

EXPLORING BARRIERS AND DRIVERS TO THE UPTAKE OF EPCS IN KENYA



Agnes Kalyonge demonstrating in the 'Pika na Power' kitchen. Photo credit by Kisambara.

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MECS note. The reliability of the data from the cooking diaries research has been affected by inconsistencies with data collection methods. A clear baseline phase was not established while the number of recorded events and when they were recorded varied considerably among participants. There were also issues with the new type of data logger used which affected the reliability of the quantitative energy data captured. As such, MECS recommends that the data from the cooking diaries and the datalogger should not form the basis of policy making or other applications without further triangulation from other data sources.

Executive Summary

Funded under the MECS Electric Cooking Outreach (ECO) challenge fund, the main aim of this project carried out by Kisambara Ventures Limited's was to capture the barriers to adopting Electric Pressure Cookers (EPCs) in Kenya and the impact EPCs have on long-term cooking habits. The project consisted of the following two main research components which together sought to better understand the opportunities to accelerate the uptake of efficient electric cooking appliances in Kenya:

1. A six-month EPC pilot study to understand how Kenyan households use EPCs, whether EPCs fit local cooking practices and the electricity supply, barriers to EPC use, and the impact the introduction of electric cooking may have on long term cooking habits.
2. Engagement with local financial institutions (SACCOs and Chamas) to identify mechanisms to break down the high upfront cost of EPCs to enable different socio-economic groups to access the technology.

Overall, the results of the EPC pilot study and SACCO/Chama engagement showed there were opportunities to increase electric cooking uptake in Kenya. The MECS cooking diaries approach was used during the EPC pilot cooking diaries data, with analysis carried out on 37 of the 70 participants. The results suggested that EPC use accounted for between 5% and 9% of dishes cooked during the pilot study. **However, further research is required to gain greater clarity on the expected usage due to reliability issues affecting the data from the cooking diaries research and the quantitative energy measurements captured from the dataloggers.**

The EPC was mostly used to prepare legumes, highlighting how the device complements the cooking of long boiling foods. Gas remained the dominant fuel used throughout the study although use reportedly fell from 81% of dishes cooked phase 1 of the pilot to 72% in the final phase 4. EPCs could form a larger part of the fuel stack if training and support is provided to enable and encourage people to cook the most common staples, ugali, leafy veg, and tea. These three dishes made up approximately half of the total cooking events during the project but were predominantly cooked on liquid petroleum gas (LPG) due to participant perceptions that the EPC was not suitable for cooking these foods. Covid-19 restrictions during the project implementation period severely restricted the live cooking demonstrations and in person follow up with participants that can enable participants to learn how to cook a wider range of dishes. These challenges could also be mitigated with a wider range of video recipes targeting these specific foods and EPC manufacturers could also assist by tailoring buttons labels and functions to East African menus.

An exit survey was carried out at the end of the pilot to better understand user experiences of the EPCs and provided further evidence of the potential to increase electric cooking in Kenya. All 70 participants were surveyed, and the vast majority of EPC user experiences were positive. All participants reported that they would continue to use the EPC and almost all (92%) stated they would recommend the EPC to others. Most (64%) reported they were satisfied with the EPC design and would change nothing about it and a majority (75%) stated they preferred cooking with electricity to other fuels as it was more convenient, faster, cleaner, safer and cheaper.

After receiving training and using the EPCs, participants' previous concerns that electric cooking was unsafe or expensive changed with 97% reporting a change in mind set. Food cooked on electricity was found to taste no better or worse compared to other fuels by the majority of participants (62). However, most (49) indicated there were dishes in their usual menu they could not cook in the EPC.

Most participants reported cooking practices changed during the pilot as the speed and convenience of the EPC enabled them to be more flexible about when they cooked. Women however remained the primary cooks after the introduction of EPCs with no major changes in gender roles although some participants reported that the introduction of the EPC had resulted in some men volunteering to cook simple meals.

Fuel stacking continued after the introduction of the EPC as households felt not all foods could be cooked in the EPC. Power outages also impeded EPC use and along with the perceived high cost of electric cooking was the main reason a majority (67%) reported they would not consider cooking solely on electricity. However, a significant minority (29%) reported 100% electric cooking is something they would want due to its convenience, and cost and time saving benefits.

By the end of the project the vast majority (66%) of participants reported that they would buy an EPC provided the price was 'right' although the price they were willing to pay varied, with most suggesting a figure noticeably below the market price. This finding also reinforced the rationale behind the second research component focused on identifying financing providers and consumer financing mechanisms that could help unlock at scale the adoption of EPCs by different socio-economic groups.

This second research component saw 24 Saving and Credit Co-operative Societies (SACCOs) and Chamas (smaller, informal cooperatives) engaged through emails, calls, in-person meetings, and demonstrations. Although responses were varied, the results overall highlighted potential for these organizations to increase electric cooking uptake in Kenya by providing financing for appliances and by encouraging their members to adopt electric cooking. As a result of this engagement, three Chamas and one SACCO began offering loan facilities for members to purchase EPCs from Kisumbari, leading to 17 EPC purchases.

Engagement with chamas was generally more successful than with SACCOs due to less bureaucracy, although the much wider reach (sometimes nationwide) of SACCOs is a key reason to pursue working with these organizations. Key lessons on how SACCOs and Chamas can be effectively engaged to start offering loan facilities for members to purchase electric cooking appliances were drawn from the project. The main recommendations were: 1) identify the key influencers and decision makers at organizations; 2) carry out live demonstrations and in-person meetings; 3) develop close working relationship with the Ministry of Energy and other large organizations to help influence SACCOs and Chamas; and 4) engage untapped potential among Chamas and SACCOs outside Nairobi.

Drawing together the findings from the various components of this study, the following were the primary recommendations to facilitate scale up of electric cooking in Kenya.

- Raise awareness to inform and encourage people how to use EPCs for a greater range of dishes including for staples such as ugali, leafy vegetables and tea.
- Increase marketing and awareness raising to raise the profile of electric cooking and overcome barriers such as perceived safety and cost issues.
- Develop more concerted awareness raising and marketing efforts to target male customers and encourage gender roles to evolve.
- Incorporate country specific functionality into EPC designs.
- Advocate for continued government support and improved electricity supply reliability to facilitate greater access to and use of electric cooking appliances.
- Explore the role of energy storage in mitigating electricity supply reliability concerns.

- Improve access to electric cooking after sales services by opening up more strategically placed service centers outside Nairobi.

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1. Introduction

We are pleased to submit this report highlighting the analysis carried out by the Kisambara Ventures Limited Electric Cooking Outreach (ECO) project which was funded by the Modern Energy Cooking Services (MECS) programme and tasked with studying the barriers to adopting Electric Pressure Cookers (EPCs) and the impact EPCs have on long-term cooking habits of Kenyans. The project had two main research components (below) which together aimed to better understand the opportunities to accelerate the uptake of efficient electric cooking appliances for urban dwellers in the two target communities in Kenya.

1. Capturing barriers to adopting EPCs and the impact they have on the long-term cooking habits through a six-month pilot study.
2. Identifying financing providers and consumer financing mechanisms that will help unlock at scale the adoption of EPCs by different socio-economic groups based on the fact that the initial cost of investment for an EPC is very high for some.

The pilot mainly targeted participants with a constant and reliable supply of grid electricity and aimed to incorporate households from a diverse range of background, including households with single parents (both male and female), housewives with husbands who are the sole breadwinner, bachelors and bachelorettes, and married couples who are both working. The project also explored if there would be any changes in gender roles once the EPCs were introduced as culturally the woman plays a major role in most Kenyan households.

The pilot assessed how much of the daily menu the participants would use the EPC for once they realized the potential of the device. Most Kenyans currently believe that pressure cookers only boil foods. In addition, we planned to change the perception that people have about electricity being an expensive medium to cook with. There is a negative connotation around using electricity to cook because it immediately registers to most Kenyans as expensive.

The financing providers we targeted were Saving and Credit Co-operative Societies (SACCOs) and 'Chamas' (informal cooperatives) which have a very wide outreach in Kenya and therefore have potential to scale the uptake of electric cooking. These organizations ranged from the very formal and structured organizations that have a lot of red tape and bureaucracy to the very informal ones with five to ten members. This was going to help us better understand how effective each of the providers were and how to utilize their strengths while overcoming their weaknesses in addressing the financial needs of our target social groups.

Project aims and objectives:

1. Assess changes in cooking culture / habits after introduction of the EPC.
2. Gather real time data to show the consumption of energy used for cooking and how frequently the EPC is used and for how long.
3. Gain insights on how different households from different backgrounds adopt and use the EPCs.
4. Gain a deeper understanding of different financing providers and preferred financing options to accelerate the uptake of EPCs at scale, including among low-income households. This focus targets the FCDO objectives of helping the world's most vulnerable and delivering value for money.

2. Methodology

The project consisted of two main research components:

1. A six-month electric cooking pilot study conducted in Nairobi and Homabay counties with 70 participants to understand the barriers to EPC adoption and whether EPCs fit local cooking practices and the local electricity supply.
2. An outreach to identify financing providers who could help address the issue of the upfront cost of EPCs for potential customers.

The initial project proposal aimed to see how the uptake of EPCs could be unlocked for the urban poor, however, due to challenges that resulted from the Covid-19 pandemic we had to change our strategy and incorporate middle income households. Hence, we changed the project title to *“Exploring barriers and drivers to the uptake of EPCs in Kenya”* to encompass our new direction.

2.1 Research component 1: EPC Pilot Study

OVERVIEW OF RESEARCH APPROACH

The pilot study was carried out in the counties of Nairobi and Homabay with 70 participants (61 in Nairobi, and 9 in Homa Bay which is in western Kenya). Among the 70 were eight enumerators who acted as both participants and data collectors. All participants were connected to the grid and their consent to participate was obtained before the project started.

The MECS cooking diaries approach was the main research method used during the pilot study. The cooking diaries format included four phases (baseline, transition, monitoring, and endline) and was preceded by a household selection survey. After the cooking diaries was completed, an exit survey was carried out to better understand user experiences of cooking with electricity.

HOUSEHOLD SELECTION SURVEY

The household selection survey formed a very important step in our project because it helped us decide on the participants who would be the best fit for the pilot study. After obtaining consent, we carried out the survey at the point of EPC purchase by the customer.

The data obtained from the survey guided the selection of households for the pilot study. Participants were selected who cooked at least twice a week. Our aim was to incorporate as much diversity on the living scenarios as possible into the project. Therefore, we made sure that we had different household dynamics which included married couples (with or without children), bachelors and spinsters (both geographical and permanently based), single parents, and friends living together. This was intended to help us contextualize how cooking decisions are made, which gender cooks more, and if the introduction of the EPC was going to change the existing cooking dynamics in different households.

COOKING DIARIES

The cooking diaries approach was the primary research method used for the pilot and involves participants keeping a daily diary of what they cook and how, with this data then matched with energy measurements of the cooking fuels used. The method was used as it enables a better understanding of how participants adopt and use EPCs, whether EPCs are a good fit for local cooking practices and the local electricity supply, and how their introduction might lead to any changes in cooking habits.

During the project, the eight enumerators visited participants weekly to note the cooking events which the households had recorded on a daily basis in a cooking diaries form as well as record measurements of fuels used. The enumerators subsequently transcribed their paper records onto Excel worksheets.

The eight enumerators had several roles. They were participants in the project, educated the participants on how to use EPCs, and were on call to assist participants in case they had any challenges. Live cooking demonstrations were also used to educate on EPC use, safety features and cleaning.

At its core, the cooking diaries method is a before and after approach. A baseline is first established of the participants' existing cooking practices which is then compared with any changes that take place after the introduction of a new appliance, in this case an EPC. Drawing on previous MECS research, the cooking diaries approach in this project consisted of four phases (as well as EPC training). A description of the different stages of the study is provided below.

- **Baseline:** During this phase, information was gathered on the participants' existing cooking practices including: foods cooked, fuels and appliances used, how many times a day households cooked, the people who cooked the meals, and if water was boiled.
- **Training:** Training was conducted with enumerators and participants on how to use the EPC safely. The enumerators were trained first on how to use and maintain EPCs before passing on this training to participant. Participants were then asked to sign a consent form agreeing to join the project and confirming they had received and understood the safety training.
- **Transition:** In this phase EPCs were introduced to most households. As with the baseline, data was collected on foods cooked, fuels and appliances used, number of meals cooked, who cooked them, and if water was boiled. This data was gathered either through phone calls or person to person meetings. Energy data on LPG and charcoal usage was collected once a week. Electric cooking events data was logged using data loggers connected to the cloud.
- **Monitoring:** This was the longest phase (3 months). To avoid participant and enumerator fatigue the less intensive light cooking diaries approach was used where enumerators made weekly visits. In a typical MECS monitoring phases, only electric cooking is monitored to help avoid fatigue. However, this project took a more comprehensive approach and collected data on all the different fuels and cooking devices used in this phase. As with all phases, participants had free reign to cook any dish they liked with whichever fuel they liked.
- **Endline:** During this phase the enumerators replicated the more intensive, daily data collection in the transition phase.

CHANGES TO THE COOKING DIARY APPROACH

The pilot study was intended to last 6 months. However, the project extended up to July 2021 because of challenges experienced with the data loggers which were found to be malfunctioning. This issue resulted in an additional 2 weeks of data collection in October for some of the households (Figure 1).

Among the first 35 households recruited for the study, a misunderstanding saw some of this initial group start using their EPCs in the baseline phase. The use of electric cooking invalidated the baseline phase which is intended to establish cooking practices before an eCooking intervention is made. To address this issue, most were switched to the 'cooking diaries light' approach which consisted of only the third 'Monitoring' phase. Another 35 households were subsequently recruited and carried out the full cooking diaries study (i.e., all four phases).

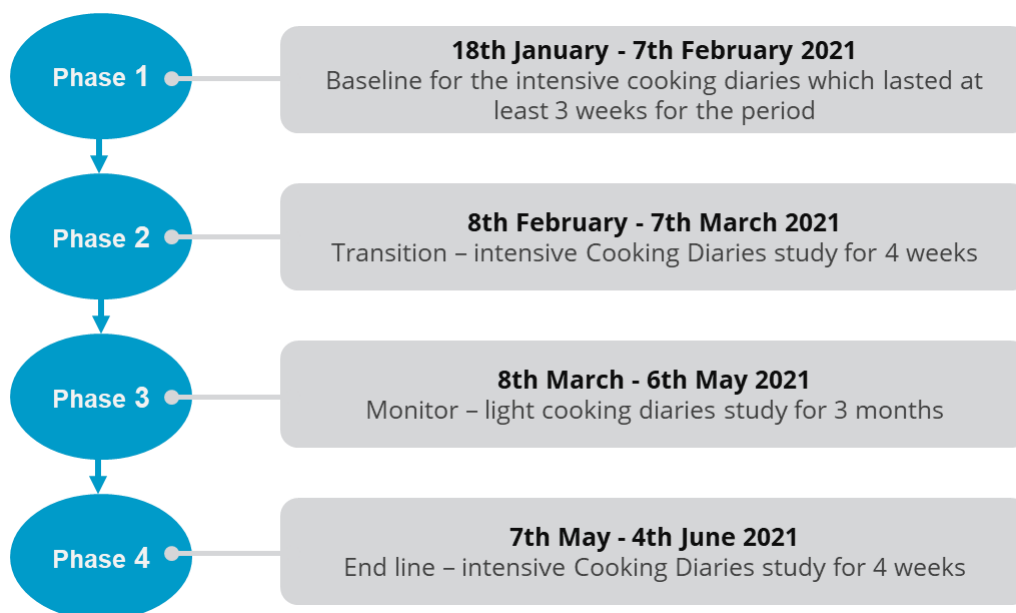


Figure 1. Adapted timelines for the Cooking Diaries study.

IMPACT OF COVID-19

Covid-19 came with its own set of challenges. Nationwide curfews were imposed and in the initial phases of the lock down people had to be in their homes by 7 pm latest. This meant that people had to cook earlier than they were used to, and some took on batch cooking of their meals. All the business premises would get locked by 6.30 pm and it was not easy for the people coming back from work to find the ingredients that they needed. This led to some people adopting unhealthy cooking / eating habits. We had to change our project from being very heavily reliant on in-person live cooking demonstrations to virtual and over the phone consultations. This was in an effort to reduce the spread of Covid-19. The pandemic meant the project had to alter course slightly from focusing on how to unlock EPCs for the urban poor to exploring barriers and drivers to the uptake of EPCs in Kenya for a wider section of the population. This resulted in the incorporation of the middle-income households in the project who were more easily accessible.

COOKING DIARIES: CHALLENGES AND LIMITATIONS

All care was taken to ensure that the enumerators were sufficiently trained on safety, how to approach and interact with participants, safe and correct usage of the EPCs, how to collect and record data correctly. However, several significant challenges arose which are detailed below.

- The data recorded by four of the eight enumerators proved to be unreliable because of inaccuracies and inconsistencies in recording it. This data was removed from the final report,

meaning only 37 households have been included in the cooking diaries analysis: 28 from Nairobi and 9 from Homa bay.

- The cooking diaries data was first collected on paper forms and later inputted by the data analyst in the software for analysis. In as much as all caution was taken by the enumerators to ensure that collection of data was done as per the procedures, some errors and ambiguity of some of the answers was found. The process could have been more accurate if the collection of data was done directly online via mobile phones or laptops to prevent any error during transfer of data from the enumerators' paper copies to the analyst's software.
- Some participants used EPCs in phase 1 meaning a clear baseline was not established and therefore there are uncertainties regarding which appliances and fuels EPCs replaced.
- The project captured electricity consumption data using a new data logger which had difficulties collecting data consistently. The dataloggers would stop working due to amperes not being set properly or internal configurations that would result in a white screen where no data would be transmitted to the cloud. These reliability issues with the data loggers meant they could only be used for part of the pilot study and therefore is an incomplete representation of participants' cooking.
- The data logger challenges resulted in the project being paused twice so these issues could be addressed and the project ended up extending from July to October. This led to some participants getting fatigued because it took more of their time than they had initially signed up for.
- The lack of in person training and follow up due to covid 19 is also likely to have had a significant influence on the usage of the EPCs, as live cooking demonstrations and in person support has a strong influence on the range of dishes that cooks choose to cook with their EPCs.

