

# ECO-Follow up Study

## Final Report



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## Executive Summary

This follow up study was conducted on Dec/Jan 2022/23 to assess the impact of the MECS ECO project in an off-grid site in Solukhumbhu district. The ECO project was a six-month electric cooking pilot study with 50 households which ended more than a year before in August 2021. The team surveyed 31 of the original ECO participants and 51 non ECO participants from the same community, conducted an intensive cooking diary with 10 households (selected from the 31 ECO participants) for 2 weeks, and had discussions with relevant stakeholders like representatives of informal groups, local government authorities, retail electrical and electronic shopkeepers, repair technicians, Nepal Electricity Authority (Salleri Branch), and the local Micro Hydropower Committee. The ECO participants provided positive feedback to the introduction of electric cooking technologies. Around 80% of ECO participants surveyed were still using the Electric Pressure Cooker (EPC) on a regular basis while the proportion of dishes cooked on electricity has significantly increased from 31% to 43% since the endline phase of the original ECO pilot and the electric cooking energy consumed per household (kW/day) has doubled. The EPC and the electric kettle were the main technologies used for cooking on electricity; the EPC principally for preparing rice and the kettle mainly for breakfast tea.

The positive impression of electric cooking (eCooking) appears to have generated willingness in the community to buy additional electric cooking appliances from the market. 45% of the ECO participants showed a willingness to buy an additional eCooking appliance while 27% of them had actually purchased another appliance. All ECO participants appreciated the smokeless kitchen eCooking provided while 97% of the ECO participants found cooking on electricity was easy and allowed them to multitask, indicating the user-friendliness and convenience of EPCs. 80% reported faster cooking on EPCs and 84% agreed that the food tastes better when cooked on electric stoves which could be due to the uniform heating, ensuring that the food is cooked evenly.

Some challenges have remained since the ECO pilot. 6 of the 31 had stopped using the EPC due to technical issues beyond the warranty period. PEEDA supported the repair and maintenance of EPCs during the overall warranty period. People have also largely limited the use of the EPC to cooking rice (78% of total dishes), possibly due to the limitation of a single inner pot. Other primary concerns that ECO participants stated were the limited electricity supply from the micro hydropower, regular voltage fluctuations which they feared could damage the technology, and the lack of access to post sales services and spare parts in the nearby localities and market centers like Salleri and Okhaldunga. The high transportation costs to travel to Kathmandu to access repair services (which themselves are often low cost could cause hindrance to local 'out-scaling' of electric cooking technologies.

The study suggests the ECO pilot has also had a positive impact on increasing awareness, interest, and use of eCooking appliances among the wider community. 70% of non-participants surveyed had an interest to buy an electric cooking appliance, while 20% had actually purchased one following the pilot. The findings suggest the ECO pilot may have helped enable this out-scaling. For instance, 25 of the 33 non-participants who reported they had heard about the ECO study said their opinions had changed positively about eCooking particularly regarding the ease and safety and smokeless-ness of eCooking. In contrast, from the 18 non-participants who hadn't heard about the ECO study, none had changed their opinions about eCooking. Despite interest in eCooking and eCooking purchases from non-participants, out-scaling may be impeded by the lack of local repair and maintenance facilities and the fact that almost all non-participants use firewood as the primary cooking fuel which is easily available either for free or with purchase. LPG is also easily available and used as secondary fuel for cooking.

The study identified several ways the ECO pilot could serve as 'launchpad' to out-scale eCooking further in the community and its surroundings. The research found that local influencers and community champions

play a pivotal role in the increased interest and adoption of electric cooking in the community and these people need to be identified and mobilised. Similarly, the increased awareness of eCooking from the ECO pilot could assist registration and renewal of informal women's group to support its group member in purchasing electric cooking technologies and maximize access to finance options and benefits from the local government. In addition, the ECO pilot has indicated that eCooking adoption could be accelerated by increasing live demonstrations that give hands on experience on technologies; providing free trials and demos to local vendors; identifying and implementing appropriate subsidy mechanisms to reduce upfront costs; and improving relevant post-sales services and easy access to local repair and maintenance provisions.

## Abbreviations

ECO	-	Electric Cooking Outreach
EPC	-	Electric Pressure Cooker
HH	-	Household
KAPEG	-	Kathmandu Alternative Power and Energy Group
KM	-	Kilometre
LPG	-	Liquified Petroleum Gas
MECS	-	Modern Energy Cooking Services
MHP	-	Micro Hydro Power
NEA	-	Nepal Electricity Authority
NPR	-	Nepali Rupees
PEEDA	-	People, Energy and Environment Development Association
UoB	-	University of Bristol

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Left: participants using an EPC to prepare tea.

Top right: installing an energy meter for the intensive cooking diary survey.

Bottom right: Surveying with a non-ECO participant.

# Table of Contents

<b>Executive Summary</b> .....	<b>ii</b>
<b>Abbreviations</b> .....	<b>iv</b>
<b>1. Introduction</b> .....	<b>1</b>
1.1 Background .....	1
1.2 Objectives of the Study .....	1
<b>2. Methodology</b> .....	<b>2</b>
<b>3. Results and Discussions</b> .....	<b>5</b>
3.1 ECO participants .....	6
3.2 Intensive Cooking Diary Study .....	13
3.3 Non ECO Participants .....	17
<b>4. Conclusion</b> .....	<b>32</b>
<b>5. Recommendations</b> .....	<b>33</b>
<b>6. Dissemination Plan</b> .....	<b>33</b>

## List of Figures

Figure 1: Status of supported eCooking appliance to eco participants .....	6
Figure 2: Purchase and interest of eco participants in buying eCooking appliances.....	7
Figure 3: Action of eco participants on technical issues encountered .....	8
Figure 4: Positive feedbacks about eCooking by ECO participants.....	9
Figure 5: Negative feedback on eCooking by ECO participants .....	9
Figure 6: Frequency comparison of EPC usage .....	10
Figure 7: % of each fuel used for cooking different dishes by ECO participants.....	11
Figure 8: % of each dish cooked on EPC .....	11
Figure 9: Comparative % of respondents cooking and not cooking using electricity by eco participants ...	12
Figure 10: Comparative % of relative frequency of fuel used for cooking in different phases of ECO project. .....	14
Figure 11: Comparison of % of dishes cooked per fuel in ECO follow up project through cooking diaries and indicative cooking diaries.....	14
Figure 12: Comparison of heating purposes in different phases of ECO project.....	15
Figure 13: Comparison of the common dishes prepared during different phases of ECO project. ....	15
Figure 14: Comparison of relative frequency of heating events in EPC during ECO follow up and ECO pilot studies .....	16
Figure 15: Percentage of each dish cooked in the electricity, or the standard fuel stacked (FS) stove during ECO pilot and follow up phases. ....	16
Figure 16: Age group of respondents of non eco participants.....	17
Figure 17: No. of family members in the non eco participants surveyed.....	18
Figure 18: Kitchen location of non eco participants .....	18
Figure 19: Types of cooking fuels used by non eco participants .....	19
Figure 20: Purchase of additional cooking appliances .....	21
Figure 21: Interest shown by non ECO participants to buy eCooking appliances .....	23
Figure 22: Experience of cooking and tasting food in eCooking appliances by non ECO participants .....	24
Figure 24: Opinion of non Eco participants towards eCooking.....	25
Figure 25: No. of non Eco participants respondents whose opinions of eCooking have changed .....	26
Figure 26: No. of non ECO participants discussing eCooking with others.....	26
Figure 27: Effect of organizations and community in promoting eCooking on non ECO participants .....	27
Figure 28: Awareness about the ECO project in non ECO participants and change in cooking behaviors .....	28
Figure 29: ECooking purchasing preferences of non ECO participants.....	28

## List of Tables

Table 1: Technical and maintenance issues .....	7
Table 2: Comparison between ECO pilot endline (n=30) and ECO follow up (n=10) .....	13
Table 3: Types of cooking devices used by non ECO participants.....	19
Table 4: Frequency of fuelwood and LPG purchased by non ECO participants .....	20
Table 5: Annual wood and LPG cylinders consumption of non ECO participants.....	20
Table 6: Reasons stated by non ECO participants to buy different electric cooking appliances .....	22



## 1. Introduction

### 1.1 Background

People, Energy and Environment Development Association (PEEDA) along with partners Kathmandu, Power and Energy Group (KAPEG) and University of Bristol had implemented Electric Cooking Outreach (ECO) project in an off-grid site in Solukhumbhu district that ended back in December 2021 and this research project was conducted under the financial support from Modern Energy Cooking Services (MECS) programme. It had a significant time duration since the project concluded. There was a curiosity among us (MECS team and Project Team) to understand on what has happened to the community since we left the site at Solukhumbhu. Hence, the team thought of the time frame as ideal for a follow up study to understand the longer term impact of the project on both ECO participating and non-participating households.

### 1.2 Objectives of the Study

- What have been the longer term impacts of the ECO pilot studies on community cooking practises for both ECO participants and non-participants?
- What are the ways in which the ECO pilot studies could serve as launchpads to 'outscale' eCooking in the community and its surroundings?



## **2. Methodology**

The follow up study was carried out using the methodology as described below:

### **2.1 Desk Study and Literature Review**

PEEDA prepare the field setup and conduct necessary literature review of documents related to e-cooking. PEEDA reviewed its own ECO study report, MECS market assessment report and other relevant e-cooking publications.

### **2.2 Data collection**

The following research methods were used during this project:

- Survey with 31 ECO pilot study households
- Two-week intensive cooking diary study of 10 ECO pilot study households selected from above 31
- Surveys and interviews with key stakeholders
- Survey with 51 non ECO participant households

#### **2.2.1 Survey with 31 ECO pilot study households**

31 HHs were selected from the supported 50 HHs by giving first priority to those who participated in the intensive cooking diary study in the original ECO pilot study. Door-door visit approach was carried out where they were interviewed using the survey questionnaire provided by MECS. The main objective of this segment was to understand the current cooking practices and behaviour changes after transitioning to eCooking. This helped to understand and design technical backstopping and follow up activities that may require in this project or the projects planned for future. Part of the survey used the MECS 'Indicative Cooking Diaries' method – a shorter, less resource intensive form of the 'Cooking Diaries method (see next section) where they were asked to list a menu of dishes cooked and devices used for cooking for a typical day. The door-to-door and direct interview modality approach was applied by PEEDA using the survey tool templates and KOBO provided by MECS.

#### **2.2.2 Cooking diaries study in 10 ECO pilot study households**

A cooking diaries study was carried out in 10 ECO pilot study households (selected from the 31 interviewed for the survey) for 2 weeks. Cooking diaries method involves recording energy measurements of the cooking fuels used and matching these recordings with diary data, where participants note which dishes they cooked and how in order to understand fuel use, cooking behaviour and preferences. The data from the cooking diaries provided quantitative and qualitative evidence to compare with the cooking diaries data from the original ECO pilot study and support the findings from the indicative cooking diaries study and survey carried out in this follow up study. The follow up study used the same cooking diaries form prepared for the original ECO pilot. An enumerator from the earlier ECO pilot was mobilized again to collect the cooking diaries data for the follow up study.

#### **51.2.3 Survey Of Non ECO Participants**

51 non-participants, selected randomly, were surveyed from the different community clusters, approximately within 5km radius of the ECO implementation site. The survey assessed the impact of the ECO electric cooking intervention on non-participants and the possibilities for the ECO pilot to serve as a launch pad for out-scaling eCooking more broadly. The interest and willingness of the non-participants were examined

and further explored the opportunities and challenges in electric cooking and helped to understand factors such as awareness of and demand for eCooking.

#### **2.2.4 Surveys and interviews with key stakeholders**

##### **Interview with local government representatives**

PEEDA conducted interview with local government representatives to understand the interest of eCooking among them and discuss the potential budget allocation for eCooking promotion. They showed interest toward the adoption of eCooking, but due to limited supply of electricity from the micro-hydropower, they prioritised installing grid networks over the promotion of electric cooking.

##### **Interview with NEA head, Salleri branch**

PEEDA discussed with NEA head of Salleri branch regarding their future plans of expand grid infrastructure in the study area. PEEDA was informed that should the community apply for access to national electric grid services, they are readily available to do so.

##### **Interview with chairperson of informal women's group**

It was discussed how the informal group is mobilizing the savings within the community and whether it can be utilized for the promotion of eCooking.

##### **Survey of local vendors of cooking appliances**

It was found that other eCooking appliances like electric rice cookers and electric kettles were available but the vendors hardly knew about other electric cooking technologies like EPCs and induction stoves.

##### **Survey of electrical repair and maintenance technicians**

Although the technicians with abilities to repair water pumps and electric rice cookers were available, they didn't have any experience of repairing EPCs and induction stoves.

##### **Out scale the eCooking in the community and its surrounding of the ECO pilot studies area**

The implementation approach of supporting electric cooking technologies was new to the end consumers; and the promotion activities including technical live demonstration was carried out to ensure the robust ecosystem such as access to affordable technology, access to finance, access to post sales services and affordable and quality repair and maintenance. This section tried to study the existing mechanisms in the local community that will sustainably unlock the out-scaling potential of electric cooking. PEEDA study team conducted a survey of local stakeholders like MHP Committee, local businesses and national level stakeholders related to e-cooking.

##### **Study on developing supply chain**

Under this section, the study focused on how appropriate supply chains could be developed in the study site by surveying potential and relevant cooking vendors and stakeholders. PEEDA conducted surveys of cooking vendors, repair technicians of electrical devices, Nepal Electricity Authority (NEA) branch head in the nearest market named Salleri (about 2 hours by vehicle from the project site).

