased an electric Kettle. Another purchased an LPG stove. The reasons given for EPCs purchases were because they cook quickly and safely. Households reported cooking hard foods like beans and makande regularly on EPCs (no longer pre-soaking them as before) as cooking these hard foods on charcoal or LPGs was too expensive.

Changes in eCooking perceptions

In the study the perception of the non-participant households on the electric cooking was also reported to change. Based on the data collected and assessed, the households' perceptions on eCooking have changed while to other households the perceptions have not changed. Figure 14 highlights that 88% of the households' opinions have changed since the ECO pilot started. The opinion was majorly on the benefits of the electric cooking appliances which suggests that was because was

influenced by people they trusted and who have experience with appliances. The changes on the opinions over the eCooking were based on various issues including the level of fear and perception they had about electricity, the taste of the food, safety when uses, and electricity being expensive, and perception that it was difficult to use electricity.

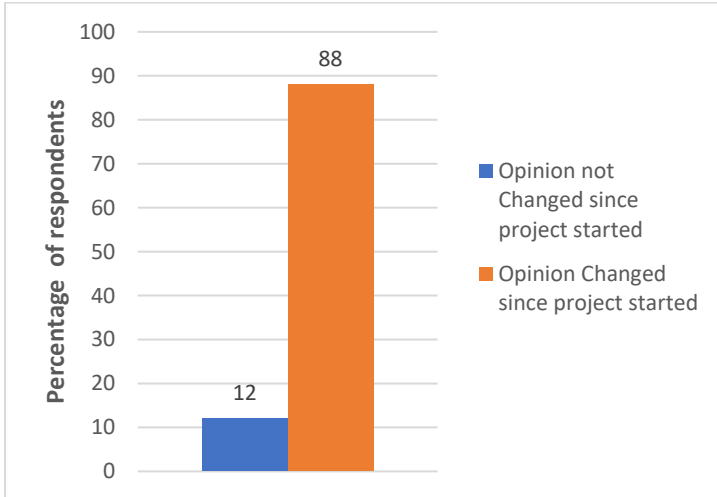


Figure 14: Changes in opinion among the households

It was also the intention of the follow-up study to assess on the other types of perceptions they have regarding the eCooking appliances. Figure 14 highlights these perceptions and indicates that non-participants still have concerns about eCooking and that more need to be done to raise awareness of the benefits of cooking on electricity as many hold outdated negative perceptions. Figure 15 shows that 42% of the households felt that cooking with electricity is unsafe, 74% said that cooking with electricity is expensive, while 76% of households felt that cooking with electricity is difficult. only 23% of households thought that food cooked with electricity taste better than other fuels.

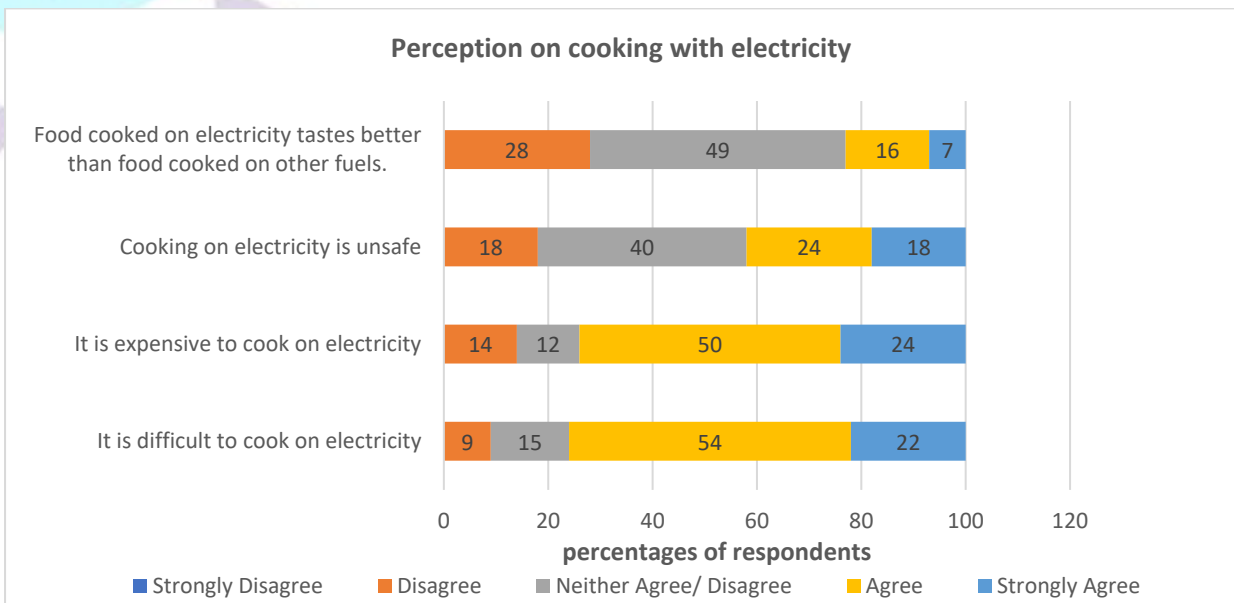


Figure 15: Perception of cooking with electricity (n=50)