The reliability of the data from the cooking diaries study and the quantitative energy measurements has been affected by these issues and therefore should not form the basis of policy making or other applications without further triangulation from other data sources.

EXIT SURVEY

Following the completion of the endline phase of the cooking diaries study, exit interviews were carried out with all 70 participants to find out user experiences of electric cooking and barriers to uptake. The survey was developed by drawing on ideas from other surveys developed by MECS country partners and covered a range of areas including:

- Attitudes and perceptions towards electric cooking
- Changes to cooking practices during the cooking diaries
- Appliance review (Whether they liked the EPCs or not, how easy they were to use, etc.)
- How they found the taste of cooked with electricity (vs on other fuels)
- Fuel stacking
- Willingness to pay for an EPC now that the project was over.
- Stability of electricity supply
- Issues (if any) that might have arisen regarding safety, repair and maintenance of the EPCs.



Figure 2: One of the project participants who we interviewed as part of the exit survey.
Photo credit by Kisambara.

EQUIPMENT AND INCENTIVES PROVIDED:

All participants purchased a Hotpoint EPC. Safety of the participant was central to the whole project being a success, therefore, we set out to source our EPCs from reputable companies only which had to have excellent after sales service, and products with the CE mark of certification.

As the project was happening in the middle of the Covid pandemic, affording an EPC was not a priority for most. Therefore, to encourage participants to join the project we offered the EPCs at a subsidized cost. EPCs were distributed through the following organization which were found to offer a timely, secure, and prompt service.

- Through motorcycle riders for clients within Nairobi.
- Via parcel delivery services through transport systems for clients who are out of Nairobi.
- By using the demonstration center of the state utility, Kenya Power and Lighting Company (KPLC), as a pick-up point for people within the central business district.

All participants were provided with data loggers for measuring the amount of electricity consumed when cooking, with the data sent automatically to the cloud for storage and subsequent analysis. The dataloggers were a new design developed specifically with a cooking diaries study in mind and captured real time data on cooking start time, cooking duration, foods cooked, and cooking method. In addition, enumerator was provided with a weighing scale to measure charcoal and LPG use.

REPAIR AND AFTER SALES SERVICES

The Hotpoint EPCs used in the project were all under a one-year warranty in case of any breakdowns. Hotpoint also has service centers in different areas of Nairobi city and recently introduced a collection point at Eldoret for clients in western Kenya. The service is very prompt for the Nairobi city dwellers but the up-country clients experienced challenges and dissatisfaction because of the long time it takes for the EPCs to be delivered to the collection point, be brought to Nairobi for repair and servicing, and

then taken back to their collection centers. This could be improved by opening up more strategically placed service centers outside Nairobi to ease the turnaround time.

The EPCs were durable, and we did not get many complaints about the devices breaking down. The few instances we had were quickly fixed and the EPCs returned to the owners and in the rare case that a device was unrepairable, it was replaced. Kisambara also provided additional after sales services to participants. Once clients had had their EPCs for a while, we sometimes made entire meals with them on calls to help people reap the full benefits of their pressure cookers.

2.2 Research component 2: Identifying financing providers

OVERVIEW OF RESEARCH APPROACH

The second research component of the project aimed to better understand the potential for Saving and Credit Co-operative Societies (SACCOS) and 'Chamas' (informal cooperatives) to provide financing options to members to accelerate the uptake of EPCs at scale among low-income urban households. Within Kenya, SACCOS and Chamas are key investment avenues because they have much greater outreach than traditional bank accounts and because they provide avenues for long-term saving and accessing loans. The difference between Chamas and SACCOS is defined as follows:

- **"Chama"** in Swahili refers to an informal cooperative that comprises of people who come together with similar interests. The chama in this report refers to a group of like-minded individuals who've agreed to contribute a fixed amount of money at agreed time intervals and at each meeting the collected funds are given to different members at rotating intervals until each of them has had their turn and the cycle starts all over again.
- **SACCOS** (Saving and Credit Co-operative Societies) on the other hand are formal and are registered under the cooperative society act. The money that members save can only be accessed in the form of loans or when a member decides to quit the SACCO and withdraws all their savings.

The aim of engaging Chamas and SACCOS was to help unlock the uptake barrier of the EPCs that is caused by the high initial cost of the devices. By having these organizations come on-board and start offering loan facilities for members to purchase EPCs from Kisambara, it could potentially enable members to take advantage of the fact that they could pay for the appliance slowly over time via instalments. Customers could also start using the EPCs as they paid for it which might increase awareness of the benefits among the wider community and lead to increased uptake.

ACTIVITIES CONDUCTED AND RESULTS:

We sent out proposals (via email) or in person meetings to more than 20 SACCOS and chamas with varying degrees of success. Some reverted and, as Kisambara, we were able to go ahead and start working with them. However, there are some that never got back to us, and all our efforts went unanswered. Follow up meetings for SACCOS were carried out via phone calls, email correspondence and in person meetings. This was mostly dictated by the organization's availability and comfort (due to Covid restrictions). The chamas were mostly engaged via phone calls and in-person meetings at their group gatherings. All the SACCOS and chamas (apart from the teachers SACCO in Mwingi county) are based in Nairobi.

The SACCOs and Chamas we targeted ranged from the very formal and structured organizations that have a lot of red tape and bureaucracy to the very informal ones with five to ten members. This was going to help us better understand how effective each of the providers were and how to utilize their strengths while overcoming their weaknesses in addressing the financial needs of our target social groups. With Chamas, we approached those in the market places because of their cash flows.

CHANGES TO THE RESEARCH APPROACH

Our initial approach mainly focused on larger SACCOs because we felt the more members an organization had, the greater the chances of there being members on board with the clean cooking agenda. However, we quickly ran into problems of red tape and bureaucracy with many larger organizations and changed our approach by trying to identify the ones that have incorporated energy and clean cooking agendas into their programs. This made it easier to secure interviews, for example, with Stima Sacco and Equity foundation group because we were going to in complement their efforts.

2.3 Gender, social inclusion, and leave no one behind (GILNOB)

GILNOB concerns were incorporated into the project and methodology. Electric cooking can help address the problems women and girls, who are normally the primary cooks, face using biomass fuels for cooking by reducing indoor air pollution and improving overall health.

Kisambara Ventures made sure women and girls from low-income households were included in the project by making them aware of the benefits of electric cooking. Twenty women from low-income households bought EPCs and fifteen became part of the ECO project. These women usually sell their wares at the market and do not make high daily earnings. However, Kisambara Ventures encouraging them to buy EPCs through Chamas or SACCOS and some were able to purchase EPCs this way because of the weekly merry go rounds in their chama. The fact that we had subsidized the price of the EPCs for the people who wanted to join the project was a major contributing factor to them being able to afford the appliance. To assist people who were not in any saving group to afford a device, we provided the option to pay in three instalments and then pick up the EPCs upon completion of payment.

The majority of the enumerators and data collection group were also women. This made it easier to connect with the women in the target communities who were the majority of the research participants. We created a space for women to work with women because they are the ones who tend to handle the kitchen duties in most homes therefore, they feel at ease consulting each other. We also worked with women as the core task force in both permanent and temporary positions in the company. They were involved in monitoring the meals being cooked by the participants on a daily basis as well as filling in the information on an excel template. We gave them an option of making phone calls to the participants instead of visiting them on a daily basis to collect data as they were not in close proximity. This enabled them to have more time to pursue other activities.

In terms of other aspects of GILNOB and safeguarding, Kisambara did not work with people with disabilities, remote communities and nor engage with children during this project. No negative consequences (intended or unintended) resulted from Kisambara Ventures ECO activities.

2.4 Key Stakeholder Interactions

Over the course of the project, MECS, KPLC, Kisambara employees, women chamas, Hotpoint and the delivery services we worked with each had unique roles that they played which, when all combined, made important contributions (see Table below). The worldwide network of MECS and the countrywide network and trusted brand of KPLC are likely to be particularly important in expanding the outreach of electric cooking in Kenya going forward.

Key stakeholder	Role
MECS:	They made it possible to carry out the project to its successful conclusion from the support they provided. This included financial, advisory, and also leveraging their connections and networks to open doors for us.
Kisambara employees:	The employees were devoted to ensuring the success of the project. They played a significant role in ensuring that the project went as smoothly as possible and smoothing over any hurdles along the way.
KPLC	Our partnership with them gives clients, and potential ones, confidence to deal with Kisambara because it's a trusted household name. This has been very key to our success.
Delivery services:	The methods that we came up with to facilitate delivery proved to be very useful, the delivery personnel always delivered the packages without any damage to them in transit.
Hotpoint:	They stock quality products that do not breakdown easily and have a very robust service centre. This enabled us to build the Kisambara brand as one that is highly regarded and trusted.
Women chamas:	The chamas provided us with a platform to do live cooking demonstrations, thereby, enabling us to get participants for the project as well as generate sales.

2.5 Electric cooking community engagement and awareness raising

To support the objectives of this study, we carried out various community engagement and awareness raising activities.

SOCIAL MEDIA.

Kisambara ventures, through Jikoni Magic, collaborated with Nimoh's Kitchen through her [Instagram page](#). We were able to recruit some participants for the ECO study through her page. Kisambara's social media pages also served as a way of training the participants on the use of the EPCs as well as their versatility on how much they can do. Jikoni Magic has posted several cooking videos which have demonstrated how the EPC fits naturally into everyday cooking. This was to further amplify the versatility of the EPC as not just a gadget for boiling but it can do much more. For instance, the [Pressure cooker playlist](#) on Jikoni Magic's YouTube channel.

LIVE DEMONSTRATIONS.

The Pika na Power demonstration kitchen by KPLC proved to be a very important platform for Kisambara Ventures. This was mostly because even though public gatherings had been banned by the government during the Covid-19 pandemic, they were still ongoing at KPLC (although in a very limited capacity) because they had the facilities to implement and observe strict Covid-19 protocols as per the Ministry of Health guidelines. We used this platform to further the understanding of clients who needed more understanding of the EPCs. We found the platform to be very important to on-board participants to our project.

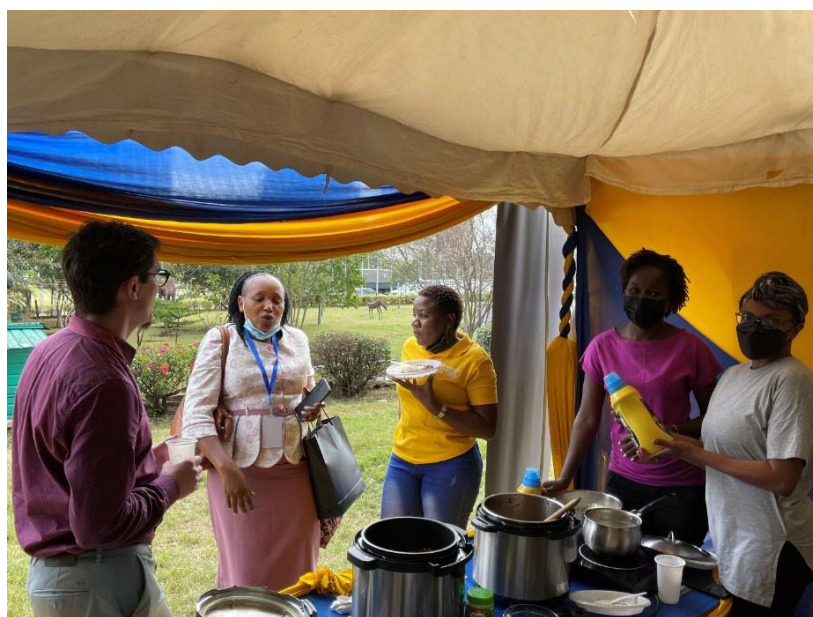


Figure 3. Demonstration event hosted by Clean Cooking Alliance of Kenya (CCAK) at Kenyatta International Convention Centre (KICC), Nairobi. Photo credit by Kisambara.

Kisambara Ventures Limited offers catering services under the umbrella of Jikoni Magic and this provided another opportunity to demonstrate the EPCS as we got an offer to cater for a function at an end of year graduation party for one of our employees' children. At the event, we used the EPCs to cater for 200 guests (both adults and children) and also had a slot to give a brief talk about EPCs to the parents who had attended (Figures 4-6). The response was very good with a lot of questions from the audience.

This opportunity made us realize that there is a gap for institutional sized EPCs that can do the work more efficiently. In as much as the EPCs helped us not get dirty and convenience of cooking, it was not the most efficient way to achieve the results we were after. We used three 8 litre EPCs to cook the food in batches before emptying the cooked dishes into a big pot.



Figure 4. EPCs being set ready for the catering job.
Photo credit by Kisambara.



Figure 5. Pilau dish that was served at the graduation ceremony.
Photo credit by Kisambara.



Figure 6. Agnes Kalyonge of Kisambara Ventures giving a small speech about EPCs and clean cooking to guests at the graduation ceremony. Photo credit by Kisambara.

EVALUATION OF THE METHODOLOGY:

To improve the study, some respondents (15) recommended for the questionnaires to be shortened and the project duration reduced. On the other hand, an equivalent number (17) stated that they felt no improvements were required on the way the study was conducted. Challenges were experienced because of Covid-19 that restricted visits to clients' and participants' homes although this was largely overcome by switching to phone calls.

Feedback from the exit survey highlighted most respondents (50) were okay with the enumerators as they found them very helpful and friendly. Furthermore, there was an indication that despite some reservations about the research process, they got along well with the enumerators and later on they were able to enjoy the visits and interviews. However, there were respondents (12) who reported the visits and interviews being intrusive and inconvenient as they interfered with their schedules and took long. As a result, they recommended for electronic or virtual engagements to save on time and allow them to engage more conveniently and reduce or rather avoid intruding into the respondents' house. Dataloggers were used during the study but the issues experiences suggest it would have been better to go for devices that were tried and tested.

Participants in the pilot used LPG as their primary fuel. In future projects we will on-board participants who have charcoal as their primary source of fuel because the impact of the direct comparable benefits that the EPC offers over charcoal will be larger.

The approach taken with the Chamas and SACCOS was very useful in understanding how to effectively engage these organizations and have their members come on-board and start offering loan facilities to purchase EPCs. Live cooking demonstrations also proved effective because they allowed us to field questions from those who attended. However, because of the government's guidelines on public gatherings, we found ourselves with a smaller audience. We intend to create systems to enable us to do virtual cooking demonstrations to reach a wider audience. The YouTube videos that we've uploaded have also generated interest and moving forward we will create more to sustain the interest.

The above methods have been effective because they have bolstered the clients' confidence in us. It has also resulted in positive word of mouth about us because of the satisfaction levels experienced.

3. Results:

3.1 Results for Research Component 1: EPC Pilot Study

3.1.1 Household selection survey results and analysis

We found that some of the households in the project owned a wide array of efficient electrical cooking appliances (EECAs) whilst others (especially in low-income households or where people live alone) had only one or none at all apart from the EPC that was supplied by Kisumbari at the start of the project. Some of the households had gadgets that were not in use and had been relegated to the cupboards, for example, induction cookers, air fryers and rice cookers. The appliances that were actively being used and were on the countertops were the microwaves and the electric water heating kettles. The microwave was primarily used for reheating food by most households while the kettle (if it's there) was the preferred choice for boiling water in the kitchens either for food, beverage or bathing.

3.1.2 Cooking Diaries results and analysis

MECS note. The reliability of the cooking diaries has been affected by inconsistencies with data collection methods. A clear baseline phase was not established and the number of recorded events and when they were recorded varied considerably among participants. There were also issues with the new type of data logger used which affected the reliability of the quantitative energy data captured and will. As such we recommend that the data from this cooking diaries section should not form the basis of policy making or other applications without further triangulation from other data sources.

Analysis was conducted on 37 of the 70 households that participated in the cooking diaries study. The reduced number is due to the challenges noted in the methodology regarding inconsistencies with data collection methods, the unreliability of the dataloggers, and participant fatigue from the project extended beyond the agreed upon duration.

The 37 households analyzed consisted of various family types (Figure 7). Single households (43%) and couples without children (27%) were the most common family type among the participants. In 35 of the 37 households (95%), the main registered ECO participant was female (Table 1). Nine of the 37 participants were from Homa Bay (2 couples and seven single households).