##### **Study on developing consumer finance options**

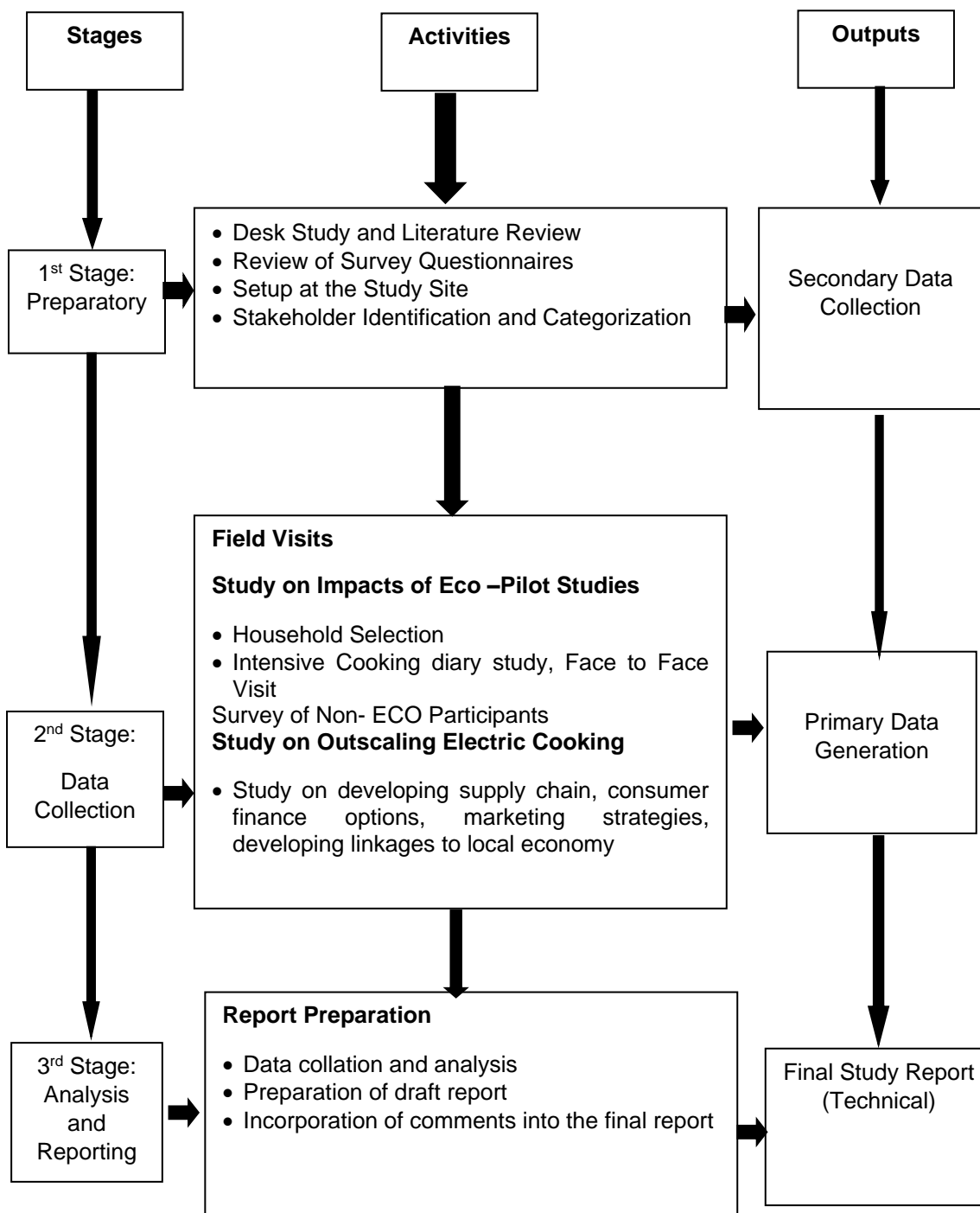
Previous implementation experiences have shown that the rural communities have high interest transitioning to the new technology when supported on a grant basis as the upfront cost of the appliances is relatively much higher than their current way of cooking methods. Therefore, PEEDA consulted with local government authorities to support with the development of consumer finance options for electric cooking.

### **Study on the introduction of marketing strategies**

The lack of awareness of electric cooking technologies and its use is one of the primary reasons that people do not use it. As such, the study also focused on what marketing strategies could potentially upscale the electric cooking technologies in the proposed study site.

### **Study on developing linkages to the local economy**

A study on the development of linkages to the local economy will be conducted by surveying potential local businesses that show interest in the e-cooking sector. The study also focused on how eCooking opportunities for local businesses can be created at the site.

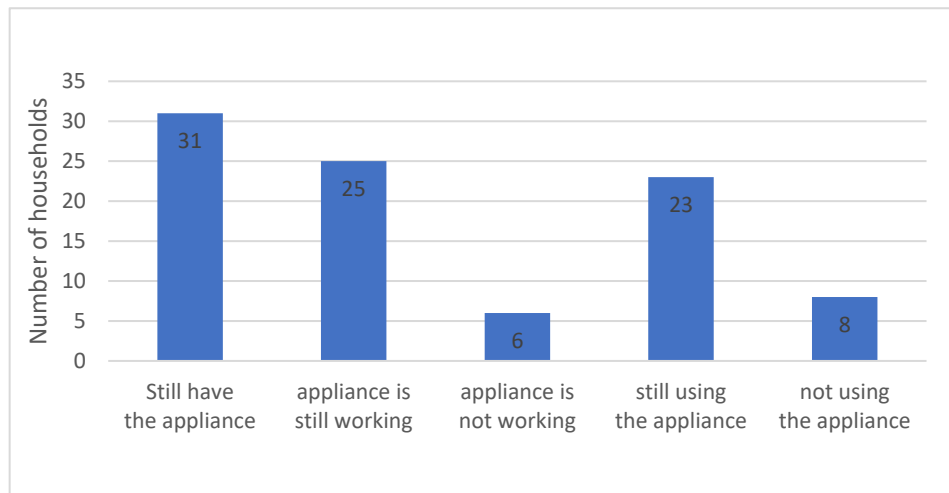


### 3. Results and Discussions

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

### 3.1 ECO participants

**Sub question: Are ECO participants still using the eCooking appliances provided? Are they using them more/less and why? How has the cooking fuel stack changed?**



*Figure 1: Status of supported eCooking appliance to eco participants*

Out of 50 beneficiaries, 31 participated in the follow-up survey. All 31 of the respondents still had the electric pressure cookers provided as a part of the ECO study (Figure 1). 25 of the respondents reported that the appliances were still working while 6 of them said that their appliances were not working due to some technical issues.

Most of the dysfunctional EPCs encountered the following technical issues:

- 1 reported that the display is not functioning properly.
- 4 reported that EPC turns on, but the inner pot doesn't heat up.
- 1 reported that EPC automatically turns off while cooking.

23 respondents were still using the EPCs on a regular basis. 6 respondents whose EPCs had technical issues were not using the device.

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

Since the end of the ECO study, 27% of participants have bought at least one other cooking appliance, all of them being electric (4 electric kettles, 1 water boiler, 1 induction stove, 1 infrared stove, 1 mixer, 1 electric rice cooker). Their willingness to purchase devices like induction stoves, infrared stoves, electric water boilers, etc., showed that they had also learned about other types of electric devices since the end of the ECO pilot. Further, 45% of households showed an interest in buying another electric cooking appliance (especially inductions stoves, kettles, and rice cookers). Those, who hadn't purchased any further cooking appliances noticed the following obstacles:

- The devices were not available in the nearby market.
- They lacked the necessary understanding of how to use these devices.
- Some of them simply couldn't afford it because of financial issues.
- Some of them were satisfied with the devices they already possessed and did not wish to buy additional devices.

“I do certainly want to buy electric cooking devices and make my kitchen completely smokeless. But my financial condition simply doesn’t allow me to do so. If I could get a subsidy from the government or from an organization, I would be able to populate my kitchen with cooking devices that run on electricity.” (ECO participant)

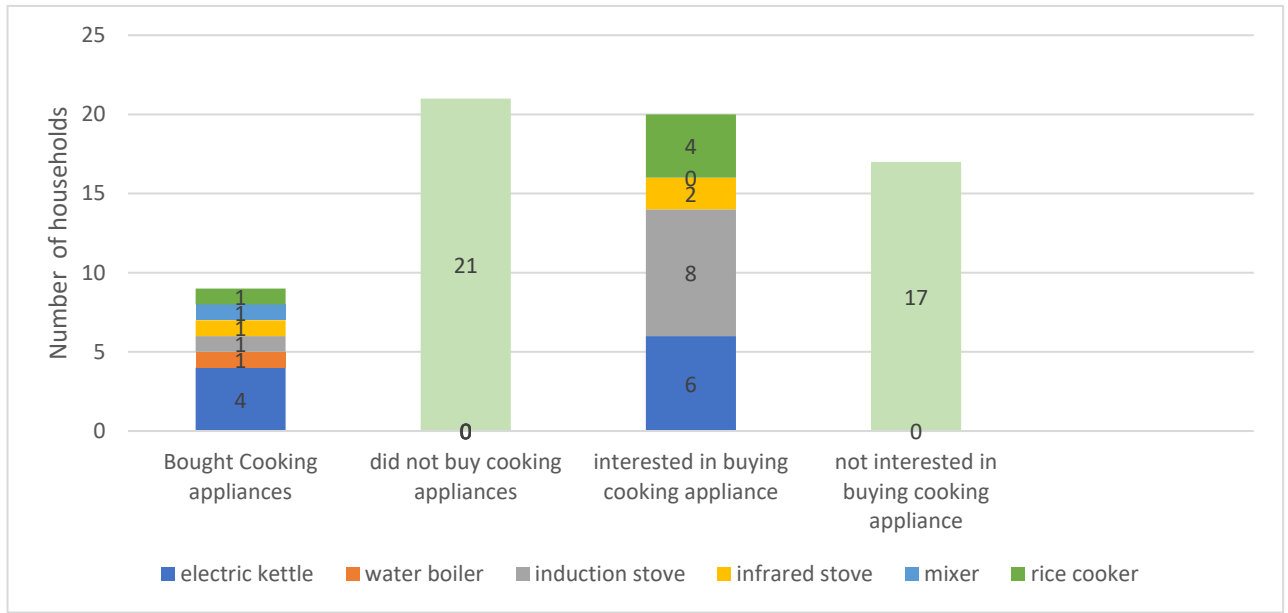


Figure 2: Purchase and interest of eco participants in buying eCooking appliances

### Safety Issues

None of the respondents reported any safety issues with the EPCs during or after the ECO study.

### Technical and maintenance issues

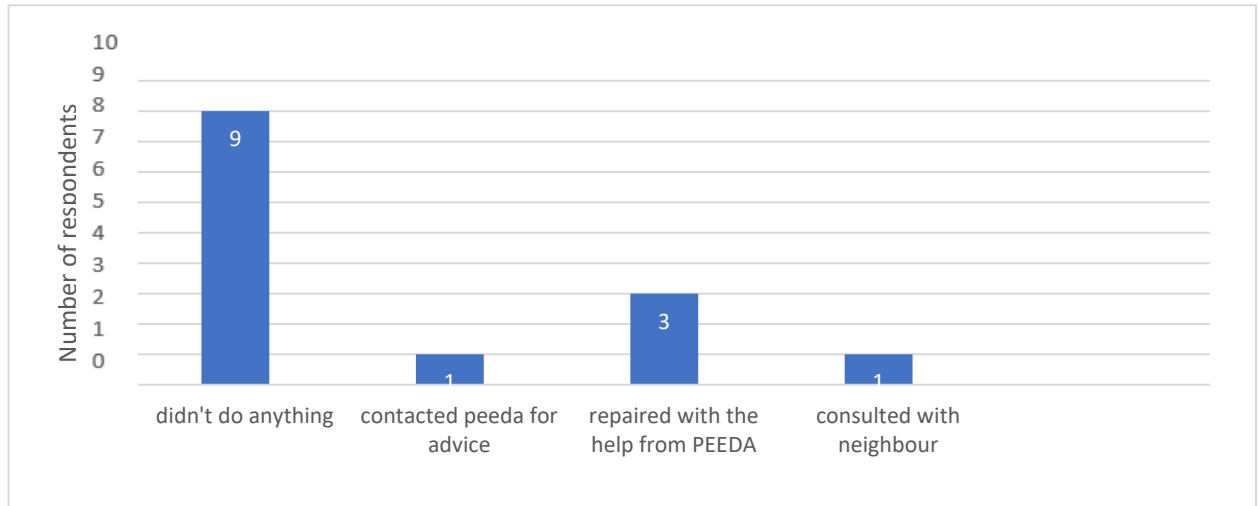
16 out of 31 participants faced either major or minor technical issues with the electric pressure cookers since the end of the research study. Despite the minor issues like discoloration of inner pot and steam leakage from the covering lead, 10 households were still using the EPCs. Radha Koirala, for example, lost the washer of the covering lead while cleaning the pot and the inner pot of her EPC also lost coating. But, she was able to cook on EPC anyway, albeit not as satisfactorily, as the food would usually overcook. 6 other major issues like EPC not turning on and inner pot not heating up rendered EPCs completely dysfunctional.

Table 1: Technical and maintenance issues

Technical issues	Number of respondents	Household still using the EPC
EPC doesn’t turn on	1	No
The float valve doesn’t rise even after the establishment of enough pressure inside the pot	2	No
The power cord doesn’t work properly	1	Yes
Washer lost	1	Yes
EPC turns on but the inner pot doesn’t heat up	3	No
Display doesn’t work or is not visible	2	Yes
Inner pot lost the coating	1	Yes
Arcing of wires inside the pot	1	Yes
Steam leaks from the covering lead	2	Yes
The three pin plug sparks sometimes	1	Yes

## What did they do about the problems?

9 of the 16 respondents who experienced technical issues did not take any action to resolve the problem.



*Figure 3: Action of eco participants on technical issues encountered*

This was either because they did not know where to take the device for repair or because there were no accessible repair service centres. The nearby city centers, Salleri and Okhaldhunga Bajar, are far from the village, with one-way bus fare costing between 800 to 1,000 Nepali rupees (NPR). This high cost of transportation, while the actual cost of repair is very low made accessing technical support and repair services challenging for the villagers. However, 3 of those 9 respondents who didn't do anything were still using the EPC.

Out of the 16 participants who complained the technical issues, 10 reported that the problems were fixed and the EPCs were functioning properly again. But 6 EPCS were damaged beyond repair and households were not using them currently.

## Electricity Supply/power outage

Almost all respondents experienced power outages since the end of the ECO study. However, the power outages were occasional and of the shorter period, mostly lasting for less than 2 hours. Power outages occurred while the EPCs were in operation, affected the cooking process. On such occasions, most of the respondents resorted to cooking on LPG or on firewood, while a few waited for the electricity supply to be restored. This highlights the importance of having backup cooking options in case of power outages.

## No change in the electricity bill

None of the participants noticed a change in their electricity bill before and after the introduction of electric cooking appliances. This was because, the micro-hydro committee did not implement any tariff systems. Instead, people were charged a flat rate of 100 rupees per month if paid in advance or 110 rupees if paid at the end of the month. Three of the participants who donated land for the construction of micro-hydro power station, were exempted from energy charges.

29 of the respondents reported having no problem even if the flat rate they pay was raised by the micro-hydro committee. However, two of them were skeptical about whether they would still prefer to cook on electricity, despite the convenience it offers. This suggests that the affordability of electricity may have an impact on some households in deciding whether to continue using an electric cooking appliance.