Influence of ECO pilot on non-participants interest in eCooking

In the study, the assessment on whether there was any external influence through discussions with various people or organisations that led to changes in the cooking practises and the opinion of the households. It seems the spread of knowledge and information among the community members on EPCs and its benefits may have contributed to non-participant purchases of eCook appliances, increased interest in eCooking, and changed perceptions. Figure 16 highlights that friends and family members were the most people spoken to about eCooking. 14 households (28%) had time to discuss about electric cooking with family members, while 27 (54%) heard from friends, 4 (8%) from company representatives while 5 households (10%) heard news about EPCs from other sources.

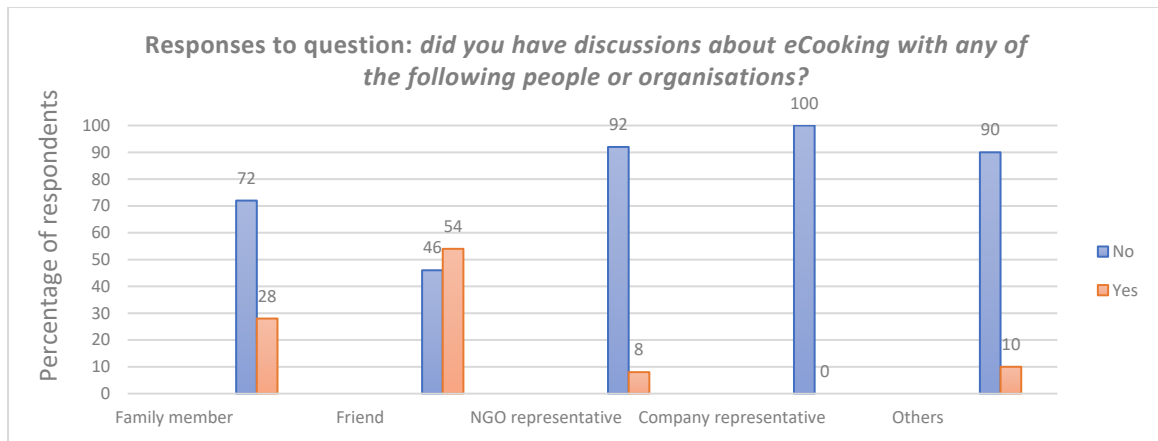


Figure 16: % of non-participant households responding yes/no to the question: did you have discussions with any of the following people or organisations.

In terms of the influence of these discussions in making non-participants more interested to buy an eCooking appliance, figure 17 indicates that friends are most influential, followed by family. 54% of households either agreed or strongly agreed that friends can influence while 28% reported the same for family. Only 10% reported NGOs and other organisations as having an influence although the sample size was small. On those grounds, the data suggests that friends and family members with good experience on the use of the appliances can have positive influence which may result into accelerated uptake and suggests opportunities for companies and organisations to use local community members to raise awareness and champion electric cooking.