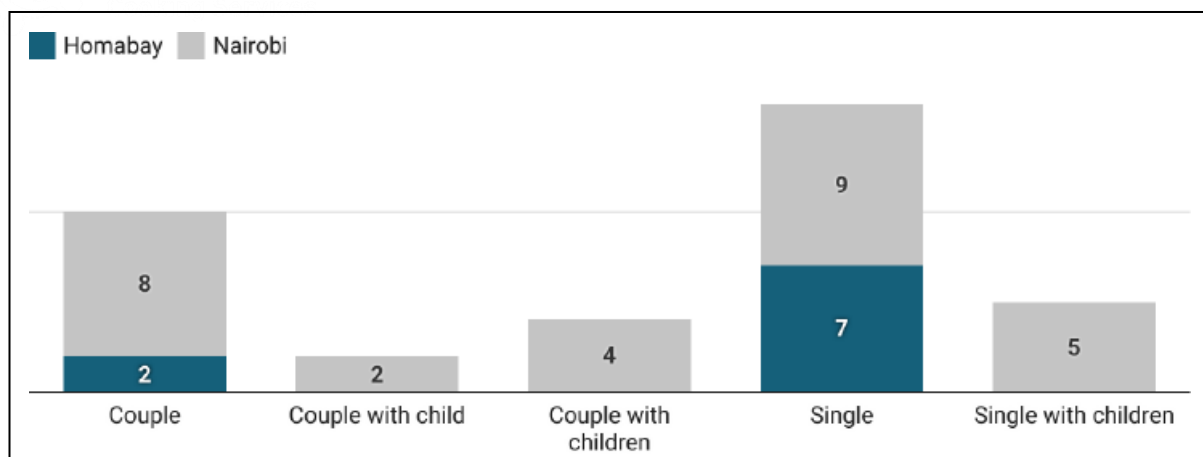


Figure 7. Family type among the analyzed cooking diaries participants

Table 1. Gender of the cooking diaries participants

Gender of registered ECO participant	No. of participants in Nairobi	No. of participants in Homa Bay	Total Participants
Female	28	7	35
Male	0	2	2

HEATING EVENTS

Figure 8 shows heating events recorded between January 2021 and November 2021. August and September 2021 had relatively low heating events recorded due to issues with data loggers which necessitated a pause in the enumeration work while a resolution on the data logger issue was being pursued. February and March 2021 recorded the largest number of heating events at 3,297 and 3,644 respectively. April 2021 recorded the third largest number of heating events.

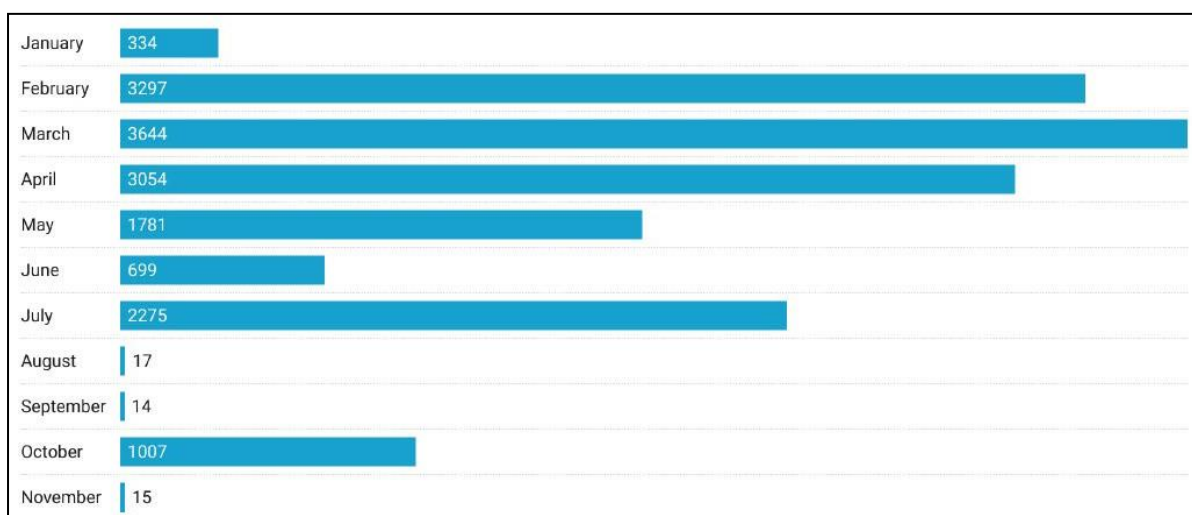


Figure 8. Heating events by month

Figure 9 shows the number of heating events in each phase of the cooking diaries study. Being the longest phase, phase 3 has most heating events (41%). The average number of heating events per participant was higher in Nairobi (459 events) than in Homa Bay (364) (Figure 9a). In terms of the proportion of heating events by meal type in each location, dinner was cooked far more than lunch in Homa Bay (Figure 9b). In Nairobi, there were noticeably fewer heating events for phases 1 and 2 than phase 4 (despite being of equivalent duration) (Figure 9c). **This imbalance and the lack of phase 4 data for Homa Bay may be due to inconsistencies with data collection methods.**

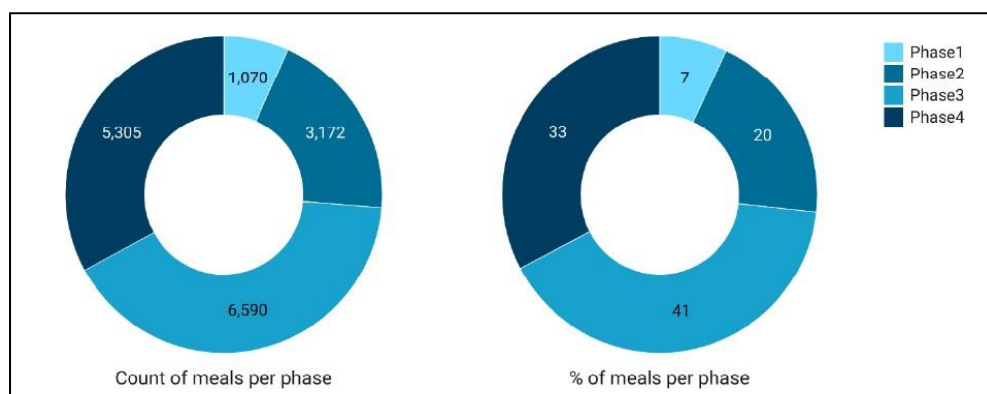


Figure 9. Heating events by phase

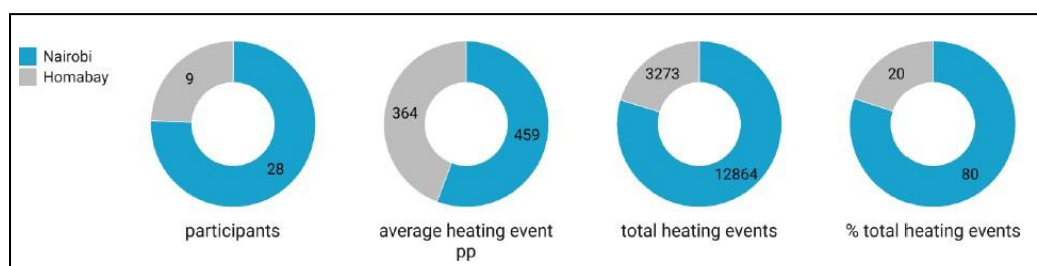


Figure 9a. Heating events by location

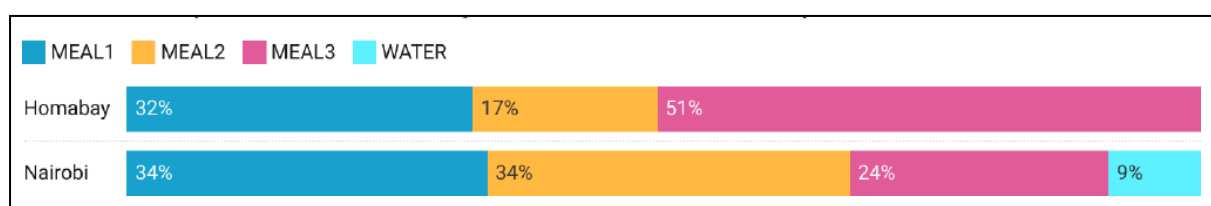


Figure 9b. Heating events by location and meal type

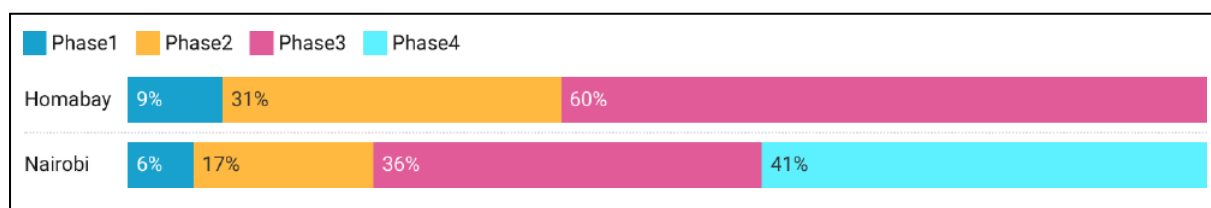


Figure 9c. Heating events by location and phase

Table 2 shows the sum total of all heating events per household and per family type. The number of heating events varied considerably among participants. A couple with a child recorded most heating events (1,133 events) while a single household recorded fewest (34 events). **The number of heating events correlates with the number of days when participants recorded data (Table 3) and seems to indicate inconsistencies with data collection methods.**

Table 2. Number of total heating events by participant and family type

	Study Participants	Ordinary household	Single household	location	family_type
1	DO_Alice Omburo	418		Homabay	Couple
2	DO_Ambrose Nabiswa	381		Homabay	Couple
3	DO_Brian Lumumba		383	Homabay	Single
4	DO_Dorothy Otieno		278	Homabay	Single
5	DO_Joyce Tibira		281	Homabay	Single
6	DO_Margaret Odhiambo		436	Homabay	Single
7	DO_Mary Omondi		356	Homabay	Single
8	DO_Pamela Kageha		413	Homabay	Single
9	DO_Stacey Mwaka		325	Homabay	Single
10	GN_Irene		39	Nairobi	Single
11	GN_Kayole		464	Nairobi	Single with children
12	GN_Kiambu		411	Nairobi	Single with children
13	GN_Kikuyu		451	Nairobi	Single with children
14	GN_Kinoo	416		Nairobi	Couple
15	GN_Loice		42	Nairobi	Single
16	GN_Lucy		65	Nairobi	Single
17	GN_Regen		34	Nairobi	Single
18	GN_Riara	454		Nairobi	Couple
19	GN_Ruaka	564		Nairobi	Couple with children
20	GN_Umoja		329	Nairobi	Single
21	GN_Umoja 2		72	Nairobi	Single
22	GN_Uthiru	182		Nairobi	Couple
23	MARG_Alice Gacheri	1,085		Nairobi	Couple with child
24	MARG_Ester Muthoni		659	Nairobi	Single with children
25	MARG_Jackline Akoth	1,133		Nairobi	Couple with child
26	MARG_Margaret Malelu	1,021		Nairobi	Couple with children
27	MARG_Sophy Wanjiku		929	Nairobi	Single with children
28	MARG_Victoria Kamau	1,048		Nairobi	Couple with children
29	MARG_Virginia Chege	1,045		Nairobi	Couple with children
30	MARM_Bachelorette		171	Nairobi	Single
31	MARM_Benedicta Akumu	1,045		Nairobi	Couple
32	MARM_Fridah		38	Nairobi	Single
33	MARM_Jacinta	178		Nairobi	Couple
34	MARM_Joan Juma	458		Nairobi	Couple
35	MARM_Married Couple	180		Nairobi	Couple
36	MARM_Single + child	179		Nairobi	Couple
37	MARM_Spinster + 1 child		172	Nairobi	Single

Table 3 displays the average number of heating events per participant on days when data was recorded. The average number of heating events per day per participant over the study period was four. An average of eight heating events per day was the highest recorded by any one participant while the lowest was two.

Table 3. Average number of heating events per participant on days when data was recorded.

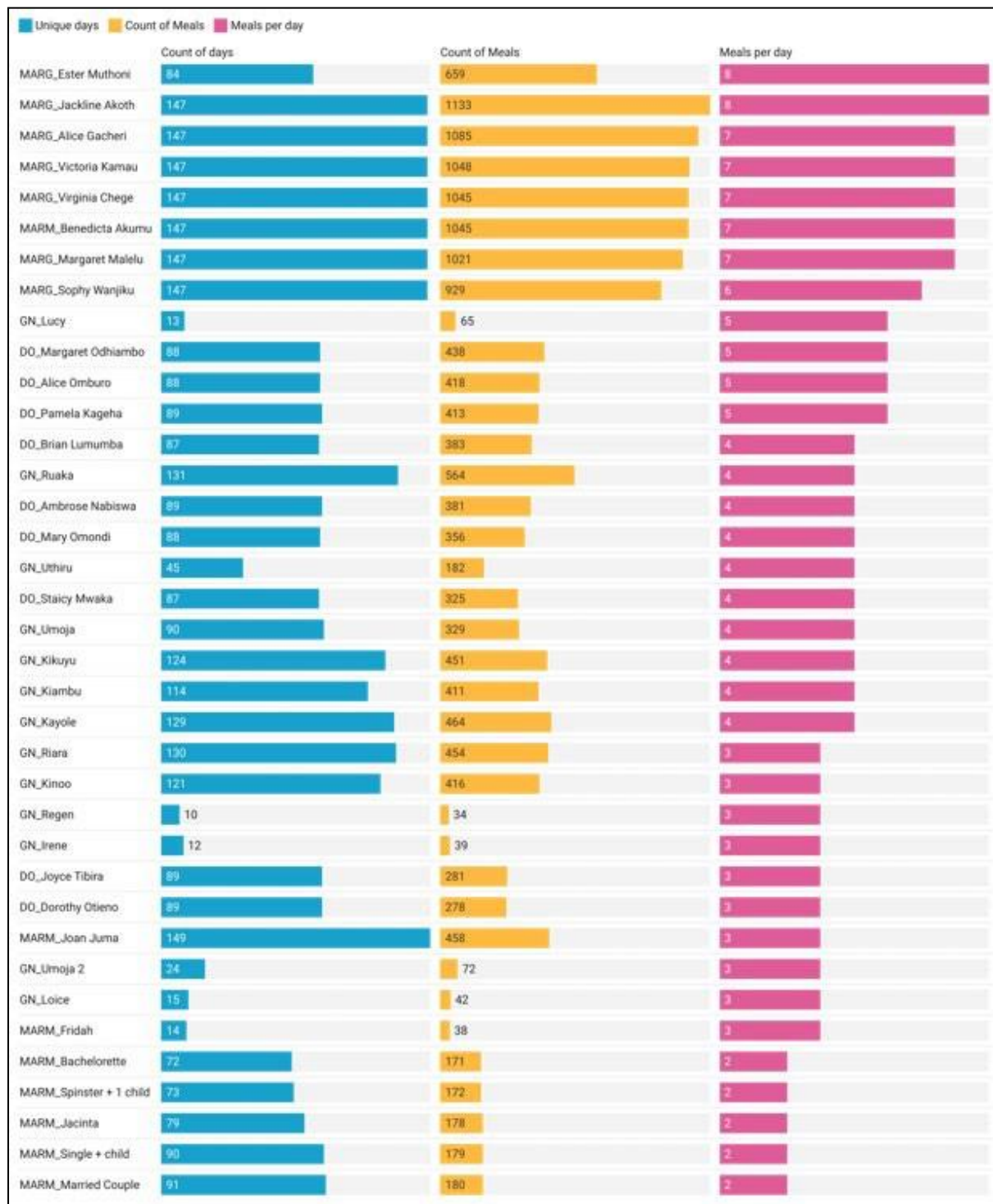


Table 4 shows the total number of heating events per meal type for each participant. There appears to be a correlation between enumerator (see capitalized letters in first column) and heating events, notably the lack of meal 3 and water heating events for many participants. **This suggest that there may have been inconsistencies with the data collection methods used by different enumerators.**

Table 4. Total number of heating events per meal type for each participant

Study Participants	MEAL1	MEAL2	MEAL3	WATER	Grand Total
1 DO_Alice Omburo	112	99	207		418
2 DO_Ambrose Nabiswa	127	47	207		381
3 DO_Brian Lumumba	120	98	165		383
4 DO_Dorothy Otieno	118	10	150		278
5 DO_Joyce Tibira	118	10	153		281
6 DO_Margaret Odhiambo	118	104	216		438
7 DO_Mary Omondli	117	56	183		356
8 DO_Pamela Kageha	119	85	209		413
9 DO_Staic Mwaka	105	53	167		325
10 GN_Irene	17	18	3	1	39
11 GN_Kayole	282	174	8		464
12 GN_Kiambu	244	146	21		411
13 GN_Kikuyu	363	78	10		451
14 GN_Kinoo	250	155	11		416
15 GN_Loice	18	20	4		42
16 GN_Lucy	15	28	20	2	65
17 GN_Regen	10	5	19		34
18 GN_Riara	248	176	30		454
19 GN_Ruaka	227	276	61		564
20 GN_Umoja	166	150	13		329
21 GN_Umoja 2	28	44			72
22 GN_Uthiru	94	78	10		182
23 MARG_Alice Gacheri	168	348	425	144	1,085
24 MARG_Ester Muthoni	96	228	252	83	659
25 MARG_Jackline Akoth	147	399	441	146	1,133
26 MARG_Margaret Malelu	266	273	336	146	1,021
27 MARG_Sophy Wanjiku	174	273	336	146	929
28 MARG_Victoria Kamau	293	256	353	146	1,048
29 MARG_Virginia Chege	289	269	340	147	1,045
30 MARM_Bachelorette	76	75	20		171
31 MARM_Benedicta Akumu	289	269	340	147	1,045
32 MARM_Fridah	18	18	2		38
33 MARM_Jacinta	86	83	9		178
34 MARM_Joan Juma	179	266	13		458
35 MARM_Married Couple	97	81	2		180
36 MARM_Single + child	96	81	2		179
37 MARM_Spinster + 1 child	77	75	20		172

Figure 10 shows heating events per meal per phase. Being the longest phase, phase 3 has most heating events across all meals. **The number of heating events per meal type varies considerably across phases 1,2 and 4 (despite the phases being of similar duration) which may be due to data collection inconsistencies.**



Figure 10. heating events per meal per phase

Table 5 highlights the number of participants who recorded data for a particular meal type over the whole study period. All participants recorded data for meals 1 and 2, with all but two recording data for meal 3. Only 10 participants recorded data for water heating.