## Cooking experience: what do you like about cooking on electricity?

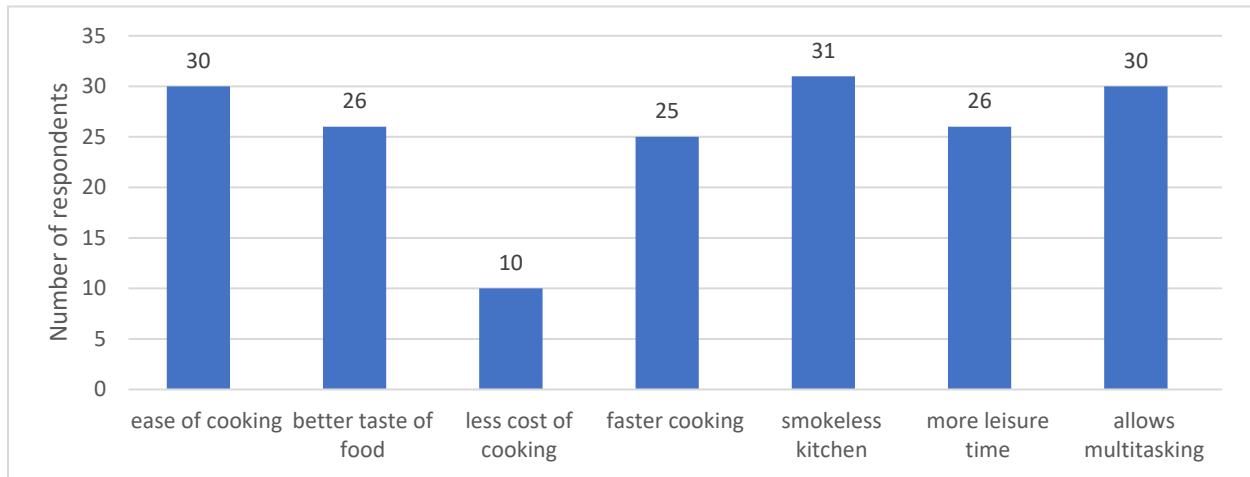


Figure 4: Positive feedbacks about eCooking by ECO participants

All the stakeholders appreciated that electric cooking produces no smoke, making the kitchen smokeless. 97% agreed that it allowed them to multitask which is an added advantage for those with busy schedules. The survey found that a vast majority of participants found electric cooking to be fast and easy. With 97% of the participants agreeing that cooking on electricity was easy, this indicates that electric pressure cookers are user-friendly and convenient to use. Moreover, 80% of the respondents reported that they could cook faster on EPCs, which is essential for people who are always busy and don't have much time to spend on cooking. Another noticeable benefit of electric cooking is the improved taste of foods. The survey found that 84% of the participants agreed that the food tastes better when cooked on electric stoves. This could be due to the uniform heating, ensuring that the food is cooked evenly.

## What do you dislike about cooking on electricity?

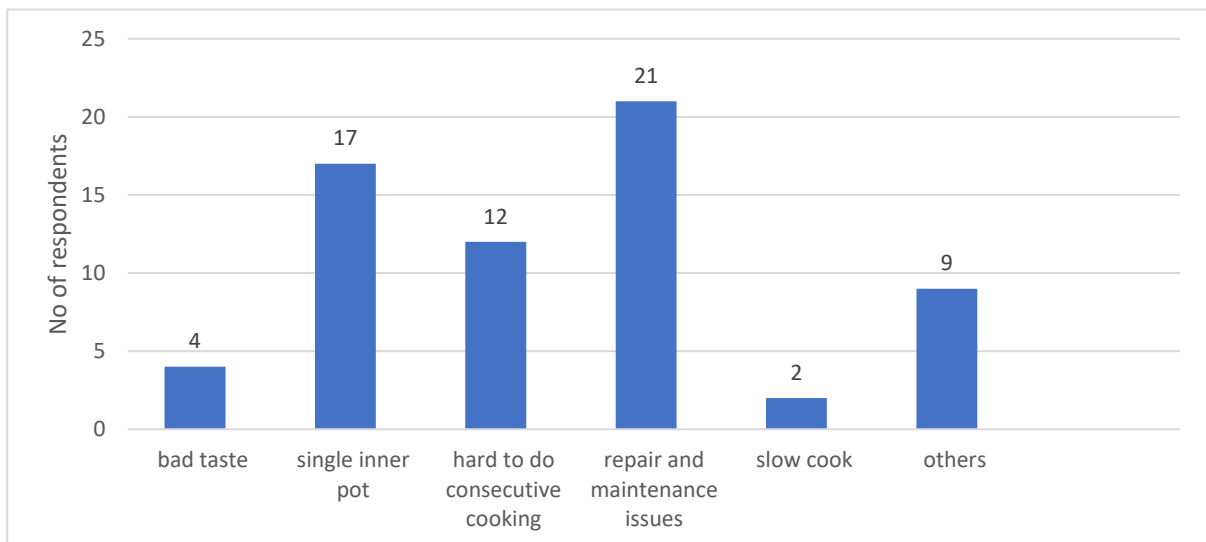


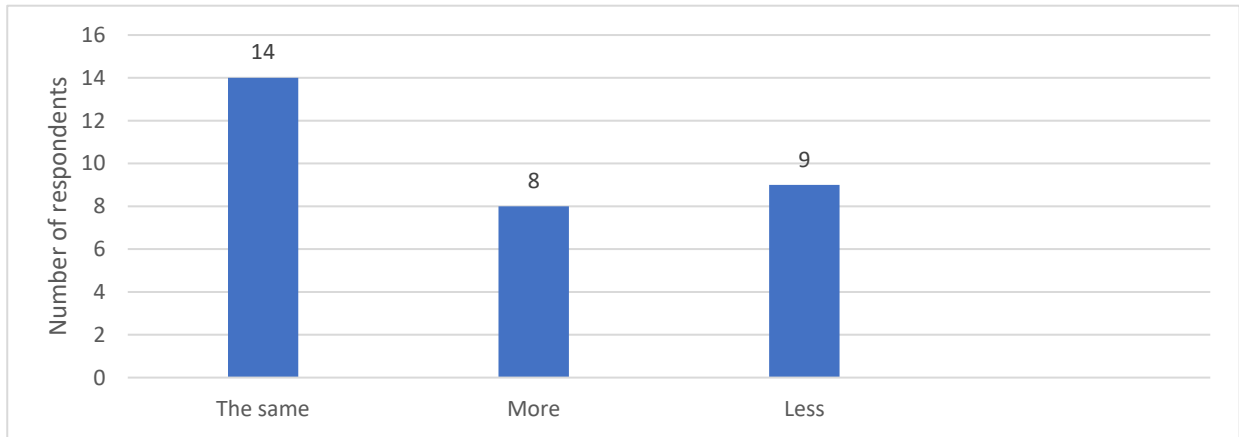
Figure 5: Negative feedback on eCooking by ECO participants

Repair and maintenance issues as stated by 21 respondents followed by single inner pot limitation (17 respondents) were prominent reasons behind ECO participants' disliking of eCooking. To cook the second dish, they either have to wait till the first dish is cooked or use another fuel like LPG or firewood.



It is clear that ECO participants are mostly positive about the electric cooking experience. If the limitations of single inner pot and repair issues are addressed, more people’s perception of eCooking might be changed in a positive way.

**Are you using e-cooking appliances more or less now?**



*Figure 6: Frequency comparison of EPC usage*

As compared to the ECO pilot study, 8 of the participants are using ECooking appliances more frequently while 14 of the participants are using in the same frequency. On the other hand, 9 of the participants have decreased the usage of these appliances, which may be due to the study being carried out in winter (see section below).

**Effects of seasonal changes on eCooking**

35% of respondents said that seasonal changes do affect their cooking behavior. It was found that they use electric pressure cookers (EPCs) more in summer than in winter. In summer, it is difficult to burn firewood because of the wetness; hence people prefer to use EPCs more. In winter, firewood is used for both cooking and space heating; consequently, EPCs are used less. However, the use of electric kettles for the purpose of water heating rises in winter.

**Meal combinations**

Most of the contributions to electric cooking during breakfast and snacks come from households using the electric kettle for preparing tea. It was observed that a significant majority of participants used for cooking rice only. This might be because of the following reasons: EPC has only one inner pot and if they try to cook everything in it, they will have to wait for a long. Instead, they opt to cook vegetables in firewood while simultaneously cooking rice on in EPC.

<b>Breakfast</b>	<b>Electric kettle</b>	<b>LPG</b>	<b>EPC</b>	<b>Firewood</b>	<b>Total</b>
	6	14	6	25	51

<b>LUNCH</b>	<b>Firewood</b>	<b>LPG</b>	<b>Electricity</b>	<b>Total</b>
<b>Rice</b>	3	1	25	<b>29</b>
<b>Dal</b>	14	6	7	<b>27</b>
<b>Dheedo</b>	1	0	0	<b>1</b>
<b>Roti</b>	0	0	1	<b>1</b>
<b>Vegetables</b>	16	7	1	<b>24</b>
<b>Milk</b>	5	0	0	<b>5</b>

<b>Total</b>	<b>39</b>	<b>14</b>	<b>34</b>	<b>87</b>
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<b>Snacks</b>	<b>Electric kettle</b>	<b>LPG</b>	<b>EPC</b>	<b>firewood</b>	<b>Total</b>
	5	7	4	17	33

<b>DINNER</b>	<b>Firewood</b>	<b>LPG</b>	<b>Electricity</b>	<b>Total</b>
<b>Rice</b>	4	1	22	<b>27</b>
<b>Dal</b>	14	2	6	<b>22</b>
<b>Dheedo</b>	3	1	0	<b>4</b>
<b>Roti</b>	3	0	0	<b>3</b>
<b>Vegetables</b>	22	5	1	<b>28</b>
<b>Milk</b>	4	1	0	<b>5</b>
<b>Total</b>	<b>50</b>	<b>10</b>	<b>29</b>	<b>89</b>

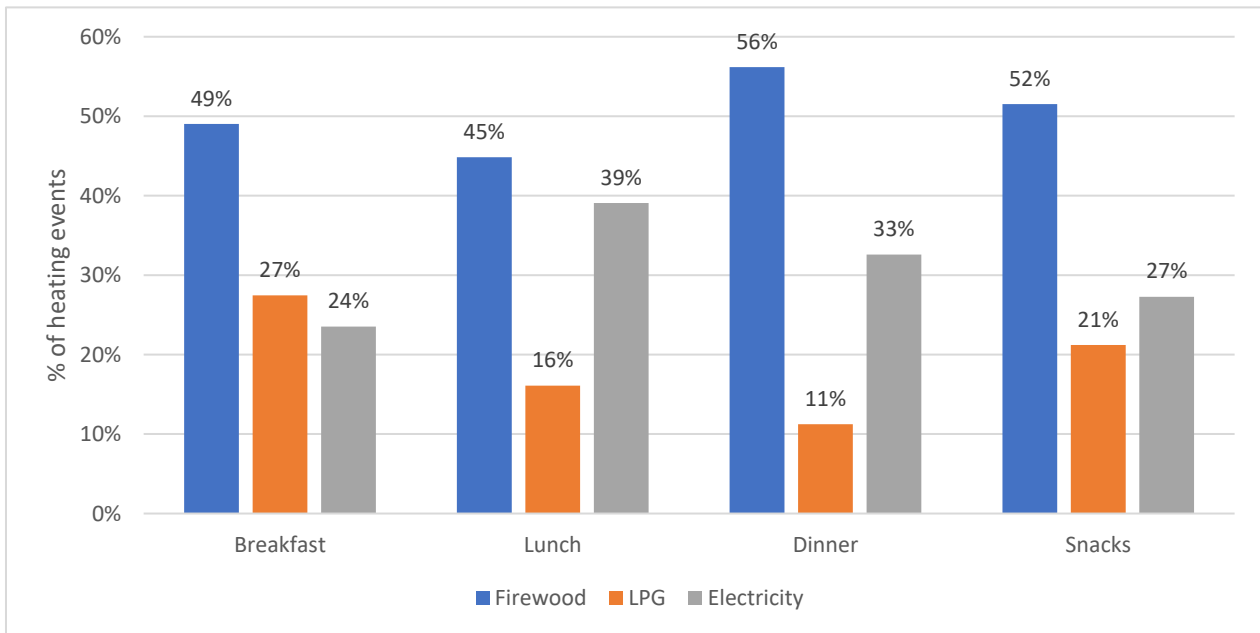


Figure 7: % of each fuel used for cooking different dishes by ECO participants

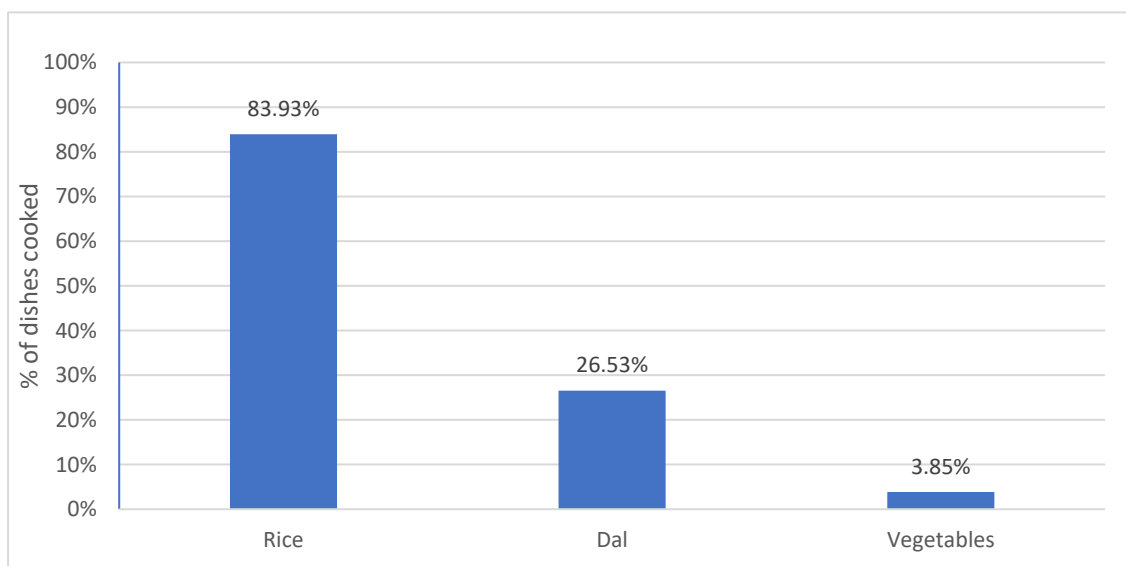


Figure 8: % of each dish cooked on EPC

## Cooking only with electricity?

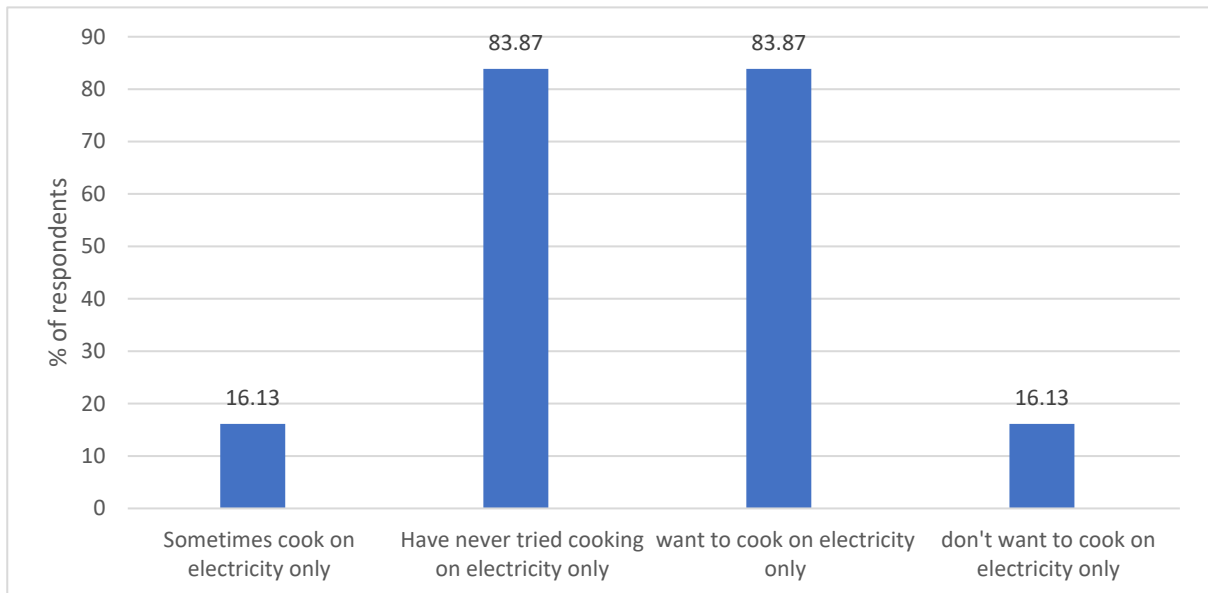


Figure 9: Comparative % of respondents cooking and not cooking using electricity by eco participants

Only 5 out of 25 EPC users said that they have tried cooking using electricity only. For most, it was not convenient to cook on electricity alone. They did not possess other electric cooking devices apart from EPCs and it would significantly increase the cooking time if they depended only on EPCs with single inner pots. Some even fear that cooking other dishes on EPC than rice would damage the equipment. Unreliable electricity provided another major setback for transitioning to 100% electric cooking.