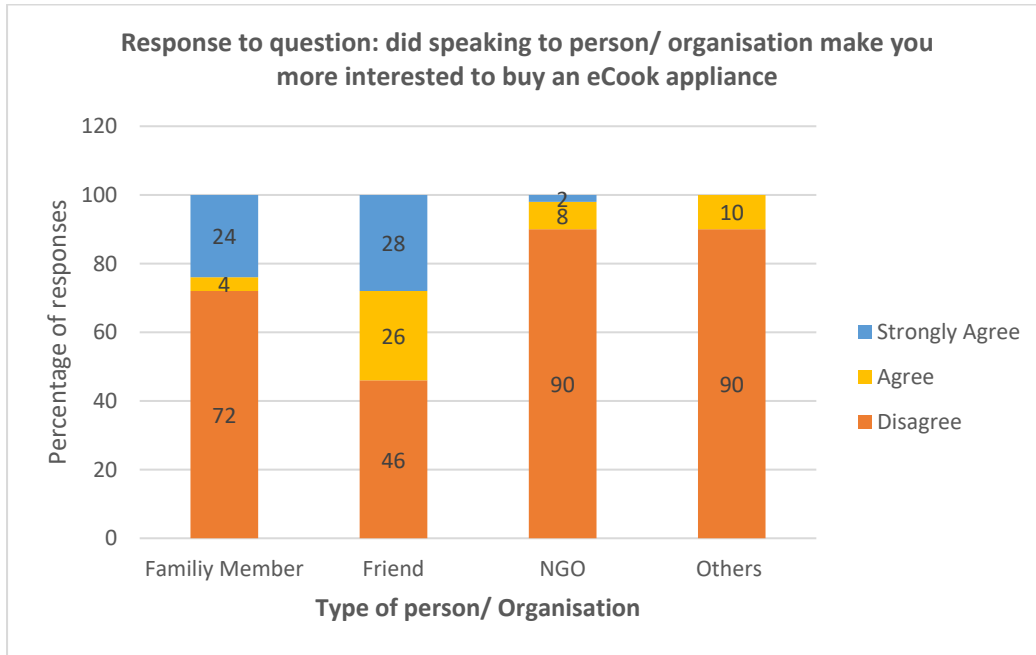


Figure 17: Responses on discussions with people/ organisation

In the study, it was also assessed on whether the non-participants knew any ECO pilot participants and information they got from the participants. 96% of the non-participants reported they knew an ECO participant, only 4% had no idea who were the participants of the study. It was also assessed whether the participants mentioned to the non-participants on anything related to the project and what exactly they were told about. Figure 18 illustrates the benefits of eCooking mentioned by participants to non-participants. Faster cooking which saves time, energy and money were the most common benefits highlighted. The information which non-participants of the ECO pilot received from project participants may in one way or another influence and made the households to develop interest on electric cooking appliance.

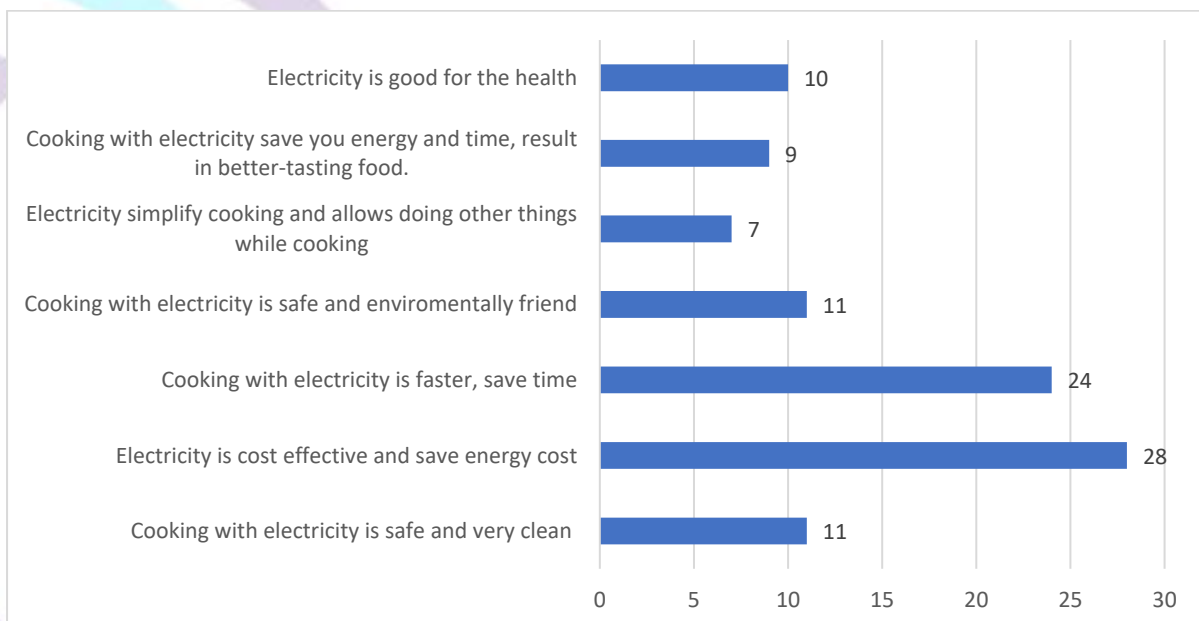


Figure 18: Information from eCooking discussions between ECO non-participants and participants n=50

3.8 Interest to buy eCooking appliance by non-participants

- Have any ECO non-participants expressed an interest to start using eCooking appliances?

In addition to the ten eCooking appliance purchase made by non-participants, it was also important to look at the broader interest of non-participants in buying or adding additional electrical appliance and type of appliance. Figure 19 indicates that households are interested on different types of appliances for different purposes. By far the main interest was in EPCs (78%) while interest for other appliances was less than 10% for each mentioned one. This implies that through the information they get from original ECO pilot study participants or friends, these particular households may have realised the various benefits of the EPC such as saving money and time.

