TESTING ELECTRIC PRESSURE COOKER ADOPTION IN SOCIO-ECONOMIC AND CULTURAL CONTEXT OF NEPAL

Loughborough University

MECS Modern Energy Cooking Services

UKaid from the British people

20 YEARS Integrated Research and IRADe Action for Development

Disclaimer

This research was funded by UK Aid from the UK government; however, the views expressed do not necessarily reflect the UK government's official policies or the research partners.

ACKNOWLEDGMENTS

This research study entitled- **"Testing electric cooker adoption in socio-economic and cultural context of Nepal"** was supported by the Modern Energy Cooking Services (MECS) programme, which the UK Aid funds through Loughborough University, UK. We thank the MECS team for the continuous support that greatly assisted the research.

We thank Dr. Jyoti Parikh for sharing her wisdom and expertise during this study. We want to show our gratitude to all other colleagues whose names are not mentioned here but put dedicated efforts into completing this study. Households in Nepal who participated in this study and diligently shared cooking dairy data with the research team deserve some credit for their dedicated efforts.

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Document Control Sheet

Issue Status	Author(s)	Reviewed By	Loughborough University Approved By	Issue Date
Draft version	Dr. Ashutosh Sharma Ms. Saumya Vaish Dr. Chandrashekhar Singh	Richard Sieff	Richard Sieff	February 22, 2022
Final version	Dr. Ashutosh Sharma Ms. Saumya Vaish Dr. Chandrashekhar Singh	Richard Sieff	Richard Sieff	March 9, 2022
Amended Version	Dr. Ashutosh Sharma	Richard Sieff	Richard Sieff	March 29, 2022

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PR Number : IRADe-PR-88(2022)

EXECUTIVE SUMMARY

This study implemented a community-scale pilot project in Nepal to monitor and understand an efficient electric pressure cooker (EPC) use pattern for accelerating the uptake of electric cooking (e-cooking). Integrated Research and Action for Development (IRADe), New Delhi, and Women Awareness Center Nepal (WACN) team carried out this pilot study to examine the socio-economic and cultural acceptability of EPC in the Nepal context. This study was supported by UK Aid and Loughborough University under Modern Energy Cooking Services (MECS) programme.

Improving access to modern clean-cooking solutions is an immensely important objective for achieving a range of development objectives, including women and children's wellbeing, improved health, and meeting climate-mitigation goals. Cooking with traditional firewood stoves (TFS) involves women and children drudgery and health hazards at all the levels of biomass chain management, which involves collecting, carrying, processing and cooking. While working in biomass chain management, women and children often forego income generation and learning opportunities. The burning of firewood for cooking releases indoor air pollution (IAP), hazardous to health for the cook and family members. Cooking with firewood leads to environmental degradation while putting pressure on local forest resources. In the absence of fossil fuel reserves, Nepal imports petroleum products, including LPG, to fulfil fossil fuel demand in the country. Therefore, cooking with LPG in Nepal puts pressure on the trade deficit, and LPG supply disruptions have social impacts too. Nepal has a difficult terrain, and transporting cylinders to hilly areas involves monetary costs and vehicular emissions. However, Nepal possesses a huge potential for hydroelectricity generation, making it an ideal country for promoting e-cooking. Policymakers have shown a growing political commitment and interest to replace traditional cooking fuels with e-cooking. A white paper entitled "Present Situation and Future Roadmap of Energy, Water Resources and Irrigation Sector" released by the Ministry of Energy, Water Resources and Irrigation (MoEWRI), Government of Nepal, in May 2018 became the first policy paper that explicitly guided the promotion of e-cooking in every household of Nepal. As a result, e-cooking received prominence in the subsequently formulated 15th Five-Year Plan (FY 2019/20 to FY 2023/24) and AEPC's activity plan (Government of Nepal, Ministry of Forests and Environment, 2021). The Nepal Council for Standards endorsed Electric Cooktop Standards 2018, which sets technical standards for household induction hobs and hotplates.

Methodology

This pilot study was carried out in Kavrepalanchok district of Nepal, with two women communities- (i) Sahara Nari Chetna Skill Cooperative, an urban women community in Banepa municipality, and (ii) Sabal Nari Chetna Agriculture Cooperative, a rural women community in

Timal rural municipality. A screening survey was carried out with 240 cooperative members, 120 in Banepa and 120 in Timal. Analysis of the screening survey was utilised for selecting 80 households (40 members from each cooperative) for distribution of EPC. The financial mechanism adopted under this study required participants to pay 15% of the EPC cost.

Cooking records were collected using a MECS cooking diary in four phases: (i) Phase 1 (Baseline), (ii) Phase 2 (Transition), (iii) phase 3 (Monitoring), and (iv) Phase 4 (Endline). The study recorded all the cooking practices of the participants in phase 1 (3 weeks), phase 2 (3 weeks), and phase 4 (3 weeks). During phase 3 only heating events carried out on EPC was collected for 6 weeks. EPC was distributed among the participants after the end of phase 1. On the day of EPC distribution, cooking training was organised for the participants where the team demonstrated cooking with EPC and related safety measures. After phase 2, a hands-on training session was organised to improve the participants' cooking skills with EPC.

Along with EPC, an appliance-level sub-meter with electrical wire and plugs, was distributed to capture the daily electricity consumption for EPC use. The consumption of firewood and LPG was measured weekly using weighing machines. Enumerators visited the households to help maintain the cooking diary and issues related to cooking with EPC. At the end of phase 4, an exit survey was organised to get the study feedback and areas for improvement.

Findings

(i) A significant and sustained change in the household's cooking fuels and stove/appliance use was observed after the introduction of EPC, captured through the number of heating events using different devices. Compared to phase 1, LPG stove and TFS share in total heating events declined significantly in phases 2 and 4, both in rural and urban locations. In rural location share of EPC in total heating events was reported to be 27.6% and 38.8%, in phases 2 and 4, respectively. In urban location, share of EPC in total heating events was reported to be 30.1% and 32.5%, in phases 2 and 4, respectively. This highlights that as households become more familiar with EPC and its benefit, they will be more willing to adopt it. EPC uptake has reduced the use of LPG and the firewood. Phase 4 data reveal that rural households are carrying out more heating events on EPC than their urban counterparts.

(ii) Rice (28.7%), pulses (16.1%), and vegetables (11%) together account for nearly 56% of heating events (Phase 4). The phase 4 cooking diary data suggests that 93.5% events of cooking rice, 17% events of cooking vegetables, 34.7% events of cooking pulses were done on EPC. This data plus the fact the menu did not change significantly during the pilot indicates that the EPC was compatible with the local menu and cooking practices. Another important change for e-cooking was noticed for water heating. In phase 1, only 37% of water heating was done using an electric kettle, which increased to 64.7% in phase 4. The convenience and benefits of EPC may have encouraged people to

use it more for heating purposes. Therefore, it seems e-cooking could be a viable and promising cooking solution in Nepal's socio-economic and cultural context.

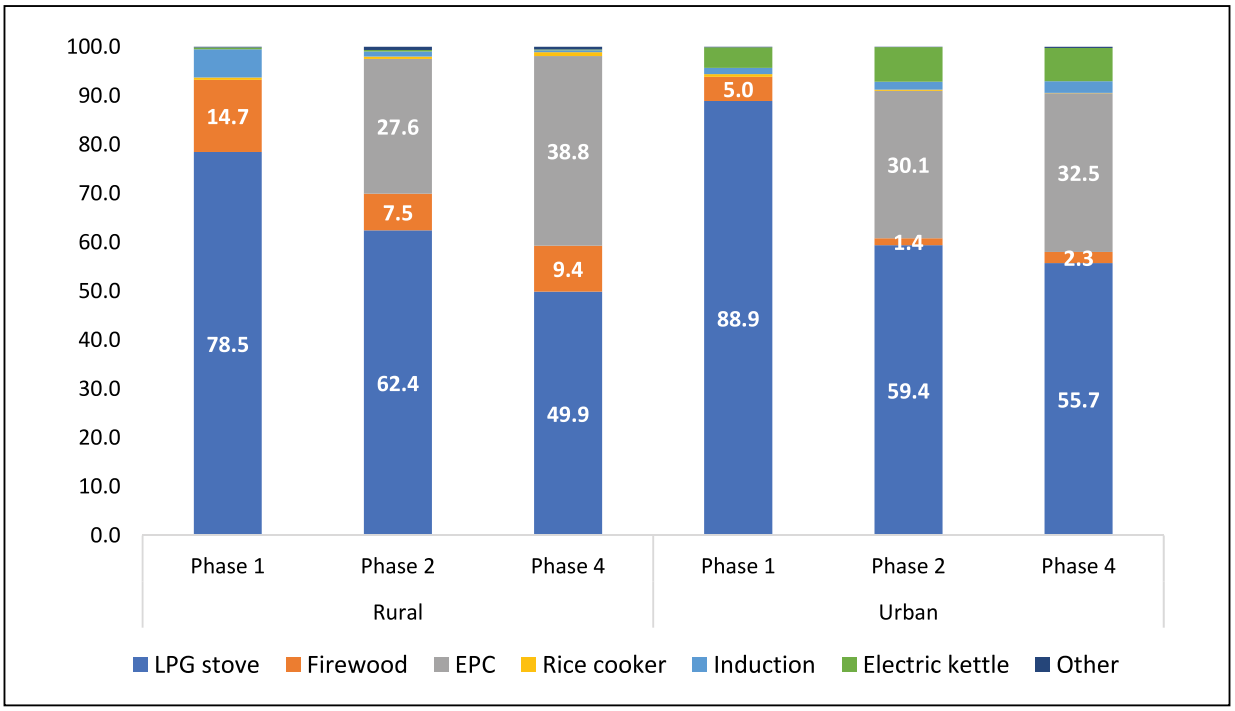
(iii) The cooking diary data reveals that most dishes are cooked/heated between 6.00 am to 9.00 am (breakfast and lunch) and 5.00 pm to 8.00 pm (dinner). In the exit interview, respondents from rural and urban locations highlighted that grid electricity reliability is good, and power-cut was reported only 2-3 times a month for 10-20 minutes. However, if a power cut occurred while cooking, households often switched from the EPC to other stoves. The quality of electricity supply voltage stability is also an issue as low voltages sometimes made it challenging to cook in the EPC.

The following key findings support the above statements:

Cooking transition

Figure 1 highlights a significant reduction in TFS and LPG stove use after introducing EPC in households. For instance, in phase 1, LPG stove was used for 78.5%, heating events in rural locations, and 88.9% in urban location. In phase 4, LPG share in total heating events declined to 49.9% in rural and 55.7% in urban location. Likewise, as compared to phase 1, the use of TFS for heating events declined both in rural and urban location in phases 3 and 4. In phase 4, EPC has been used for 38.8% of heating events in rural areas and 32.5% in urban locations.

Figure 1: Percentage heating events using different cooking appliances



Fuel Stacking

The exit interview highlighted that energy stacking becomes essential for households as EPC cannot be used for all heating events. EPC has some limitations like deep-frying, boiling, and

roasting. Few families revealed that they plan to buy another EPC to carry out simultaneous cooking at the market prices. The reliability of grid electricity supply was good in the study locations and power cut was reported only 2-3 times a month for 10-20 minutes

Appliance feedback

In the exit interview, 80% of the participants revealed that it was very easy to learn cooking on EPC. Older participants suggested that hand-on training activity organised after phase 2 helped them learn to cook in EPC. All the participants conveyed that food cooked in EPC is very tasty, especially rice and meat tastes tender. There are few local dishes like *Dhido* and *Sel roti* which they cannot cook in EPC. If a separator is provided with the EPC, rice and pulses could be cooked for small families in a single heating event, thus saving cooking time and energy. Several participants suggested providing extra pot with EPC.

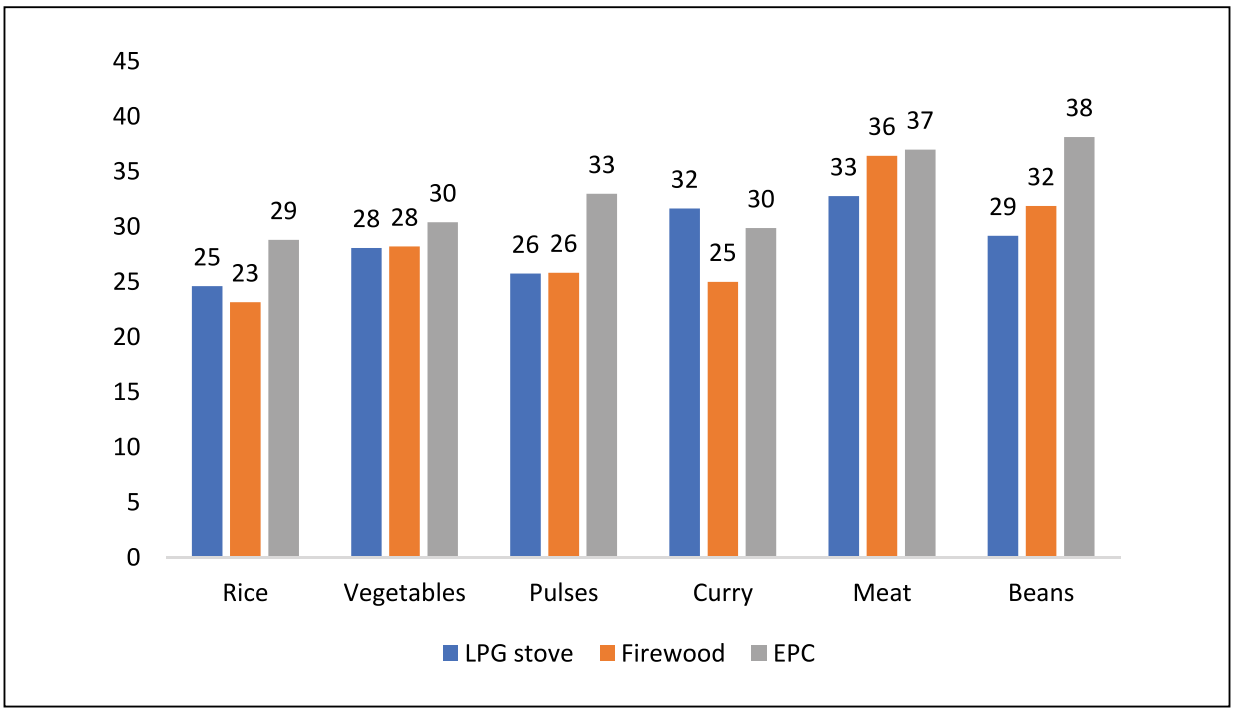
Gender aspect

Women have the primary responsibility of cooking in the participant households. However, the number of heating events by men, increased from 4% in phase 1 to 9% in phase 2 and 11% in phase 4. This change was primarily contributed by male members using EPC. In phase 1, merely 31 households reported heating events carried out by male members, which increased to 42 households in phase 2 and 41 households in phase 4.

Cooking time

The households mainly cooked rice, vegetables, pulses, curry, meat, and beans using an EPC. To compare the average cooking time on EPC for these dishes with LPG stove and TFS, we have

Figure 2 : Average cooking time using different cooking stove/appliance



considered only traditional pressure cooker events for cooking these dishes. We combined the data of phases 2 and 4 to arrive at the average cooking time for these dishes (Figure 2). The average cooking time for local dishes is more on EPC (except curry) than the LPG stove and TFS. However, unlike cooking with an LPG stove and TFS, which requires continuous flame monitoring, EPC provides the liberty to carry out other activities while food is being cooked. Its automatic feature of switching off after food gets cooked saves the food from burning. Cleaning the EPC pot was reported to consume less time than utensils used on LPG stoves or TFS. Cleaning pots used on TFS were the most challenging and time-consuming.