“I use EPC to cook rice only because I fear that the EPC will break down if I cook other foods than rice on it”. “I only have EPC and no other devices. It will take longer if I try to cook using EPC only.” “I don’t want to transition to 100% electric cooking because I fear that most electronic devices malfunction and need expensive repair within a few months, and that will put an additional financial burden.”

“The micro-hydropower committee doesn’t use a tariff system. We only pay 100 rupees per month no matter the usage. So, transitioning to pure electric cooking is not going to increase my electricity bills. Also, I won’t have to spend days collecting firewood.”

### Word of mouth spread effect

24 recommended EPCs to others while 7 did not do so. They recommended because: it was easy to use EPCs, saves a lot of time and provides more leisure time, allows multitasking, small children showed interest, food stays warm for long time, smokeless kitchen, 20 said that their neighbours asked about EPCs while 11 said that their neighbours did not ask anything about it.

### How would much your neighbour pay for EPCs?

The respondents were uncertain about that. Answers ranged from NPR 3000 to 6000 mostly clustering around 4000/5000 similar to the subsidised price (~30 to 50% of the market price of an EPC, which typically ranged from NPR 8,000 – 10,000 in the local market) paid by the 50 ECO pilot study participants. 7 said that their neighbours have bought at least one electric cooking device since the end of ECO study. 24 said that theirs have not bought any eCooking device. (4 said that their neighbours have bought electric rice cooker while 2 said electric kettle)

## Concluding summary

It can be concluded that ECO participants were satisfied with the use of Electric Pressure Cookers despite technical issues for some. The benefits these Electric Pressure Cookers have provided and generated willingness to further buy additional electric cooking appliances from the market.

## 3.2 Intensive Cooking Diary Study

Along with the survey to ECO-participants, 10 households, selected from the 31 ECO participants surveyed, were involved in the intensive survey using cooking diaries to provide more detailed quantitative data on changes in the use of e-cooking appliances provided. The key outcomes from the cooking diary data are presented below.

10 household from the first phase of ECO-pilot project maintained the cooking diaries for 14 days. Table 2 summarizes and compared the data obtained with the endline phase data of ECO- pilot project.

*Table 2: Comparison between ECO pilot endline (n=30) and ECO follow up (n=10)*

	ECO-pilot Baseline	ECO-pilot transition	ECO-pilot endline	ECO- follow up
No. EPC heating events per day	-	1.8	1.78	1.82
No. heating events per day	3.90	3.28	3.30	3.89
No. dishes per meal	2.14	1.95	1.77	1.89
No of people per household	4.64	4.63	4.13	3.73
Wood usage total (kg)	3,713	1986	1,483	559
Average wood usage per household (kg)	138	74	62	62
LPG use total	-	-	-	5.57
LPG use per household (Kg)	-	-	-	1.86
Electrical cooking energy consumed per HH (kWh/day)	-	0.5	0.46	0.842

Table 2 shows that the number of EPC heating events was consistent across the study, while the average wood usage per household was the same in the ECO endline phase and the follow up study. The number of dishes per meal and heating events are found to be slightly increased in this study, showing the varieties of dishes cooked. However, the number of people catered per household is decreased.

Total wood usage in the ECO pilot endline (n = 30) and ECO follow up (n = 10) are 1,483 kg and 559 kg respectively over the period of two weeks intensive cooking diary study. In the follow up study, average was calculated considering only 9 households who used firewood, leaving the one that didn't use firewood.

In summary, the electric energy consumed per household (kW/day) in the ECO follow up study is nearly the twice than previous endline study since the households participated were found to cook in the induction, infrared and electric kettle after the ECO-pilot project. Meanwhile the firewood consumed per household is similar.

Figure 10 shows that relative percentage of dish cooked per fuel in firewood is increased by 18% than the endline phase of pilot project although its lower than other phases. Meanwhile the lowest heating events was recorded with LPG whereas maximum with electricity in ECO follow up than ECO pilot project. The

data collection period in ECO follow up was the winter season so, the household preferred to use firewood as it works for heating space as well. The addition of other e-cook stove such as induction, infrared and electric kettle in the households has displaced LPG for cooking in follow up study. Further, the participants have not refilled the LPG as its expensive and harder to refill. This also suggests that households are willing to adapting towards the new appliances for easy, cost effective smokeless, and fast cooking.

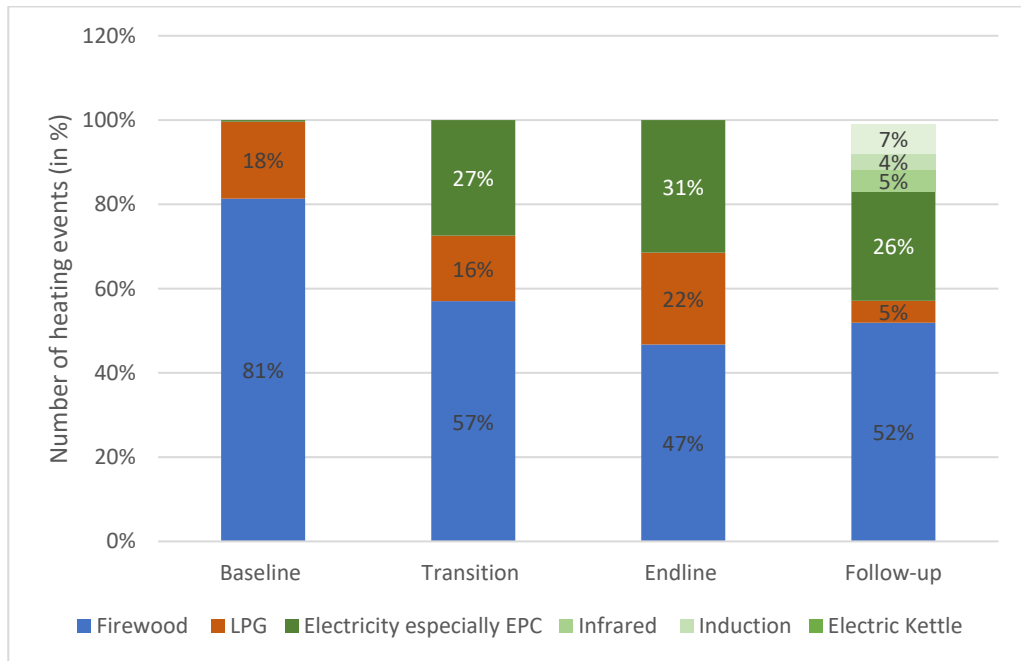


Figure 10: Comparative % of relative frequency of fuel used for cooking in different phases of ECO project.

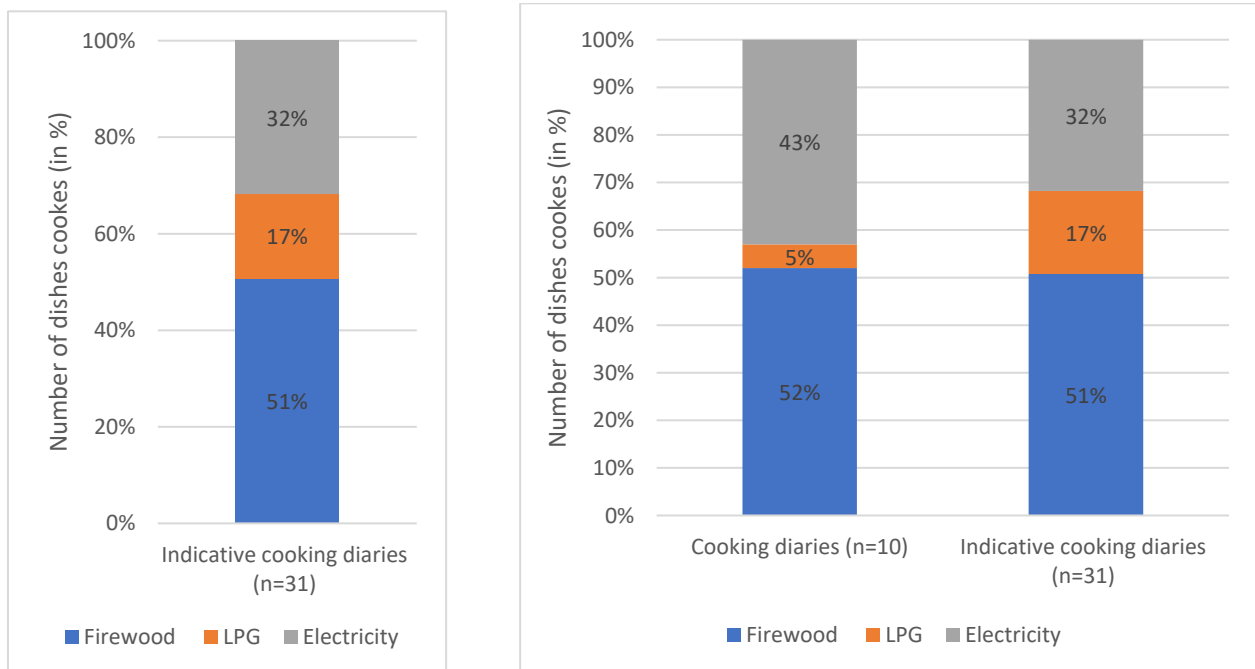


Figure 11: Comparison of % of dishes cooked per fuel in ECO follow up project through cooking diaries and indicative cooking diaries.

Figure 11 compares the % of dishes cooked per fuel between the cooking diaries and indicative cooking diaries used in ECO follow up project. The use of these two methods noticed the difference in the percentage of preference of the fuels for heating purposes. In inductive cooking diaries, 17% of dished were found to be cooked with LPG which is higher than the result showed by the cooking diaries. This might be due to low inclusion of the household using LPG in intensive cooking diaries survey. Although less than the

cooking diaries data, there is still sizeable cooking with electricity shown by the indicative cooking diaries, increasing confidence in the overall finding that most ECO participants continue to use eCooking stove for a significant proportion of their cooking. Meanwhile, % of dishes cooked by firewood in both methods is similar.

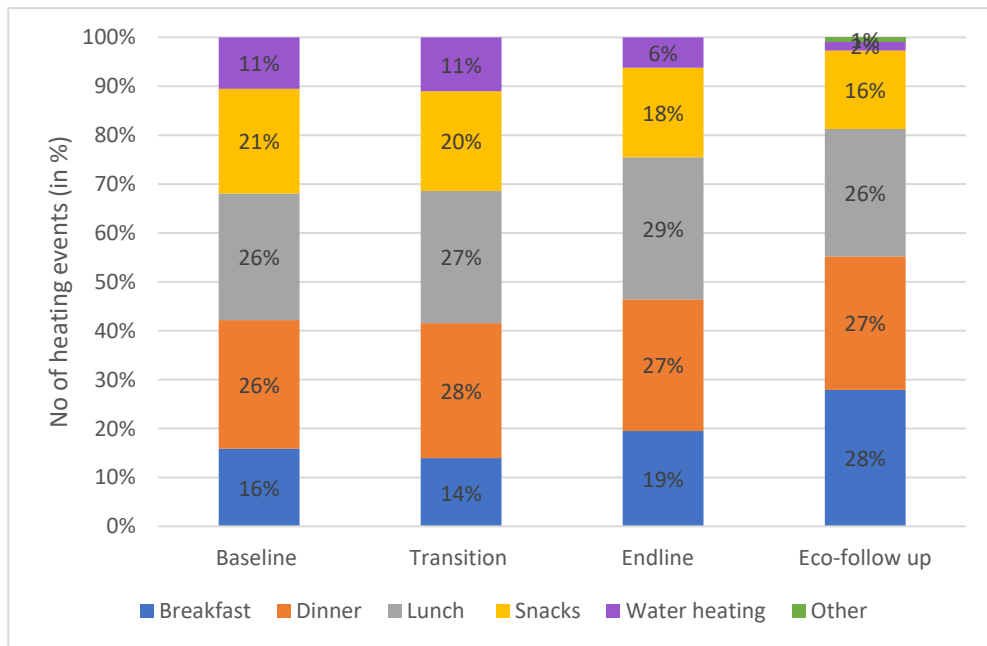


Figure 12: Comparison of heating purposes in different phases of ECO project

Figure 12 shows the relative frequency of heating events during endline of ECO-pilot and ECO- follow up, which is across all stove types used by households. The little change (i.e. < 5%) of cooking events between the ECO pilot and follow up period can be noticed expect for the breakfast. During the data collection period, the village was observing some cultural rituals in which most of the household had lunch in relatives or neighbours in some of the days so, the number of events for lunch is lesser than dinner. Again, this also causes the participants to have breakfast at home, increasing the heating purpose for this meal. The tea, milk, leftovers, and yam are mainly consumed for breakfast.