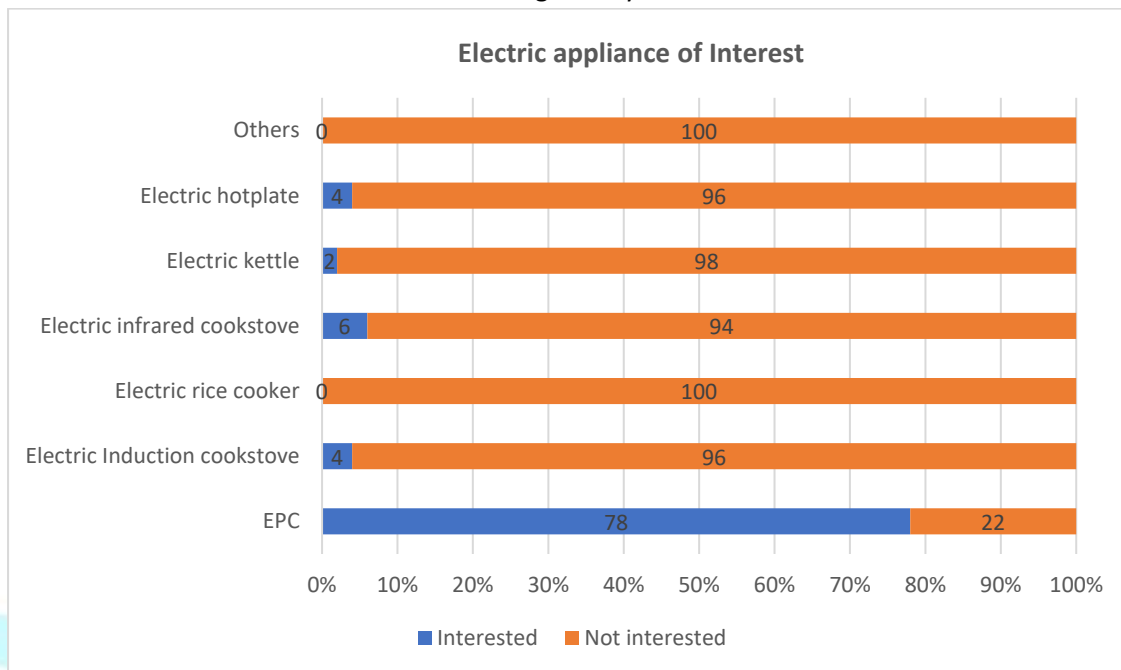


Figure 19: Electrical appliances of interest to non-participants

On the procurement of these eCooking appliances, the assessment on what could be the driving and determinants that leads into the procurement preferences among the non-participants was carried out for the participants to agree or disagree on the statements which were introduced to them. Figure 20 indicates that during procurements the preferences of the appliances is determined and derived by a number of different factors which may include self-decisions and opinions from other people based on how they perceive the appliance. Out of 50 households of the non-participants interviewed only 24 households (48%) disagreed on self-making decisions when purchasing the appliances. The given data from Figure 20 suggests that the non-participants think involving someone else who already have experience on the devices may help to get a good, high quality brand/ appliance.