Table 5. number of participants recording data for each meal type

Meal type	No. of participants	% of participants
Meal 1	37	100
Meal 2	37	100
Meal 3	35	95
Water	10	27

Figure 11 displays the percentage of participating households recording data for each meal during each phase. The proportion of households is broadly consistent across phases, increasing slightly over the course of the study for meal 1 and decreasing slightly for meal 3.

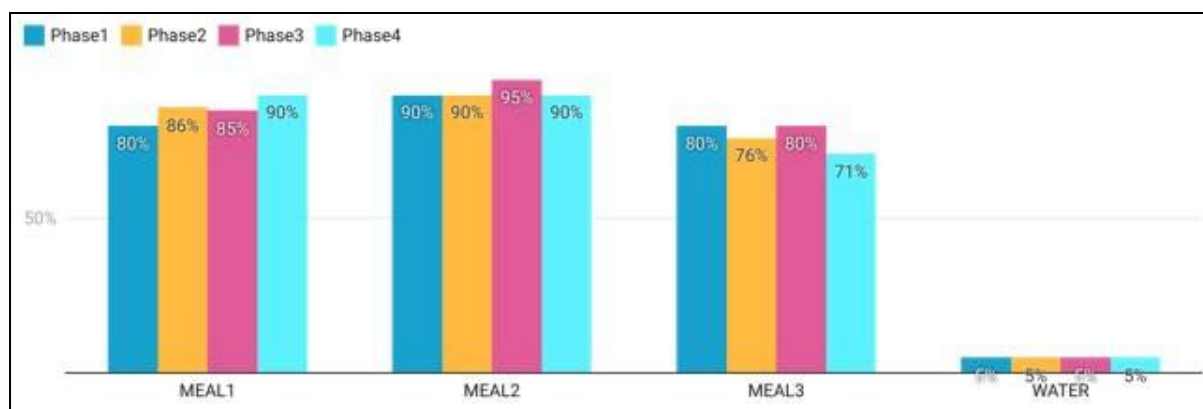


Figure 11. Proportion of participating households recording data for each meal by phase

Figure 12 highlights the distribution of heating events across each meal type. Breakfast, lunch, and dinner were cooked in similar proportion. Water heating was less common, reflecting the fewer number of participants who recorded data on this metric (Table 5).

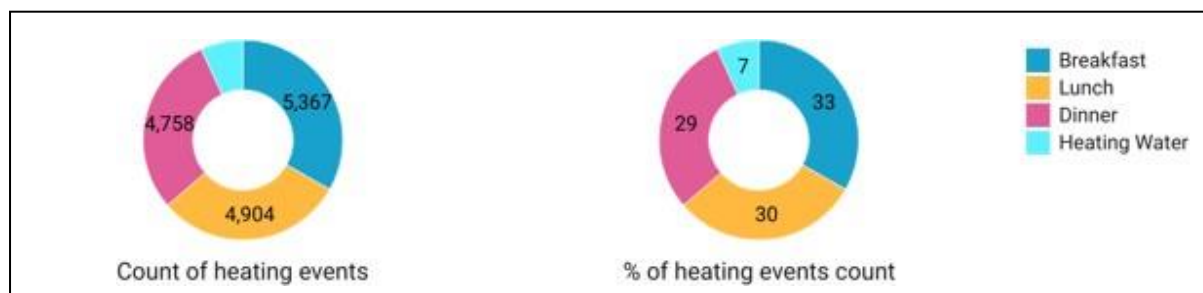


Figure 12. Distribution of heating events by meal type

Figures 13-14 potentially enable comparisons between the number of heating events for single households and couples (both with and without children) per meal type. However, it is difficult to determine trends as there are a large disparity between the number of overall heating events per phase. **As previously noted, this may be due to data collection inconsistencies.**

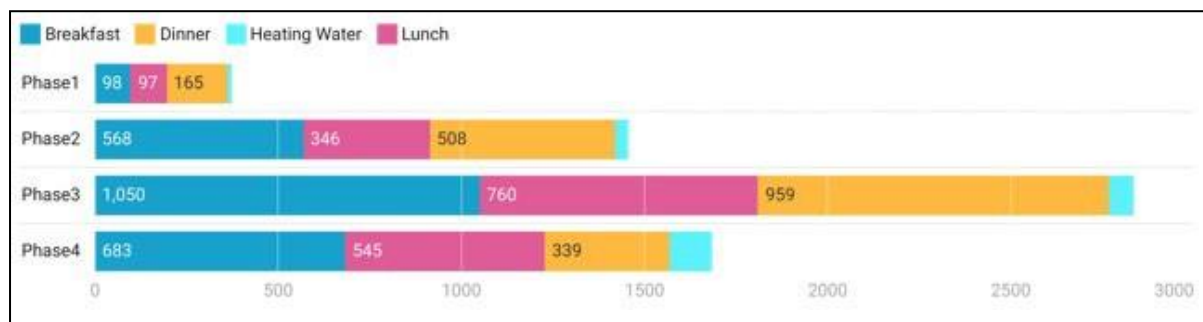


Figure 13. Number of heating events per meal for single households

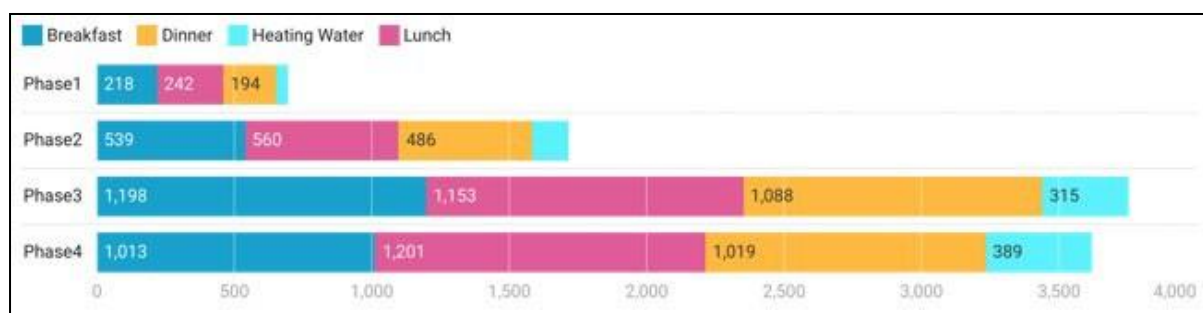


Figure 14. Number of heating events per meal for couples

Figure 15 shows the most common dishes cooked during the pilot. Staples, ugali and leafy veg along with tea were cooked the greatest number of times. Tea is drunk very frequently across the country reflecting the Kenyan saying that “every time is tea time”. Figures 16-17 disaggregate dishes cooked by location. In Nairobi, leafy veg is the most common dish followed by ugali while in Homa Bay ugali is cooked most, reflecting its status as the main regional staple. In Nairobi, ugali and rice are both commonly cooked staples and there are more dishes that are frequently cooked than in Homa Bay.

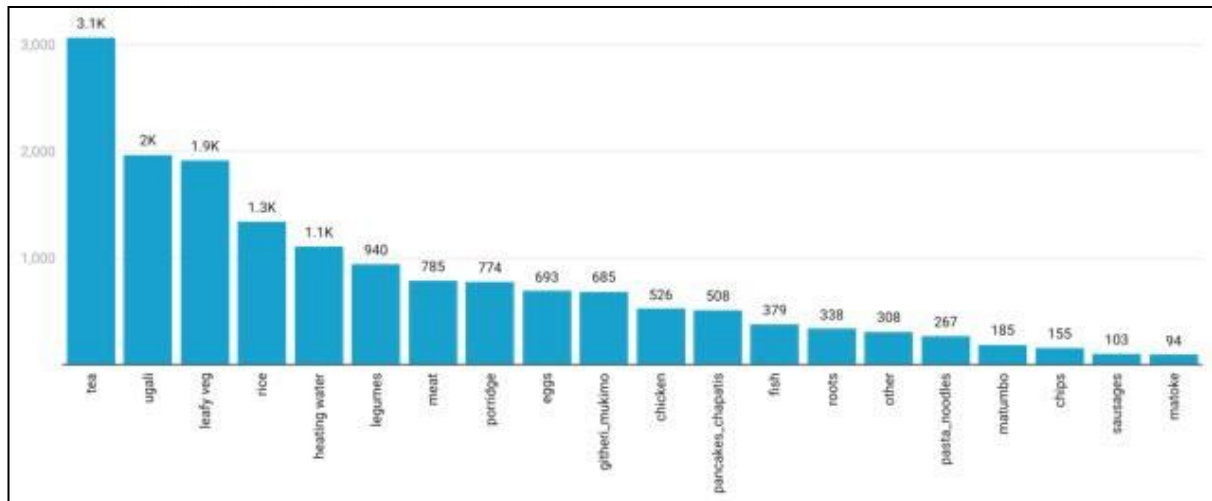


Figure 15. Dishes cooked over the course of the study (all fuels/devices)

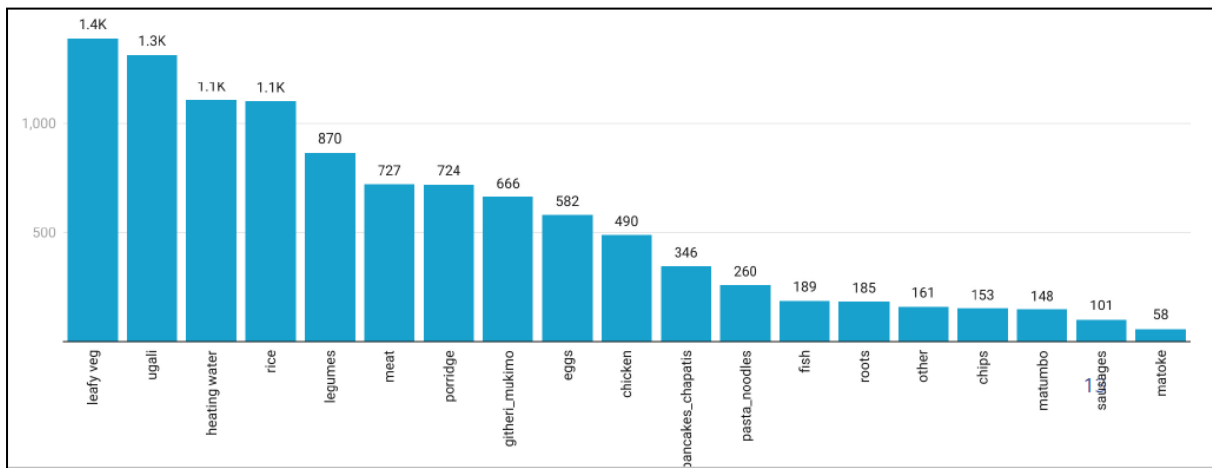


Figure 16. Dishes cooked over the course of the study in Nairobi

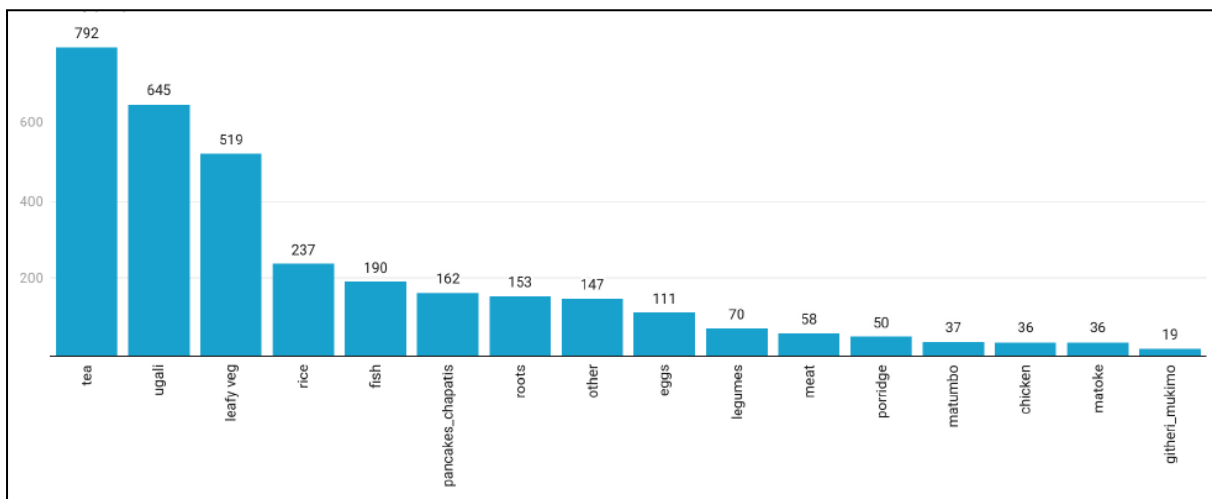


Figure 17. Dishes cooked over the course of the study in Homa Bay

Figure 18 highlights the number of meals cooked by gender in each phase. Phase 3 was longer than the other phases and so there were more heating events. Only two of the 37 registered participants were men, so it is difficult to determine gender-based cooking trends from the graph although the drop off in male cooking events in phase 4 is unusual. Figure 19 disaggregates the number of heating events for each meal type by the gender of the cook. The figure shows there were no recorded instances of men heating water and indicates that men cooked lunch less frequently than dinner and breakfast. Again, the lack of male participants limits how much can be determined from this result.

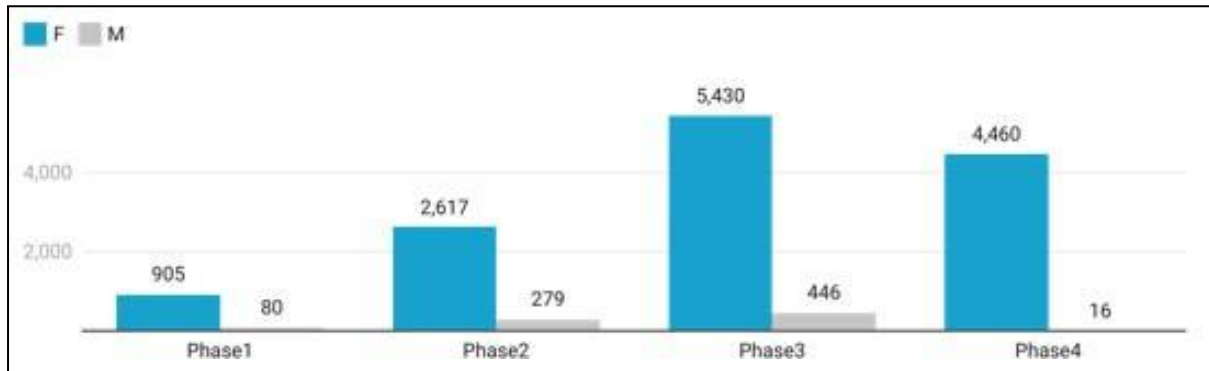


Figure 18. Number of meals cooked by gender in each phase

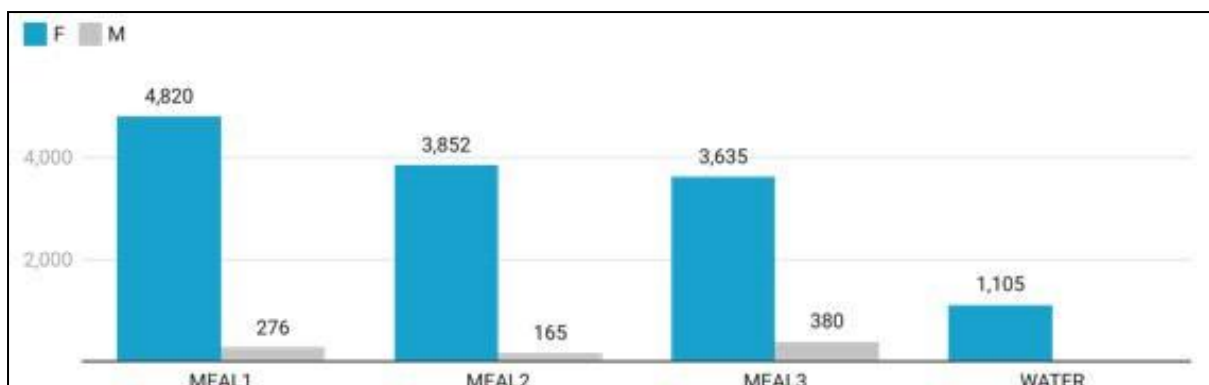


Figure 19. Number of heating events for each meal type by the gender of the cook

Anecdotally, participants reported that the introduction of the EPC in households containing men resulted in some of them getting interested enough to start volunteering cooking some meals that were not complicated in nature (for instance, boiling meat or cereals). We felt that more men would be willing to adopt the EPCs more if there was a concerted effort geared towards encouraging them; for example, by having programs where men cook and demonstrate how easy it is to cook, and which highlight safety aspects and cost saving because they are the ones who control the budget in many households. This may contribute to gender roles evolving in Kenya, which is a mainly patriarchal society, where cooking is an activity that is mainly a females' preserve. EPC Marketing specifically geared to bachelors, especially university students living away from home and likely not yet married, could be introduced to try to create more interest in cooking and influence gender roles before they become aligned.

COOKING DEVICES UTILISED

Figure 19 shows the percentage of heating events cooked on different fuels and devices for each phase. Gas was the main cooking fuel used in each phase. Gas usage varied, increasing from 81% to 85% of heating events between phases 1 and 2 before dropping to 72% of heating events in phase 4. This fall in gas use in phase 4 appears to be mainly due to increased kettle use which rose from 6% in phase 2 to 12% in phase 4. Steadily increasing EPC use also likely played a part, rising from 6% to 9% of heating events between phases 1 and 4. **However, the use of EPCs in phase 1 means unfortunately a clear baseline was not established and therefore there are uncertainties regarding which appliances and fuels the EPC replaced.**

Two types of gas stove were used by participants. Interestingly, usage of free-standing gas cookers (using 13 kg and 22.5 kg LPG cylinders) reduced from 58% to 34% of heating events between phases 1 and 4 whilst use of table-top gas stoves (6kgs) significantly increased from 23% to 38% of heating events over the same period. The assumption behind this change in gas stove usage is the rising cost of living and participants struggling to afford the larger 13kg and 22.5kg gas cylinders used with the gas cookers. This issue may have caused participants to start migrating to the smaller more affordable 6 kg cylinders used with the table top gas stoves. Many Kenyans work on a "kadogo economy" basis where they prefer to buy items in small quantities to cater to their immediate needs.