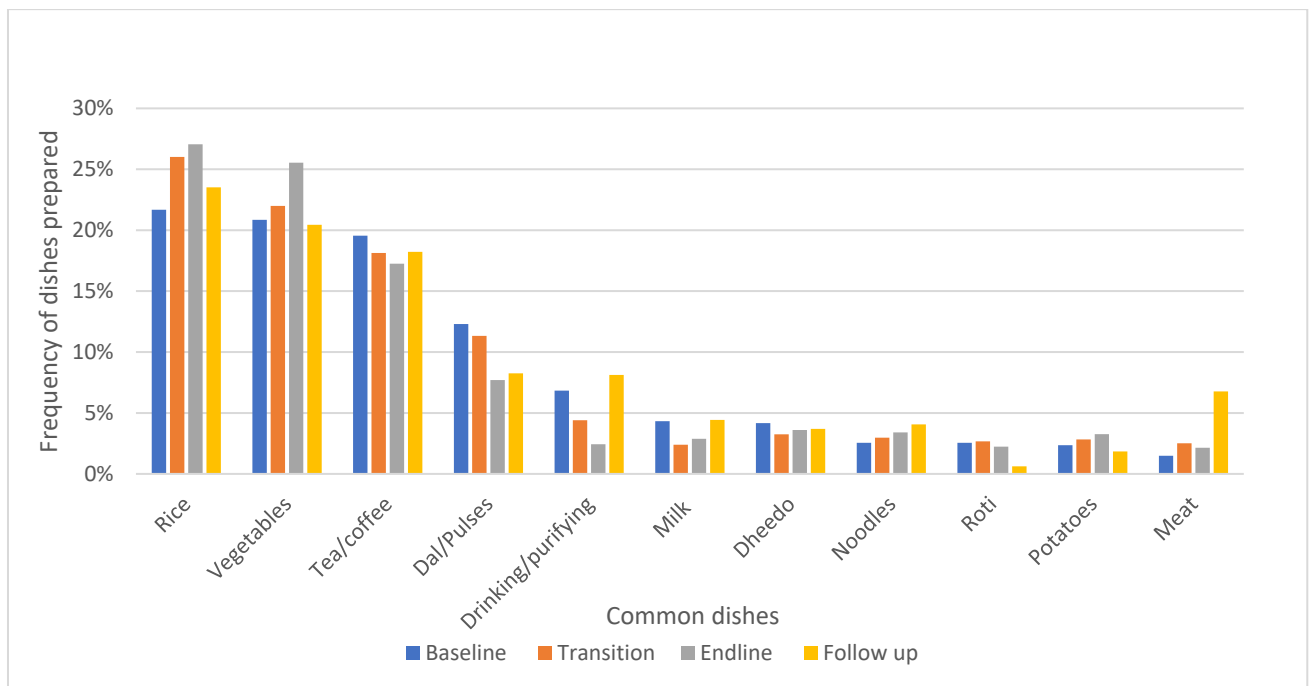


Figure 13: Comparison of the common dishes prepared during different phases of ECO project.

Likewise, Figure 13 shows the breakdown of dishes commonly cooked during different period of ECO project. As can be seen, there is very little change in most of the dishes. The staple dishes like rice, vegetables and dal/pluses are the commonly cooked dishes whose number is slightly changed in all the phases. The consumption of the meat is noticeably increased by more than 5% than other phases. Slight changes in the frequency of the dishes signifies the introduction of the electric cooking doesn't make any change in cooking or consumption behaviour.

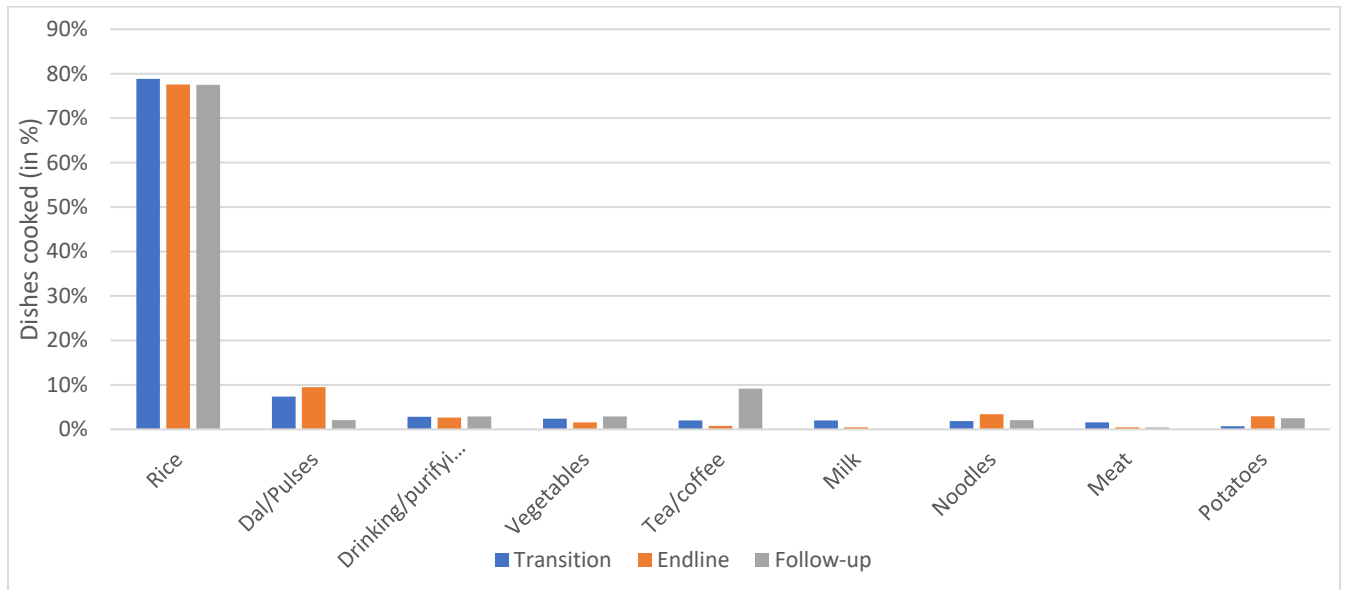


Figure 14: Comparison of relative frequency of heating events in EPC during ECO follow up and ECO pilot studies

Figure 14 shows rice cooking overwhelmingly took place in the EPC in all the phases of project, 78% of total rice cooking cooked in the EPC. Similarly, preparing short time dishes like tea/ coffee in EPC has increased by 8% than the pilot project, indicating towards the ease and fast cooking of the dishes. In addition, people also preferred to have hot drinks during the winter season (study period). However, preparing dal/pulses in EPC have been decreased by 4-8% than the pilot phase. This might be due to participant's perception that cooking varieties with EPC rather than rice damages it. In addition, no repair centre near to households also hindered in using it more frequently in a day.

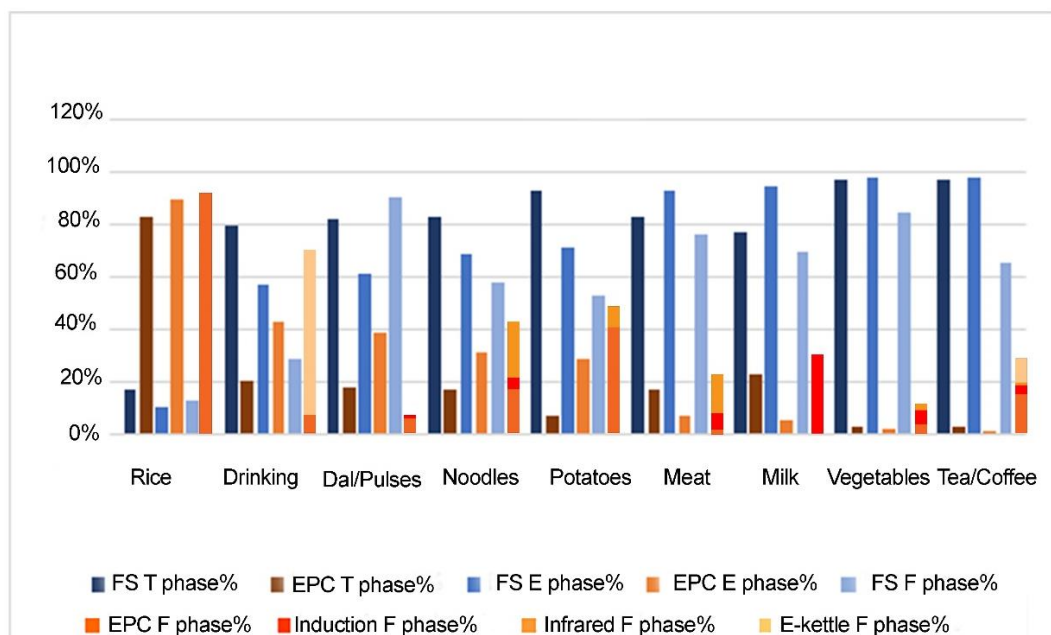


Figure 15: Percentage of each dish cooked in the electricity, or the standard fuel stacked (FS) stove during ECO pilot and follow up phases.

Figure 15 shows the proportion of total cooking of each dish by electricity and other fuels during the ECO pilot and the ECO follow up study. In previous research phases EPC was only the electric appliance used for cooking, meanwhile the addition of the other appliances can be clearly seen in follow up phase, indicating the difference of the fuel stack in different phases.

From the cooking diaries, household cook rice in electric stoves especially EPC in every phase of the project and similar record was obtained in pilot project as well. The voltage fluctuation and number of people catered lack the 100% rice cooking in electric stoves. The proportion of milk, meat, vegetables water heating and noodles has decreased to cook in EPC but preferred other electric stoves to prepare these dishes. This makes these dishes cooked with electricity more than 15 % than the previous phases. Indicating towards the acceptance of other available electric appliances and change the cooking behaviour. Dishes potatoes, and tea/ coffee has increased to cook in EPC. The other fuels such as LPG and firewood consumption has been decreased for most of the common dishes prepared in follow up phase. Hence, it can be concluded that the transition from biomass fuel and LPG to electric cooking is possible.

### 3.3 Non ECO Participants

#### Sub question 1. Have cooking practices for non-participants changed since the end of the pilot study? How? Have perceptions of ECooking changed? how? Why?

51 non ECO participants were surveyed in the follow up study in Necha Salyan ward 1 and 2, Solukhumbhu. Out of 51 surveyed, 28 were males and 23 were females. We used random sampling for the selection of survey respondents of non ECO participants, irrespective of gender. The respondents were of the age range starting from 14 years to 68 years. Graph below shows the diverse age group of respondents during the survey.

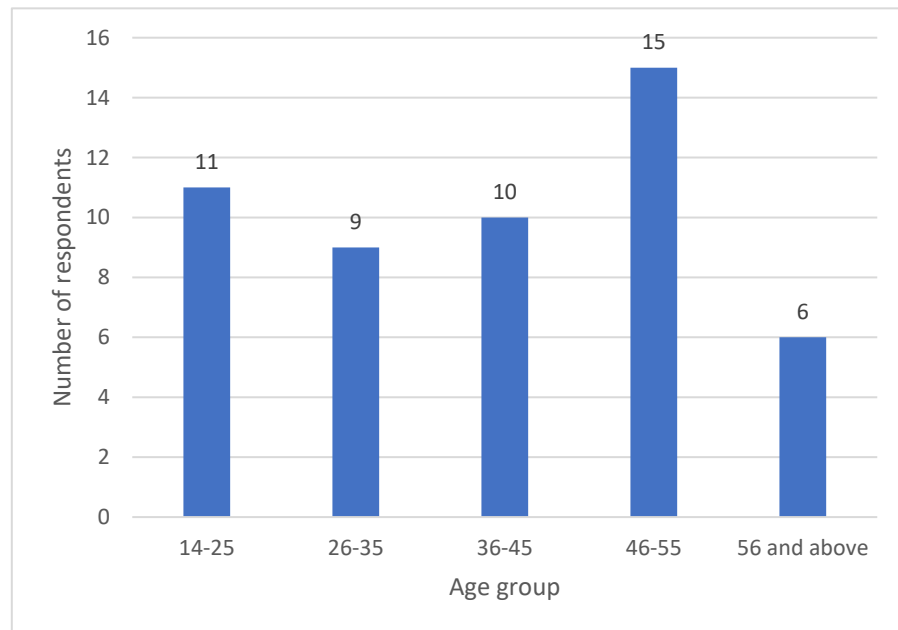


Figure 16: Age group of respondents of non eco participants

#### Household size

In total, there are around 206 members in the 51 families surveyed, with an average family size of 4.03 per household. 31 respondents have 3 to 4 members followed by 12 respondents with 5 to 6 members.



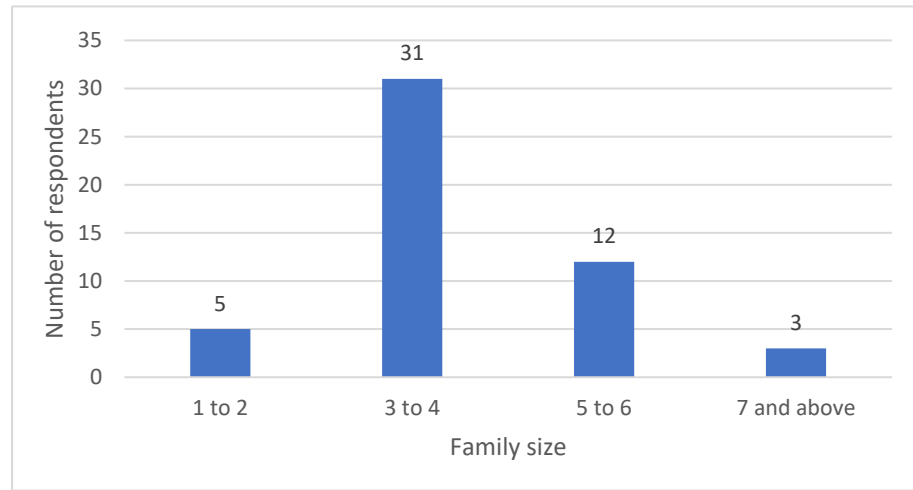


Figure 17: No. of family members in the non eco participants surveyed

### Location of Kitchen

We see that 32 out of 51 respondents have indoor kitchen with no outdoor area for solid fuel stoves followed by 17 respondents with indoor kitchen and with outdoor area for solid fuel stoves.

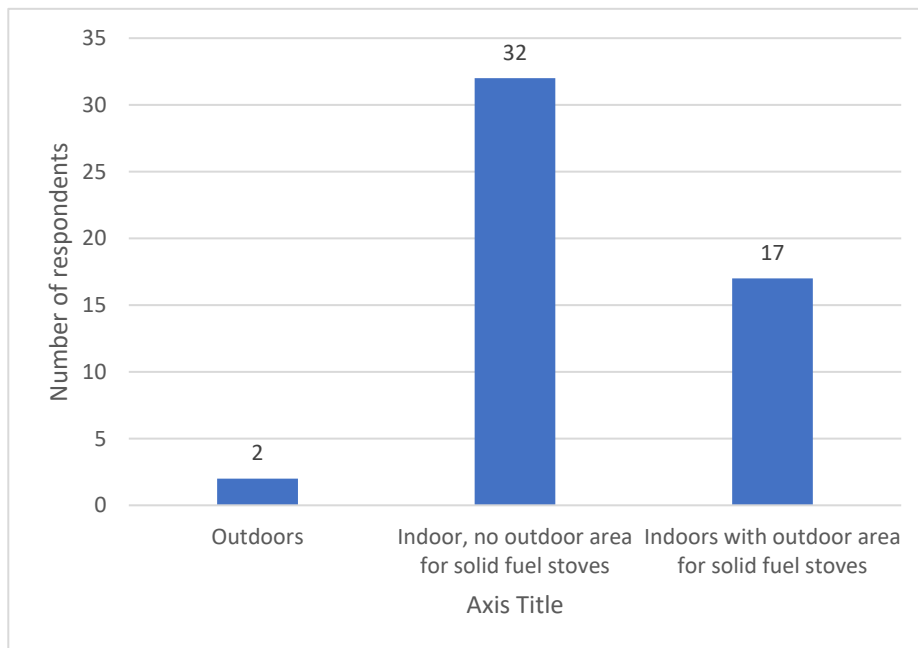


Figure 18: Kitchen location of non eco participants

### Frequency of cooking

We observe that 44 out of 51 families cook more than 3 times a day, followed by 6 families cooking 3 times a day.