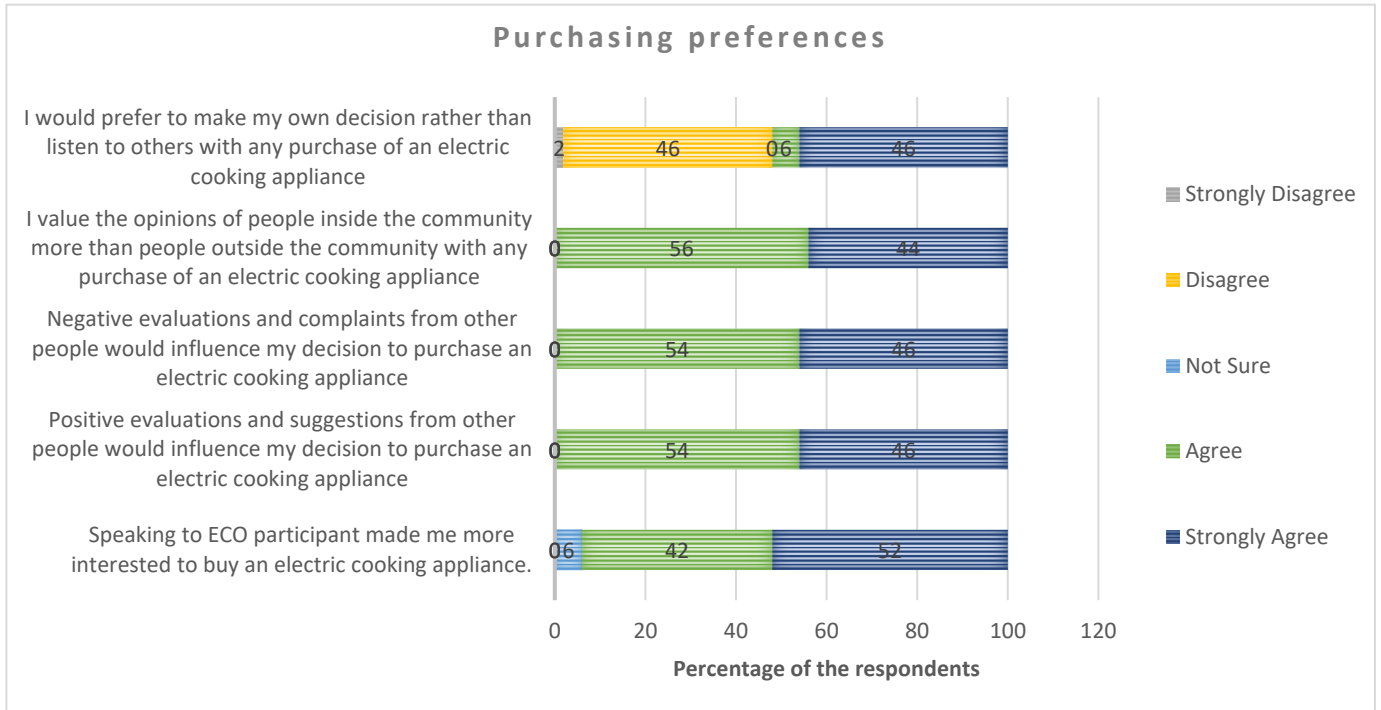


Figure 20. Purchasing preference by non-participants households

On the willingness to pay for the electric appliances, the most common responses were Tsh 100,000 (43 USD) by 32% of respondents, Tsh 150,000 Tsh (64 USD) by 14% of respondents, and Tsh 120,000 (51 USD) by 12% of respondents (figure 21). A range between Tsh 50,000f and Tsh 90,000 was stated by 26% of the families. Only 2% indicated to be able to buy the appliances at Tsh 300,000 and was willing to buy electric kettle and EPCs.

The market cost of eCooking appliances varies depending on the type, whereby costs ranges from Tsh 55,000 (for kettle) to 550,000 Microwaves and electric grills. Other eCooking appliances such as EPCs of different brand including SESCOM Electric Pressure cookers ranges from Tsh 140,000 to Tsh 250,000. The data suggests that 16% of respondents who are willing to pay for Tsh 150,000-Tsh 300,000 are the immediate customers who needs more awareness and guidance on how to acquire the quality appliances.

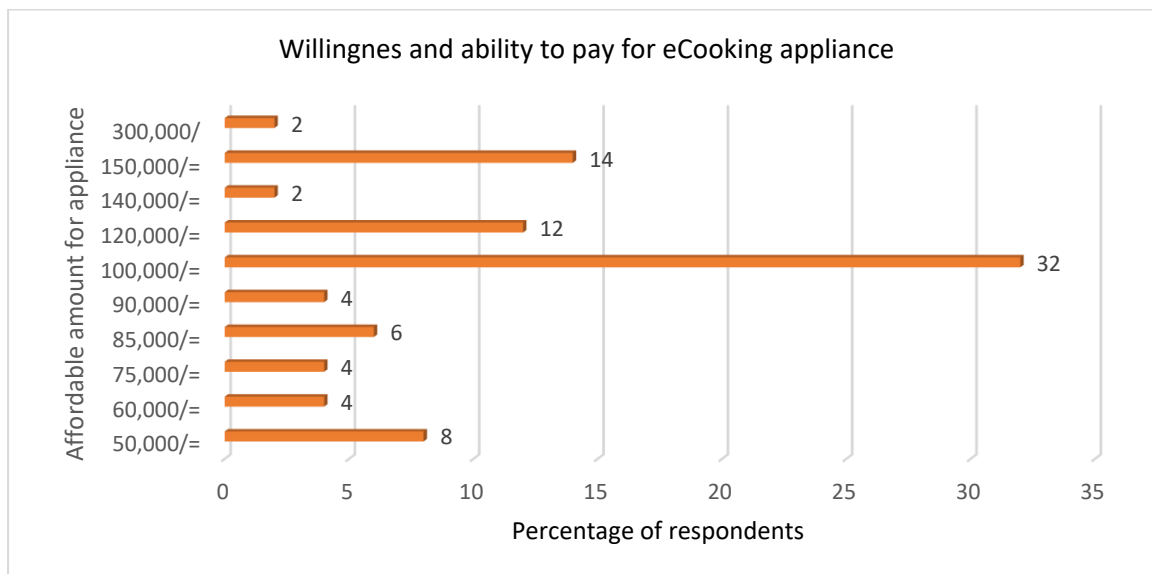


Figure 21: Ability to buy eCooking appliances.

It was also the interest of the follow-up study to understand how much do the non-participants houses pay for electricity and for charcoal which is common fuel to majority of the houses. This was aiming to assess the general expenditures on electricity at household (remember the electricity is used to power even non-cooking appliances) and amount spent on charcoal. Figure 22 and 23 highlights how much the families generally spend on these fuels. The electricity expenditure shown in Figure 22 is for all appliances and not only those used for cooking.