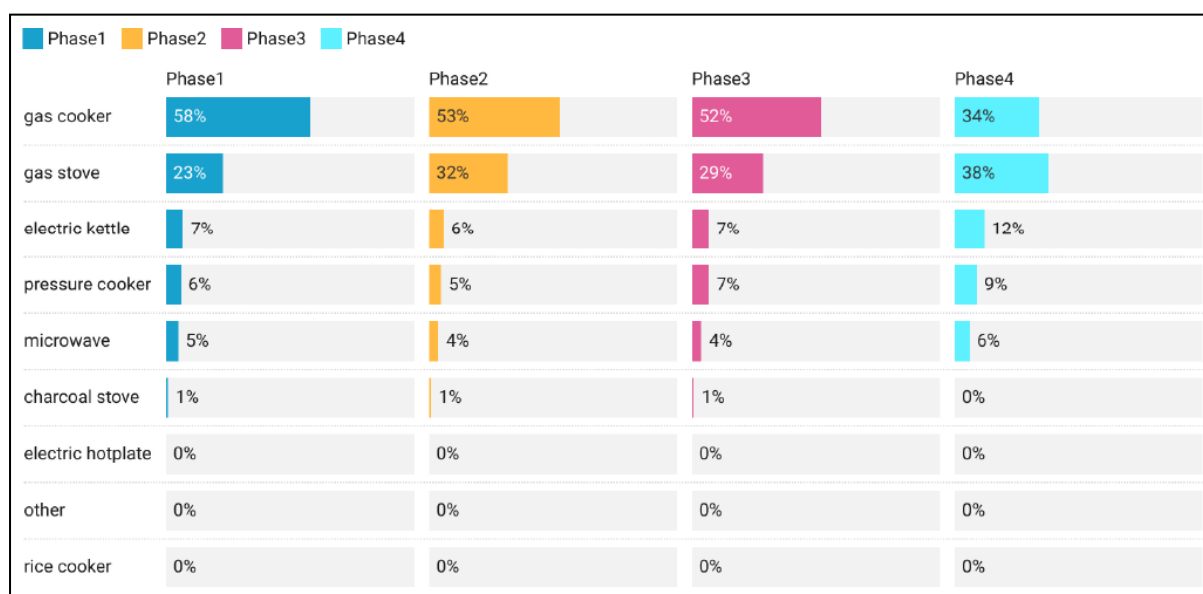


Figure 19. Proportion of dishes cooked by appliance/fuel type per phase

Figure 20 highlights the proportion of heating events in each meal category cooked on all electric cooking appliances. The proportion of heating events using electricity was broadly similar for lunch and dinner. Electricity was used far less at breakfast (8%). All water heating events recorded used electricity, in part reflecting the relatively frequent use of kettles.

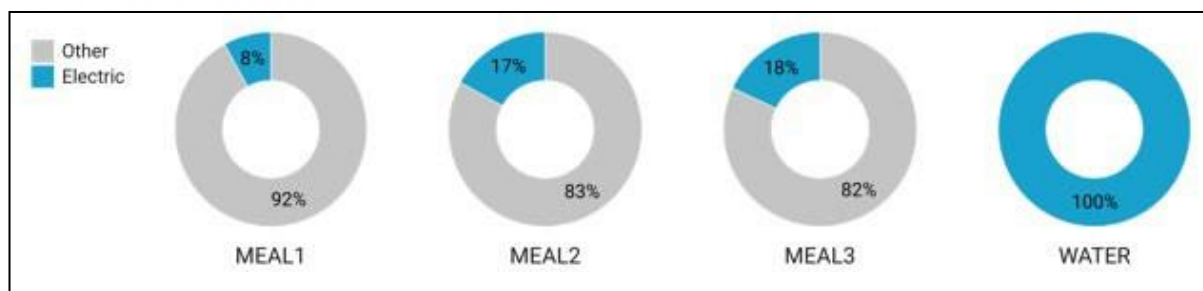


Figure 20. Proportion of heating events cooked on electricity (all appliance types) by meal category.

Figure 21 shows the proportion of heating events in each phase cooked on electricity. Usage is fairly consistent across phases 1 to 4, but there is a sharp increase between phase 3 (18%) and phase 4 (26%). Figure 22 focuses solely on Homa Bay. The results indicate that there was no electric cooking in phase 1-3, but in phase 4 this rose considerably to where 61% of dishes cooked, consisting of 55% EPC use and 6% Kettle use (Figure 23). These phase 4 readings indicate eCooking uptake appears to be considerably more in Homa Bay than in Nairobi households. **However, it seems these results may need to be treated with some caution as the intention was for EPCs to be introduced in phase 2. For there to be no electric cooking in either phase 2 or 3 and then a sudden large surge in phase 4 including for kettles (which may have been owned prior to the project start) suggests there may have been inconsistencies with data collection methods. As such, figures 21-23 should not form the basis of policy making or other applications.**

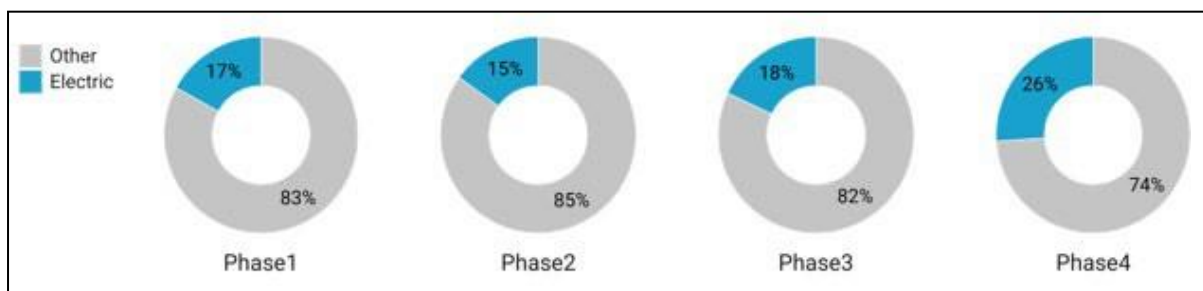


Figure 21. Proportion of heating events in each phase cooked on electricity

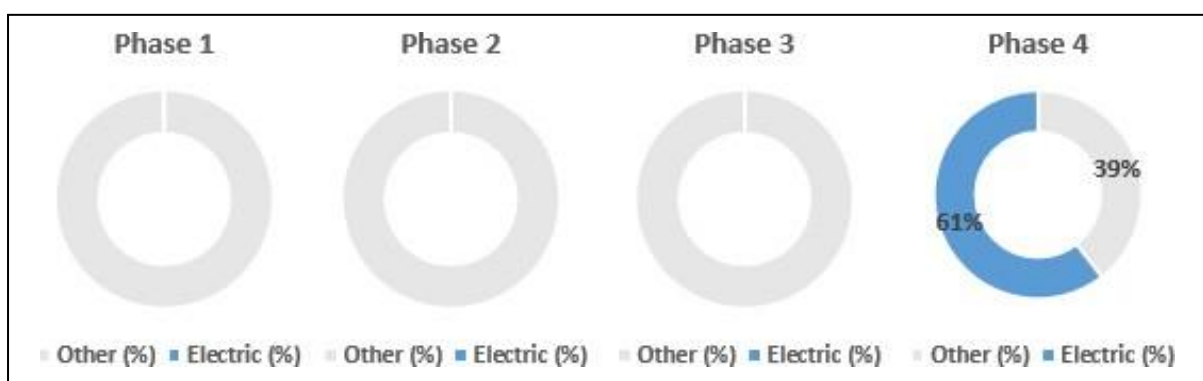


Figure 22. Proportion of heating events in each phase cooked on electricity in Homa Bay

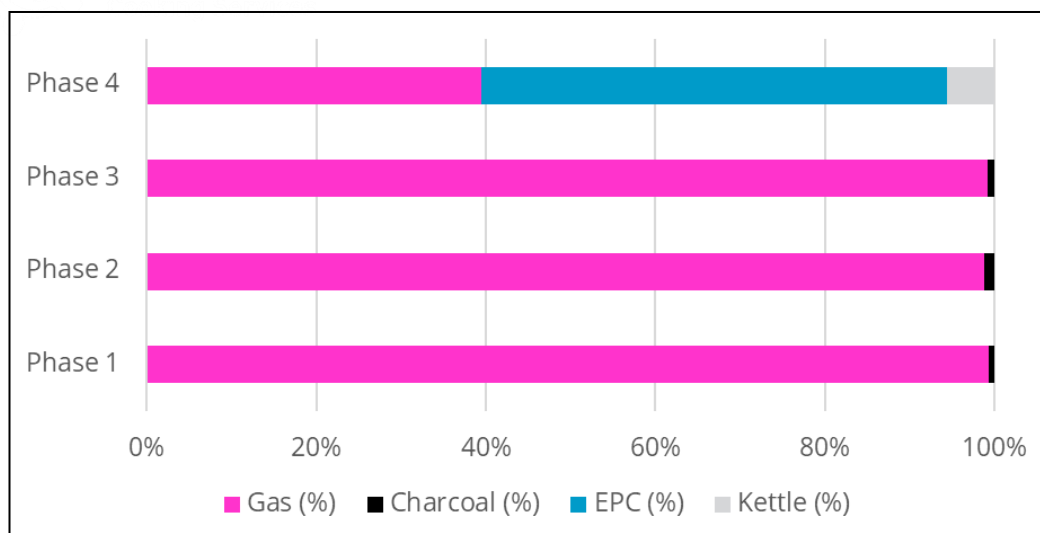


Figure 23. Proportion of cooking events per cooking device per phase in Homa Bay

Figure 24 compares electric cooking use between single households and couples (referred to as ordinary households in the figure). Couples accounted for a larger proportion of heating events (24%) than single households (15%) despite there being more single households (21) than couple households (16) (Figure 7). However, the denomination of single and couple do not account for whether there are children in the household, which may be a factor in cooking fuel choices.

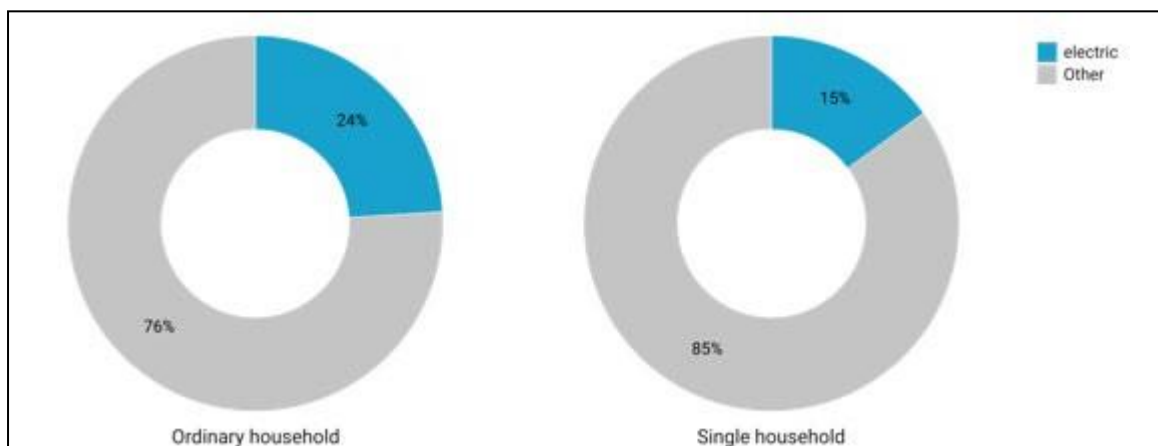


Figure 24. Electric cooking use between single and couples households

Figure 25 shows the proportion of heating events per cooking device per family type. Couples used the EPC for a greater proportion of heating events than single households. Couples with multiple children used it for the greatest proportion of cooking events (10%) while single households with no children were the most reliant on gas. Disaggregated data shows this trend was reversed in Homa Bay, where singles used electricity for a slightly larger proportion of heating events compared to couples although the sample size consisting of seven single and 2 couple households was small (Figure 26).

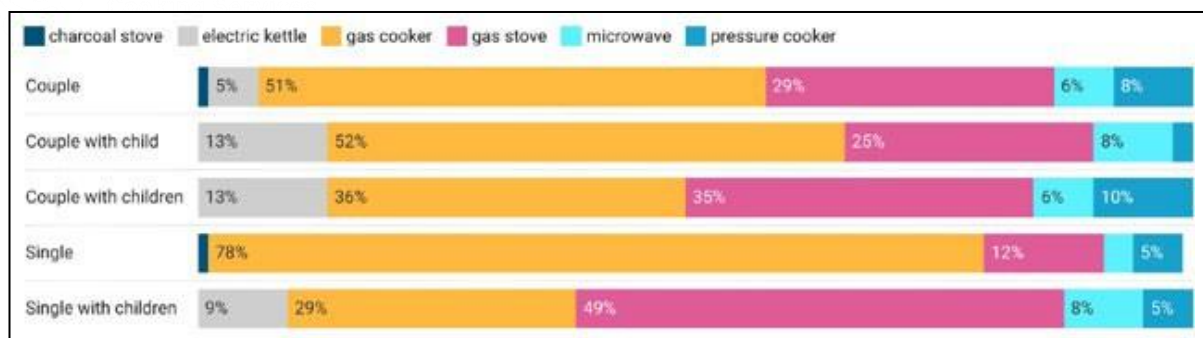


Figure 25. Proportion of heating events per cooking device per family type

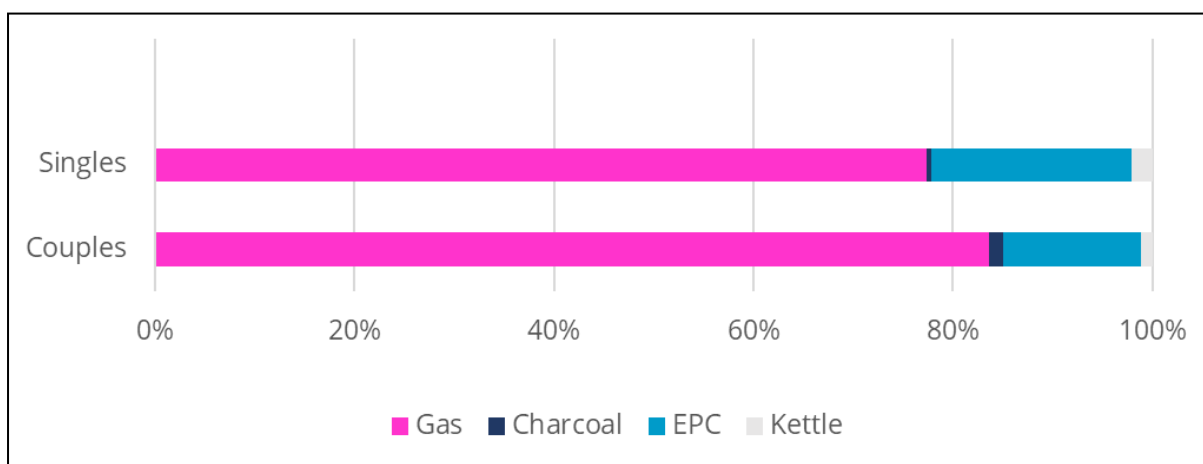


Figure 26. Proportion of heating events by cooking device for different family types in Homa Bay

Table 5 indicates households in used multiple fuel types to complete their cooking events. The number of households using devices with other fuels is shown in the green highlighted cells.

Cooking device	charcoal	electricity	kerosene	lpg gas	other
charcoal stove	2				
electric hotplate		2	1		
electric kettle		16		1	
gas cooker		16		24	
gas stove		5	3	21	1
microwave		23	2	11	
other		7		1	4
pressure cooker		24	3	16	
rice cooker		1		1	

Table 5. Ownership and use of multiple stoves/fuels

ELECTRIC PRESSURE COOKER USE

Figure 27 shows the dishes most commonly cooked on the EPC, the energy used to cook these dishes, and the cost of cooking the dishes on the EPC. This data was collected from the datalogger during the month of October. Legumes were the most prepared meal using the EPC, while the main staples of tea, ugali, and leafy veg which represent approximately half of all participant cooking events (see Figures 15-17) appear not to have been cooked on the EPC or very rarely in cases where these dishes may have been included in the 'other' category.

These results seem to indicate that these staple dishes are currently perceived as not suitable for being cooked in an EPC, with most participants preferring to cook them over LPG. There are several possible reasons behind these perceptions. Boiling tea in an EPC is often considered risky because milk can overflow into the electric component. Ugali is culturally cooked (mostly) over high heat and has an intricate heat balancing act towards the end of its cooking process which can be challenging in an EPC. The green leafy vegetables require high heat and a wide cooking pot to prevent retention of the liquid that's released from the vegetables. The EPC is usually deep which can prevent effective evaporation of the liquids in this dish.

To encourage users to adapt and start using the EPCs to cook these staples and other dishes that are currently perceived as not being suitable in the EPC, the right training and support is needed (for example, live cooking demonstrations or video recipes for each of these specific food types). In addition, manufacturers could tailor devices to local cuisines. For instance, EPCs could have a ugali function programmed in a way that simulates the traditional ugali cooking for the locals by having the heat automatically regulating itself and beeping to alert the cook that it's getting into the next phase.