S.N.	Cooking Frequency per day	No. of families
1	More than 3 times a day	44
2	3 times a day	6
3	2 times a day	1

## Type of cooking fuel

As we observe below Figure 19, 33 respondents use wood only, 15 wood in addition to LPG and 3 using other cooking fuels in addition to LPG and wood. This shows that the non ECO participants are highly dependent on wood and LPG. Other cooking fuels include electricity, induction, electric kettle, biogas)

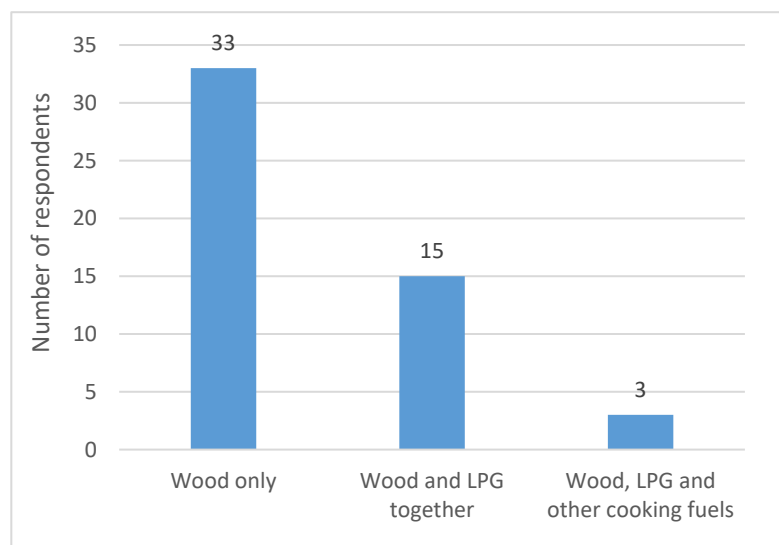


Figure 19: Types of cooking fuels used by non eco participants

## Type of cooking devices used for cooking

Out of 51 respondents, we see only 23 families using a single type of cooking devices, firewood – 3 stone fire only (19), firewood – portable stove/improved cook stove only (3) and firewood – 2 stone fire only (1). Besides that, all other respondents use firewood – 3 stone fire in addition to other types of cooking devices like LPG, Electric Kettle, Rice Cooker, Electric Mixer, Biogas, Electric Induction Cookstove and Water dispenser.

Table 3: Types of cooking devices used by non ECO participants

S.N.	Type of cooking devices	No. of families
1	Firewood – 3 stone fire only	19
2	Firewood – portable stove/ improved cook stove only	3
3	Firewood – 2 stone fire only	1
4	Firewood – 3 stone fire and improved cook stove	2
5	Firewood – 3 stone fire and LPG	12
6	Firewood – 3 stone fire and Electric Kettle	4
7	Firewood – 3 stone fire and Rice Cooker	2
8	Firewood – 3 stone fire and Electric Mixer	1
9	Firewood – 3 stone fire, LPG and Electric Kettle	2
10	Firewood – 3 stone fire, LPG and Rice Cooker	1
11	Firewood – 3 stone fire, Electric Kettle and Biogas	1
12	Firewood – 3 stone fire, LPG, Electric Kettle and Rice Cooker	1
13	Firewood – 3 stone fire, LPG, Electric Kettle, Rice Cooker and Electric Induction Cookstove	1
14	Firewood – 3 stone fire, LPG, Electric Kettle, Electric Induction Cookstove and Water dispenser	1

## Effect of change in season for using appliances

Only 3 out of 51 respondents states that the change in season affects the type of appliances we use for cooking. The reasons being more firewood is used in the winters and less LPG is used in summers.

## Frequency of purchasing cooking fuel

There is a mixed response of purchasing durations of cooking fuel. There are groups of respondents that pay cash for wood, by purchasing either once or twice a year and that do not pay for wood, as they explore in their own lands and collect wood and when required.

In terms of LPG, it looks like LPG is the secondary source of cooking fuel with the variation of purchasing LPG ranging from once in a month to once in 4 months and above. However, the use of LPG also depends on the family size staying in the sites. The high number of families purchasing wood might reflect that they might be more or less likely to be interested in eCooking provided that they are sensitized with both the pros and cons of electric cooking, while it does not seem the high usage of LPG gas by non-ECO participants.

*Table 4: Frequency of fuelwood and LPG purchased by non ECO participants*

S.N.	Frequency of purchasing wood	No.	S.N.	Frequency of purchasing LPG	No.
1	Once a year	26	1	Once a month	2
2	Twice a year	7	2	Once in 2-3 months	8
3	Occasionally/ as and when required/ own lands for free	10	3	Once in above 3 months to 4 months	1
			4	Once in 4 months and above	7

## Annual Quantity of using cooking fuels

The annual quantity of wood and LPG gas cylinders in usage by the respondents are just an approximation that indicates how much of wood and LPG are being used on an annual basis. The data indicates that there is a high volume of wood used annually, while there is a mixed variation of the number of LPG cylinders being used for cooking purposes. Thus it can be inferred that if ECO non participants are highly dependent on wood. For those who purchase wood, electric cooking could also be an alternative cooking option.

*Table 5: Annual wood and LPG cylinders consumption of non ECO participants*

S.N.	Annual Qty of wood in usage	No.	Annual Qty of LPG cylinders	No.
1	0-20 bharis	3	1-2 cylinders	4
2	21-40 bharis	9	3-4 cylinders	8
3	41-60 bharis	10	5-6 cylinders	4
	61 bharis and above	19	7 cylinders and above	2

Note: 1 bhari – 40 kg approximately.

## Cost of Cooking fuels

The cost of one LPG gas cylinder at the site comes in the range of NPR 2000- 2800. On an average, the price of one LPG gas cylinder was NPR 2400. The team could not understand the range of the price of one cylinder at the site, but it was assumed that some respondents might have included the cost of transportation as well up to reaching the household location from the place of the cylinder vendor. On the other hand, there was a huge variation in the price of wood purchased, ranging from NPR 1000 to NPR 30000 annually. The reasons could be as follows:

- The price of wood purchased differs from private property to community forests.
- The quantity of wood purchased also differs from one person to another.

- Some respondents might have included the cost of labor to load and unload and also included the cost of transportation.

Thus, there was not a fixed rate (1 bhari firewood costs in between NPR 200 to 400) for the price of wood purchased. However, based on the dependency of non ECO participants, it can be observed that there could be potential savings should the non ECO participants switch to electricity both financially and health wise.

### Price of electricity and number of units used

Since the site did not have any access to the grid, the access to electricity services were from the community owned micro hydropower plant. The tariff rates (NPR 100 to 110 per month) were the same both for domestic customers and end use enterprises like mills, which was a surprising finding for the study team as such enterprises would use far more electricity than domestic consumers. The management committee of the micro hydropower plant had given free electricity to few households who had provided lands on which the powerhouse was built. Majority of the respondents stated that the tariff was NPR 100-110 per month with one respondent stating NPR 150 in addition had to be paid due to his mill enterprise which was not verified by the study team. In addition, none of the non ECO participants had any idea of how many units of electricity were used as there was the flat electricity tariff.

### Sub question 2. Have any ECO non-participants started using ECooking appliances or expressed an interest to do so in the last year?

#### Purchase of additional cooking appliance (electric or non- electric)

11 out of 51 (21%) non ECO participants stated that they purchased/ added an additional cooking appliance in the last year.

The electric kettle was mainly purchased as it did not require to burn firewood and inhale smoke, easy to boil water and kitchen would be smokeless. Rice cooker was purchased as it was perceived that it is easy to cook rice and saves time.

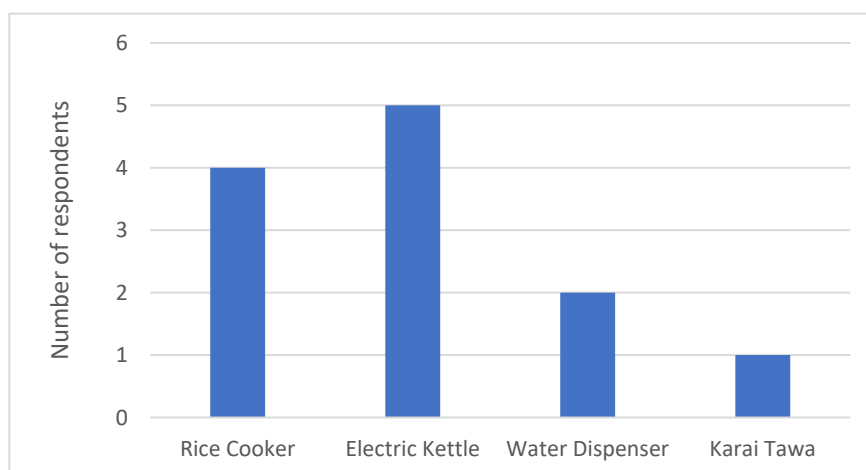


Figure 20: Purchase of additional cooking appliances

**Enquiry from neighbourhood after purchase of cooking appliance/ recommendations to others:** Only 3 respondents each stated that their neighbours enquired about the cooking appliance purchased.

#### Interest to buy an electric cooking appliance

36 out of 51 non ECO participants stated that they have an interest to buy or add an electric cooking appliance.

Table 6: Reasons stated by non ECO participants to buy different electric cooking appliances

EPC	Electric Induction Cookstove	Electric Rice Cooker	Electric Kettle
Multi – functional	Smokeless kitchen	Smokeless kitchen	To boil water easily and faster
Ease of cooking	Easy to cook dishes and boil water	Ease of cooking and time, money and energy savings	To upgrade social status in the community
Experience of neighbours observed during cooking	Good review from friends	To maintain social status	Less consumption of wood to boil water
Speed of cooking in an EPC than cooking in firewood	No need to burn wood and inhale smoke	Even children can cook food on the appliance	Time saving
Options to make more number of dishes	Saves time to collect firewood	Time to collect wood in the forest can be used for other household chores	
Smokeless kitchen and no need to burn firewood	No need to go to forest		
Time saving	Avoid transportation costs of bringing wood from forest to home		
	Not necessary to refill like gas cylinders		

Similarly, 15 out of 51 non ECO participants stated that they are not interested in buying an electric cooking appliance, reasons for which are given below.

- The participants were fine with what they had currently and practice traditional firewood cooking
- Low income and lack of knowledge of electric cooking
- Depending on the decision of the husband to use electric cooking appliances
- Easy to cook in firewood
- Unknown of how to use electric cooking appliances

### Reflection of Interest to buy electric cooking appliances

We see positive responses of interest to buy electric cooking appliances as shown in the graph above.

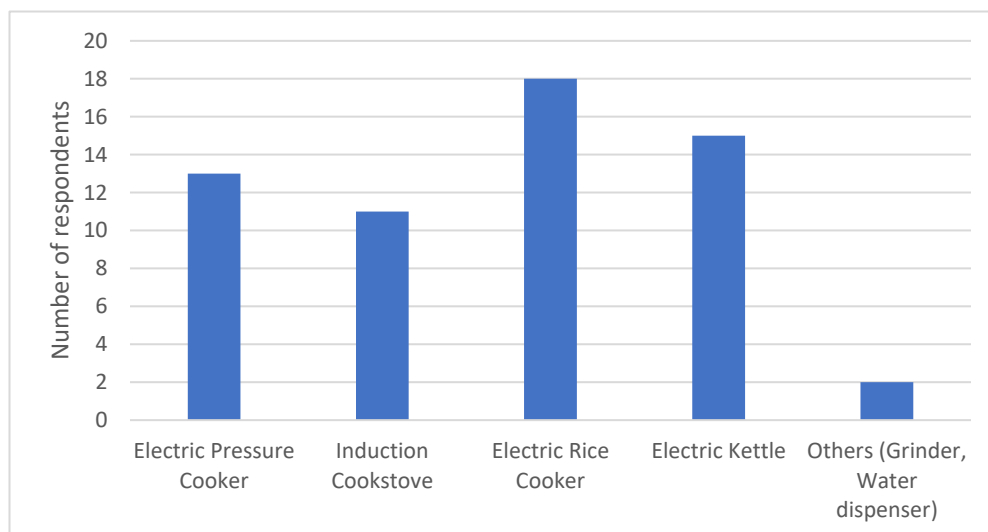


Figure 21: Interest shown by non ECO participants to buy eCooking appliances

### Reasons to delay the purchase of interested electric cooking appliances

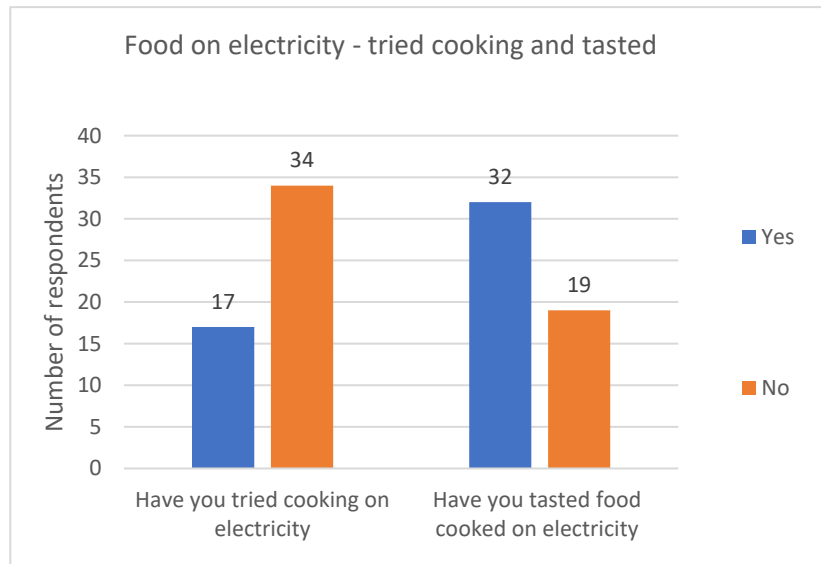
Despite the interest of the participants to purchase electric cooking appliances, the following reasons are listed that indicate why the non-ECO participants have not purchased yet as follows:

- Those who own private forests are collecting firewood for free, hence they do not wish to purchase eCooking appliance(s).
- Financial conditions are not that good enough that prioritizes electric cooking appliances for purchase.
- The source of electricity currently is not reliable with periodic voltage fluctuations.
- Safety concerns exist during the use of electric cooking appliances.
- Lack of knowledge to properly use these appliances.
- Market is very far from the household.
- Old people staying in the household do not know how to use such appliances.
- Doubtful in the quality standards of the product available in the nearby markets
- Fear of current leakage in electrical products during usage

### Willingness to pay

There was a mixed response from the non – ECO participants in response to the willingness to pay to purchase electric cooking appliances like EPCs, induction stoves, and electric kettles. 8 respondents stated that are willing to purchase electric cooking appliances at the price available in the market, 17 showed willingness to pay below NPR 5000 (subsidised price), which is around 30 to 50% of the price of EPCs available in Kathmandu. Remaining 26 had not thought it.