Energy use and cost

There has been a significant reduction in cooking energy consumption by the participant's households after the introduction of EPC (Figure 3). Using prevailing LPG and electricity prices in Nepal, fuel stacking costs have been presented in figure 4. Though, firewood is collected fuel in rural areas involve no monetary cost to households. But collection and transportation of firewood put a heavy burden on women and children's well-being.

Figure 4 shows that the uptake of EPCs has enabled rural households to save **50%** on their combined cooking fuel costs and enabled urban households to save **35%** on their combined cooking fuel costs.

Figure 3 : Cooking energy consumption in different phases (in MJ)

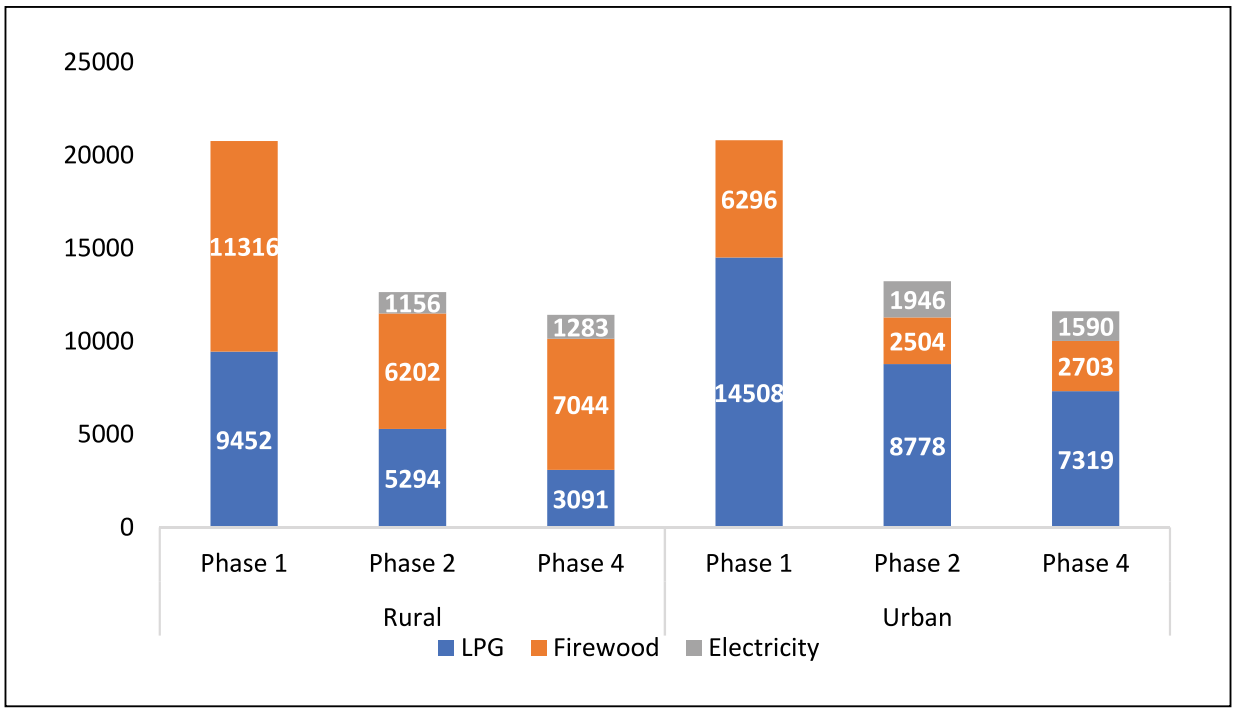
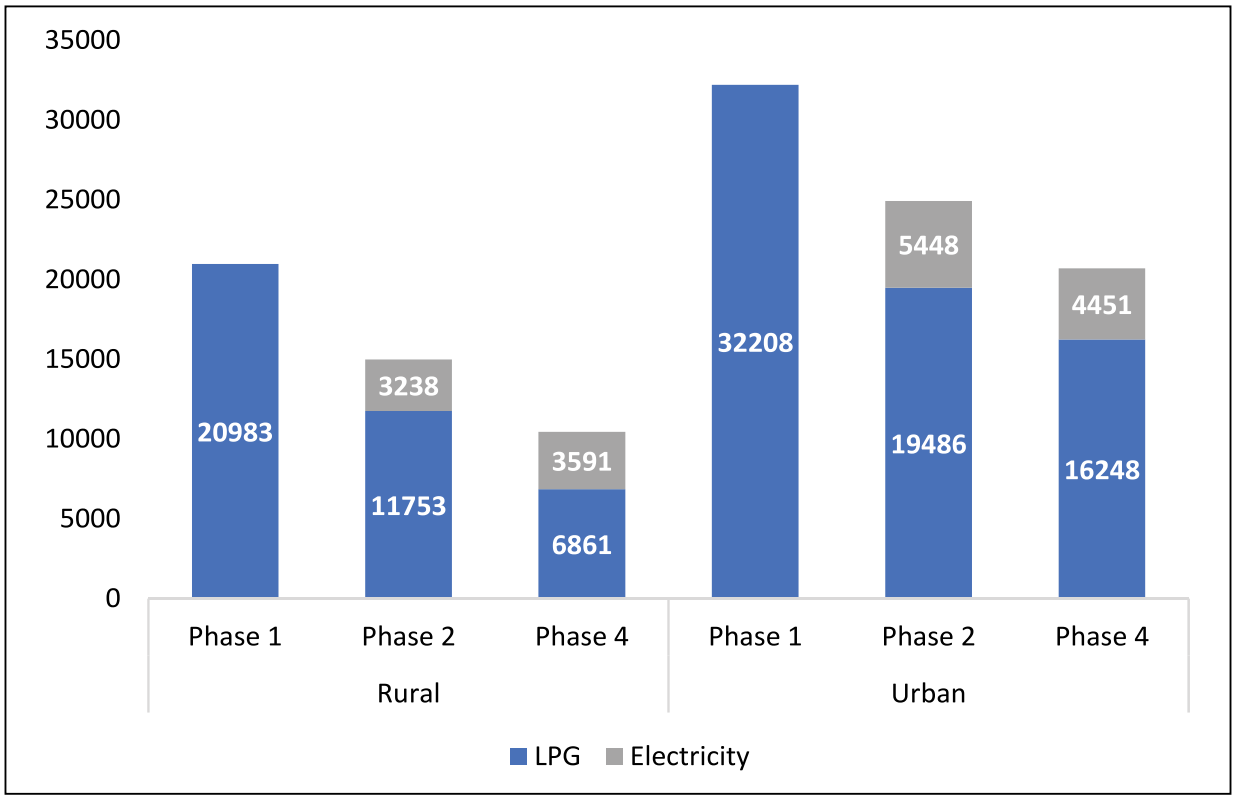


Figure 4 : Cost of stacked fuel (in NPR)

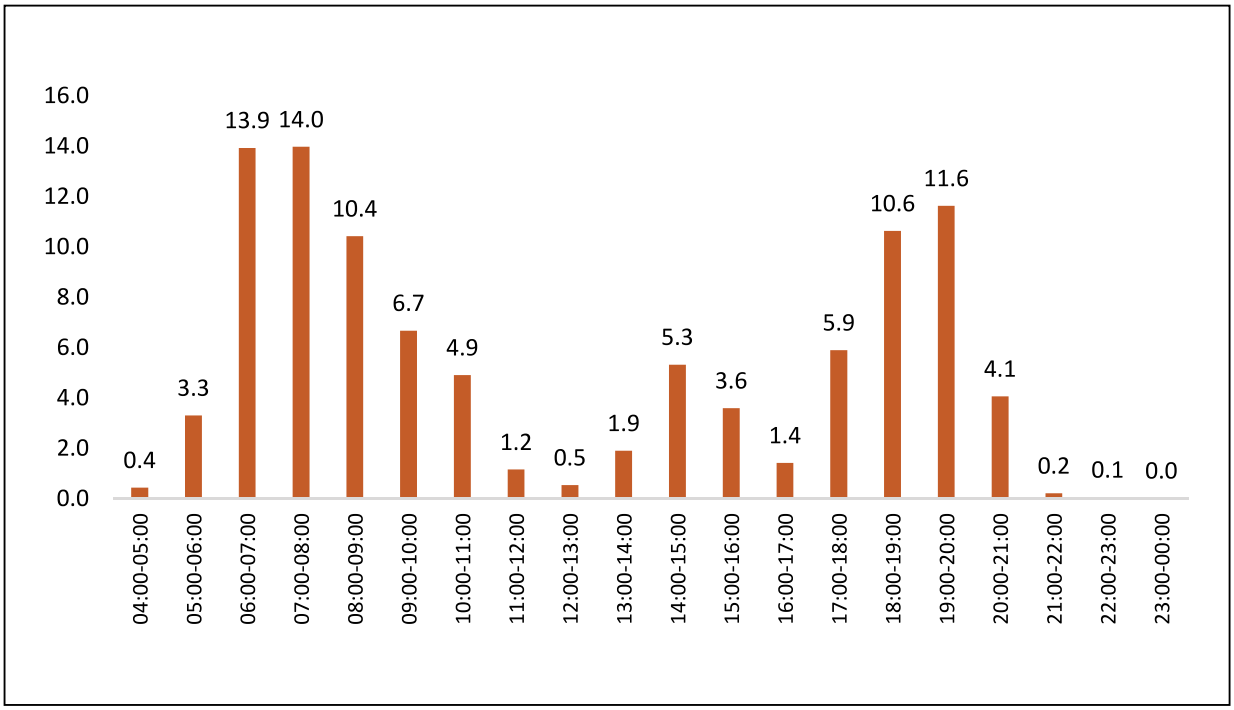


EPC and electricity supply

Under this study, an EPC of 1000 watts of power was distributed to the participants. Reliability of grid electricity was good in the study location. Power cut was reported only 2-3 times a month for 10-20 minutes. However, the quality of electricity supply is still a challenge. During low voltage, dish does not get adequately cooked; therefore, the quality of the electricity supply needs to be improved to promote e-cooking.

An understanding of the daily cooking hours is important for promotion of e-cooking at large scale. This understanding will help facilitate provisioning for uninterrupted quality electricity supply to households for a better e-cooking experience. Figure 5 presents all the heating records of phases 1,2, and 4 on an hourly scale, in a 24 hours format. In the morning, 6:00-9:00 and 17:00-20:00 is the peak cooking hours in the evening. To promote e-cooking and improve users experience, it is important to ensure reliable quality electricity supply during peak cooking hours.

Figure 5 : Percentage distribution of heating events for Phase 1, 2, and 4 on an hourly scale



Recommendations

Electricity as cooking energy is still in its infancy in Nepal; recently, electric cooking has gained policymakers' attention, as evident in recent policy documents. Given that Nepal has vast potential for hydroelectricity generation, it would be beneficial to promote e-cooking in Nepal. However, promoting e-cooking requires a constant commitment by policymakers, civil society, and development partners. This study believes that governments, financial institutions, donors, and the private sector could accelerate the uptake of electric cooking in Nepal with the appropriate support and coordination.

An assessment of the electricity supply status to support e-cooking appliances will have a long-term implication for the adoption of e-cooking. There is a need to develop an innovative financing solution, especially for poor households, to acquire e-cooking devices by solving the issue of high upfront costs. Expanding distribution and retailer store networks would build the supporting ecosystem for adopting e-cooking. Targeted strategies for promoting e-cooking and campaigns for consumer awareness and adoption of e-cooking appliances will have positive implications. Technological innovation should also be directed towards making e-cooking devices more user-friendly and affordable.

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LIST OF ABBREVIATIONS

AEPC	Alternative Energy Promotion Centre
CBS	Central Bureau of Statistics
CCS4ALL	Clean Cooking Solution for All
EPC	Electric Pressure Cooker
GW	Gigawatt
ICS	Improved cookstoves
IRADe	Integrated Research and Action for Development
LPG	Liquified Petroleum Gas
MECS	Modern Energy Cooking Services
MJ	Mega Joule
MoEWRI	Ministry of Energy, Water Resources and Irrigation
SDG	Sustainable Development Goal
TFS	Traditional Firewood Stoves
WACN	Women Awareness Center Nepal

PREFACE

Since its inception in 2002, IRADe has been engaged in clean energy transition from technological, environmental, socio-economic, cultural and policy perspectives. Clean cooking is a key driver for well being of family and can directly deliver gains across atleast 10 of the Sustainable Development Goals-SDGs. IRADe has undertaken a number of research studies, and held policy discourses at local, national and global levels. Recent concerns for high import bills of LPG and climate change necessitates electrification of cooking energy sectors. Increasing electricity supply through renewable technologies is becoming more affordable and opening new windows of opportunities. **Adopting electric cooking** will reduce the burning of fossil fuels and biomass. It is increasingly being recognized as a prime reason for air pollution and climate change.

We are delighted to present the report **"Testing Electric Pressure Cooker adoption in Socio-economic and Cultural Context of Nepal,"** developed under the project funded by the UKAID from the UK government through the Modern Energy Cooking Services (MECS) programme. The study was implemented at a community-scale pilot in 80 households in Kavrepalanchok district, Nepal, to monitor and understand an efficient electric pressure cooker (EPC) use pattern for accelerating the uptake of electric cooking. The multi-functional electric cooking appliance was welocmed by the local comminuties and gave a hope for its upscaling.

I hope this study will serve as an important contribution for all stakeholders to better understand and respond to the socio-economic and cultural challenges of the clean cooking transition in many Asian and African countries. I sincerely thank and appreciate the efforts of IRADe team, MECS, and the local consultants from Nepal for their valuable contributions in ensuring that the project is completed, despite the various pandemic restrictions.

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1. INTRODUCTION

1.1 Background

Sustainable Development Goal (SDG) 7 aims to achieve universal access to affordable, reliable, and modern energy services by 2030. Access to clean cooking energy is an important driver of social advancement, economic growth, healthy lifestyles, and sustainable development. Men and women have different energy needs because of their different social and household roles (Skutsch, 2005). Traditionally, women are responsible for cooking and childcare in the home (Westendorp, 2011); cooking culture in Nepalese society is no different; women bear most of the burden of cooking. Households in Nepal rely heavily on traditional energy sources (biomass) for cooking using traditional cookstoves, which poses a considerable challenge for achieving SDG7. The use of biomass fuels for cooking has a range of adverse consequences, especially for women, and puts additional pressure on local forest resources, particularly in places where firewood is scarce (Adkins et al., 2012). Women suffer health hazards at all the biomass chain stages because they manage the work as gatherers, processors, carriers, and end-users (Parikh, 2011). They often sacrifice their education and give up income-generation opportunities to fetch fuel and cattle feed. Cooking with biomass results in indoor-air pollution (IAP) that causes a variety of respiratory illnesses such as chronic obstructive pulmonary disease (COPD), asthma, bronchitis, and pneumonia (Bruce et al., 2006).Along with SDG 7, the adoption of clean cooking fuels has distinct linkages to other SDG goals, particularly for SDG-3 (to ensure healthy lives and promote well-being for all at all ages), SDG-5 (to achieve gender equality and empower all women and girls) and SDG-13 (take urgent action to combat climate change and its impacts).