Based on the experience on the uses of electricity for cooking using efficient appliances (EPC), the households spend average of 2kWh per day if the households are entirely cooking with electricity. However, due to fuel mix which is commonly practised, the household can spend an average of 1kWh per day cooking with efficient cooking appliance. The average unit costs for urban tariffs are Tsh 355/kwh and Tsh 100/kwh in rural setting. On those grounds the households can spend an average of Tsh 355 -700 per day or Tsh 10,650 to 21,000/ per month for cooking with electricity. Figure 23 indicates the general costs for buying and spend on charcoal at non-participants households. Figures on expenditures varied due to size of the family, frequency in cooking and also nature and type of stove is used.

When comparing data from figure 24 and 23, the findings suggests that expenditures on electricity (an average of Tsh 10,650-Tsh 21,000) is cheaper than when uses charcoal. All interviewed non-participants households can afford to cook with electricity if get access and acquire the EPCs. This implies the necessity of creating awareness to this group on the savings they can make when they start use efficient cooking appliances.

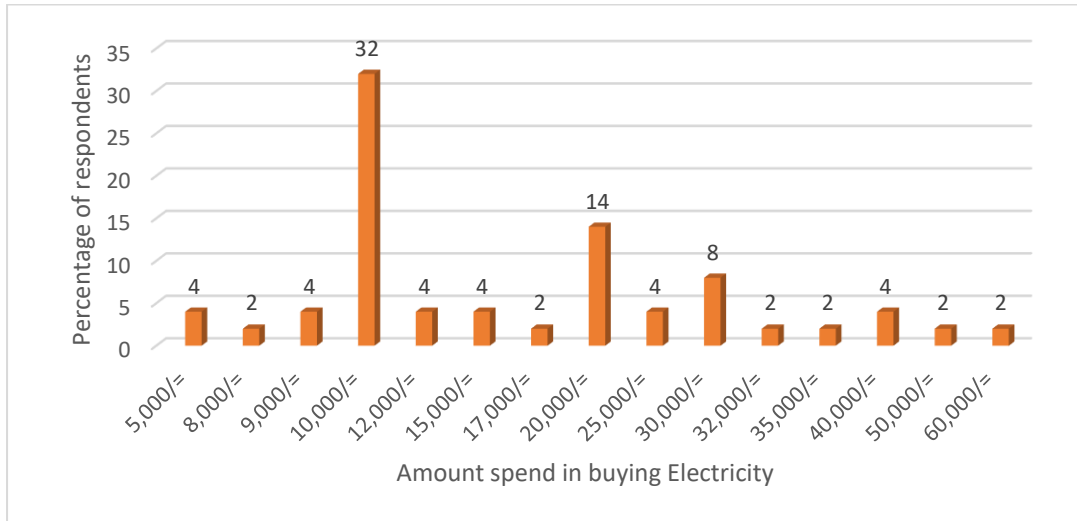


Figure 22: General expenditure on electricity for households.

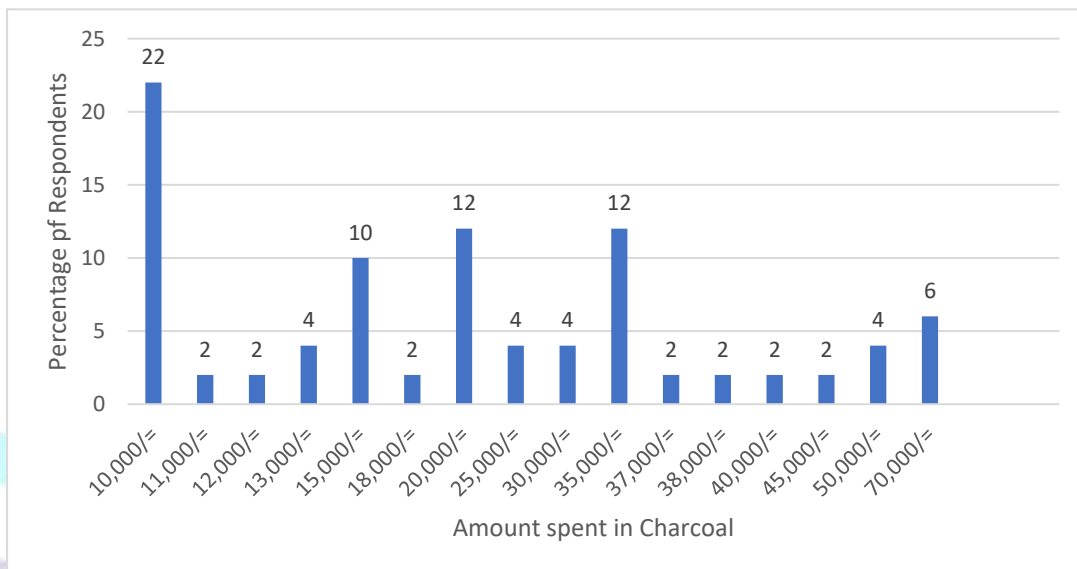


Figure 23: Expenditure on charcoal by households.