## Experience of cooking and tasting food in electricity



*Figure 22: Experience of cooking and tasting food in eCooking appliances by non ECO participants*

As we can see in Figure 22, only one third of the non – ECO participants surveyed have tried cooking food on electricity but around two-third have tasted food cooked on electricity.

### Perceptions of electric cooking

As we can see Figure 23, majority of the non ECO participants neither agree or disagree on whether food cooked on electricity tastes better than food cooked on other fuels. There is almost an equal proportion of responses on the safety of cooking on electricity, and cost of cooking on electricity, some agreeing to this point of view, some have no opinions on this part while some disagree that cooking on electricity is unsafe. Further, a larger percentage of respondents do not find difficulty cooking on electricity.

People can be assured about the safety of electric cooking by live demonstrations and providing them with hands on experience with the technology. Further, locals who have already used eCooking appliances and perceived them as safe could be mobilised to the communities that perceive electric cooking as unsafe. During live demonstrations, communities can be provided with the comparative cost of cooking on electricity and other fuels like LPG and firewood.

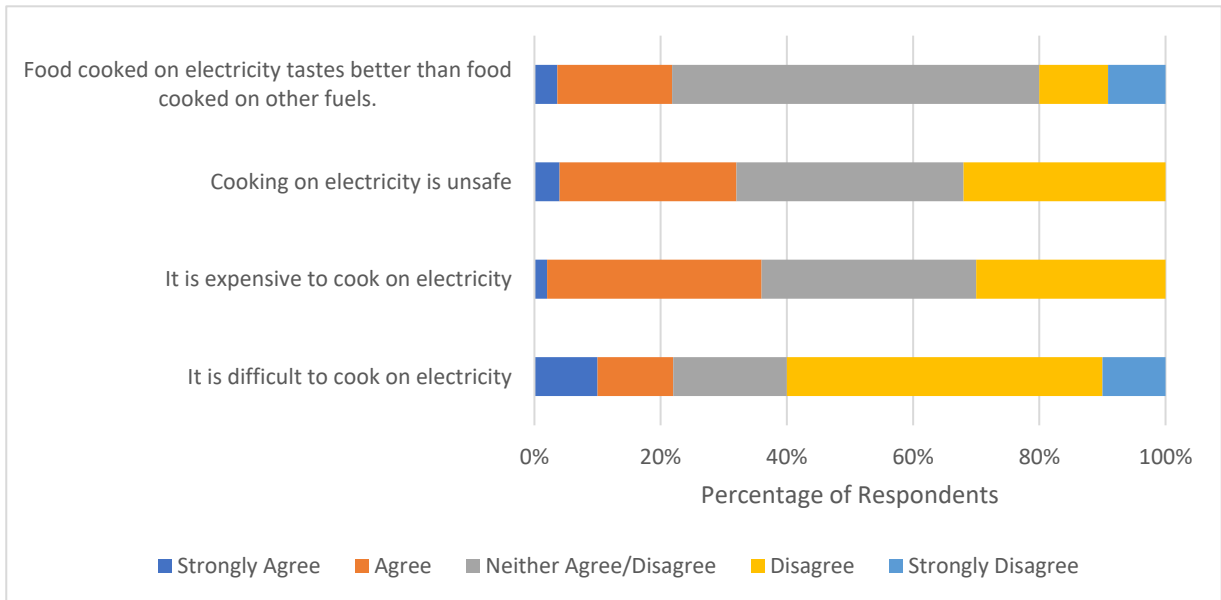


Figure 23: Perception of non ECO participants towards eCooking

### Have your opinions of electric cooking changed since the ECO project started?

#### Opinions towards electric cooking

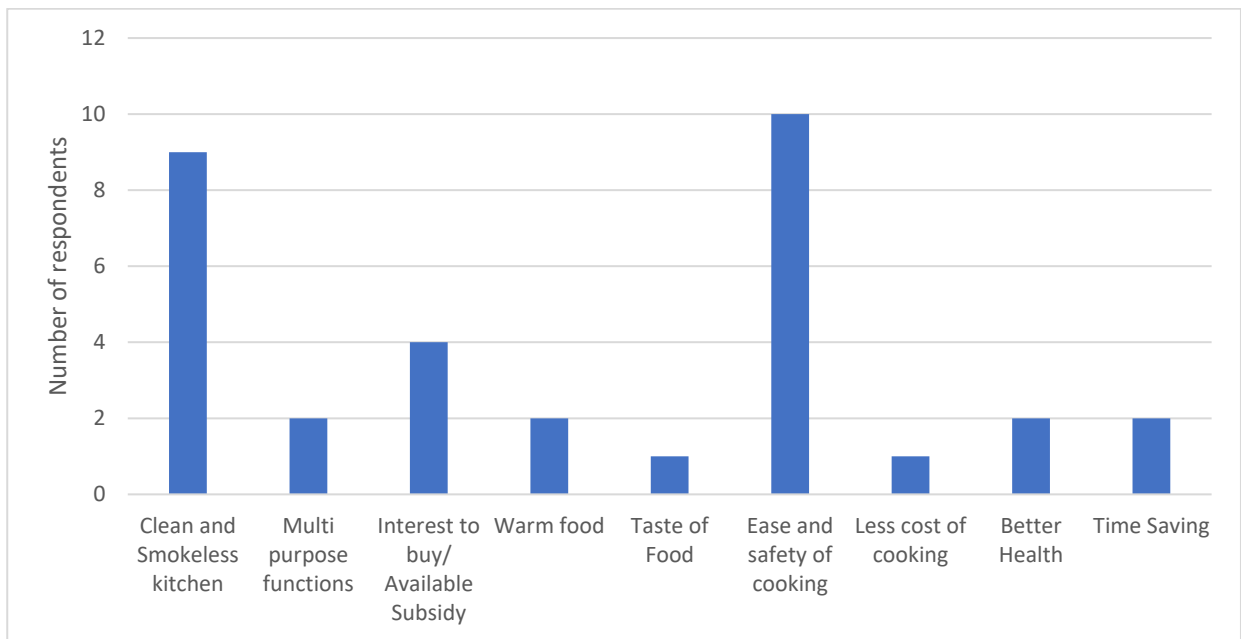
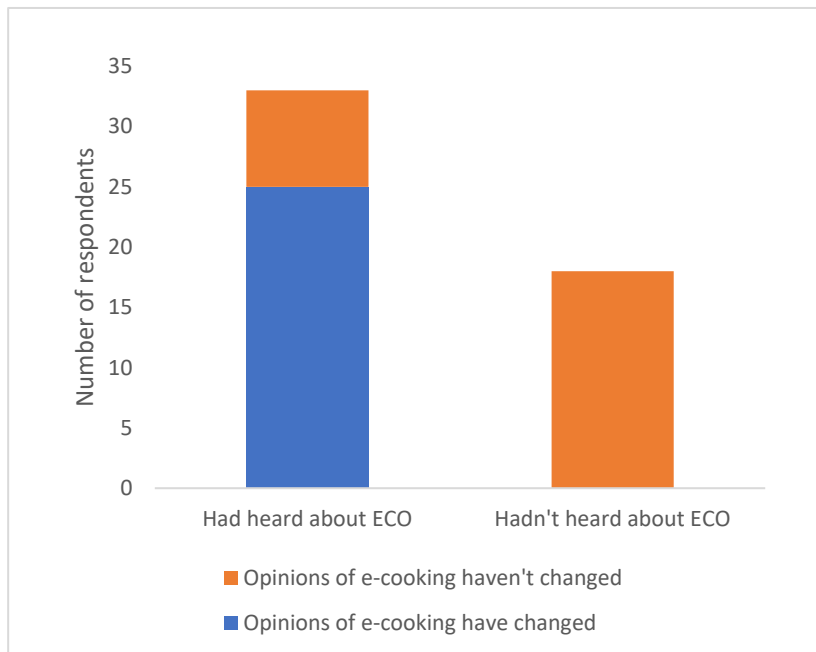


Figure 23: Opinion of non Eco participants towards eCooking

25 of the 51 respondents reported their opinions towards electric cooking had changed over the last year. All 25 were among the 33 non ECO participants that reported they had heard about ECO project, highlighting the significant impact of the study. Those who have heard about ECO project, majority of them have opinions of eCooking changed, while those who hadn't heard about ECO have no change of opinions of eCooking.

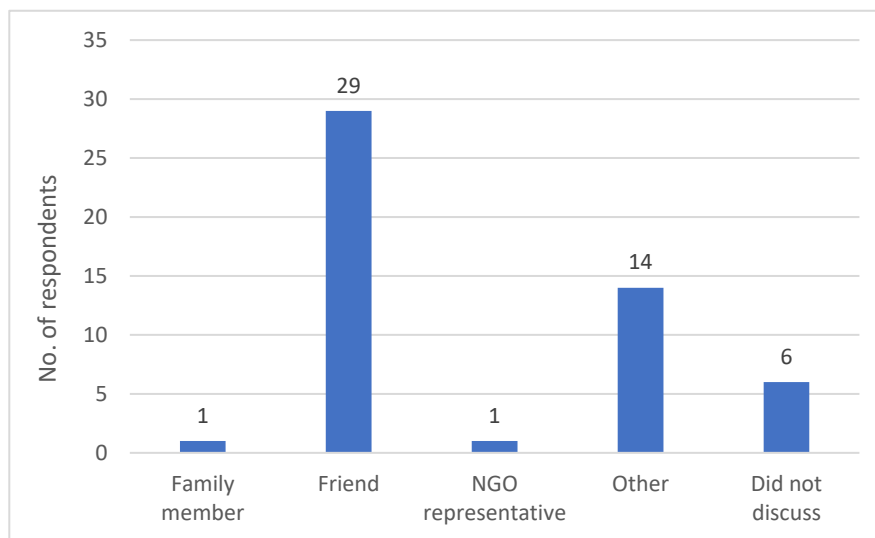




*Figure 24: No. of non Eco participants respondents whose opinions of eCooking have changed*

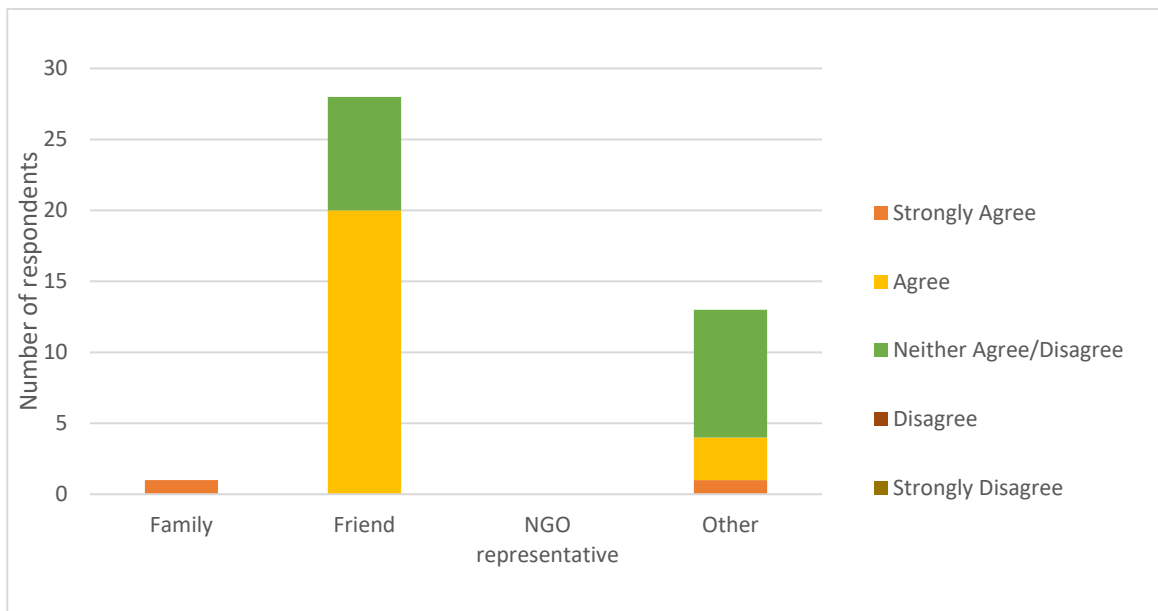
There were a variety of positive opinions of the 25 participants who had a change of opinions towards electric cooking over the last year. Out of this, 10 non-participants responded to ease and safety of cooking followed by 9 participants of clean and smokeless kitchen. With this variety of positive opinions, we see that 25 non ECO participants also have a possible interest in eCooking.

#### **Discussion on electric cooking with others**



*Figure 25: No. of non ECO participants discussing eCooking with others*

Around 29 non ECO participants stated that they have discussed on electric cooking with friends followed by 14 discussing with other people in the community. This shows that friends were the most influential in raising interest in e-cooking. We assume these friends mean the people living in the same community as all 29 of them stated they were locally based



*Figure 26: Effect of organizations and community in promoting eCooking on non ECO participants*

From Figure 27, we see that friends of the non participants increased the interest of the non participants to buy an electric cooking appliance which was otherwise in the case of the discussion with other persons. This might probably because of the belief towards the word and experience of the friend in using the electric cooking appliance. However, it should also include the convincing power of the friend to create such interest to actually procure an electric cooking appliance which was not seen otherwise besides 2 non participants as shown in the graph above.

### **Knowing about ECO Project**

There was a very minimal number of respondents from among the non ECO participants (only 2 out of 51) whose cooking practices have changed since the ECO project started although 11 out of 51 had purchased additional cooking appliances.