The households in Nepal use solid fuels (firewood) as the primary cooking fuel, followed by Liquefied Petroleum Gas (LPG). Firewood is the primary fuel for cooking in 52.4% of households (Table 1). The use of firewood as the main fuel is more prevalent in rural areas of Nepal (65.8%) than urban areas (35.4%). In urban households, LPG is used as main fuel in more than 54% of households, whereas only 16.5% of rural households use LPG as main cooking fuel. Table 1 highlights that usage of LPG may also have an income dimension since there is an increasing trend of LPG usage with the rise in consumption level. In the poorest consumption quintile, only 2.2% of households use LPG as the main cooking fuel, which goes up to 74.5% for the richest consumption quintile.

Table 1 : Percentage distribution of households by main fuel used for cooking in Nepal

	Firewood	Cow dung	Leaves/ straw/ thatch	LPG	Biogas	Other	Total
Urban/Rural							
Urban	35.4	4.6	1.7	54.1	3.8	0.4	100
Rural	65.8	11.7	3.4	16.5	2.5	0.2	100
Consumption Quintile							
Poorest	67.2	20.7	8.3	2.2	1.1	0.4	100
Second	71.7	12.6	5.2	7.7	2.8	0	100
Third	69.3	8.1	1.9	16.6	3.8	0.4	100
Fourth	49.3	4.8	0.4	41.4	3.7	0.3	100
Richest	19.8	2	0	74.5	3.3	0.4	100
Nepal	52.4	8.5	2.7	33.1	3.1	0.3	100

Source: CBS, 2017

Nepal is a landlocked country and deprived of fossil fuel reserves. LPG has to be imported, and in 2018-19, Nepal imported 429,609 MT of LPG, which is a 270% increase since 2008-09 (AEPC, 2021). Over-dependence on LPG imports has widened the trade deficit and made Nepal susceptible to energy security risks. Moreover, transporting LPG in mountain regions is difficult and incurs high costs. Nepal possesses rich hydropower potential with an estimated 42 GW, technically and economically viable hydro generation capacity. Nearly 95% of households in Nepal have access to electricity, 71.7% have electricity from the national grid, and 23% of households are connected to off-grid sources (World Bank, 2019). 72% of households have access to reliable, affordable, and uninterrupted electricity for a significant part of the day (*ibid*).

Alternative Energy Promotion Centre (AEPC) is a Government institution established on November 3, 1996, under the Ministry of Science and Technology to develop and promote renewable/alternative energy technologies in Nepal. The mission of AEPC is to make renewable energy a mainstream resource through increased access, knowledge, and adaptability, contributing to the improved living conditions of people in Nepal. Currently, it is under the Ministry of Energy, Water Resources, and Irrigation. In its earlier programs, Alternative Energy Promotion Centre (AEPC), Nepal, did not prioritize electricity as a cooking choice despite high rates of access to electricity and abundant hydropower-generation options (Paudel et al., 2021; Government of Nepal, Ministry of Forests and Environment, 2021). In the past, the focus was on technologies/devices that could more efficiently combust solid biomass. Now new opportunities are being created for modern, clean cooking fuels such as electricity, biogas, and compressed biomass pellets (Government of Nepal, Ministry of Forests and Environment, 2021). Prime Minister of Nepal announced the "Clean Cooking Solution for All by 2017 (CCS4ALL)" in January 2013, which guided the subsequent policies and plans on clean cooking. However, e-cooking was absent as a clean cooking option in CCS4ALL that

focused on biogas, efficient biomass cookstoves, and briquette/pellets. A white paper entitled "Present Situation and Future Roadmap of Energy, Water Resources and Irrigation Sector" released by the Ministry of Energy, Water Resources and Irrigation (MoEWRI), Government of Nepal, in May 2018 became the first policy paper that explicitly guided the promotion of e-cooking in every household of Nepal. As a result, e-cooking received prominence in the subsequently formulated 15th Five-Year Plan (FY 2019/20 to FY 2023/24) and AEPC's activity plan (Government of Nepal, Ministry of Forests and Environment, 2021).

1.2 Project aims and objectives

The adoption of electric cooking will reduce the burning of biomass and fossil fuels that are increasingly being recognized as a prime reason for climate change. Switching to e-cooking in Nepal will mitigate the need for stockpiling of LPG cylinders due to fear of LPG import disruptions and save scarce foreign exchange reserves spent on imported fuel. A multi-functional electric cooking appliance may fit staple Nepalese household daily food such as rice, pulses, soup, vegetables, or chicken.

This study aims to understand the willingness of women communities in rural and urban locations to adopt EPCs and challenges faced and related behavioural changes. It involves collecting data on cooking practices from participating households using the cooking diaries approach. The findings are intended to help accelerate the uptake of the EPCs and e-cooking in Nepal. The specific objectives of the study are:

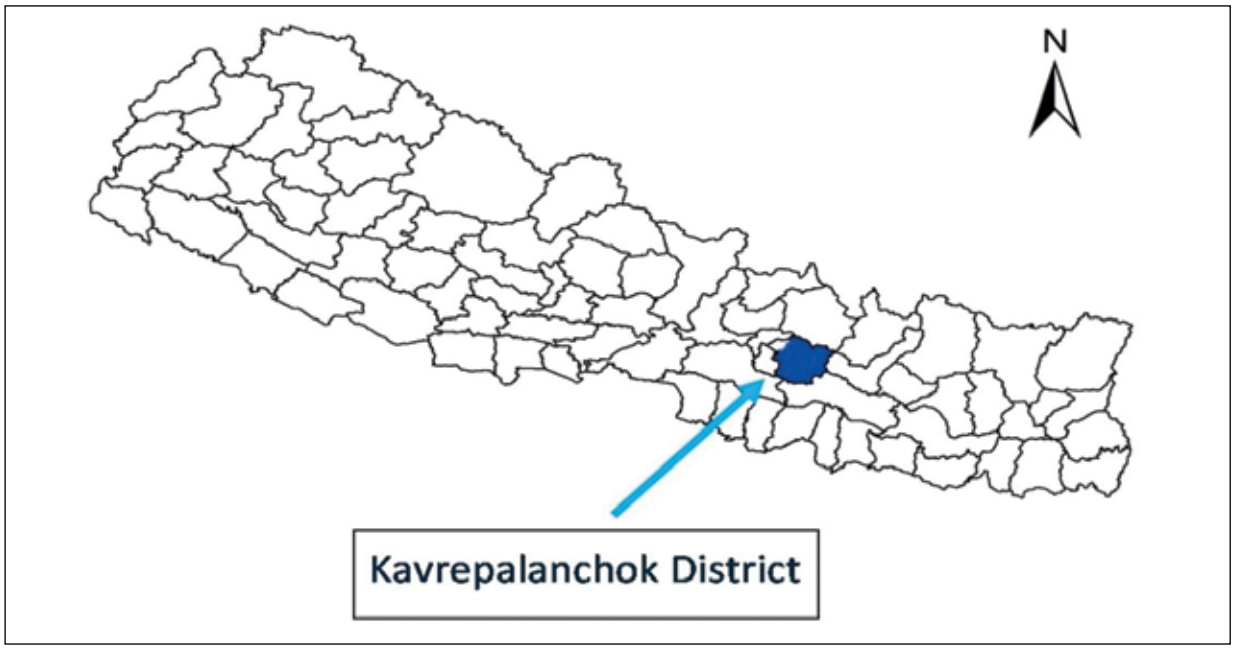
a) To capture existing rural and urban community cooking practices, fuel-mix, gender dynamics, and willingness to use EPC;

b) To understand the EPC cooking experience of community members;

c) To report findings and suggest specific policy recommendations and strategies for scaling-up EPC cooking in the region.

2. METHODOLOGY

The study was implemented in Kavrepalanchok district, Nepal, with two women communities- (i) Sahara Nari Chetna Skill Cooperative, an urban women community in Banepa municipality, and (ii) Sabal Nari Chetna Agriculture Cooperative, a rural women community in Timal rural municipality. In this study, women communities refer to members of the above-mentioned credit-saving cooperatives. These cooperatives have been promoted by Nari Chetana Kendra Nepal (Women Awareness Center Nepal), a civil society that works to promote social, economic, and gender empowerment. The president and secretary of these two cooperatives organised meetings to discuss the scope of this study with their respective community members. In the meeting, 154 cooperative members from Timal and 215 cooperative members from Banepa expressed their verbal willingness to voluntarily participate in this pilot study. The detailed household selection and data collection process have been described in the following sub-section.



Map 1 Study location (not to scale)

2.1 Household selection

The research team randomly selected 120 households each from Timal and Banepa (total 240 households) for the study. The selected households were asked to fill out a registration form to participate in this study. A structured questionnaire was prepared to understand the households' cooking practices, cooking fuel mix, electricity status, electricity wiring, household size and intra-household gender-mix, willingness to use, and ability to pay for EPC, etc. The proposed pilot required motivated and capable households having basic infrastructure like grid connection and good electricity wiring at home, willing to pay the capital cost (15% of the capital cost of EPC), ready to maintain a daily cooking diary. Moreover, EPC cannot cook

for large families, so we restricted the intervention household's family size to 8 members. From the registration survey data we found there are 116 households in Banepa and 120 households in Timal have family sized 8 or less. The data collected for 240 households were screened on the following parameters:

- Grid-connected
- Status of wiring
- Households where at least two meals are prepared in a day
- Family size is of 2-8 person
- Willing to maintain a daily cooking diary
- LPG monthly consumption at least 5 Kgs
- Willingness to pay for EPC

It was found that 87 households in Timal and 92 households in Banepa were qualified to receive EPC based on the above parameters. It was planned to distribute 40 EPCs in Timal and 40 EPCs in Banepa. Therefore, from the list of households, which satisfied the screening parameters, we randomly selected 40 households each from Timal and Banepa (Figure 1). Based on registration data analysis, 40 households from each of the two communities (a total of 80 households) were chosen for EPC distribution.

Table 2 Demographic characteristics of the beneficiary households

Location	No. of households	Family members	Average family size	Adult (18 and above)		Children (Below 18)		Average adult education	
				Male	Female	Male	Female	Male	Female
Rural	40	161	4.03	61	63	23	14	6.20	3.94
Urban	40	175	4.38	66	66	27	16	9.09	6.45

Data Source: IRADe-WACN registration survey

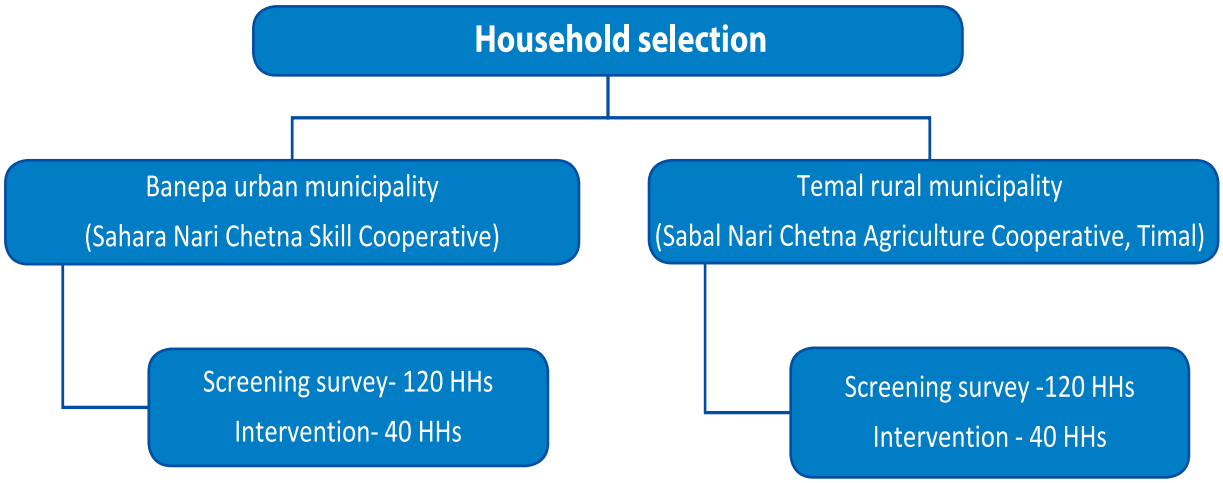


Figure 1 Household selection process

2.2 Cooking Diary

The participant households recorded daily cooking activities using a localized version of the MECS cooking diaries approach (with Nepalese translation). Four enumerators were trained to maintain cooking diaries and were assigned to monitor the intervention households' data. They also recorded the daily electricity consumption of the EPC using sub-meters along with the weekly consumption of firewood and LPG using a weighing tool. The data entry operators uploaded the daily cooking diary data weekly on the SurveyCTOportal (in English).

The study used two types of cooking diaries:

a) Intensive cooking diary

- All cooking events on any stove
- Times of cooking events
- Dishes cooked/heated
- Number of people cooked for
- Type of utensils used for cooking
- Detailed cooking process data
- Gender of the cook

b) Light cooking diary

- Only cooking events on EPC
- Time electric appliance was used
- Dishes cooked/heated
- Number of people cooked for
- Cooking process
- Gender of the cook

Figure 2 : Inception meetings with the participants of Banepa municipality to discuss the benefits of electric cooking

2.3 Phases of cooking diary data collection

Cooking diary data were collected for 15 weeks and divided into 4 phases- Baseline, transition, monitoring, and end line. In the baseline phase, participants maintained a cooking diary for three weeks. EPCs were distributed after completing the baseline phase. Before handing over the EPC to study participants, two-day EPC training sessions were organized in each study location. The training sessions covered the basics of handling EPC functions, safety measures, live demonstrations of cooking local dishes, and EPC benefits. The study procured 80 EPCs and electric sub-meters from local vendors in Kathmandu, Nepal. Philips Model No HD 2139/65 (6 Liter) with features such as nutritional keep warm, 24-hour preset timer, keep warm, non-stick inner pot, auto pressure release, large digital display were procured. The reason for the purchase of this particular device was because of the 2-year warranty with established service and repair centers in Kathmandu. Electric sub-meters were installed in the participating household's kitchen and checked for proper functioning. After distributing the EPC, the participants were given two weeks adaptation break (no cooking diaries); however, enumerators regularly visited the participant's house to monitor the use of the devices for cooking.

In the transition phase, cooking data was collected for three weeks. Before the monitoring phase, the study team organized two-day events in each study location (Timal and Banepa). During this event, study participants were divided into small groups and were asked to cook local dishes in EPC. The idea was to understand the level of familiarity with EPC based cooking among the participants. It was also to identify participants who may require more cooking training with EPC and promote cross learning among the participants dwelling in the same vicinity (under the prevailing pandemic, social distancing and other COVID guidelines issued

Figure 3 : EPC distribution in Timal municipality

by the local administration were followed). The monitoring phase was carried out for six weeks using a light cooking diary. In the endline phase, data was collected using an intensive cooking diary for three weeks.