Figure 27 also provides data on the energy consumed and cost when cooking these dishes on an EPC using the pressure cooker and sauté modes. However, it is unclear whether the data for energy consumed and cost refers to these cooking modes being used in unison or on a standalone basis. **Given this uncertainty, the energy and cost data in Figure 27 should not form the basis of policy or other applications.**

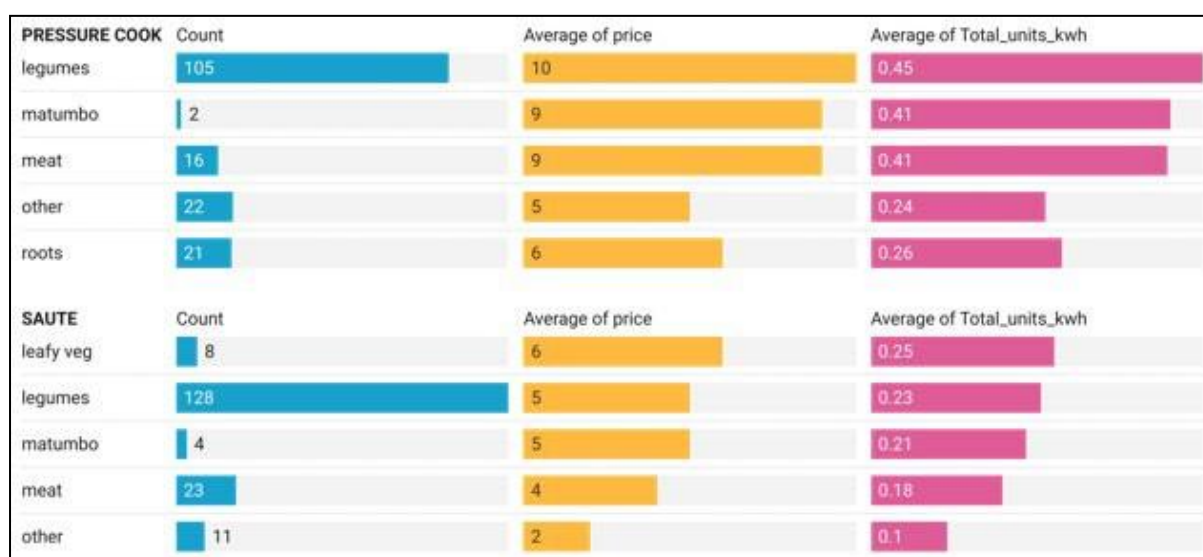


Figure 27. Dishes most commonly cooked on the EPC

Figure 28 shows the number of heating events cooked on the EPC on days when the dataloggers were active. The data indicates most participants used the device for 1-2 meals per day. However, as there were reliability issues with the dataloggers, the number of days when the EPCs were used is likely to be underreported here.



Figure 28. Number of EPC heating events on days when the dataloggers were active

COOKING DIARIES: CONCLUSIONS

Overall, the findings from the cooking diaries data indicate that participants used the EPC for some, but not a major part, of their cooking. Over the course of the pilot study, EPC use increased slightly from 5% of all dishes cooked in phase 2 to 9% in phase 4. Gas remains by far the main fuel used by the participants although there was some drop off with usage falling from 81% (phase 1) to 72% (phase 4). This decrease seems to be mainly due to increased kettle use, which rose from 7% (phase 1) to 12% (phase 4) and partly due to the aforementioned increase in EPC use. The most notable change in fuel/device use during the pilot was a large switch from using gas cookers to smaller gas stoves, which has been likely driven by affordability as the latter uses smaller, cheaper LPG cylinders.

It seems likely that EPC usage could be increased further if awareness was raised on how to prepare the main staples of ugali, leafy veg, and tea in the device. These three dishes accounted for approximately half of all dishes prepared by participants but were hardly ever prepared in the EPC due to participant perceptions that the EPC was not suitable for cooking these foods. There are some difficulties with preparing these dishes in the EPC but these could be largely addressed through sensitization efforts. EPC manufacturers could also assist by tailoring buttons labels and functions more to the menus common in the East African market. Similarly, sensitization could help people use the EPC to cook a range of other fairly common dishes (e.g., pasta, pilau), thereby realizing more of the appliance's capabilities and potentially increasing adoption. More concerted and targeted awareness raising and marketing is also required to encourage more men to start cooking and build on the anecdotal evidence from this project that the introduction of the EPC led to some men in participating households volunteering to cook.

3.1.3 EPC Pilot Study: Exit Survey Results and Analysis

The exit survey aimed to better understand ECO participants' experiences of cooking with electricity following the introduction of the electric pressure cooker (EPC). The survey was conducted in October 2021 with all 70 ECO households and recorded participant experiences and perceptions of electric cooking and any changes to cooking habits since the introduction of the EPC.

HOUSEHOLD COOKS

100% of the participants (70 households) received an EPC to use during the cooking diaries. Out of these respondents, 49 households stated that the EPC was used by female members, followed by 13 which had both female and male family members using the device and finally 7 households that had male members using it (Figure 29). The majority of the respondents (45) indicated that there was no change in responsibilities for preparing and cooking food as a result of the introduction of the EPC. However, we found that as the project progressed some of the male participants became more involved in cooking food in EPC. This appears to be because of the convenience it offered; the fact that it is portable and can be used for cooking while in the living room.

Q2. Who in your family uses the electric cooking appliance? N=69

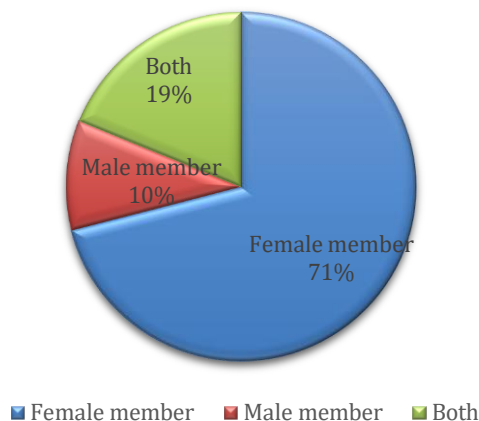


Figure 29. Household family members using the EPC

CHANGES IN COOKING PRACTICES:

The majority of the respondents (57) noticed there were changes in the food they cooked or the way they cooked since they received their EPCs. They reported that meals cooked faster and they started cooking more food that took long to cook, such as cereals, because with EPC it took shorter time to cook and they did not have to monitor the process. This meant that their cooking times became more flexible given that food would cook faster.

55 of the respondents indicated that they learned new tips and techniques with the introduction of EPCs (Figure 30). For instance, setting up timings for different foods, baking cakes, steaming and making yoghurt, and other techniques such energy saving and following the menu to make different dishes.

Q4. Have you learned any new tips/techniques/dishes since you started using these appliances? N=67

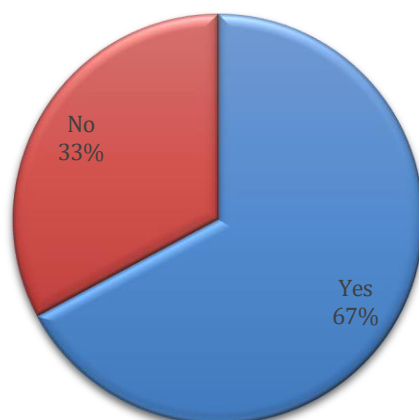


Figure 30. Percentage of participants learning new cooking techniques after receiving an EPC

Most (50) respondents indicated that their cooking was not affected by Covid-19 situation. Some of the responses we got stated that the fact that they had their own gardens meant that they continued accessing produce the same way they did before. 17 of the participants, however, said that they were affected by Covid-19 and some of them indicated prices of everything went up, for food and LPG.

APPLIANCE REVIEW:

45 of the respondents were okay with the EPCs and would change nothing about them (Figure 31). However, for the 23 respondents who indicated that they would change some things, most of them said that they would have liked to see a local menu because there were some cooking options they didn't understand. Also, some respondents (14) suggested design changes to include different sizes of inner pots (i.e., larger pots for larger families and smaller pots for smaller families) and more than one pot for cooking different dishes at the same time. 2 of the respondents indicated that a solar powered one would be welcome, especially by people without electricity or when there is outage.

66 of the participants did not have difficulties learning to cook using the EPCs. However, 2 of the respondents indicated that they took time to learn how to cook with the appliance. 61 respondents indicated that people need to receive training on how to use the electric cooking appliance as opposed to self-training. 61 participants indicated that the usage of the appliances and safety were the key areas the training should focus on.

49 of the respondents indicated that there are dishes in their usual menu (i.e., what they cook each week) that they could not cook using the appliance which contributed to fuel stacking continuing. Some of the dishes that respondents could not cook using the appliance include ugali, tea, chapati, fried eggs, madazi and pancakes. Deep frying was thought of as not being possible and respondents reported they had to use LPG for this. This function is currently not impossible with most EPC models. To address this, EPC models are required that can reach sufficiently high temperatures that allow food to deep fry without getting soggy.

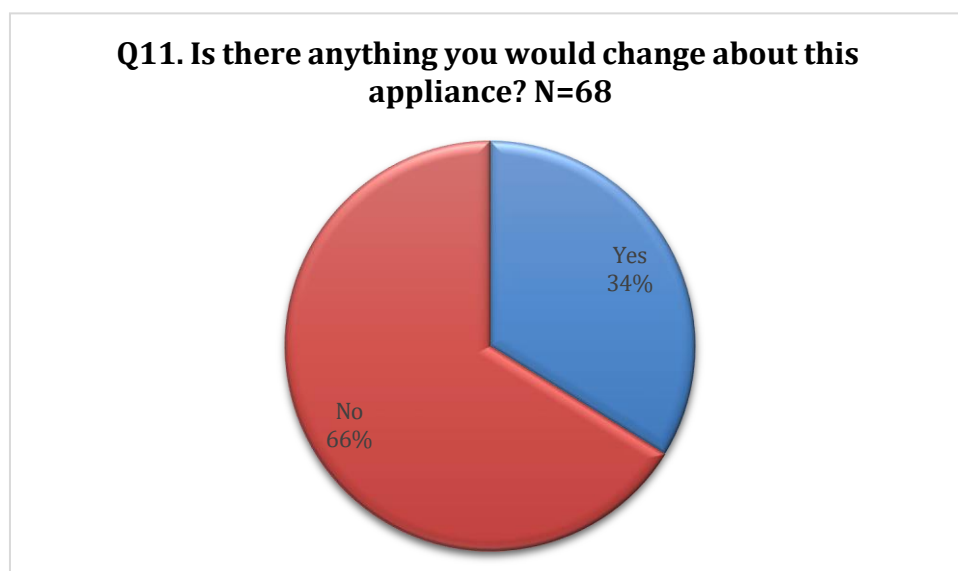


Figure 31. Proportion of participants that would like to change something about the EPC

EXPERIENCE OF COOKING WITH ELECTRICITY:

The majority (52) indicated that they preferred cooking with electricity more than with other fuels because it was more convenient, faster, cleaner, safer and cheaper. A few indicated that they preferred other fuels, and the thing that was most disliked (by 13 participants) about cooking with electricity is the inconvenience caused by power outages. Also indicated to a lesser extent was the fact that there is only one inner pot hence they can only cook one meal at a time, and it would take time to clean for different dishes. However, one respondent indicated that it's just difficult to adjust fully to electric cooking.

FUEL STACKING:

63 of respondents reported that they continued using other fuels from the time they started cooking with electricity (Figure 32). LPG was the most used fuel for cooking among the households, followed by charcoal, with a few also using firewood and kerosene. None of the respondents used dung or biogas as cooking fuel. 40 of the respondents reported that they do not use different cooking fuels at different times of the year. Most respondents (47) reported that they would not consider cooking with electricity only because of power outages and perceived high costs. However, a significant minority (20) reported that it is something they would want to do due to its convenience, and time and cost saving benefits.

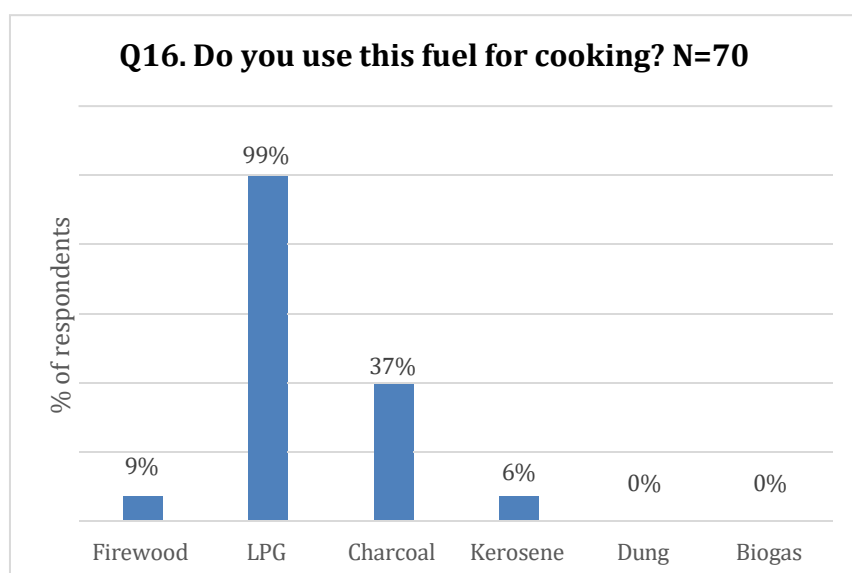


Figure 32. Proportion of participants using other fuels as well as the EPC

Households reported various likes and dislikes about the fuels they used alongside electricity.

- **LPG** was liked because of its availability, convenience, easy and faster cooking compared to other fuels like charcoal. Also, respondents liked it because it is a clean fuel (no smoke) hence it does not bring health problems. LPG was disliked because it is expensive, gets finished quickly and not knowing when it's about finished as it is difficult to monitor usage.
- **Firewood** was liked because of its availability. Also, one respondent indicated that it gives them a sense of African cooking. Respondents didn't like smoke from firewood which can

cause health problems like eyes irritation, coughing and headache. Also, in some places such as urban areas firewood is unavailable.

- **Charcoal** was liked because of its affordability and its available in smaller quantities. A few respondents also indicated that charcoal can be used to warm houses during cold seasons. Respondents didn't like that charcoal was dirty and produces smoke which brings health problems such as headaches.
- **Kerosene** was liked because it was cheap and available in smaller quantities (depending on customer's need). Respondents didn't like that kerosene smells and also produces smoke.

PERCEPTIONS OF COST AND SAFETY OF EPCs:

Before the study began, 57 of the respondents thought that cooking with electricity was expensive and would drive their electricity bills up. Safety was also a key concern as 6 of them felt that cooking with electricity was unsafe as could lead to power surges and hence accidents.

After the experience with the electrical cooking appliances, 68 respondents reported a change in mindset about cooking with electricity. They said that they realized it was affordable, safe, convenient and easy to use, and a clean form of energy. The majority of the respondents (57) think cooking with electricity is cheaper than cooking with fuels they normally use (Figure 33).

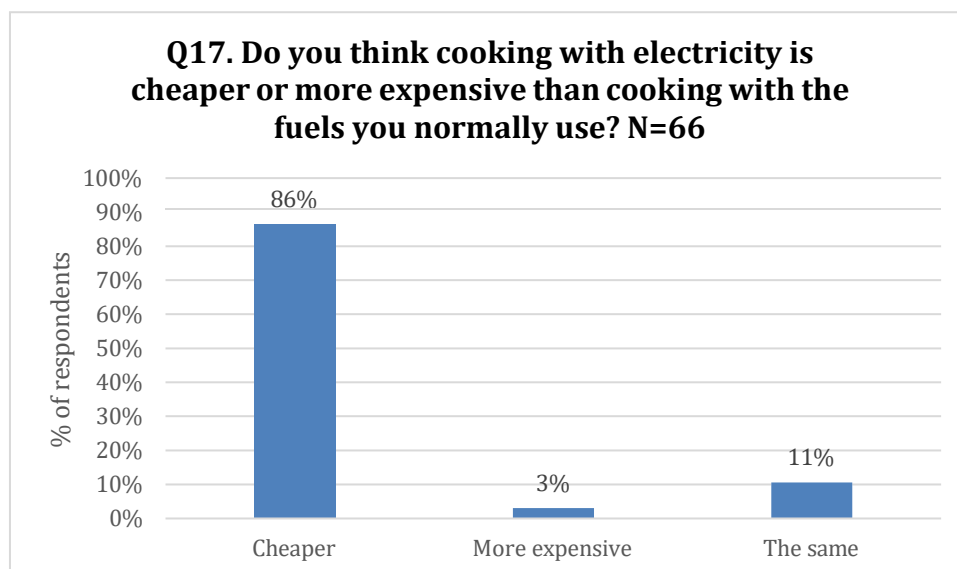


Figure 33. Proportion of participants who view electric cooking as more expensive than cooking with other fuels

TASTE OF FOOD COOKED IN EPCs:

Most participants (62) reported that no food/ dishes tasted better nor worse (63) when cooked with electricity. A small number (8) reported that some food/dishes such as githeri, beans and rice tasted better when cooked with electricity while a few respondents (7) noticed a worse taste in rice and ugali cooked with electricity and proposed the use of LPG to cook these dishes better.

WILLINGNESS TO PAY:

Most respondents (66) reported that they would buy this appliance if they saw it in a shop. The average amounts they were willing to pay for the appliance ranged from Ksh. 5,000 (indicated by the

majority of households) to a very small minority who stated they would pay (a maximum) of Ksh. 15,000. 2 respondents reported that they were undecided on whether to purchase the appliance at the market price of Ksh. 10,400, and 1 was unwilling to purchase.

RECOMMENDING THE EPCs TO OTHERS:

All the respondents reported that they would continue to use the EPC and the majority (65) stated that they would recommend the EPC to others (Figure 34). Most respondents reported that people from their neighbourhood had already inquired about the appliance, however, a small number indicated they have not recommended this to others already.