3.9 Opportunities and Challenges to start using eCooking-non participants

- What are the opportunities and challenges for non-participants to start using electric cooking?

The understanding on whether the non-participant sees or feel if there will be any challenge for them to access the electric appliance and start using it and the associated opportunities was also assessed.

Opportunities on using the eCooking to non-participants

- **Time, energy, and cost savings and multi-tasking:** Non participants could save time, costs and energy if they start using efficient electric cooking appliances. Using the eCooking appliances could as well provide the users ample time to do other households activities due to its semi-automatic mode of operation once the timer is set.

- **Reduced time and drudgery to look for cooking fuels:** By using the eCooking appliances it reduces the challenges of these families to look for fuels or re-filling whenever it is finished. Being connected to electricity provide users opportunities of using the readily available energy at home as no new infrastructure will be required as compared to LPG and charcoal.
- **Clean cooking environment:** since 88% of the respondents have indoor kitchen, there may be an incentive to start using the eCooking appliances to help maintain the clean environment at their kitchen place. When other alternatives especially charcoal and firewood is used it leads to smokes or soot on the cooking utensils, so switching to eCooking makes users to always appear smart.
- **Exposed to market development business:** awareness on the presences of eCooking appliance and its benefits could be turned into a business opportunity by non-participants households by becoming eCooking sales agents.
- **Financing models mechanisms:** the demand for the electric cooking appliance from non-participants could have trigger establishment of financing models that could support those wanted to acquire the appliances. These models could be under MFIs, or employees financing facility which ensure access to large number employees and early adopters.

Challenges to start using the electric cooking

During the data collection 28% of the respondents indicated that there will be challenges in accessing and use of the electric cooking while 72% indicated that there is no challenge for the same. Key challenges which were expressed included:

- Level of awareness and knowledge gap on the benefits of eCooking among the community members is still low whereby measures to address the situation are required.
- The low purchasing power to buy the appliance especially on upfront payment was expressed as a bottleneck because their income is seasonal.
- Fear of the reliability of the electricity was as well expressed as challenge, this is due to experience they have which they may force them to do fuel stacking most of the time.
- Difficulties in using the electric devices, especially for the first time, how to maintain them in case of the technical default, how to use it accurately and when it is damaged where to get the services.
- Some households were not connected to electricity during the ECO pilot study, so despite of being aware of eCooking, couldn't act as was no power at home.
- In Tanzania culture women are ones producing and preparing foods, and are ones decide on the type of food to be cooked daily, and cooking appliances to be used. All these are practical when they use the traditional fuels. The decisions to buy for the EPCs and other appliances which are more expensive relies on men, this can contribute to the low uptake especially if eCooking is not their priorities (*Byrne et.al 2020*). This was also attested by one of the respondents on how she managed to convince her spouse to buy EPCs.
- In some cases, the size of the family comparison to the size of the appliance has been used to hinder the households acquiring the appliances, claiming the appliance to be small that can't meet the cooking requirements of big families.
- Socio-cultural resistance to device adoption was also a challenge with some households believing that using modern cooking appliances cannot give out food with good taste as compared to traditional and common charcoal and firewood stoves.

4.0 Ways the ECO pilot can serve as launchpad to ‘out scale’ eCooking

- Research question 2. What are the ways in which the ECO pilot studies could serve as launchpads to ‘outscale’ eCooking in the community and its surroundings?

- Informed by the research and findings from research question 1 and any additional more targeted questions asked as part of the research.

The eCooking purchases, increased interest and change perceptions indicate there is a potential eCooking market for non-participants households. The ECO pilot project could serve as a launch pad to cater for this market and further out-scale eCooking in the community and its surroundings in the following ways.