2.4 Exit interviews and analysis

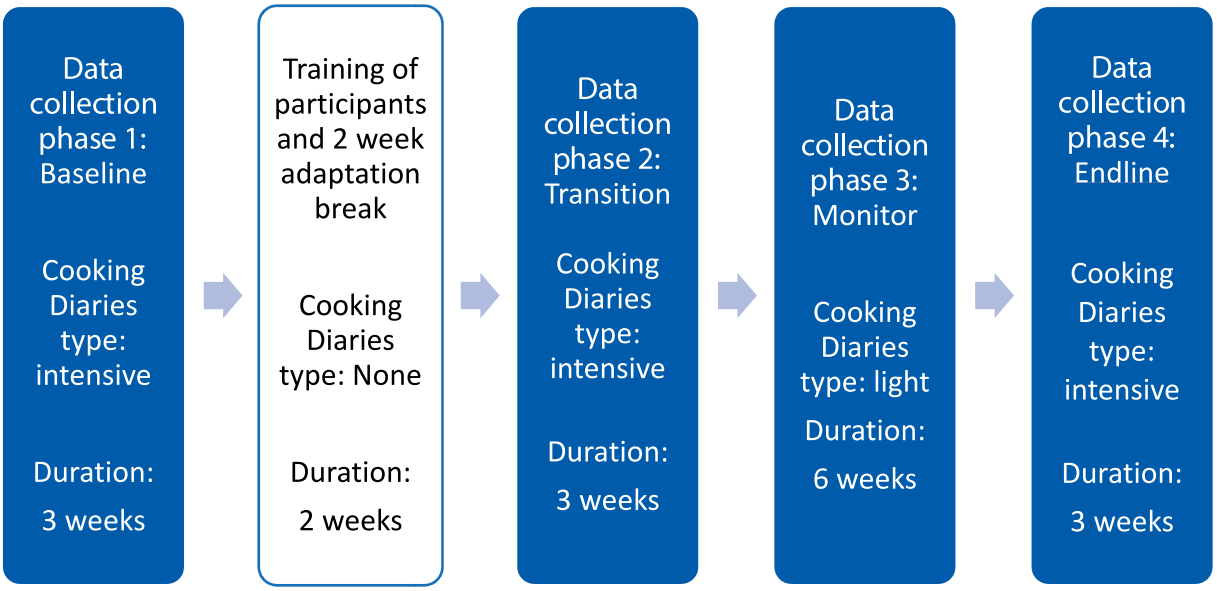


Figure 4 : Phases of data collection

Figure 5 : Distribution of Electric Pressure Cooker and electric sub-meter in Banepa municipality

After completing data collection for all the phases of the cooking diary, an exit interview was conducted in all the participant households (80) using a structured questionnaire. The exit interview was conducted to understand the change in cooking habits, appliance review, cooking experience with EPC, taste of food cooked on EPC, fuel stacking behaviour, willingness to purchase new EPC, electricity supply status, and related issues to appliance safety, repair, and maintenance. The data collected through the cooking diaries and exit interviews were analysed using tables, histograms, and qualitatively to prepare the report.

2.5 Project practicalities/logistics

The research team distributed the EPC to each participant during the two-day demonstration activity conducted after the baseline phase in both the municipalities. Abiding by the COVID norms, a list of 20 intervention households was prepared, and participants were invited from each household. Thus, 40 urban households were covered in two sessions, and similarly, 40 rural households were covered in the next two sessions. The small groups' demonstration and distribution activities were done to maintain social distancing and provide personal attention to each participant's queries.

For better understanding of the participants, all the trainings were conducted in the local language with the help of field support staff. The user manual was read out to the participants, and each cooking function was explained in detail. During the device demonstration sessions,

Figure 6 : EPC device demonstration and training in Banepa in a group of 20 participants

Figure 7 : Device demonstration and live cooking training in Timal municipality

special attention was given to community engagement. Randomly picked participants were asked to answer a few questions about the device and the cooking functions after the demonstrations. During the live cooking training sessions, the participants were made to involve in cooking the staple dishes under the supervision of the research team. The participants were further divided in 4 hroups each group comprose 5 members. Each of the hroups cooked dishes without any support from the research team in the two-day cooking activity programme conducted before the monitoring phase. After EPC distribution, the

enumerators also supported the participating households to use the appliances by visiting their homes in case any member require any support to cook food in EPC.

The team gave instructions for the safe handling and cleaning of the EPC. Some of the instructions provided during the training session were:

- Unplug the EPC when not in use
- Don't use the appliance in case of voltage fluctuations
- Remove the upper lid as per the directions given on the top of the lid
- Use a dry cloth to wipe the moisture after using a wet cloth to clean the surface
- Use a sponge to clean the inner insulated pot

Figure 8 : Old women of Timal community learning to operate EPC during household visits

Ninety-five percent of participating households did not face any problem with the EPC throughout the pilot program, as they could easily maintain the cooking device. The field support staff took care of the technical errors in the EPCs reported by the households and also got it repaired at the service center in Kathmandu. Technical errors arising from excessive moisture (Error-E2), pressure development, early power cut off (Error- E4) were repaired at the service center. Once the EPC was repaired, it was transported back to the household. It took approximately 5-7 days to repair and return the EPC to the beneficiary household. The temporary errors did not impact people's confidence; however, service centers in close proximity would have enabled the households to get the devices repaired locally with less transportation cost, resulting in enhanced confidence in electric cooking.

Initially, the 80 EPCs were tested and stored in Kathmandu. Before the demonstration activity, the field staff transported the EPCs to the cooperative offices in the rural and urban areas. Because of the rough terrain, transportation to the rural areas was challenging. Extra care was taken while transporting the EPCs to the rural areas to keep the device safe. The boxes were secured with strings and ropes to protect them from damage.

3. MAIN RESEARCH FINDINGS AND LESSONS LEARNED

This section provides the findings based on the cooking data collected using a daily cooking diary from 80 households. The analysis is based on data collected for three phases, namely phase 1 (Baseline), phase 2 (Transition), and phase 4 (Endline). The cooking diary used for these three phases is comparable because it covers all the cooking events on any stove/cooking appliance. The phase 3 (monitoring) data covers the cooking event only for dishes cooked in EPC. Therefore, results from phase 3 have been utilised only for EPC analysis. Table 2 below provides the phase-wise total number of heating records for urban and rural participants.

Table 3 Total number of heating event records in Phases

Phase	No. of weeks	Heating records		
		Rural	Urban	Total
Phase 1	3	5,418	7,773	13,191
Phase 2	3	4,612	7,192	11,804
Phase 3	6	2,452	4,633	7,085
Phase 4	3	3,806	6,060	9,866
Total	15	16,288	25,658	41,946

Data Source: IRADe-WACN e-cooking diary Nepal, 2021

3.1 Monitoring community cooking practices

Under this study, EPC was distributed to 80 households. MECS cooking diary forms were administered for cooking dairy data collection. More than 90 percent of households found it convenient to use and report daily cooking data. The research team also found it an effective tool for data collection.

The cooking diaries data suggests that all the participant households are using EPC along with cooking stoves/appliances (Table 4). However, the number of households using biomass and LPG stoves remained consistent in all three phases in rural and urban locations. Though households' use of LPG stoves and TFS does not show any significant change across the three phases, it is imperative to see the frequency of different stoves/appliances usage.

Table 4 Cooking devices used by number of households for heating purposes

Location	Phases	Electric hotplate	Electric kettle	Firewood stove	LPG stove	Induction	Microwave	Rice cooker	EPC
Rural	Phase 1	1	3	24	38	6	1	3	N.A
	Phase 2	5	3	28	40	2	2	4	40
	Phase 4	0	6	25	39	4	1	2	40
Urban	Phase 1	2	24	11	40	4	0	7	N.A
	Phase 2	2	29	9	40	6	1	14	40
	Phase 4	3	29	11	40	6	3	3	40

Data Source: IRADe-WACN e-cooking diary Nepal, 2021

Table 5 shows that rice is the most cooked dish, followed by tea, vegetables, and pulses in the three phases. After introducing EPC, the share of rice in the heating events has increased in phase 2 and phase 4. Boiling water is another important heating event as shown below. Table 5 shows the menu did not change significantly during the pilot, indicating that the EPC was compatible with the local menu and cooking practices.

Table 5 Dishes as percentage of heating events in three phases

Dish	Number of records			Percentage share		
	Phase 1	Phase 2	Phase 4	Phase 1	Phase 2	Phase 4
Rice	3153	2968	2831	23.9%	25.1%	28.7%
Tea	2301	1825	1349	17.4%	15.5%	13.7%
Vegetable	2061	1638	1592	15.6%	13.9%	16.1%
Pulses	1529	1195	1088	11.6%	10.1%	11.0%
Water	885	743	541	6.7%	6.3%	5.5%
Milk	657	642	558	5.0%	5.4%	5.7%
Curry	389	769	360	2.9%	6.5%	3.6%
Meat	447	524	488	3.4%	4.4%	4.9%
Pickle	503	321	170	3.8%	2.7%	1.7%
Noodles	258	272	178	2.0%	2.3%	1.8%
Roti	169	148	107	1.3%	1.3%	1.1%
Dhido	100	138	118	0.8%	1.2%	1.2%
Eggs	132	109	44	1.0%	0.9%	0.4%
Beans	29	93	117	0.2%	0.8%	1.2%
Potato	105	33	46	0.8%	0.3%	0.5%
Bread	119	19	8	0.9%	0.2%	0.1%
Soup	36	49	52	0.3%	0.4%	0.5%
Pulses and Rice		77	67	0.0%	0.7%	0.7%
Corn	49		29	0.4%	0.0%	0.3%

Dish	Number of records			Percentage share		
	Phase 1	Phase 2	Phase 4	Phase 1	Phase 2	Phase 4
Sel roti		47	10	0.0%	0.4%	0.1%
Sweet	27	9	26	0.2%	0.1%	0.3%
Khichadi	21	7	27	0.2%	0.1%	0.3%
Puwa	53			0.4%	0.0%	0.0%
Others	168	178	60	1.3%	1.5%	0.6%
Grand Total	13191	11804	9866	100.0%	100.0%	100.0%

Data Source: IRADe-WACN e-cooking diary Nepal, 2021

A significant change in the household's cooking behaviour and practices was observed under different phases, reflected in the number of heating events using different devices. Table 6 highlights stove-wise percentage dish heating. After the introduction of EPC, a shift in cooking devices for heating was observed for significant dishes like rice, vegetables, pulses, beans, potato boiling, pulses-rice (using separator). More than 93% of rice was cooked on EPC in phase 4; use of an LPG stove and TFS declined sharply. Similarly, a decline in the LPG stove and TFS use was observed for cooking vegetables, pulses, beans. EPC use for cooking beans significantly increased in phase 4 (30.8%).

Table 6 Stove-wise percentage use for dish heating

Cooking Appliance	Rice			Tea			Vegetable		
	Phase 1	Phase 2	Phase 4	Phase 1	Phase 2	Phase 4	Phase 1	Phase 2	Phase 4
LPG stove	84.7%	15.5%	6.1%	90.3%	89.6%	88.4%	86.5%	79.1%	75.7%
Firewood	9.8%	1.0%	0.3%	4.8%	2.2%	2.1%	12.0%	4.9%	6.3%
EPC	0.0%	83.2%	93.5%	0.0%	0.0%	0.0%	0.0%	15.0%	17.0%
Rice cooker	1.4%	0.2%	0.0%	0.0%	0.2%	0.1%	0.1%	0.5%	0.0%
Induction	4.1%	0.1%	0.1%	4.1%	3.8%	4.5%	1.4%	0.6%	0.9%
Electric kettle	0.0%	0.0%	0.1%	0.9%	4.1%	5.0%	0.0%	0.0%	0.0%
Cooking Appliance	**Pulses**			**Boiling water**			**Milk**		
	Phase 1	Phase 2	Phase 4	Phase 1	Phase 2	Phase 4	Phase 1	Phase 2	Phase 4
LPG stove	85.5%	54.4%	57.0%	56.9%	28.5%	24.8%	93.5%	94.4%	91.0%
Firewood	9.2%	3.0%	6.3%	2.3%	0.5%	0.8%	6.1%	2.8%	4.1%
EPC	0.0%	40.6%	34.7%	0.0%	4.0%	0.8%	0.0%	0.0%	0.0%
Rice cooker	0.0%	0.2%	0.0%	2.3%	2.7%	5.4%	0.2%	0.0%	0.2%
Induction	5.2%	1.8%	1.9%	1.6%	3.9%	3.6%	0.3%	2.8%	4.5%
Electric kettle	0.0%	0.0%	0.0%	37.0%	60.3%	64.7%	0.0%	0.0%	0.2%
Cooking Appliance	**Curry**			**Meat**			**Pickle**		
	Phase 1	Phase 2	Phase 4	Phase 1	Phase 2	Phase 4	Phase 1	Phase 2	Phase 4
LPG stove	85.0%	83.1%	83.6%	80.5%	80.3%	76.0%	88.1%	96.2%	95.1%

Firewood	14.0%	9.1%	14.2%	16.3%	12.4%	18.1%	8.7%	2.2%	4.9%
EPC	0.0%	7.5%	1.4%	0.0%	6.3%	5.5%	0.0%	0.6%	0.0%
Rice cooker	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Induction	1.0%	0.3%	0.6%	3.1%	1.0%	0.4%	3.2%	0.9%	0.0%
Electric kettle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cooking Appliance	**Noodles**			**Roti**			**Dhido**		
	Phase 1	**Phase 2**	**Phase 4**	**Phase 1**	**Phase 2**	**Phase 4**	**Phase 1**	**Phase 2**	**Phase 4**
LPG stove	84.1%	92.6%	88.8%	92.9%	94.6%	90.7%	46.0%	61.6%	50.0%
Firewood	10.9%	5.5%	7.3%	7.1%	4.7%	9.3%	54.0%	37.7%	49.2%
EPC	0.0%	1.1%	1.7%	0.0%	0.0%	0.0%	0.0%	0.7%	0.8%
Rice cooker	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Induction	5.0%	0.7%	2.2%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%
Electric kettle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cooking Appliance	**Eggs**			**Beans**			**Potato boiling**		
	Phase 1	**Phase 2**	**Phase 4**	**Phase 1**	**Phase 2**	**Phase 4**	**Phase 1**	**Phase 2**	**Phase 4**
LPG stove	85.5%	92.7%	93.2%	69.0%	71.0%	59.8%	90.5%	84.8%	65.2%
Firewood	5.3%	4.6%	6.8%	31.0%	8.6%	8.5%	9.5%	0.0%	21.7%
EPC	0.0%	1.8%	0.0%	0.0%	18.3%	30.8%	0.0%	15.2%	13.0%
Rice cooker	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	0.0%	0.0%	0.0%
Induction	8.4%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%
Electric kettle	0.8%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cooking Appliance	**Bread**			**Soup**			**Pulses and rice**		
	Phase 1	**Phase 2**	**Phase 4**	**Phase 1**	**Phase 2**	**Phase 4**	**Phase 1**	**Phase 2**	**Phase 4**
LPG stove	95.8%	94.7%	87.5%	100.0%	77.6%	84.6%	-	0.0%	0.0%
Firewood	4.2%	5.3%	12.5%	0.0%	0.0%	0.0%	-	0.0%	0.0%
EPC	0.0%	0.0%	0.0%	0.0%	18.4%	1.9%	-	100.0%	100.0%
Rice cooker	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	-	0.0%	0.0%
Induction	0.0%	0.0%	0.0%	0.0%	2.0%	13.5%	-	0.0%	0.0%
Electric kettle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	0.0%	0.0%
Cooking Appliance	**Corn roasting**			**Sel roti**			**Khichadi**		
	Phase 1	**Phase 2**	**Phase 4**	**Phase 1**	**Phase 2**	**Phase 4**	**Phase 1**	**Phase 2**	**Phase 4**
LPG stove	93.9%	-	96.6%	-	85.1%	90.0%	90.5%	85.7%	77.8%
Firewood	6.1%	-	3.4%	-	14.9%	10.0%	9.5%	0.0%	7.4%
EPC	0.0%	-	0.0%	-	0.0%	0.0%	0.0%	14.3%	14.8%
Rice cooker	0.0%	-	0.0%	-	0.0%	0.0%	0.0%	0.0%	0.0%
Induction	0.0%	-	0.0%	-	0.0%	0.0%	0.0%	0.0%	0.0%
Electric kettle	0.0%	-	0.0%	-	0.0%	0.0%	0.0%	0.0%	0.0%

Data Source: IRADe-WACN e-cooking diary Nepal, 2021

Figure 9 Enumerators monitoring the cooking practices of participating households using cooking diaries in Timal

Almost 80% of the beneficiaries agreed that EPC is very easy to use with proper training in the exit interview. While some benefitted and quickly learned the instructions during group demonstrations, the others needed individual training and community members' help. Some dishes, like rice, pulses, beans, meat tasted better when cooked in an EPC. However, the participants reported that it was challenging to deep-fry, make tea, boil milk, or cook the traditional dishes (Dhido, Sel roti) in an EPC. The device cannot be used to make *Roti/Chapati* (a type of bread).