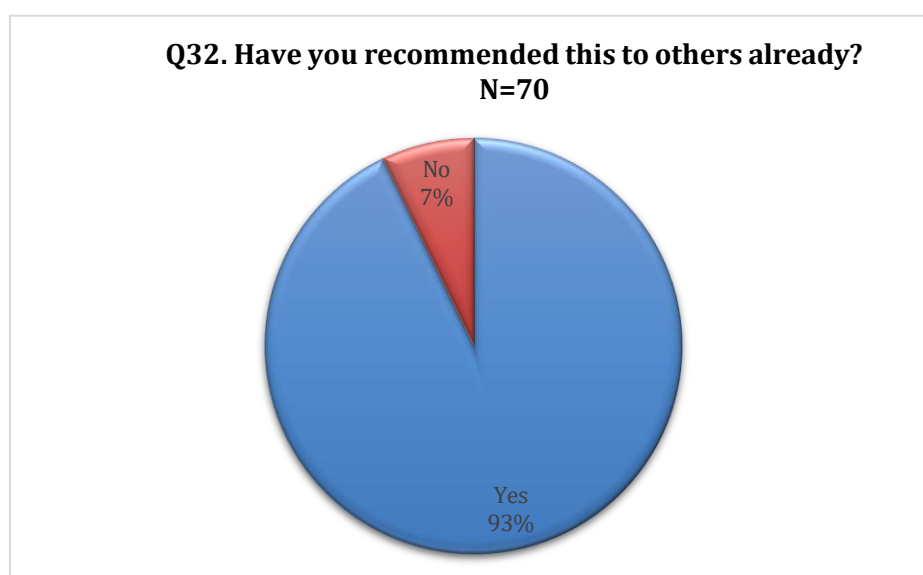


Figure 34. Percentage of participants recommending the EPC to others

ELECTRICITY SUPPLY:

Most participants (53) reported they had had power outages in the period during the pilot study (Figure 35). A substantial number of respondents (30) experienced power outages 1-3 times a month followed by 18 who experienced the outages 1-2 times a week. None of the respondents experienced power outages more than once a day while only 1 experienced it once a day. Nonetheless, approximately a fifth of the respondents never experienced any power outages.

Majority of the respondents (49) indicated that the power outages were due to power maintenance while a few (8) stated they were caused by weather related issues such as rain and fallen poles. Most of the power outages were experienced for a few hours while a few were experienced for a full day.

39 of the participants indicated that the power outages affected their cooking or heating water with the EPC. Consequently, they had to use alternative means to cook, with LPG being the most preferred option. The power outages resulted in participants having resistance to adopting cooking with electricity as their only fuel as they needed to have a backup.

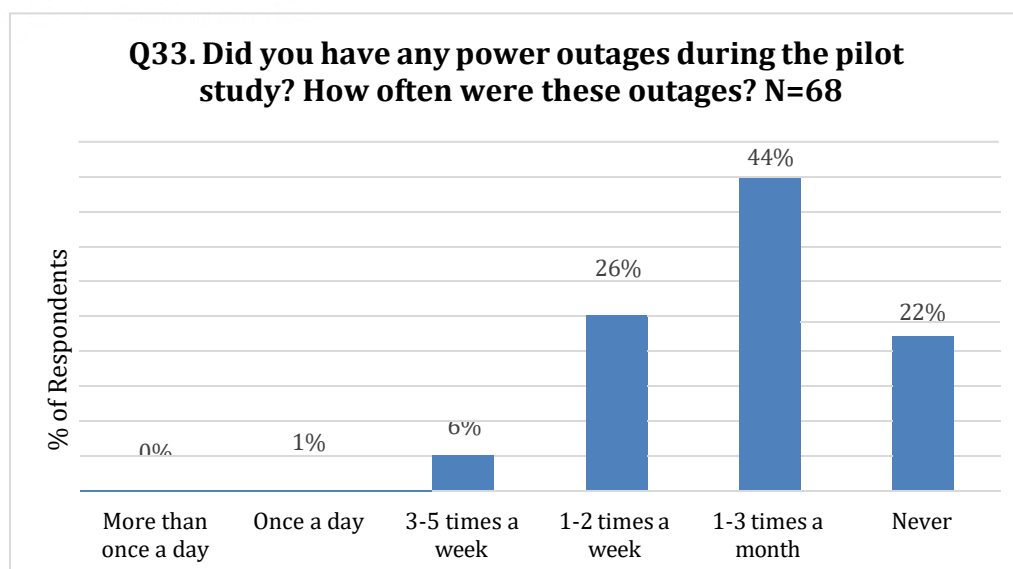


Figure 35. Percentage of participants experiencing power outages during the pilot study

SAFETY REPAIR AND MAINTENANCE:

The majority of the respondents (60) did not experience any safety issues or concerns with the EPC. The issues which were reported by a few households (7) related to characteristics of the appliance, such as being hot and noisy. Similarly, the majority of the respondents (63) indicated that they had not had any technical or maintenance issues with the EPC. Only two participants had issues due to wear and tear of the appliance. In the event that there was an issue where the EPC broke down, most respondents (44) indicated that they would take it to a technician for repair while some (16) stated that they would take it to the supplier as per the warranty notice.

The majority of the respondents (39) reported that they would not replace their EPCs with a different electrical appliance if the need arose (i.e., it no longer worked and could not be repaired), and would instead purchase another EPC as a replacement. Nonetheless, a substantial number of the respondents (26) indicated that they would replace it with a different appliance and, depending on their budgets, probably buy an induction cooker.

EXIT SURVEY: CONCLUSIONS

Overall, the findings from the exit survey indicate further evidence of the potential to increase electric cooking in Kenya as the vast majority of participant EPC user experiences were positive. Analysis was carried out on all 70 participants and the main findings were:

- User experience of the EPC was positive. Respondents found the EPCs easy to use and most (52) said they preferred cooking with electricity to other fuels because it was more convenient, faster, cleaner, safer and cheaper.
- All the respondents reported that they would continue to use the EPC and almost all (65) said they would recommend the EPC to others.
- Concerns about safety and cost changed after using the EPCs. Almost all respondents (68) reported a change in mind set and realized that electric cooking was safe and affordable to

use. Most (61) highlighted the importance of training on how to use the electric cooking appliance correctly and safely.

- Food cooked on electricity was found to taste no better or worse compared to other fuels by the majority of participants (62).
- Most respondents (57) noticed changes in their cooking patterns after they received the EPCs. This was mostly due to the convenience and speed of the EPCs which saw them cook more heavy foods as they took less time to cook and didn't need to be monitored. The greater speed of cooking also meant the time of day when cooking happened became more flexible.
- Most (55) of the respondents indicated that they learned new energy saving tips and cooking techniques following the introduction of EPCs.
- Power outages were reported by most respondents (53) and this along with the perceived high cost of electric cooking were the reasons a majority (47) reported they would not consider cooking solely on electricity. However, a notable minority (20) reported 100% electric cooking is something they would want due to its convenience, and cost and time saving benefits.
- Fuel stacking continued after the introduction of the EPC due to power outages and because most (49) participants reported that not all dishes could be cooked on the EPC. LPG was the most common other fuel cooked with, used by almost all respondents.
- Most (45) respondents reported they were satisfied with the EPCs and would change nothing about them. Of those that suggested alterations, the most common were cooking options for local menu items, different inner pot sizes and provision of more than one inner pot for cooking different dishes.
- By the end of the project 66 of the respondents reported that they would buy an EPC if they saw one in a shop and the price was right although the price participants were willing to pay varied, with most suggesting a figure noticeably below the market price.

3.2 Results for Research Component 2: Identifying financing providers

This section highlights the findings from the Kisambara ECO project research into the opportunities for SACCO and Chama cooperatives to increase access to electric cooking appliances through their loan facilities. To explore this potential, the Kisambara ECO study engaged various SACCOs and Chamas to advocate that they offer loan facilities to members to purchase eCooking appliances from Kisambara. Having these organised groups come on-board could not only help unlock the uptake barrier caused by the high initial cost of electric cooking appliances but also help raise awareness of the devices through word-of-mouth recommendations among members. On boarding finance providers has particular opportunities for awareness raising as customers can start using EPCs and provide first-hand experience to others while they pay for the devices over time via instalments. In addition, whenever a company approaches a SACCO, they are required to inform members about the good being offered. This therefore provides members with more information than they would ordinarily get in a store.

A 'diary like' record of the activities carried out with each organization was kept and the results of this engagement are provided below in table 6 (SACCOs) and table 7 (Chamas). In order to easily

comprehend the progress made towards each organization offering loan facilities for eCooking appliances to their members, a traffic light coding system has been used in the table whereby:

- Green = organizations have begun offering loan facilities to members to purchase eCooking appliances.
- Amber = Situation uncertain/organizations have not begun offering loan facilities to members, but it may become possible in the future
- Red = organizations have not responded or indicated they are not interested in offering loan facilities.

Table 6. SACCOs: Record of Activities Conducted and Results

Name of SACCO	Description	Activities Conducted	Results
Stima Sacco	It is a deposit taking SACCO that currently has over 154,000 derived from the energy, utilities, education, services, diaspora, individuals, groups/ Chamas, small and micro enterprises (SMEs) among other sectors.	We had already started selling to the Sacco members but some more requirements were brought up by the management towards the end of 2021. These were; to show proof of the credit worthiness of the directors and extra documentations from the registrar of companies. We have submitted the documentation to the management.	All that remains is signing the MOU. Awaiting feedback from the Sacco
Merdat Sacco	It's got 280 active members who are exclusively DT Dobie employees and is registered by the Societies act in Kenya.	we are onboard and have started selling	We have been given a slot to demonstrate the EPCs during their annual general meeting (AGM) in 2022 where all Covid protocols will be observed.
Equity Foundation Group	Not-for-profit foundation established in 2008 as the social arm of Equity Group Holdings. It seeks to transform the lives and livelihoods of the people of Africa. Equity Group Holdings, through Equity Group Foundation (EGF) seeks to increase awareness of the benefits of clean energy for cooking, lighting & heating for both domestic and industrial use.	We met with the management and were given a list of requirements which we've fulfilled in part. These are opening an account with Equity bank, getting a Till number, Making fliers, signing an MO. We have been to fulfil part of the requirements; opening an account as Kisambara Ventures with Equity bank, got a Till number (mobile banking system tailor made for Equity bank) that will enable us to trade directly with them.	We have a demonstration slotted for 26th to 28th January 2022 at the Equity headquarters. The MOU will be signed after we complete the demonstrations.

KCB Sacco	Also known as Kencom SACCO, is for both employees and corporate clients of Kenya Commercial Bank.	Still waiting for a response from the proposal sent. I was given another email address to send the proposal too.	We have had some Email correspondence but so far there have been no tangible results.
Hoechem	Hoechem Sacco was Registered more than 30 years ago to empower members working under Highchem group of companies. Hoechem Sacco aims to Empower members through savings and credit to allow them to borrow at affordable interest rates for development, Medical emergencies, School fees and other financial obligations	The chairman will give us a slot to present during the education day in July 2022 after having a sit down as a committee to discuss if they needed an EPC as one of their products in the SACCO.	The education day for the SACCO members was cancelled from in-person to virtual due to Covid protocol restrictions. Hence, we were unable to get a slot to do any presentation. They are planning to have one this year (July 2021) which we are hoping to get a slot.
Chuna Sacco	Established in the year 1976. the two main objectives are to afford its members an opportunity to save money and to afford its members an opportunity to save money. It was originally intended for any employee or ex-employee of the University of Nairobi and CHUNA SACCO LTD but now it's been opened to residents in Nairobi or elsewhere in Kenya	The proposal was already sent. The committee is yet to have a siting. The treasurer bought an EPC. The Sacco treasurer resigned and handed me over to a new official who is to do a follow-up on the proposal.	So far, there is no response from the official as we had not been able to schedule a meeting with him due to on-site and off-site working arrangements.
Phiphatech sacco		The proposal was already sent. The committee is yet to have a sitting.	No response yet.
Harambee Sacco	It started as a merry go round chama in 1969 at the Office of the President (OOP) and has grown to almost 70,000 members and an asset base of Ksh. 32.5 billion.	Was given a contact person that we followed up to secure an appointment with the in-charge and had a conversation with her. The aim was to have a presentation during their regional sacco meetings in different counties. However, It has been very difficult to set up an appointment/Meetings due to Covid. At the moment we cannot have a zoom meeting because of lack of quorum. Only 5-10 People may be in attendance. The in charge was meant to call us in case of any	So far, no further communication has been forthcoming and any efforts to engage them hasn't borne fruit.

		openings but so far there hasn't been any communication.	
KWFT	Kenya Women Microfinance Bank PLC (KWFT) is a Microfinance regulated by the central bank of Kenya. Main aim is to give unbankable women an opportunity to financial access.	Saw them last week and they requested for a proposal which will be sent early next week. I resent them another proposal.	There has been no response after the proposal was sent, however we are pushing for feedback.
Teachers Sacco - Mwingi county	It comprises of teachers from Mwingi county and is regulated by Sacco Society Regulatory Authority. It currently has 7 branches.	Waiting for appointment to go and detail about EPCs to the board of directors. 19th - I had a phone conversation with Justus. He will speak to the CEO and find out when we can make the presentation on EPC. I expect feedback tomorrow (20th April 21) Mr. Justus to update us on any slot openings for next month on the next board meeting. The follow up call set on the 1st week of May.	I got a new contact who is currently being very positive and encouraging. Possibility of the talks progressing is increasing.
Chai Sacco Society	The Sacco is regulated by Sacco Society Regulatory Authority (SASRA), Currently has five branches located in Nairobi, Mombasa, Kisii, Litein, and Nkubu	Waiting for our documents to be reviewed and feedback on the way forward	No feedback has come from their end any effort to make contact with them hasn't been successful.
Nation Media Sacco	Deposit Taking Sacco (DTS), Licensed and Regulated by the Sacco Society Regulatory Authority (SASRA). It gives members an opportunity to accumulate savings and deposits and thereafter providing them with credit facilities at a fair and reasonable interest rate to better their economic wellbeing.	Sent proposal, awaiting feedback	We sent a proposal and had an in-person meeting. However, there has been no tangible result.

Association for Microfinance Institutions (AMFI)	Was established in 1999 with the aim to build the capacity of the Kenyan Microfinance Industry and it is member based. It has 59 fully paid-up members.	The person we had been given as our contact moved departments and we've been unable to get a hold of the new in-charge.	We plan to revive talks with them this year because of the potential they have. They are the umbrella body for all the microfinance organizations in Kenya. Unlocking them will open so many doors for us.
Blue Eagle Sacco	Blue Eagle Sacco is a licensed deposit taking Sacco established in 2015 with the objective to organize and promote the welfare and economic interest of its members.	Requested for a proposal. Proposal sent and we are waiting for feedback.	No feedback has come from their end any effort to make contact with them hasn't been successful.
Springboard Capital Sacco	Started in 2000 as a welfare group (bereavement, weddings, education, etc.). In four years, it grew into an investment group and in 2010 the holding company diversified into a credit lending arm. The company has since grown to a fully-fledged Micro Finance institution that offers credit facilities across the country to various customer groups.	Requested for a proposal.	No feedback has come from their end any effort to make contact with them hasn't been successful.

Table 7. Chamas: Record of Activities Conducted and Results

Name of Chama	Description	Activities	Results
Kitengela Six Chama	This group came together as a social group that was meant to offer encouragement on Facebook because of a shared interest of having babies born on the same month. After several meetings it evolved into a chama where they contribute money and access it through merry go rounds every time they meet in a member's house.	Demonstration on how to use EPCs were conducted. Members were to plan on raising funds to purchase of each other EPC	Some of the members later on dissented and refused to contribute which resulted in the whole idea disintegrating. It's been very hard to revive the whole project from there.
Cornerstone ladies	They are an informal group that contributes money each month and through the contributions are able to help each other out to afford different services or products through their merry go rounds.	The ladies were trained on using the EPC. Awaiting feedback on the purchase of the EPC in July	Out of the 10 members, 3 purchased the EPC and they joined the project.

14 sisters chama	A group of 14 women who are based in Shauri Moyo, Nairobi. They contribute money monthly and members access the money through a merry go round. They also do table top banking where the members are able to access credit and pay it back at a small interest.	She will organize for us a date to do a presentation to their chama	We sold 8 EPCs and from that number 3 joined the ECO project.
Malkia bazaar		Requested for a video on the EPC so that she can send to the members.	Not yet gotten any feedback from them
Mihango ladies chama	This is a group of 12 members who are based at an open-air market in Mihango area of Nairobi County. They contribute a fixed amount of money each week which is given to its members on a rotational basis.	The ladies were trained by one of the enumerators on the basics of the EPC. They contributed for each other so that they could get the EPC at the project price.	We were able to get 9 of them to join the project.

DISCUSSION & COMPARISON BETWEEN WORKING WITH SACCOS AND CHAMAS

Overall, tables 6-7 highlight some success in the engagement with SACCOS and Chamas, with 4 of the 20 organizations offering loan facilities to their members to purchase eCooking appliances (coded green). Engaging Chamas was statistically more successful than SACCOS. Three of the five Chamas began offering eCooking appliances to their members compared to only one of the 15 SACCOS (Table 8). The most encouraging results were from 14 Sisters chama and Mihango ladies chama where the provision of loan facilities saw members purchase a total of 17 EPCs.