They purchased rice cooker and electric kettle over the last year. 30 out of 51 participants responded that they know someone in their community who was an ECO participant, 3 did not know while 18 did not provide any response. Although there was a list of names of the ECO participants, there were around 3 names that had more frequencies whom non ECO participant knew. These 3 ECO participants spoke to around 40 ECO non participants and were reported as stating the following about electric cooking as listed below:

- Ease of cooking
- Clean and smokeless
- Automatic, multiple options and use of time for other works

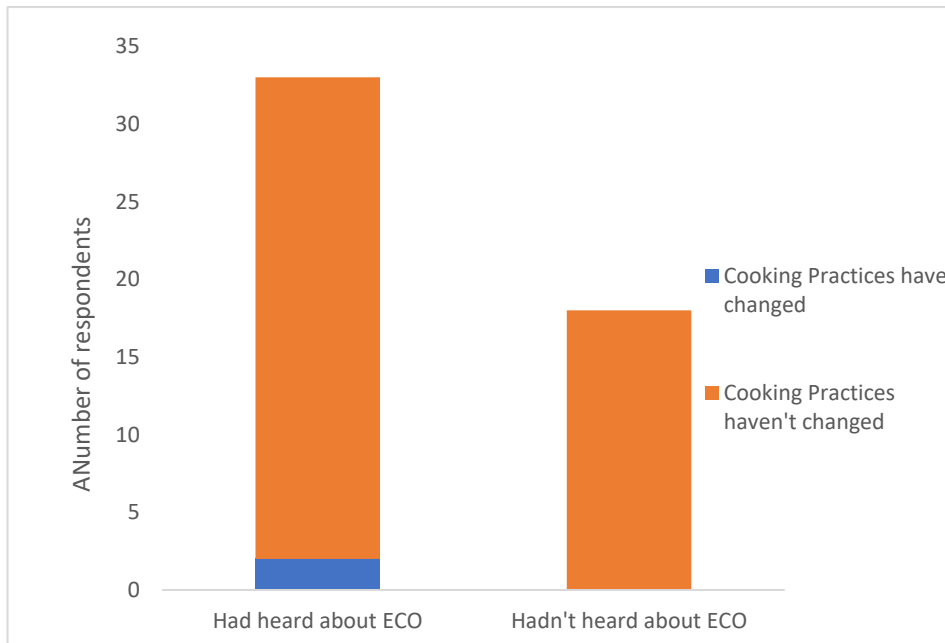


Figure 27: Awareness about the ECO project in non ECO participants and change in cooking behaviors.

These ECO participants were not reported to have mentioned anything negative about electric cooking. However, the responses show that only 10 ECO participants including above mentioned 3 names with more frequencies recommended electric cooking to non participants while remaining didn't comment, neither recommended electric cooking nor advised against using electric cooking. Thus, we can see that there are possible local influencers whose speech could definitely be instrumental in raising awareness on electric cooking in the local community.

**Sub question 3. What are the opportunities and challenges for non-participants to start using electric cooking?**

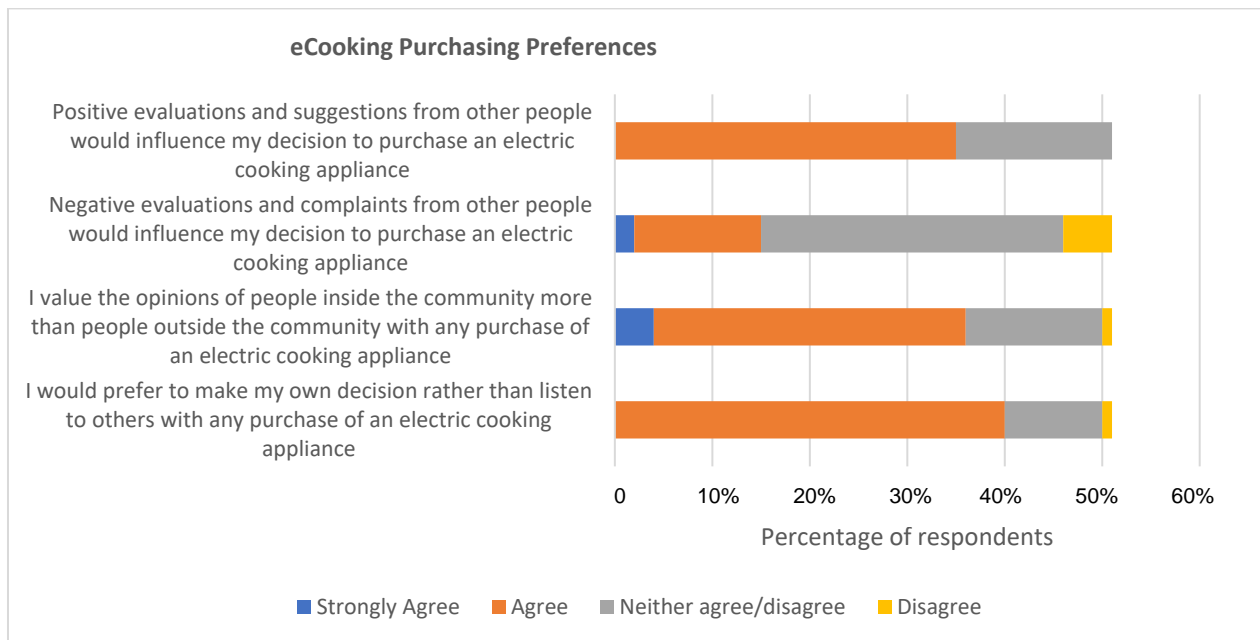


Figure 28: eCooking purchasing preferences of non ECO participants

As we see from the Figure 29, there is a mixed variety of eCooking purchasing preferences of the non ECO participants. It shows definitely that the respondents agree to the positive evaluation and suggestions would influence to buy an electric cooking appliance while on the other side, negative evaluations do not affect in the same proportion. In addition, the influence of people within the community is more in comparison to

that outside the community. On the contrary, despite valuing evaluations, suggestions, opinions, the figure shows that the sole decision lies to oneself to purchase an electric cooking appliance.

With regards to challenges or access to e-cooking, 38 out of 51 non ECO participants state they would have challenges to access to e-cooking services as listed below:

- Low financial condition of participants
- Reliable source of electricity supply
- Shock, Current leakage, Safety concerns and electrocution especially for children
- Lack of knowledge in operating electric cooking appliances
- Perception of expensiveness of cooking

## Summary

A positive instigation has been spread about electric cooking among the non -ECO participants. The high dependence on wood might likely provide room for transitioning to electric cooking, however the limited source of electricity powered by the micro hydropower might restrict the interest to shift to eCooking. Moreover, it is likely that the non ECO participants would also show interest to buy electric cooking appliances should there be similar subsidised prices of EPCs for the non ECO participants.

There are spacious areas of improvement to further raise awareness in the community as a whole. PEEDA was able to only penetrate to 50 households in Solukhumbhu with funding from Modern Energy Cooking Services (MECS) Programme. Should there be higher supply of electricity in the community, electric cooking can reach to even higher of households with positive messages from the local influencers within the community. The high interest to buy electric cooking appliances and converting that interest into action requires funding support, technology demonstrations, reliable electricity supply, awareness campaigns and messages from local influencers who have experienced using such technologies.

## Research Question 2: What are the ways in which the ECO pilot studies could serve as Launchpads to 'outscale' eCooking in the community and its surroundings?

This study suggests the ECO pilot has had a positive impact on increasing awareness, interest, and use of eCooking appliances among the wider community. 80% of ECO participant respondents were still using the EPCs on a regular basis. 27% of ECO participants have bought at least one other cooking appliance, all of them being electric(4 electric kettles, 1 water boiler, 1 induction stove, 1 infrared stove, 1 mixer, 1 electric rice cooker). Further, 45% of households showed an interest in buying another electric cooking appliance. 97% of the ECO participants agreed that cooking on electricity was easy, this indicates that electric pressure cookers are user-friendly and convenient to use. 11 out of 51 (21%) non ECO participants stated that they purchased/ added an additional cooking appliance in the last year. All these findings from research question 1 conclude that there is requirement of the development of eCooking devices. To help accelerate the opportunities for wider adoption of electric cooking the ECO pilot helped enabled, this study makes several recommendations in the following key areas.

### Supply chain development

The major actors in the supply chain development of eCooking devices mainly include suppliers of e-cooking devices and utensils and supplier for access to electricity (could be off-grid MHP or NEA). The limited capacities in the supply of electricity by the MHP at the site was a major hindrance to outscale eCooking in the community and its surroundings. Although non participants surveyed showed interest to use eCooking devices, they were reluctant in actual purchase of a new one due to regular voltage fluctuations in the electricity supply. As such, it is essential to provide regular supply to electricity especially during peak

hours of morning lunch preparation time (around 7 to 9 am) and evening dinner preparation time (around 5 to 7 pm). Further, not only should be the supplier of electric cooking devices in the market, but there should also be appropriate repair and maintenance centers of such devices. During the field visit, it was also observed that induction and electric pressure cookers had not reached to the Salleri market even (nearest market from the site) which in turn would definitely mean the repair technicians in the site are unaware of the existing products in the local community. To boost up this positively, suppliers of electric cooking devices should collaborate with local vendors of kitchen utensils to encourage sales and support of such devices to local communities. This would be possible only when the local vendors would be convinced enough that the product sales would increase his business turnover in the local community. A free trial product to the local vendors could be a triggering step that would allow them to include electric cooking devices in their product portfolio.

Transportation cost amplifies the cost of purchase of eCooking technologies in addition to the cost of repair and maintenance and that is why priority to purchase an EPC or induction is very low. The cost of repair of eCooking technologies in the nearest market inclusive of transportation is higher than refilling an LPG gas cylinder. Thus, it is essential to identify measures that could potentially reduce transportation costs.

### **Consumer finance options development**

At the site, PEEDA conducted discussions with head and secretaries of informal women's groups providing credit to assess how they function. The groups use a system of 'cash revolvment', similar to revolving credit, where group members have access to collected cash in credit and repay on an instalment basis mainly during their group meetings. Informal word of mouth communication and the belief among group members was a prioritized factor for cash revolvment on an interest basis, subject to documenting those cash records in an informal manner. Since the money collected is minimal, should there be any group member interested to buy electric cooking devices on an interest basis, the respondents agreed to support if such instances arise which is rare. Thus, informal groups are willing to lend money on an interest payment basis if any member of the group would be willing to use the cash for buying electric cooking devices. In addition, these informal groups should be capacitated enough to formalize them so that they can avail the benefits of the Government, not only limited to access to finance options or electric cooking.

Further, there were a lot of banks and microfinance institutions which could lend money in the form of loan. However, these institutions do not have any special provision to entertain loan just to purchase electric cooking devices. In this case, the Government of Nepal could introduce such consumer finance options within the banking and financial institutions at a minimal interest rate to upscale penetration of e-cooking devices.

### **Introduction of marketing strategies**

PEEDA had conducted live demonstrations of the electric cooking technologies along with providing brochures and pamphlets related to electric cooking. This was effective where local communities had hands on experience and observation of those technologies. Besides, live demonstrations it is essential to even let the clients know of the other benefits and disadvantages of these technologies, so that they can be fully convinced before usage. Letting them know of the comparisons of using different cooking fuels against electric cooking technologies will be even more effective which should further be done during the live demonstrations itself.

Electric cooking can further be accelerated when local influencers provide positive message on electric cooking to the communities. The belief in local influencers can boost up penetration of electric cooking in rural communities. As such, it is essential to identify such local influencers who are first convinced with the use of these technologies and then spread the message in the community. It should also be well noticed that

should eCooking utensils do not come under priority even after providing subsidies to reduce upfront cost, there are chances that local people could turn back into their conventional mode of cooking. Thus, it is necessary to keep a regular track from within the local community to prioritize eCooking as the preferable mode of cooking.

### **Linkages to the local economy**

Since eCooking is very much at an infant stage in the project site and the nearest market center, Salleri, there are tremendous eCooking opportunities for local businesses. Current sales of the local kitchen utensils vendors can boost up if they are well connected with those utensils providers from major market centers like Kathmandu. For this, appropriate platforms should be established for discussion among the relevant vendors, both in the community and market centers. Few brands like Tulip and Electron products are currently seen in the Salleri market. These local vendors should be made aware of the existence of such electric cooking technologies and make them aware with how such technologies can support with the local economy.

Moreover, the existing repair technicians could be capacitated and trained on the repair and maintenance of electric cooking technologies to ensure technical support to customers should there be any kind of damage in the product. The local people using these technologies should be sensitized on the presence of such repair personnels available.

### **Leveraging capacities of specific local organizations**

There are very few community based organizations at the project site at the local level, however there are banking and financial institutions, electric repair shops, and other organizations at Salleri. Discussions with them to leverage their capacities in raising awareness on eCooking could potentially reduce the consumption of LPG and use of firewood for kitchen purposes.

## 4. Conclusion

- Around 80% of ECO participants surveyed were still using the Electric Pressure Cooker on a regular basis. 45% of the ECO participants showed willingness to buy additional appliance while 27% of them had actually purchased one additional electric cooking appliance. 97% of the ECO participants found cooking on electricity was easy, indicating the user - friendliness and convenience of electric pressure cookers. 80% reported faster cooking on EPCs allowing to people to multi-task, 84% agreed that the food tastes better when cooked on electric stoves. Even 70% of non ECO participants had an interest to buy an electric cooking appliance, while 20% actually purchased it. This reflects that ECO pilot studies had a positive impact on community cooking practices for ECO participants and non participants.
- There are ways in which ECO pilot studies could serve as 'launchpads' to out scale eCooking in the community and its surroundings. ECO pilot studies could identify and mobilize local influencers to monitor eCooking prioritization at the local level on a regular basis. Free trial products and demonstration to local vendors could potentially boost up sales of electric cooking devices, provided local repair technicians are also capacitated to repair such devices should there be damages in the product. Similarly, ECO pilot studies could assist registration and renewal of informal women' s group to support its group member in purchasing electric cooking technologies and maximize access to finance options and benefits from the local government. The findings from the ECO pilot studies could be used to lobby and advocate with the Government of Nepal to introduce consumer finance options within the banking and financial institutions at a minimal interest rate to upscale penetration of e-cooking devices.

## 5. Recommendations

- To ensure the quality of electricity for e-cooking, the MHP committee should prioritize peak load management activities and monitor it as 29% of ECO participants have added the new electric cooking appliance and almost all participants have experienced outages after end of ECO pilot project.
- Identify and provide repair and maintenance trainings to repair technicians at Salleri and repair personnels within the local communities would reduce the concerns of people using those technologies.
- 33% non-participants showed interest to buy electric cooking device in the partial subsidies amount about 30 to 50% so, lobby with local government is essential to provide certain incentives encouraging the e-cooking in communities.
- For outscale of e-cooking, the nearest local market should be connected to the big markets, and vendors should also be given free trial and orientate about the new e-cooking devices.

## 6. Dissemination Plan

- The findings of this follow up with the wide range of stakeholders including: Government Agencies, AEPC, RERL, private sector organizations as well as development partners.
- With the coordination among relevant e-cooking stakeholders, PEEDA will further explore potential way forward measures to out scale electric cooking in rural communities like Solukhumbhu where access to electricity is limited or off-grid sites. The findings of this study will be used to lobby with policy level stakeholders in the scaling up of electric cooking potential in Nepal.
- PEEDA will report and present the findings of this study in clean cooking future events.