Fuel stacking was visible in the cooking diary, and the participants highlighted reasons for the same during exit interviews. The use of other cooking stoves along with EPC was seen in almost all the households as they are required for simultaneous cooking along with EPC to save time and during electricity supply disruptions. Many local dishes like Dhido and Sel Roti taste better when cooked on LPG/TFS; LPG stoves are required to prepare tea and chapatis, which cannot be cooked on EPC. A few participants use firewood to keep the house warm and are freely available, even though they are aware of the disadvantages of using firewood, including the adverse health impacts and difficult cleaning of sooty utensils. LPG stoves (with more than one burner) are used for simultaneous cooking, involve less cooking time, but are expensive and have refill transportation challenges. The use of multiple cooking devices reflects stacking is a common phenomenon. It also reflects that EPC does not fulfill all the cooking needs of households.

Gender disaggregated cooking/heating data helps understand the broader behavioral/ societal changes. Table 7 shows that the number of heating events carried out by male family members was 4% in phase 1, which increased to 9% in phase 2, and 11% in phase 4. This

change was primarily driven by the increased heating events done by male family members using EPC. In phase 1, merely 31 households reported cooking by a male member, which increased to 42 in phase 2 and 41 in phase 4. Efficient and convenient cooking appliances attract a male for cooking/heating. Table 8 displays the dishes prepared by male members on EPC during phases 2 and 4 in an urban and rural location. Men who are using EPCs are cooking staples like rice, pulses (Table 8).

Table 7 Number of heating records by gender

Stoves/ Appliance	Phase 1		Phase 2		Phase 4	
	Female	Male	Female	Male	Female	Male
Electric hotplate	4		5	2	10	
Electric kettle	333	16	505	19	401	15
EPC			3,213	227	3,146	303
Firewood	1,124	59	414	36	432	64
Gas stove	10,718	446	6,560	589	4,768	506
Induction	396	17	122	42	114	46
Microwave	4		19	5	12	8
Rice cooker	60	8	31	12	8	26
Other	6		3		5	2
Grand Total	12,645	546	10,872	932	8,896	970

Data Source: IRADe-WACN e-cooking diary Nepal, 2021

Table 8 Location wise dish preparation by male on EPC in phase 2 and 4

Location	Rice	Pulses and Rice	Pulses	Meat	Beans	Others
Rural	**386**	**10**	**18**	**5**	**3**	**4**
Urban	**76**	**11**	**9**			**8**
Grand Total	**462**	**21**	**27**	**5**	**3**	**12**

Data Source: IRADe-WACN e-cooking diary Nepal, 2021

The households mainly cooked rice, vegetables, pulses, curry, meat, and beans using an EPC. To compare the EPC average cooking time for these dishes with LPG stove and TFS, we have considered only traditional pressure cooker events for cooking these dishes. We combined the data of phases 2 and 4 to arrive at the average cooking time for these dishes (Table 9).

Table 9 Average cooking time of major dishes using different cooking devices (in minutes)

Dishes	LPG stove	Firewood	EPC
Rice	25	23	29
Vegetables	28	28	30
Pulses	26	26	33
Curry	32	25	30
Meat	33	36	37
Beans	29	32	38

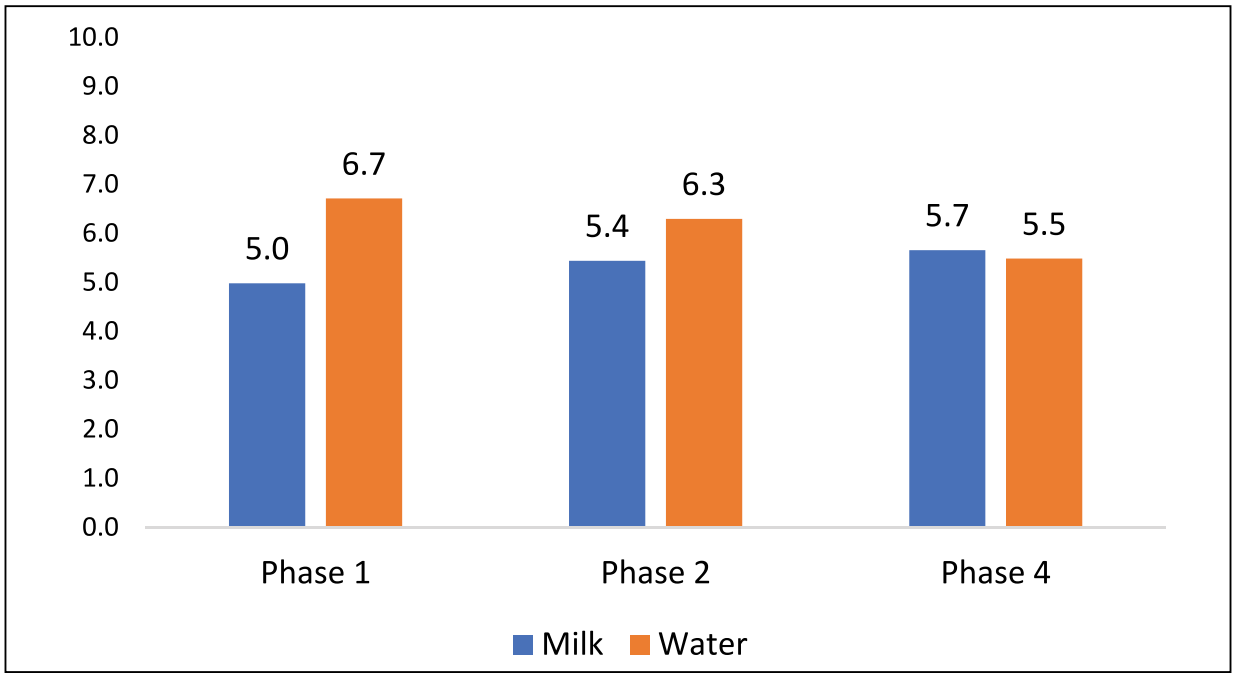
Data Source: IRADe-WACN e-cooking diary Nepal, 2021-22

Table 9 suggests that the average cooking time is more on EPC than LPG and firewood stoves for rice, vegetables, pulses, meat, and beans. However, the advantage of EPC is that it does not require high human intervention like the regular stirring of food while cooking. Also, it automatically switches off once the food gets cooked, so there is no problem with food burning. Therefore, participants during the exit interview highlighted that though EPC takes more cooking time, it reduces monitoring time for the cook. The cook gets spare time for other activities while cooking in EPC. Few of the households in the community tried cooking rice and pulses in a single heating event using a bowl as a separator. As a result, the average cooking time for rice and pulses was reduced to 34 minutes, reflecting time and energy saving. However, cooking two dishes using separator will reduce the amount of each food cooked. We found that this cooking practice was adequate for serving up to 6 people based on the cooking diary data.

Figure 10 Use of bowl as a separator to cook two dishes simultaneously in an EPC

Water heating is another important part of kitchen energy consumption. In this study, we have captured water heating data only when water is boiled for other purposes such as purifying, hot drinks, bathing, and other than part of any dish preparation. Water heating accounts for more than 5% of heating events (Fig 11). Electric kettle was the most used appliance for water heating (64.7%), followed by an LPG stove (24.8%), in phase 4 (Table 6). Moreover, the use of LPG stove for water heating has shown a downward trend over the three phases whereas electric kettle use is on the rise for heating water.

Figure 11 Share of water and milk in total heating events (in %)



Data Source: IRADe-WACN e-cooking diary Nepal, 2021

Boiling milk is another important heating activity and its share in total heating events is more than 5% (Fig 11). It excludes whether milk has been boiled to make tea or other purposes like making sweet dishes. As per the heating records of phases 1,2, and 4, the LPG gas stove is the preferred device for boiling milk (Table 6).

3.2 Monitoring electricity supply and use

Cooking diary was maintained in all four phases of data collection. In phase 2, daily electricity data consumption was added to the cooking diary. Electronic sub-meters were installed in the participant households, and necessary wiring and plugs to collect the electricity consumption data for EPC. Participants were asked to do the cooking only after connecting the EPC with sub-meters and noting the daily electricity consumption units in the cooking diary. Enumerators verified the cooking diary data records with appliance-level sub-meters consumed units.

Under this study, an EPC of 1000 watts power was distributed to the participants. The cooking fuel consumption data reveals that fuel stacking was administered by all the households even after receiving EPC. Major reasons for energy stacking were (i) uncertainty of electricity supply and quality of electricity supply, (ii)EPC is not suitable for cooking all local dishes like *Dhido* and *Sel roti, etc*. Though the reliability of grid electricity supply was good in the study location and power cut was reported only 2-3 times a month for 10-20 minutes. However, some households reported that they could not operate EPC due to low voltage. During the exit interview, some households reported that the dish is not cooked properly if they continue to cook in EPC during low voltage. Therefore, the quality of the electricity supply

needs to be improved as low voltage sometimes makes it challenging to cook in EPC. In case of interruption in power supply, even for a few minutes, it impacts the cooking time with EPC because it restarts the processes from the initial level. However, if the power supply resumes early, the insulation of EPC helps to maintain the temperature and does not significantly affect the cooking time. It was reported that because of these reliability issues with the electricity supply; fuel stacking with EPCs becomes necessary. More than 50% of the participants agreed that power interruption had forced them to switch to other cooking stoves/appliances. EPC is perceived as a sophisticated device, and many households believe that in case of any fault/damage, they may not be able to get it repaired locally. Compared to younger cooks, older people take a longer time to learn cooking on EPC, and in some cases, they seek younger generation's help for assistance.

Electricity, LPG, and firewood are the three important fuels used by the household for cooking using different cooking devices. Total energy consumed by different devices depends on the number of dishes cooked and the number of people it is cooked. However, it is important to convert the total fuel used in a single unit to compare energy used by different devices because each fuel type has different calorific values. Table 10 is used to multiply the quantity of fuel consumed with their respective calorific values to calculate the energy consumption in MJ.

Table 10 Calorific values and conversion efficiencies of different fuel types

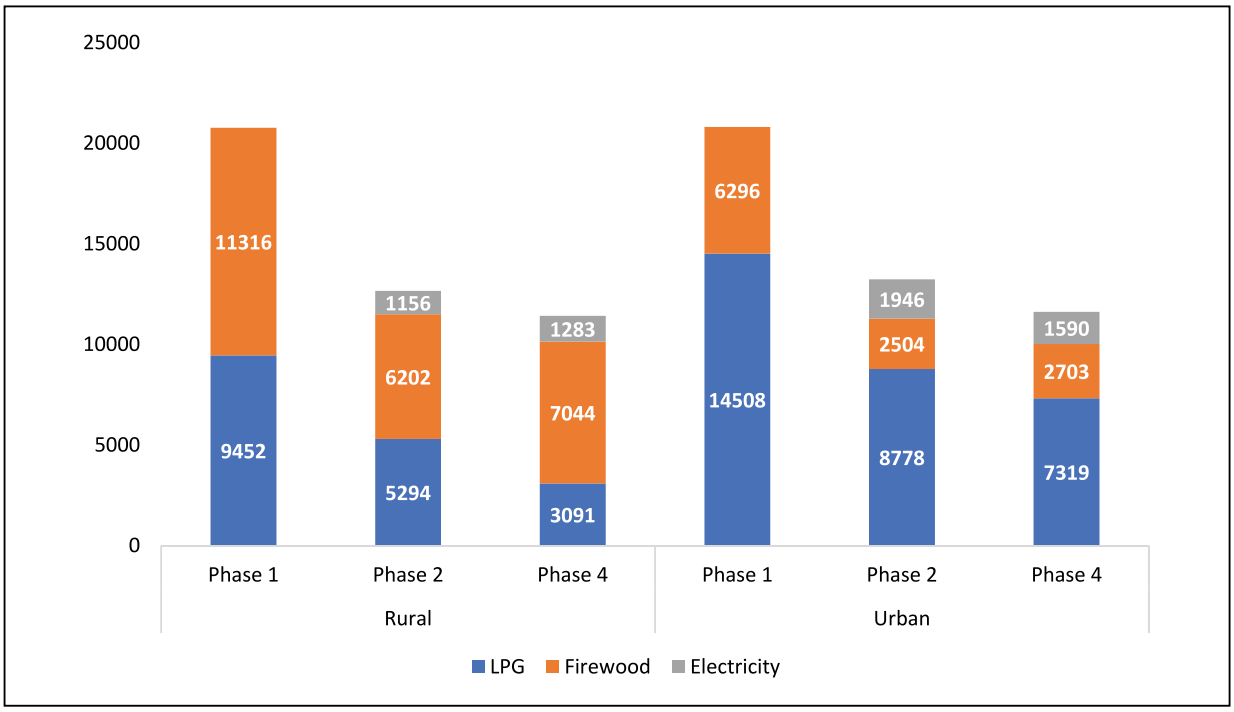
Fuel type	Calorific values
Firewood	15.9 MJ/kg
LPG	50.0 MJ/kg
Electricity	3.6MJ/kWh

Source: World Bank (BLG14 Cooking Costs by Fuel Type.xlsx)

The EPC use data during different phases is quite encouraging. Figure 12 has been prepared using cooking diary data for consumption of LPG, Firewood and electricity for EPC and converting it in MJ using table 9. There has been a significant reduction in cooking energy consumption by the participant's households after the introduction of EPC (Figure 12). Analysis suggests that in rural location, as compared to phase 1, total cooking energy consumption (only considered for LPG stove, TFS and EPC) fall by 39% in phase 2 and by 45% in phase 4. In urban location, compared to phase 1, total cooking energy consumption fell by 36% in phase 2 and by 44% in phase 4. Compared to phase 1, in rural location reported number of dishes fell by 15% in phase 2 and by 30% in phase 4 (Table 3). Similarly, in urban location the number of dishes fell by 7% in phase 2 and 22% in phase 4. The total number of people cooked for had decreased by 17% in phase 2 and 33% in phase 4 in rural location; and by 3% in phase and 23% in phase 4 for urban location[1].