Table 8. Summary of progress with SACCOS and Chamas engaged

	Green	Amber	Red	% Offering loan facilities for eCooking appliances
SACCOS	1	6	8	6.66% (1 of 15)
Chamas	3	0	2	60% (3 of 5)
Total	4	6	10	20% (4 of 20)

The research found it was easier to access and work with Chamas because they were less bureaucratic than SACCOS. The lack of bureaucracy facilitated engagement because it meant there was a simple chain to follow to get approval for work, with decisions made by the members themselves. Chamas also had less members than SACCOS making it easier and faster for decisions to be reached on whether to offer loans for the EPC. The members tend to have an informal agreement in place and agreements are usually verbal and very binding. The smaller size of Chamas also makes it easier to organize demonstrations.

There were also challenges with Chamas. Although the informal nature of the organizations meant Chamas were easier to access and could reach decisions more easily, it was also just as easy for a Chama to stop being accessible and cut off ties and to reverse decisions. The lack of formal systems therefore meant there were less guarantees behind any progress made and usually meant there was

no official avenue for recourse to discuss any decisions unfavourable to the project's aims. In addition, not all Chamas offer credit facilities and tend not to have a wide reach as they usually involve people in a similar situation coming together informally and agreeing to finance each other towards a common goal.

The engagement with the SACCOs tended to be more drawn out due to their more formal and bureaucratic processes that had to be followed, requiring a product to be registered and vetted before being adopted. It was also difficult to engage with members without management support. These more formal processes were more tedious but ensured that Kisambara could not simply be removed from their systems as hoc unless a formal decision had been made. Another challenge apparent with some SACCOs was that the organization was more interested in how they could benefit from engaging with Kisambara rather than the success of the project itself.

Generally, the larger SACCOs (e.g., Stima SACCO) had more red tape that hampered progress as decisions had to be approved by many parties. In contrast, success was hard with the much smaller Merdat SACCO where dealings were more straightforward. With Merdat, the management was approached, the proposal presented, and a meeting held with members of the SACCO all on the same day. This less convoluted process helped streamline the decision for Merdat SACCO to start offering loan facilities to members for eCooking appliances.

Despite limited success so far with SACCOs, their comparative advantages means it make sense to continue to pursue working with these organizations. The larger memberships of SACCOs have scope to quickly open up very large markets, all offer credit facilities, and their organised and formal structures help guarantee payments. SACCOs also have a much wider reach as anyone can register to be part of a SACCO and some even cover the whole country.

An issue affecting engagements with both SACCOS and Chamas was the difficulty in identifying the key people at an organization who would enable us to push the agenda of the project. Calls and emails were often unanswered or were subject to run rounds - being passed from representative to representative - but without getting access to the key decision maker.

REVIEW OF FINANCIAL MECHANISMS OFFERED BY SACCOS AND CHAMAS

- **Lipa pole pole (pay little by little)** enables customers to pay for goods in instalments without additional interest. Once they complete payment, they own the goods. This method was used by Kisambara Ventures for some of the aspiring clients. We kept the EPCs in our possession until they finished payment and then we had them delivered. This was not such a popular option for some of the clients because they'd have preferred to pay as they used the EPCs but since we had no guarantee of the payments being completed, we couldn't allow it. Hence, the ones who could went for the option below.
- **Payment by instalments** from financing institutions enables customers to take a loan to buy the EPC which they pay for in instalments with an additional interest. This was very effective in the case of Merdat and Stima SACCOS. This was by far the most popular from the feedback we got because the clients were able to enjoy all the benefits while still paying for their EPCs.

- **Check off system** of payment sees a portion of money deducted from a person's salary to pay for the EPC. How this works is the salary is deducted before the employee receives it. The cost of the EPC remains the same and the employee gets to use the pressure cooker because the employer knows where to get the remaining payments. This is the system that is used at Stima Sacco (KPLC) and Merdat (DT Dobie). We did not on-board any client who used this method.

CHALLENGES EXPERIENCED IN ENGAGING AND SETTING UP AGREEMENTS AND SUGGESTED MEASURES

1. Some of the large SACCOs had a lot of bureaucracy and red tape that hampered the progress, for instance Stima SACCO. Decisions had to be approved by so many parties. The smaller SACCOs, for instance, Merdat were very straightforward to deal with. We approached the management, presented the proposal, a meeting with members of the SACCO was arranged on the same day and we started selling.

Measures to help overcome challenge: Hold in-person meetings

2. Some SACCOs were more interested in what they would get as a result of engaging with Kisumbara in the project than the success of the project itself.

Measures to help overcome challenge. Hold live demos (which were halted during the project because of the Covid-19 pandemic).

3. Covid 19 made it impossible for some organizations to allow outsiders to access their premises and we had to conduct all our meetings via phone and emails. This made it difficult to pin an individual down for any solid commitment.

Measures to help overcome challenge. Prompt feedback so as to chart a way forward faster. We are still in discussion with some organizations even though we engaged them at the beginning of our project.

4. Identification of the key people who would enable us to push our agenda, we were taken for a lot of run rounds and never got to access the key decision maker. This led to most of our emails not being answered.

Measures to help overcome challenge. Identification of the right officials who can push our agenda. This done through a lot of networking within the organization which eventually helps identify the key decision makers.

REASONS FOR LACK OF INTEREST BY CHAMAS AND SACCOS AND SUGGESTED MEASURES

1. Liquidity: some SACCOs did not have enough funds to enable them to extend loans to its members hence limiting the number of products available to their members.

Measures to help overcome lack of interest. Liquidity management is integral function of financial institutions. The SACCOS have to implement better internal workings that mobilize deposits which balances out with credit extensions and also better investments of any idle funds that they might be having.

2. Too many products were already on offer to its members, so they were not taking on any products lest they confuse their members.

Measures to help overcome lack of interest. More effort should be invested in enlightening the officials on the importance of adopting clean cooking solutions to both the environments and health of their members. This can be through live cooking demonstrations and online video demonstrations. The trickle-down effect will be that this information will soon be passed on to the members.

3. Lack of adoption of the whole EPC and clean cooking agenda from the committee members who approve the products to be sold to its members.

Measures to help overcome lack of interest. See measures for point 2.

SUMMARY OF MAIN FINDINGS

We had more success with encouraging Chamas to offer loan facilities for EPCs than with SACCOs largely because the Chamas had less bureaucracy, and it was easier access to members. However, it is also just as easy for Chamas to stop being accessible due to the same reasons and cut off ties. When it comes to SACCOs there is a process that has to be followed which is a lot more tedious, but it ensures that you remain in their systems until it is decided to start the process of removing you from their systems.

The findings indicate there is potential to use financing organizations such as SACCOs and Chamas to scale up electric cooking as they can ease the burden of the upfront cost of eCooking appliances EPCs for members, which may lead to more people taking them up as opposed to trying to save up the requisite funds. Successful interactions with SACCOs and Chamas are therefore required to help realize this potential and the study found the following points to be key drivers of successful engagement.

1. Having organizations that have clean cooking as part of their key agenda. For example, KPLC already has that as one of its key deliverables being increased consumption electricity. The Equity group foundation already has a department tasked with energy and environment.
2. Having less bureaucracy when making decisions in order to have projects implemented faster.
3. Relationships we made in the process of carrying out the project who opened doors for us which would have been harder to open otherwise. For example, in Stima SACCO we managed to get useful referrals to people who helped push our agenda forward and now all that remains is signing the MOU.
4. Having one big / major organization engaging with another big organization on our behalf. For instance, KPLC had started talking to Equity on our behalf.
5. Identifying key decision makers and influencers (particularly those convinced about the clean cooking agenda) within the organizations as well as contact people who were prompt in answering our emails and propositions.
6. Banks such as Equity which have their own cooperatives present a particular opportunity to push the clean cooking agenda through their large reach.
7. The Ministry of Energy could promote clean cooking as part of its agenda through events or forums thereby creating awareness on the various options which the citizens can adopt such as use of EPCs.

4. Overall Conclusions

Overall, the results of the EPC pilot study and SACCO/Chama engagement show there are opportunities to increase electric cooking uptake in Kenya. Overall, the results of the EPC pilot study and SACCO/Chama engagement show there are opportunities to increase electric cooking uptake in Kenya. **However, further research is required to gain greater clarity on the expected usage and therefore impacts of any expanded uptake due to the reliability issues affecting the data from the cooking diaries research and the quantitative energy measurements captured from the dataloggers.**

Analysis carried out on the cooking diaries data from 37 of the 70 participants suggested that EPC use accounted for between 5% and 9% of dishes cooked during the pilot. While this did not seem to constitute a major part of participant cooking, which remained dominated by gas use, there does appear to be clear scope for EPCs to form a larger part of the fuel stack by providing the right training and support to enable people to use the EPC to cook the most common staples, ugali, leafy veg, and tea. These three dishes made up approximately half of the total cooking events during the project but were predominantly cooked on LPG due to participant perceptions that the EPC was not suitable for cooking these foods. Covid-19 restrictions during the project implementation period severely restricted the live cooking demonstrations and in person follow up with participants that can enable participants to learn how to cook a wider range of dishes. These challenges could also be mitigated with a wider range of video recipes targeting these specific foods and EPC manufacturers could also assist by tailoring buttons labels and functions to East African menus.

Datalogger data shows the EPC was mainly used to prepare legumes, highlighting how the device complements the cooking of long boiling foods. This finding suggests targeting EPC interventions towards households that use charcoal as their primary fuel will likely result in greater usage of the appliances, as charcoal is usually used for these heavy dishes. The direct health benefits the EPC offers compared to fossil fuel stoves will also be greater for households transitioning from charcoal compared to those mainly using LPG as the participants in the pilot were.

The findings from the exit survey provide further evidence of the potential to increase electric cooking in Kenya. Analysis was carried out on all 70 participants, with the vast majority reporting positive user experiences of the EPC. All the respondents reported that they would continue to use the EPC and almost all (65) reported they would recommend the EPC to others.

Most (52) preferred cooking with electricity to other fuels because it was more convenient, faster, cleaner, safer and cheaper. Concerns about electric cooking being unsafe or expensive changed after receiving training and using the EPCs. Almost all respondents (68) reported a change in mind set and realized that electric cooking was safe and affordable to use. Food cooked on electricity was found to taste no better or worse compared to other fuels by the majority of participants (62). However, most (49) indicated there were dishes in their usual menu they could not cook in the EPC. Most (45) respondents reported they were satisfied with the EPCs and would change nothing about them. Of those that did suggest alteration, the most common were cooking options for local menu items, different inner pot sizes and provision of more than one inner pot for cooking different dishes.

Most respondents reported cooking practices changed after EPC were introduced, highlighting the speed and convenience of the device had enabled them to cook heavier foods and be more flexible about when they cooked. Most (55) also indicated that they had learned new energy saving tips and

cooking techniques following the introduction of EPCs. Women however remained the primary cooks in the ECO households, with most respondents reporting no change in cooking roles after the introduction of EPC although anecdotal evidence from the pilot indicates that the introduction of the EPC led to some men volunteering to cook.

Fuel stacking continued after the introduction of the EPC mainly because respondents reported that not all foods could be cooked in the EPC (e.g., for deep frying). Stability of electricity supply also impeded EPC use. Power outages were reported by most respondents (53) who were concerned about what would happen in cases of black outs while cooking. They preferred to still have charcoal and particularly their LPG jikos, which contributed to the continued fuel stacking with by almost all respondents.

By the end of the project the vast majority (66) of participants reported that they would buy an EPC if they saw one in a shop and the price was 'right' although the price they were willing to pay varied, with most suggesting a figure noticeably below the market price. This indicates that stakeholders should work cohesively to ensure the upfront cost barrier is reduced and the findings from the engagement with SACCO and Chama show there is potential to use the loan facilities provided by these financing institutions to unlock this affordability gap.

The outreach work carried out through this project found engaging chamas was generally more successful as they had less bureaucracy and easier of access to members as compared to the SACCOs. This engagement resulted in three Chamas and one SACCO began offering loan facilities to purchase EPCs from Kisambara, leading to 17 purchases of EPCs.

Engagement tended to be more successful with organizations that already had clean cooking as part of their key agenda. For example, KPLC already has that as one of its key deliverables being increased consumption electricity and the Equity group foundation already has a department tasked with energy and environment. Working with less bureaucratic organizations was also a success driver as it expedited decision making and implementation of the proposition.

Successful engagement was also largely driven by individual relationships developed in the process of carrying out the project. For instance, in cases where organization contacts were prompt in responding to emails and propositions, and more importantly where they opened doors which would have been harder to open otherwise. Similarly, having a major organization engage with another large organization on behalf of the proposition was fruitful.

SACCOs and Chamas appear to have potential to increase electric cooking uptake in Kenya given their large outreach and the finance mechanisms they offer members to access products that might otherwise be unaffordable. Larger organizations with their own SACCOs such as national banks have particularly potential due to the size of their membership. This project has shown how engagement with SACCOs and Chamas can lead to these organizations offering loan facilities to purchase eCooking appliances and raising awareness of their benefits among benefits. This process should be replicated to encourage other SACCOs and Chamas to come on board. The findings from the project enabled key lessons to be draw on how SACCOs and Chamas can be effectively engaged to begin selling eCooking appliances. The main recommendations are:

- 1) Identify the key decision maker at an organization. This proved to be a very good starting point for success.
- 2) Carry out live demonstrations and in-person meetings (often not possible under the Covid-19 pandemic) as these tended to gain more traction.
- 3) Identify and engage influential members of SACCO/Chamas who have adopted and are convinced by the clean cooking agenda to push the proposition.
- 4) Develop a close working relationship with the Ministry of Energy (MoE) who can promote clean cooking as part of its agenda through events or forums thereby creating awareness on the various options which the citizens can adopt such as EPCs. Once the SACCOS and chamas see that the MoE endorses the clean cooking message that we are spreading then they'll have confidence to adopt our agenda.
- 5) Cast a wide net and engage as many Chamas and SACCOs as possible. For example, there is untapped potential outside Nairobi.
- 6) Identify and engage large organizations who can then engage with other large organizations on behalf of the project.

5. Recommendations

Drawing on the findings from the various research component of this project, the following are the primary recommendations to facilitate the scale up of electric cooking in Kenya.

1. **Training to encourage people to use the EPCs for staple dishes.** We found the EPC was very rarely used to cook staple dishes as participants perceived the device was not suitable for these dishes. Training (e.g., live cooking demonstrations, in person follow up and video recipes for specific foods) on how these staples can be prepared on the EPCs (and perceived challenges overcome) is required to enable EPCs to form a larger part of the fuel stack.
2. **Continued improvement of electricity infrastructure.** Power outages were the main inconvenience reported by participants and the reason a majority would not consider cooking solely on electricity. Improving the reliability of the electricity supply can increase consumer confidence and enable people to use electric cooking as much as they want.
3. **Increase marketing and awareness raising.** We feel that aggressive marketing and sensitization of the Kenyan population is vital so that the clean cooking message is always top of mind anytime they think of purchasing any cooking devices. Sometimes the learning curve can be very intimidating, and some people might shy away from buying an EPC because of it. Leveraging social media, having campaigns run on popular television channels will go a long way in demystifying the EPCs. Common incorrect perceptions about electric cooking safety and cost issues can also be mitigated through concerted and targeted messaging and training.
4. **More concerted efforts to target male customers.** More targeted awareness raising and marketing efforts are also required to encourage more men to start cooking and the pilot study revealed some evidence that the introduction of the EPC resulted in some men in participating households volunteering to cook. Such efforts may slowly and over time lead to gender roles beginning to evolve and see more men participating in kitchen activities.
5. **Design country specific EPC functionality.** Most EPCs on the Kenyan market have functions which do not apply to Kenyan cooking which may discourage possible customers. For instance, ugali is mostly cooked over high heat and has an intricate heat balancing act towards the end

of its cooking process which the EPC doesn't currently offer. The EPCs could have an ugali function programmed in a way that simulates the traditional ugali cooking process by having the heat automatically regulating itself and alert the cook that it's getting into the next phase.

6. **Continued government support.** The government through the ministry of energy has already made it part of their agenda to focus on promoting clean cooking and clean cooking devices by coming up with policies which focus on facilitating clean cooking and phasing out the use of charcoal by 2028. This would go a long way in helping us push the clean cooking agenda even further. KPLC also plays an important role in scaling up electric cooking as their key mandate is to plan for sufficient generation and transmission capacity to meet the demand of its customers. KPLC also endeavours to maximize the use of electricity to its on-grid customers through initiatives such as promoting clean cooking using electricity.
7. **Improved rural after sale services.** While EPC after sales services proved very prompt in Nairobi, up-country clients experienced challenges and dissatisfaction because of the long time it takes for EPCs to be delivered to a collection point, be brought to Nairobi for repair and servicing, and then taken back to collection centers. This could be improved by opening up more strategically placed service centers outside Nairobi to ease the turnaround time.

KISAMBARA NEXT STEPS

The results of this study are of relevance to the wider clean cooking sector and particularly useful to MECS, KPLC, Ministry of Energy, Clean Cooking Association of Kenya (CCAK) and the Clean Cooking Alliance (CCA). Going forward, we will keep leveraging on the partnerships and collaborations that we've established – for example, we are currently working with MECS and KPLC – to ensure the uptake of EPCs at scale is realized. Although lack of finances may hamper the pace at which Kisambara might expand its clean cooking business, we intend to scale up the clean cooking agenda through the following activities:

- Replicate our findings with other SACCOs and chamas that are located in other counties.
- Expand our operations to other counties within Kenya, we will start by targeting the greater Nairobi Metropolis.
- Look for more funding opportunities to help us scale up and facilitate our activities (including outside of Nairobi). Increased funding that will help us scale up faster by being able to purchase in bulk which helps in the ability to negotiate better pricing.
- Look for new partners to take the clean cooking agenda further, for instance African Center for Technology Studies (ACTS) and CLASP.
- Start a series that will be purely targeted at cooking using EPCs that will be aired on our social media platforms and on one of the TV programs if possible.
- Develop video recipes showing how to cook the specific foods identified in this report as possible to cook in an EPC, but rarely cooked in the EPC by participants due to lack of awareness.