- Building on the awareness raising from the ECO pilot can play a significant role in out scaling eCooking in the community and its surrounding areas. The original ECO pilot study managed to reach a certain range and group of people within the community through various community meetings, social services centres and at government offices. However, non-participants were found to still have concerns about eCooking, indicating the level of awareness concerning the benefits of eCooking is still low, and more efforts are required. Decisions to adopt and use eCooking appliances will of course depend on the influence of community members at different levels.
- More encouragingly, the ECO project seems to have had a positive impact on community perceptions of the EPC. 9 of the 11 eCooking appliances bought by non-participants since the end of the ECO project were EPCs while 90% of non-participants expressed an interest in buying an EPC, far more than any other eCooking appliance (infrared stoves, were second most of interest but only by 7% of respondents). As the EPC was not used in the community before the ECO project, these findings suggest these households developed interest in EPCs as a result of the project awareness efforts and” word of mouth” influences, particularly from friends and families.
- Marketing and sales of the appliances using various methods and strategies. Despite the fact that there was not much marketing for ECO pilot study, this method could have also been done by launching and airing various programmes in wider coverage media, use of social media accounts of the company using attractive messages.
- Word-of-mouth positive feedback from ECO participants and eCooking users can encourage efforts to scale the adoption of eCooking. Positive feedback from ECO participants likely had a significant impact on non-participants purchasing and using eCooking appliances.
- Maintaining the supply of appliances of high quality and standards can accelerate the uptake and use. During ECO pilot, the EPCs and other appliances which were used for the study were of high quality, this helps to spread of good message from the users which encouraged the market to adapt, and the users experience may in one way or another have impacts on the success of the clean cooking sector. When the appliance in the market is of low quality, it discourages the users, and the regular complaints may to lead distortion of the market and hesitation to switch into modern cooking technologies. It requires more awareness on to the end users on to identify high quality appliances in the market by looking at some notable key physical appearance features (*Shuma et.al 2022*)
- The equipment financing model trialled during the original ECO pilot could also be used as a way to out scale the appliance uptake. The model was to address the issues of affordability

even though there was willingness to pay but low purchasing power among the community members. Operationalising the financing models which can involve MFIs and cooperatives or women finance groups can help large number of people to acquire the appliance and repay at agreeable flexible terms.

- Ensuring availability of a knowledgeable and skilled team of technicians who can play role in providing the after sales services. The availability of after sales services including spares parts assures the users long term uses of appliance and they develop trust.
- Market development systems that ensure the last miles users access the eCooking appliances, this involves recruiting and use of sales agents at different level. Sales agents who are committed can distribute appliances to wider population where couldn't be possible for company to reach.
- The experience of the ECO project has increased the understanding of more on lobbying and advocating for enabling environment to enable the process of transitioning to eCooking appliances and scaling up efforts. According to Clemence and Todd (2022), the strategy of promoting electric cooking fits well with Tanzania's current status, future plans, and development priorities. It is one means of stimulating demand and generating revenue for the government and national utility in order to avoid falling into an uneconomical electricity surplus. The high prices of appliances also hinder the out scaling, so if the government supports and waive tax and duties, the unit price will go down hence the quicker uptake.
- End user training on the use of electrical appliances and provision of user guide manuals to end users is a way of making users secure with what they buy. Regular training reduces the level of fear among the users hence encourage the uptake.



5.0 Conclusion and Recommendations

Key conclusions:

- Participants of the study have continued to use the EPCs even after the end of the project. It was observed that the use of EPCs has become common among households and electricity has become the dominant fuel.
- The study has likely contributed to long term impacts which are associated with the use of electricity for cooking. It includes financial savings, improved health, and acceptance of electricity as primary fuel for cooking.
- The power outage was among the things which households didn't like when they are using EPCs, though they happen few times in a week. Households should be encouraged not to abandon the appliance as soon the country shall have a big supply of electricity.
- It was observed that there are some slight changes on cooking practises whereby men have developed interest in cooking.
- The original ECO study also appears to have had a broader impact beyond the pilot participants. 9 new users of EPCs were reported from the non-participants.
- Buying an appliance sometimes may not be a straight and self-decision rather an influence from family or friends who already have the appliances. Communities should be encouraged by giving the good testimonies of the benefits of eCooking.
- It was observed that while perception in the community on the eCooking have changed, many non-participants still held outdated concerns on the safety of the appliances, difficult in using and the electricity costs. It is evidently expressed by participants that those perceptions have made them spent a lot on alternative and unclean energy cooking solutions. It is recommended to continue with eCooking awareness and marketing to encourage uptake.
- Challenges to increased uptake include affordability. The low ability to buy additional appliance was expressed as a major concern among the respondents due to seasonal income and other social economic aspects. The introduction of financing mechanisms or government tax waivers may help address the affordability issues of the appliance unit cost.
- The follow up study highlights the potential for the ECO pilot study to serve as a launchpad towards increasing local uptake (or 'out-scaling') of EPCs in the community. A number of achievements from the project can be replicated in other locations to further extend the impacts.

Dissemination Plan

It is however with the interest of the project that the finding of the follow-up to be disseminated and shared with stakeholders at different levels. The stakeholders to receive the findings includes research bodies, the government officials and clean cooking alliances. Findings will help to show how the project has created significant impacts in the community, the challenges they are encountered and efforts which are made to ensure a total switch to clean cooking solutions while promoting the out scaling of the eCooking.

6.0 References

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7.0 Appendix

- Raw data sets.

Please refer to the original terms of reference for further guidance