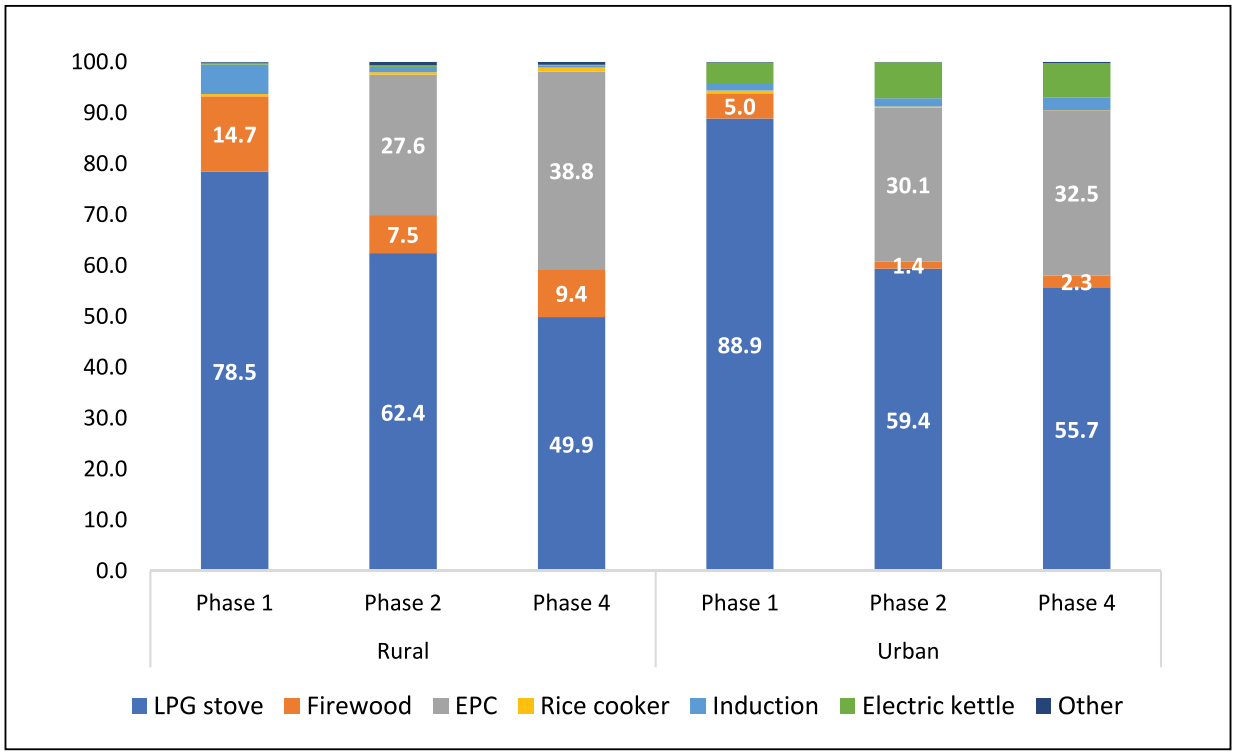
1 The reason for the decline in the number of people cooked for is uncertain in phase 4. One reason could be the easing COVID 19 related restrictions post lockdown allowing migrant workers to resume their jobs in the work locations.

Figure 12 Cooking energy consumption in different phases (in MJ)



Data Source: IRADe-WACN e-cooking diary Nepal, 2021-22 and author's calculation

Figure 13 Percentage of heating events using different stoves/appliances

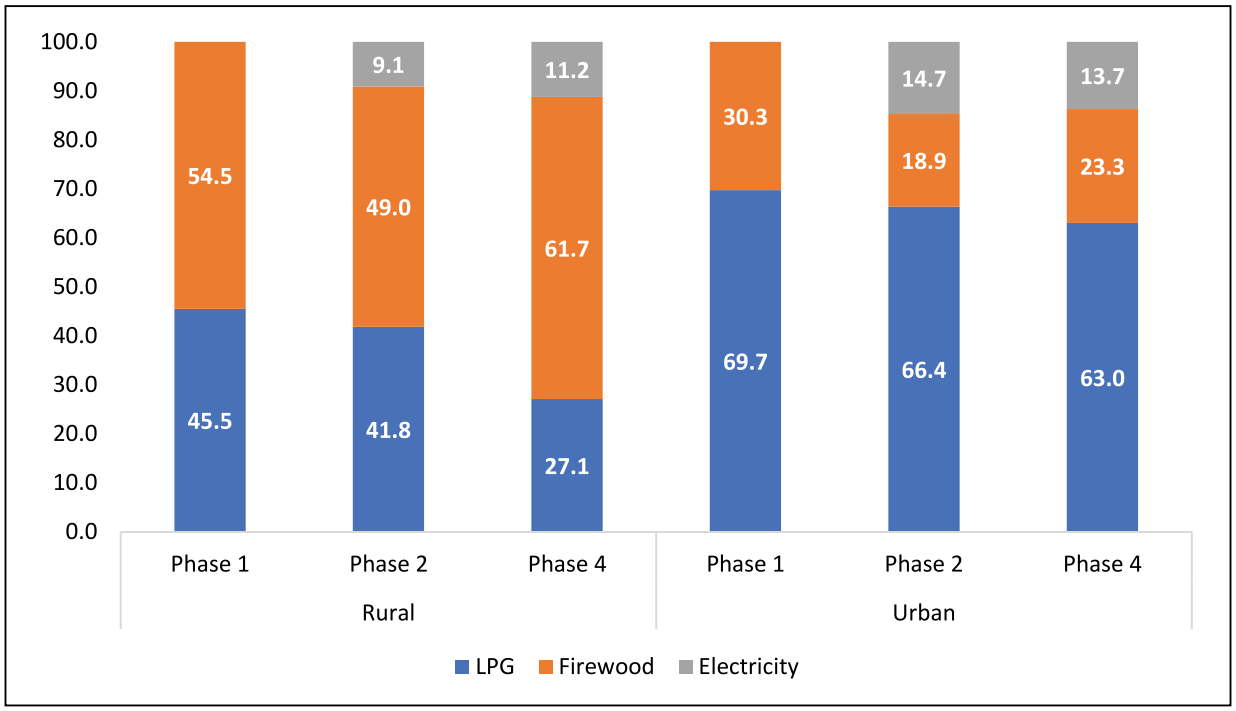


Data Source: IRADe-WACN e-cooking diary Nepal, 2021

Figure 13 highlights a significant reduction in the use of firewood and LPG stove after the introduction of EPC in the households. For instance, LPG was used for 78.5%, 88.9% of heating events in phase 1, in rural and urban location respectively. LPG usage for heating events in phase 4 reduced to 49.9% in rural and 55.7% in urban location. Likewise, the use of firewood for heating events decreased both in rural and urban location in phase 4 as compared to phase 1. Under phase 4, EPC has been used for 38.8% of heating events in rural areas and 32.5% in urban locations. 29% in phase 2, and further, its share in total heating events reached 35% in phase 4. The above finding suggests that EPC use by community members reduced the overall cooking energy demand.

Figure 14 presents the percentage share of cooking stoves LPG, firewood, and EPC in community heating events over cooking diary phases. Together, these three stoves/appliances have nearly 94% share in total heating events in phase 1 and phase 2 and 93% in phase 4. Figure 14 suggests that the share of EPC in the total energy consumed by households (for LPG stove, TFS and EPC) was 9.1% and 14.7% in phase 2 which increased to 11.2% and 13.7% in phase 4, in rural and urban location respectively. It also suggests a decline in the share of LPG usage over the phases 2 and 4, both in rural and urban location.

Figure 14 Share of stove/appliance in energy consumed for cooking (in %)

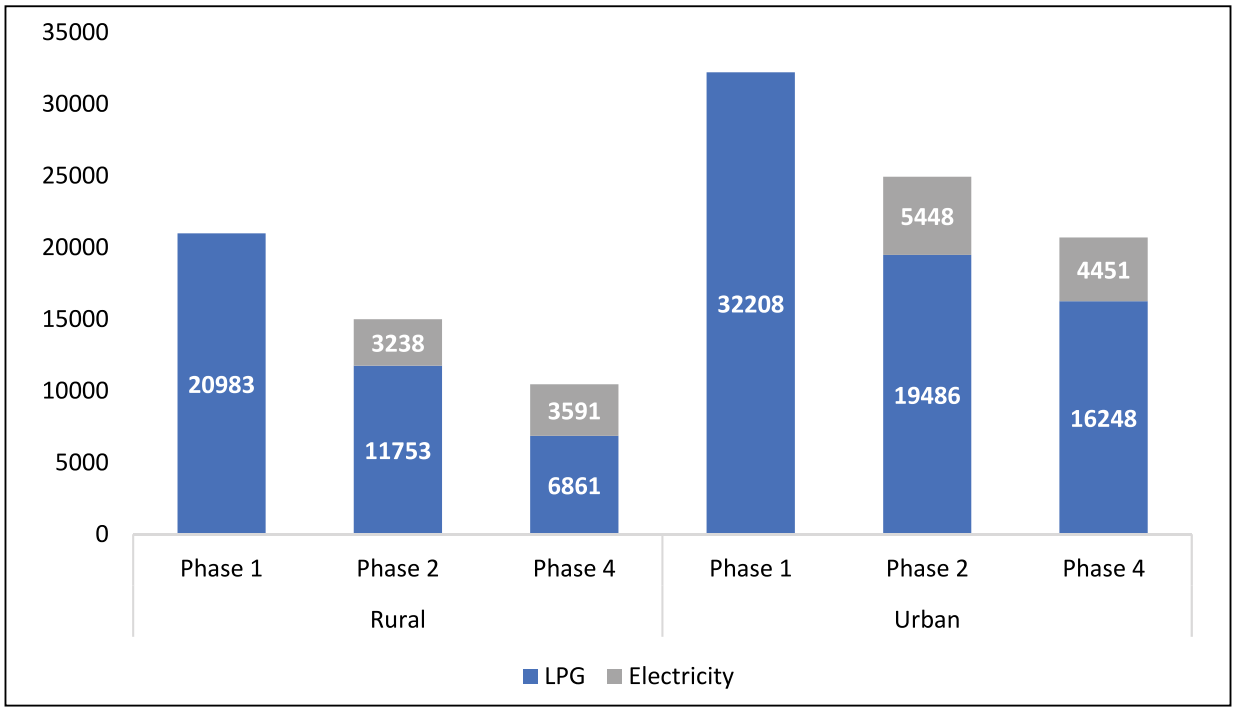


Data Source: IRADe-WACN e-cooking diary Nepal, 2021-22 and authors calculation

Changes in the energy consumed per cooking fuel have a direct impact on the cost of cooking. A 14.2 kg LPG cylinder costs NPR 1575 in Nepal. The calorific value of an LPG-filled cylinder is 710 MJ (using table 9). So, per MJ, the LPG price in Nepal currently is NPR 2.22. The prevailing

electricity price in Nepal is nearly NPR 10 per KWh (though there are tariff slabs). So, per MJ electricity price in Nepal comes to NPR 2.8. Firewood is collected fuel and does not incur a monetary cost. However, labour and drudgery of women in collecting firewood cannot be ignored from the policy perspective. Using LPG and electricity price per MJ and figure 12, fuel stacking costs have been presented in figure 15. The cost analysis suggests that compared to phase 1, in phase 4 rural and urban households saved 50% and 35% respectively, on their combined cooking fuel costs. The introduction of EPC had enabled households to save cooking fuel costs.

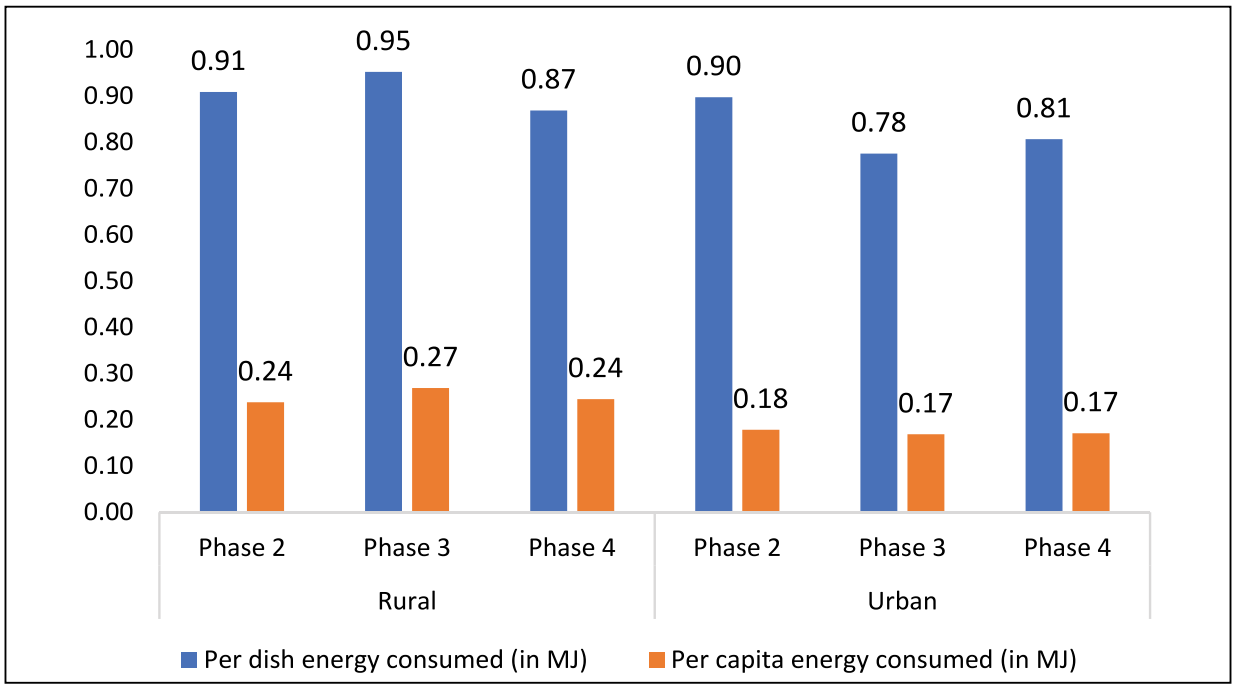
Figure 15 Cost of stacking fuel (in NPR)



Data Source: IRADe-WACN e-cooking diary Nepal, 2021 and author's calculation

The team collected daily electricity consumption data using sub-meters and weekly LPG and firewood consumption quantity. Therefore, cooking diary energy consumption data cannot be used to calculate the average energy consumption for a particular dish. Hence, we have analysed the average per capita energy consumption for dishes cooked on EPC (in MJ). Per capita, energy consumption has been calculated using energy consumption (amount of fuel x calorific value) divided by the number of people cooked for. Figure 16 below presents per dish and capita energy consumption (in MJ) for dishes cooked on EPC. The average energy consumption per capita for cooking on EPC was found to be higher in rural households than urban. Also, the average energy consumption was higher for rural households in phases 2, 3, and 4.

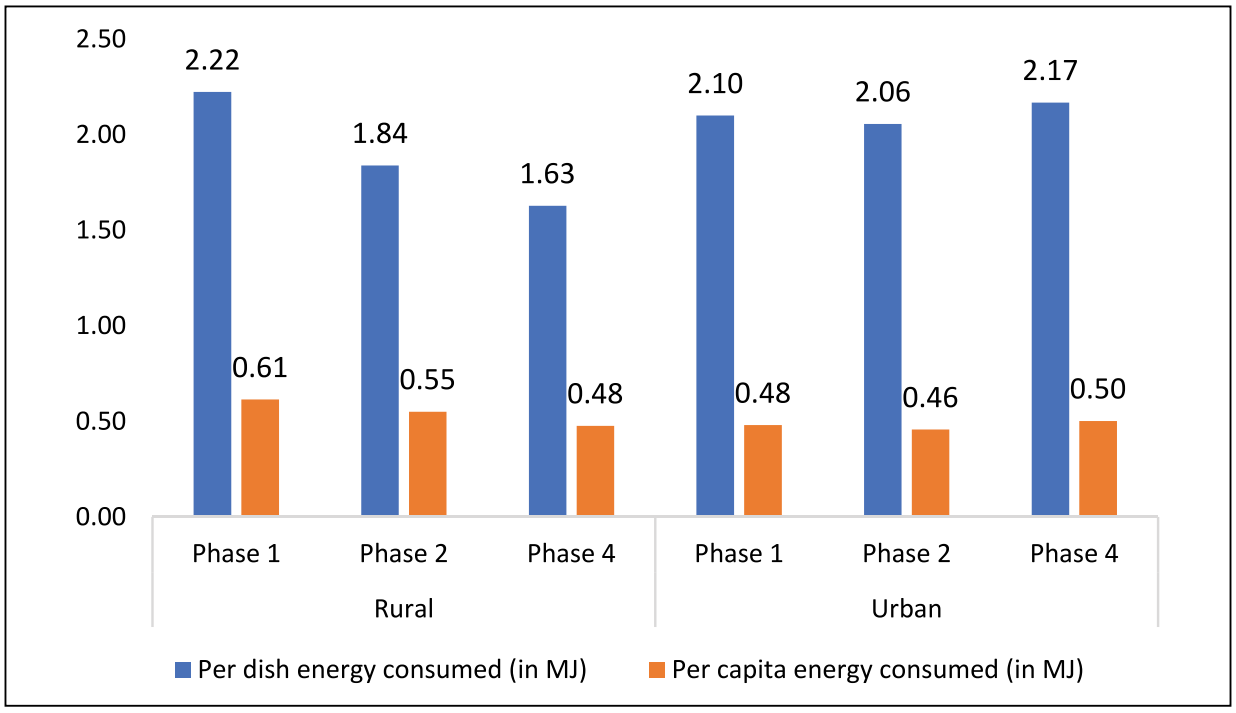
Figure 16 Average per capita energy consumption for dishes cooked on EPC



Data Source: IRADe-WACN e-cooking diary Nepal, 2021-22 and author's calculation

We calculated the average per capita energy consumption (in MJ) for dishes cooked on an LPG stove (Fig 17). Figures 16 and 17 show that the average per capita energy consumed (in MJ) is less for EPC than LPG. Among the commercial fuels, the findings in figures 15-17 indicate the EPC is more economical and efficient than LPG.

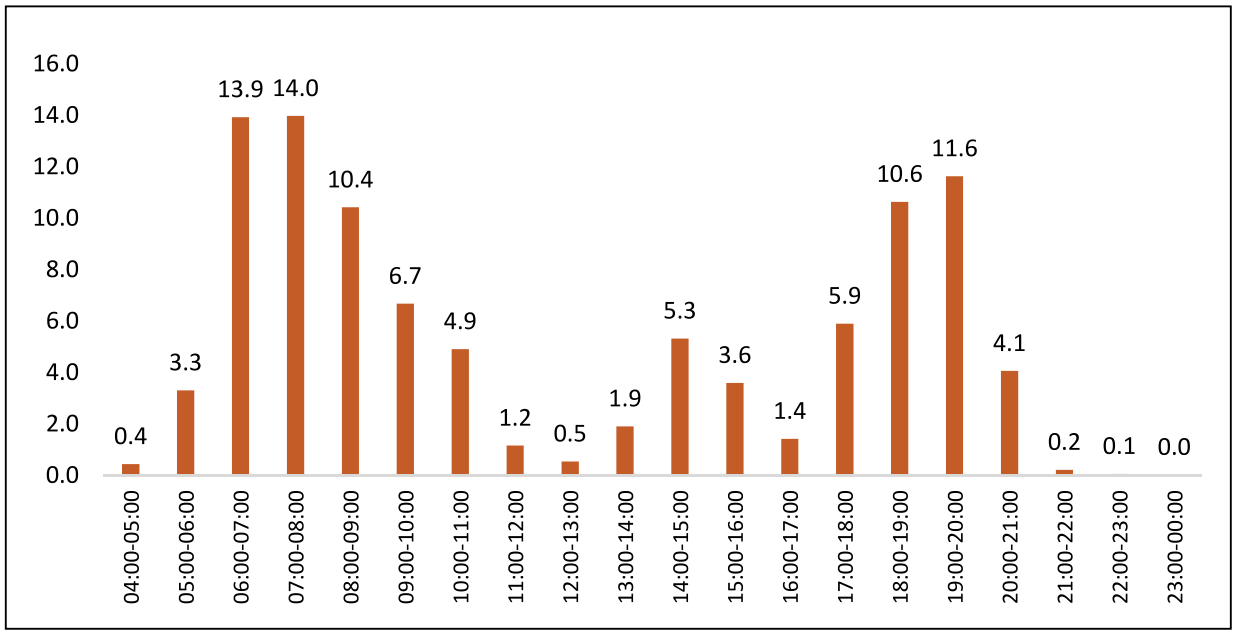
Figure 17 Average per capita energy consumption for dishes cooked on LPG



Data Source: IRADe-WACN e-cooking diary Nepal, 2021-22 and author's calculation

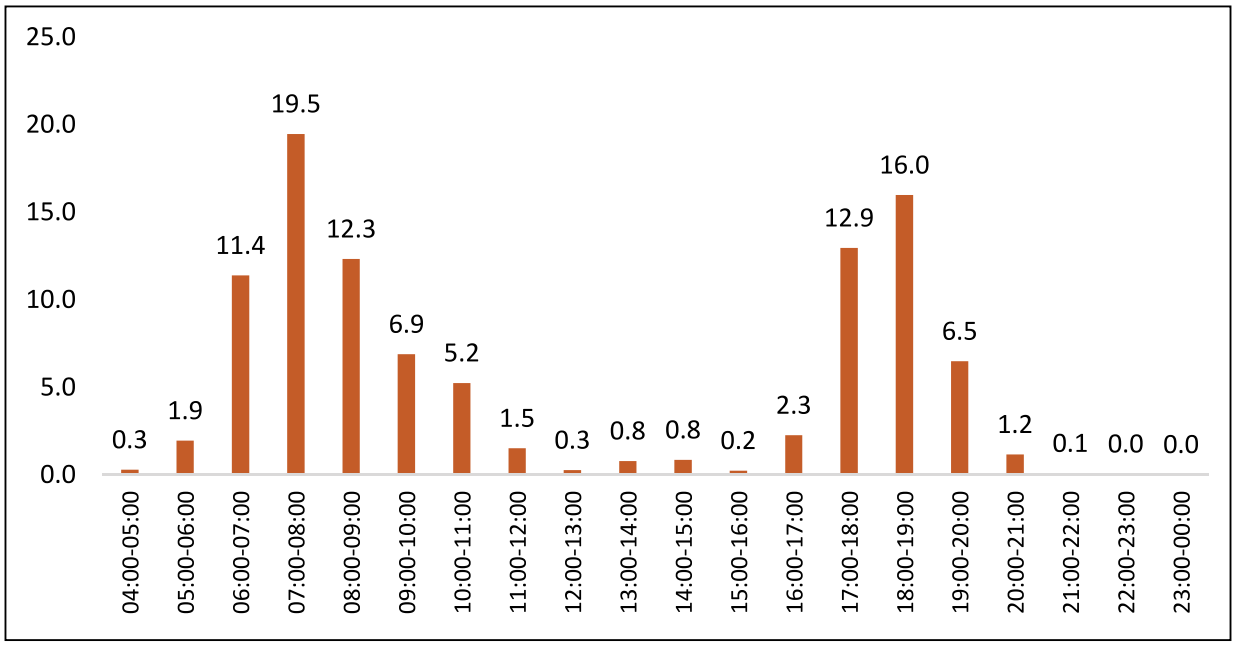
To promote e-cooking, it is important to know the time of cooking. This understanding will help facilitate uninterrupted quality electricity supply to households for a better e-cooking experience. Based on the data collected through the cooking diary, figure 18 presents all the heating records of phases 1,2, and 4 on an hourly scale, in a 24 hours format. Figure 19 illustrates the EPC heating records of phases 2,3, and 4 on an hourly scale.

Figure 18 Percentage distribution of heating events for Phase 1, 2 and 4 on hourly scale



Data Source: IRADe-WACN e-cooking diary Nepal, 2021-22

Figure 19 Percentage distribution of heating events on EPC for Phase 2, 3 and 4 on hourly scale



Data Source: IRADe-WACN e-cooking diary Nepal, 2021-22

Figure 18 and 19 reveals that 6:00-9:00 (morning) and 17:00-20:00 (evening) are the participant households' peak cooking hours. Therefore, to promote e-cooking and improve user's experience, it is important to ensure reliable quality electricity supply during peak cooking hours.

3.3 Finance mechanisms data

The selected EPC model for this study costs around NPR 19,000 (USD 157) in Nepal's local market, is too expensive for many consumers to pay upfront. However, there are EPC models available from other brands for a price as low as approximately NPR 5600 (USD 46.25)[2]. Many poor consumers need access to affordable consumer financing options or some other innovative financing mechanism to support them with upfront capital for acquisition of EPC. To understand the affordability challenge and how it could be addressed, a financial mechanism was integrated into the study to unravel the nuances and complexity of the financial mechanism.

Financial mechanism envisaged in this study consists of part payment by the participants for the EPC provided by the project fund. Each participant receiving EPC were asked to pay 15% of the capital cost. To spare the household from the burden of onetime payment and understand their repayment discipline, they were asked to pay 15% of the capital cost in fixed monthly instalments over three months (phase 2, phase 3, and phase 4). It was found that all the 80 households who received EPC paid 15% of the EPC cost upfront in a single payment instead of fixed monthly instalment as envisaged in the project. From the exit surveys, it was found that almost 46 percent of people agreed to pay the full cost of EPC upfront, and merely 6 percent of people said that they could not pay for the EPC. Other 48 percent are willing to pay for the EPC in instalments. This suggests that consumers are willing to pay for clean and efficient cooking appliances.

The upfront capital cost of EPC would be a challenge in Nepal for large-scale adoption. Consumers' payment behaviour needs to be examined in detail with a more focussed study objective to design a suitable financial mechanism for EPC financing. It would be helpful to learn from the experiences of microfinance institutions (MFIs), consumer finance institutions (CFIs), or cooperative credit societies (CCSs) who have experiences of financing small amount loans for expensive household appliances to design a robust EPC financing mechanism.

3.4 Stakeholder interactions

The issues of clean cooking are of utmost concern to citizens, governments, civil societies, etc. Diverse stakeholders often have different perspectives, interests, and agendas about the adoption, impacts, and scaling-up of electric cooking. The study identifies and categorizes the following significant stakeholders for the EPC based cooking:

2 Source: https://www.daraz.com.np/electric-pressure-cookers/

- E-cooking appliances, manufacturer, distributors, and retailers;
- Electricity producer and distributor companies;
- Financial institutions, national and international donor agencies;
- End-user households, civil societies, research, and training institution;
- Government (local, sub-national and national) and government implementation agencies working in energy and related sectors.

All the stakeholders are important for the large-scale adoption and sustained use of EPC for cooking. Transition to EPC requires a strong willingness to collaborate and develop a shared vision. Sufficiently aligned stakeholders can undertake joint action, share experiences, and contribute to the transition. During this study following stakeholders were consulted:

I. **EPC distributor/retailer in Kathmandu, Nepal**: EPC is a new product for the Nepalese market. Phillips EPC is an expensive product compared to other brands available in the market. As the sales are not very high, they do not keep the product in their stock. IRADe also faced a challenge to procure 80 EPCs. Retailer could not supply all the 80 EPCs as they had to import the product from Singapore. They demanded 50 percent advance payment to order the product. It took almost 1 month for them to deliver the product after the order was placed with advance payment.

II. **Civil societies in Nepal working at the grass root level**: EPC appeared to potentially meet a major portion of Nepalese households' cooking needs. However, affordability is a challenge for a large section of the population. Availability of EPC to the consumer at their convenient locations and an ecosystem around it for maintenance (in case of wear or tear) needs to be developed by distributors and retailers to instil confidence among the consumer for adoption.

III. **Deputy Mayor of Banepa municipality**: There is a broad consensus that replacing (or at least reducing the demand for) traditional firewood and increasing the demand for clean/efficient cooking alternatives could positively impact Nepal. However, EPC-based cooking is still in its infancy. It requires a lot of working with end-user households to raise awareness, impart training, and build a conducive transition environment to electric cooking.

IV. **Ward Chief of Timal rural municipality**: The basic minimum requirement for persuading households to switch to EPC is the availability of quality electricity (sufficient voltage), especially in the morning and evening (cooking time for the households). Electricity producers and distribution companies have a significant role in ensuring quality electricity to the households.

V. **Secretaries and members of credit-saving cooperatives in Kavrepalanchowk**: Affordability of EPC at the current market price to a large section of households in Nepal is a challenge. Financial institutions, national and international donor agencies may come together to develop a solution to address this critical challenge credit saving cooperative may work with the distributors to finance the product.

VI. **Local Bankers in Kathmandu**: Bank officials suggested that the loan amount required by a customer for EPC purchase is small, which may not be suitable for a bank to finance. Banks generally offer loans against collateral posted by borrowers. Each loan involves a fixed cost - loan processing charge related to due diligence and documentation.

The stakeholder's consultation with policymakers will be carried out during the workshop. The team received good support from all the stakeholders in the research work.

3.5 Scaling up electric cooking

The finding of this study reflects that households use EPC for partial cooking, along with other cooking fuels, such as LPG and firewood. Fire-based cooking using firewood has been the most defining characteristic of household cooking for ages. Over the past many decades, the focus in the clean cooking sector has been on the transition from biomass/firewood to improved cook stoves (ICS) or gas (LPG, or biogas) based cooking. Electric cooking is a recent and emerging phenomenon in Nepal. This means that transition to electric cooking requires increased efforts to accelerate transition. The requirement of a good quality electricity connection in the kitchen further adds to the complexities.

This study found that households with electricity connections in the kitchen use EPC daily to cook most foods during lunch and dinner. The study finding regarding EPC usage by participant households is very encouraging and suggests that transition to electric cooking could be rapid provided the right conditions are in place. However, familiarity with cost-effective alternatives, and better adapting solutions to people's actual behaviours and cooking preferences, is critical for transition. The study also found many other significant challenges that inhibit the large-scale uptake of electric cooking.

- **Need for stacking**: EPC in its current form is not a complete cooking solution that could be suitable for cooking all the local foods. A household with EPC still needs to rely on other more flexible e-cooking device (such as an efficient induction stove to supplement their cooking requirement.
- **Cultural and behavioural barriers**: Electric cooking is a new concept for households in Nepal. All important stakeholders require a continuous effort to create awareness and provide an enabling environment for the e-cooking transition.
- **High upfront cost**: Affordability of a good quality EPC/e-cooking device is a challenge for most poor households in Nepal.

To upscale electric cooking in Nepal, the following steps need to be prioritized. The government needs to set clear goals to transition to electricity. Better access to finance for EPC acquisition, a more robust e-cooking supply chain, widespread and reliable post-sale service network would help scale up the adoption of e-cooking. Interventions in the cooking sector should recognize the key role of cultural and behavioural factors in accelerating or slowing down the adoption rate of electric cooking technologies. Policies and incentives could be introduced to make electric cooking more affordable to a large section of population.

4. SOCIAL INCLUSION

In the pilot study discourse, efforts to promote social inclusion have been a significant concern of the research team. For this purpose, the team devised strategies such as group device demonstrations, participant cooking programmes, for maximum participation in the communities without any social barrier such as their age, gender, religion, disability, or economic status. Throughout the various phases of the study, active inclusionary steps to facilitate such participation were taken by the team and support staff. The study structure provided equal opportunities, thus welcoming equality and promoting social inclusion.

The project was implemented in a rural community along with an urban community to include the marginalised people of remote areas. The people of Timal are geographically marginalised and are poor compared to the urban communities. Because of the remote location, residents of Timal are disadvantaged as they are less likely to be reached out by awareness campaigns and thus remain unaware of the latest technologies available in the market. Transportation of LPG cylinders is challenging for the Timal community; therefore, this project aimed to spread awareness and benefits of electric cooking, especially in the most vulnerable area. The beneficiaries were randomly selected from the registration data irrespective of age, sex, race, ethnicity, religion, income, etc. The selected beneficiaries were a mixture of youth and older adults, working and non-working women. The people actively encouraged each other to use the electric pressure cooker; the youth helped the elders to operate the EPC in their communities.

Figure 20 Community lunch prepared on the EPC during the training session

The training sessions and demonstration activities focused on increasing social interaction and saw active participation from all the beneficiaries. People were motivated to help other community members and elders operate and explore the device. The beneficiaries prepared lunch for the community members during the live training sessions, thus promoting community harmony. This helped reduce the likelihood of external or social influences impacting the project. To ensure that the learnings reach other members and encourage further uptake of e-cooking, the team motivated the beneficiaries to share their experience of electric cooking with those who did not receive an EPC under the pilot program and recommend the device if found useful.

Figure 21 Community learning; member of the urban community helping other participants

5. GENDER

Women and girls play the primary role within the household cooking sector. Generally, women and girls shoulder house-care activities; therefore, they are disproportionately affected by lack of access to clean cooking fuel. IRADe has been working for gender mainstreaming since its inception. Given our experience so far, we know why gender balancing is important and what they can achieve. Women were included in the design, implementation, and monitoring of the project activities. Women were involved right from the beginning as a researcher to conceptualize the project idea to implementation and execution of project activities.

The core project research team had a balanced mix of males (3 males) and females (2 females). To support the lead organization research team, two female consultants from Women Awareness Centre Nepal WACN, Nepal[1] were part of this study. These local consultants were responsible for liaising with local policymakers, government energy departments, and relevant stakeholders in Nepal. With the support from lead organization researchers, they also coordinated the implementation of the project activities. Local consultants were responsible for organizing the community members for this pilot project and monitoring the field activity's progress. In addition to the local consultants, four females were involved as local enumerators to carry out surveys and maintain e-cooking diaries.

The study was implemented in the Kavrepalanchok district of Nepal, with two (1- rural and 1- urban) women communities working to promote social, economic, and gender empowerment. Community participants well perceived the intervention. Many women stated that male members of the households are also happy to cook with EPC. As per our assessment, there are no unintended or negative consequences of using electric cooking on the gender dynamics of the household.

1 WACN is a Nepal based not-for-profit organisation that works to create a culture of self-reliance among women, children, and disadvantaged groups through the development of their inherent qualities.

6. NEXT STEPS

With surplus hydroelectric electricity generation capacity and electrification of households, Nepal could strive to transition its cooking sector from traditional biomass and LPG to electric cooking. The transition would dramatically reduce GHG emissions and eradicate indoor air pollution. To this aspect, the current study brings together the EPC users' experience, social and cultural aspects, financial viability for its adoption. The research output will create awareness regarding e-cooking to encourage mass adoption. It will also provide an important input to the e-cooking device manufacturer to adapt their device according to the cooking needs of the different socio-economic and culturally diverse groups for more extensive adoption. It has the potential to influence energy policy primarily related to cooking.

Dissemination and communication of research results is an important exercise to achieve the desired outcome. The effective and targeted dissemination of results ensures that key stakeholders, including policymakers, understand it. The study result will be disseminated through workshops and journal paper publications. The dissemination workshop will bring together policymakers, women groups, electric cooking appliance suppliers/manufacturers, civil societies, researchers, and users to inform study findings to accelerate EPC adoption. The result of this project will also be leveraged to sensitise the policymakers and regulators in the South Asia region. Identifying potential international and national funding agencies would be the next step towards developing the project. The final project report will be shared with the identified funding agencies, and opportunities for scaling up this study in DFID supported South Asia region countries will be discussed. A research plan will be prepared and submitted to the interested funding agency. The study has prospects for scaling up in Nepal and other DFID countries like Bangladesh.

7. CONCLUSION

Electricity has become the primary energy source for lighting; however, electricity as cooking energy is still in its infancy in Nepal. In the recent past, electric cooking has started getting policy traction, as evident by many policy documents released recently by the national government of Nepal. The current study has generated a detailed understanding of the adoption of EPC in Nepal's socio-economic and cultural context.

The study found that given the availability of EPC with the households, all of them used it for cooking dishes in both rural and urban areas. Uptake of electric cooking was significant and sustained, with the EPC accounting for 29% of all heating events across both communities in phase 2 and 36% in phase 4. 100% the participant households agreed that EPC is an efficient device, and they would like to continue cooking with EPC.

The menu did not change significantly after the introduction of the EPC, indicating that the EPC was compatible with the local menu and cooking practices. The EPC was predominantly used to cook rice which may have been a factor in the increase in rice cooking during the pilot. The EPC was also frequently used to cook beans and pulses-rice together (using a separator). Households preferred not to cook dishes like dhido and Sel roti in the EPC, using either firewood or LPG instead. EPCs were also not used for the daily making of tea, with mainly LPG and sometimes inductions stoves preferred.

It was observed that the household used to cook major food items between 6.00 am to 9.00am (breakfast, lunch) and 5.00 pm to 8.00 pm (dinner). Load shedding was not an issue for e-cooking in the survey households. The reliability of grid electricity supply was good in the study location and power cut was reported only 2-3 times a month for 10-20 minutes. However, the electricity supply (voltage) quality is an issue to run the e-cooking device and when power cuts occurred, 50% of participants reported the interruption forced them to switch to other cooking stoves/appliances.

8. RECOMMENDATIONS

Status of electricity supply: Electricity is not viewed as a complete solution for cooking because reliability and quality of electricity continue to be challenges for most households in Nepal. A household may not be fully assured that they can cook with electricity every day either because of load shedding – availability of electricity at the time of cooking or low electricity voltage supply. Electricity supplies are also interrupted during bad weather conditions or damage to the local supply infrastructure. Poor households currently using freely available biomass in their nearby vicinity may not find electric cooking affordable. An assessment of the electricity supply status to support e-cooking appliances in households will have a long-term implication for adopting e-cooking in Nepal.

Upfront capital cost of e-cooking device: Affordability of EPC is one of the most significant barriers to its large-scale adoption in Nepal. To purchase EPC, there is a need to develop an innovative financing solution, especially for poor households.

Ecosystem development: Availability of e-cooking devices and infrastructure for repair and maintenance in the nearby vicinity is required to gain consumer confidence. It emerged from the study that many consumers were apprehensive about EPC because they feared that it would be difficult for them to get it repaired in case of any damage. Expansion of distribution and retailer store networks would build the required ecosystem for EPC adoption.

Capacity building and awareness creation: E-cooking is a new technology for Nepal households. Developing strategies for promoting e-cooking and campaigns for consumer awareness and adoption of e-cooking appliances and practices will provide much needed support for the adoption of e-cooking at a large scale.

Technological innovation in the existing e-cooking device: Evidence from the pilot study suggests wide acceptance of EPC by households both in rural and urban areas. The majority of households found that electricity is an efficient cooking device. However, EPC in its current form is suitable for partial cooking, not a complete cooking solution. EPC owners still have to possess another cooking appliance to meet the cooking needs- the need for stacking limits the adoption prospects of EPC. Functions written in local languages will also be helpful for the cook.

Favourable Policy supporting e-cooking: The government of Nepal has to play a significant role in promoting e-cooking for both rural and urban households. The penetration of electricity is growing in both urban and rural areas. But mere access to electricity will not be sufficient for a household to switch to e-cooking. Additionally, following steps could be taken by the government to address the acquisition cost of the e-cooking device for the households:

- To reduce the cost of e-cooking device acquisition, government could provide a targeted subsidy for poor households.
- Government may procure e-cooking devices and distribute it to the households. The procurement price of the e-cooking device may drop due to the aggregation of demand.

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APPENDIX I- PROJECT EVALUATION FORM

What went well?

The most remarkable thing during the pilot project was the people's response to the new cooking device. Most of the people were unaware of the Electric Pressure Cooker. They conceived the EPC to be no better than a rice cooker, but we could change their perception and convince them to include EPC as a major cooking device in their kitchen with the dedicated training and workshops. The participant feedback about the device was a boost to the project. The team was pleased with the continuous effort of the participants to fill in the cooking diaries daily.

The communities' feedback from previous interventions highlighted a lack of proper training. Hence, we focused on providing regular training to the participants and the enumerators. The research team maintained consistent monitoring of the EPC usage and provided quick responses to participant's queries. The data collection strategy of handing out the printed cooking diaries to the participants helped us collect data even from the remote areas where online platforms could not be used because of poor or no internet connection. The weekly collection of the printed cooking dairies and uploading the data on the online platform (SurveyCTO) helped the off-site team regularly monitor the data. Household visits helped the team precisely understand individual EPC handling and operation problems.

Although the project activities do not require tracking the EPC usage after the exit surveys, we plan to take telephonic participant feedback after a gap of six months to understand their uptake of the device and check its durability.

We appreciate the hard work of the local partners and would extend warm thanks for their dedication to the project. The local partners managed to travel and collect information from each participating household. They sincerely uploaded the data on the platform and helped in organising the events. The research team also did a commendable part and travelled as soon as the COVID restrictions eased. The data management team managed the extensive data sheets and dealt with the missing information.

What did not go so well and why?

The project timelines got affected because of the delay in certain activities due to the COVID restrictions. The people were skeptical about letting the enumerators enter the house to collect information during that phase. There were restrictions to host events in large groups. The remote geography of the rural municipality was another challenge. The rural area is connected to the highway via a small bridge damaged during the flash floods, thus disrupting the only vehicle route to the area. The collection of filled cooking diaries and giving out cooking diaries for the next phase were delayed until the bridge's restoration.

EPC and the technology used in electric cooking is a new concept for older adults, so the elders' faced problems while operating the device initially and took some help from the younger members of the family. Some members cannot read the user manual written in the English language. So individual household visits were organised, keeping the elders in mind. The service center of EPC is located in Kathmandu, so the local field staff had to transport the EPC to Kathmandu for repair as the participants could not take the device to the service center themselves.

This study delivered value undertaking various activities to reach the goals. The participants and the entire team learned and improved during the implementation of the activities. It was a fresh experience for everyone, including the project team members, enumerators, and beneficiaries.

The teamwork and project planning amidst the uncertainties kept the project running along with the support from the MECS team. The participants were very understanding and maintained decorum throughout the project. A few improvements in the device, such as providing more inner pots, the inclusion of Nepali language in the user manual, function buttons in the local language, additional functions such as deep-frying and roasting, can help in the better uptake of the device. The community training programs need to be encouraged with better infrastructure facilities at such centres.

What would you do differently?

Suppose we were to implement the project again. In that case, we will provide induction along with EPC to serve as a complete cooking solution and enable simultaneous cooking by the participants. The team would be more prepared with strategies to cope with issues relating

to the elders and find more technicians nearby so that the repair and maintenance problem is solved. We would have pre-printed the user manual in the local language with instructions for using the EPC for cooking staple dishes.

In the future, if we get similar projects, we would like to invite the rural and urban participants to a shared space for more significant interaction and cross-learning. This was not possible during this project because we had to follow the COVID guidelines and safeguard the people by maintaining proper distancing. We would like to develop more knowledge content like videos of specific recipes using the device to share with the participants. Since the upfront cost of the device is unaffordable for low-income households, we would like to strategize innovative funding mechanisms for such families for equal opportunities and resource gain.

A further technical investigation is needed in the design of the device to suit the local needs. Since EPC is a new device in the kitchen, there is a curiosity to learn and operate the device. It was highlighted during the exit surveys that younger members and men are interested in the device because of the latest technology, but if they would continue to use the device later remains unclear.

APPENDIX II PARTICIPANT FEEDBACK

"I am happy to receive and operate the Electric Pressure Cooker. At first, I thought it would be like an induction with pots, and the electricity consumption would be higher, but on receiving the device, it was different, and the electricity consumption is less."

"Food cooked on EPC tastes very good, as it evenly cooks the food, and I can do other work while the food cooks on EPC. I would prefer electric cooking as it is cheaper than LPG."

–Radhika Gimri, President of women cooperative in Banepa municipality

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"Was very excited about the device's appearance. It looks like a rice cooker but can cook various dishes using one single appliance. The taste and look of food are delicious; cleaning the pot is easy, no need for continuous stirring. Because of EPC, I don't have to worry about keeping an extra cylinder at home."

"I need two EPCs for my house because it takes time to cook on it and cannot cook dishes simultaneously."

–Anita Saptkota, resident of Banepa municipality

"*Initially, I thought EPC would be convenient to cook rice alone. But I cook vegetables and meat as well. Curry chicken and rice cooked in an EPC taste very delicious. There is no problem of smoke like that of firewood."*

"I got confused by so many buttons on EPC, but now I have become comfortable using different functions."

–Hira Maya Tamang, resident of Timal rural municipality.

"I have learned to cook various dishes on EPC now. Expected a separator along with the device for cooking at least two dishes together. Everyone in the house is happy with the food's taste. I clean the pot with a sponge. Cleaning process is easy, unlike the sooty utensils that are used on firewood. I can do other activities while cooking on EPC. I get more time to do my farm work and look after my children and home."-

–Sadiksha Lama, resident of Timalrural municipality

"This a new device for our family, and we were not aware of the benefits of EPC. It looks very interesting and has different functions for cooking. I have attended the cooking workshops and have learned to operate the device. The food tastes better than I had expected. I make videos during the cooking sessions, which helps my wife operate the device later at home. We are happy with the overall device and will continue using the device for cooking."

–Balram Magar husband of Maili Magar from Banepa municipality

Figure Local food items prepared on EPC while training


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