Gender-Responsive Electric Cooking in Nepal

ENERGIA
INTERNATIONAL NETWORK ON
GENDER & SUSTAINABLE ENERGY

6 May 2021

Cover photo: Ms Nirmala Lama proudly shows her rice cooker. Mangaltar, Kavre, Nepal. Photo by Indu Sharma.

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PREFACE

This report presents the main findings of an empirical study that is part of a project entailing both evidence building and stakeholder networking and engagement. The project is a collaboration in the area of gender and modern energy cooking services between ENERGIA and the Modern Energy Cooking Services (MECS) programme and is managed by Loughborough University. ENERGIA is the lead partner for MECS in Nepal, and it is coordinating, managing, and providing technical leadership to the one-year research project on gender-responsive electric cooking.

The MECS programme is a partnership between researchers, innovators, policy makers, and ESMAP. It draws on expertise and work from around the world to co-construct new knowledge with practitioners and the private sector. It is led by Loughborough University, UK.

MECS is a five-year programme funded by UK Aid (DFID), which aims to spark a revolution by rapidly accelerating the transition from biomass to clean cooking on a global scale. By integrating modern energy cooking services into energy planning, MECS looks to leverage investment in renewable energies, particularly, electricity access—both grid and off-grid—to address the clean cooking challenge. Modern energy cooking is Tier 5 clean cooking, and, therefore, MECS also supports new innovations in other relevant cooking fuels, such as biogas, liquefied petroleum gas (LPG), and ethanol. The intended outcome is a market-ready range of innovations (technology and business models) which lead to improved choices of affordable, reliable, and sustainable modern energy cooking services for consumers. We seek to have the MECS principles adopted in the SDG 7.1 global tracking framework and hope that participating countries will incorporate modern energy cooking services in their energy policies and planning.

The other partners of the programme are Practical Action Consulting-Nepal, which has expertise in implementation and research of clean cooking programmes in Nepal and 60 Decibels, an impact measurement company with wide international expertise in the field of energy access and other sectors, including agriculture and financial inclusion.

Acknowledgements

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Support for graphs: Julie Marchand

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EXECUTIVE SUMMARY

Transition to clean cooking is necessary for protecting the health and lives of the 2.7 billion people who suffer from the health and environmental impacts of existing cooking practices. As cooking is typically a task that women engage in, understanding the barriers to and opportunities of a transition to electric cooking from a woman's perspective will expand our understanding of the uptake and use of electric cooking appliances. Taking a gender perspective, we look at how decision-making around purchase and use is distributed across the sexes and how access to resources and aspirations influence the adoption of electric cooking by disaggregating between men and women as both customers and users of electric cooking appliances.

This report presents the findings of a research study that was performed in Nepal. It offers insights into how gender issues and gender norms influence electric cooking uptake by broadly exploring gender perspectives based on user experience with electric cooking in Nepal. The study was set up to identify key gender issues and explore opportunities for improving the gender-responsiveness of the projects and programmes on electric cooking, as well as for building insights for future gender-responsive research and data collection on electric cooking. This report brings together evidence and synthesises findings with a focus on gender issues and gendered differences in the uptake, use, and benefits of electric cooking.

This study looks at both induction stove and rice cooker as the main electric cooking appliances in Nepali households. The induction stove programme in the Temal municipality, Kavre district was central to the study.

Methodology

The study was performed by a consortium led by ENERGIA, and empirical data was collected by Practical Action Consulting (PAC)-Nepal and 60 Decibels across two studies using the following tools:

- 302 phone surveys in 194 households (Banke, Kavre, and Sindhuli districts);
- 8 key informant interviews (KIIs) (Kavre district);
- 7 focus group discussions (FGDs) with 61 participants (Kavre district); and
- 50 household surveys (Kavre district).

These methods were selected to complement one another and to draw lessons from the differences in their application to the study of gender issues.

Although the FGDs allowed for inputs from non-users of electric cooking appliances, the respondents were from households with access to electricity.

Findings

The highlights of the findings of this study that could potentially inform decision-makers to consider gender in future programmes and policies are presented by specific areas: information and awareness raising, affordability, and gender equity.

In developing gender-responsive information and awareness approaches to electric cooking, insights into the channels, sources, and content of information and decision-making can lead to recommendations on developing information packages and approaches that address the specific needs of both men and women.

Findings, discussion and recommendations

Decision-making is often shared between men and women, in both male- and female-headed households, but household budgets are mostly controlled by men. Additionally, women were not reached to the extent men were by official information channels, indicating that gender-responsive approaches are needed both to enhance uptake and to optimise the use of induction stoves by women, who are the main cooks.

These findings lead to the following recommendations for the development and implementation of awareness and information strategies. Firstly, the approaches should ensure that information reaches women through the channels that they mostly use and appreciate. Demonstrations, including hands-on experience of cooking a range of dishes, and information dissemination through local informal sources and women's networks should be part of such approaches. The effectiveness can be enhanced through organising events for same sex groups, allowing and ensuring attendance of both men and women. Furthermore, both men and women need to be targeted, both for decision-making around uptake and for supporting use by both men and women. Such targeted information should resonate with either or both sexes.

Inclusiveness and affordability

The findings on inclusiveness and affordability are related mainly to expenditures, payments and loans, including within-household dynamics:

- The induction stove programme reached households that are relatively well off compared to the Nepal average. Rice cooker users are also relatively well off.
- The lowest income households were not reached through the information channels of the programme.
- Loans were taken by lower middle income group households to purchase induction stoves. Only women affiliated with a savings and credit group took loans. The savings and credit groups or women's self-help groups supported access to finance as well as experience sharing on the use of the system.
- Women's control over the (smaller) budget for the rice cooker is higher than over the (larger) budget for the induction stove package. Similarly, they have a high level of control over the day-to-day budget for cooking fuels as they often contribute to the payment of electricity bills and decision-making regarding LPG refills.

Shifting gender norms

Cooking is a task with a strong gendered role pattern, large time implications, and also a relatively high (potential) household budget component so that it can play a crucial influence in shifting gender roles, gendered responsibilities, and decision-making.

The finding that men use electric cooking appliances more frequently than traditional stoves, and even LPG, suggests that electric cooking may be a step towards changing gender roles and norms. Also, the fact that a number of male respondents chose to identify themselves as

main users of the induction stove reflects an emerging trend that using the induction stove is something that men can do and it is not exclusively in the realm of women. Despite such shifts, however, the evidence did not indicate structural changes in agency and empowerment, which may take time to happen.

These findings imply that information and awareness activities should consciously target both men and women.

Selection of sites for increasing programme impact

The impact of cooking on electricity will depend on the fuel or technology it is replacing. Replacing biomass with electricity has several benefits, such as an improvement in air quality and a reduction in the time spent on both fuel collection and cooking.

This provides evidence that, if electricity replaces firewood or charcoal for cooking, the benefits of improved air quality, improved health, saving in cooking time, cleaner kitchen and pots, and less time on fuel collection are going to be considerably bigger than in substituting LPG.

Time saving is the highest in areas where cooking is highly dependent on fuelwood combined with scarcity of fuelwood. In these areas, the provision of alternative fuel for cooking is essential to achieve development impacts, especially compared to areas where electric cooking replaces LPG.

Increasing the use of electric cooking needs a holistic approach by upscaling not only the current users but also the grid capacity and reliability. The limited offer of the induction stove by the Community Rural Electrification Entity (CREE) programme due to the limited electricity supply corroborates this.

Suggestions for further research

We recommend conducting further research as follows:

- A detailed study of cooking practices to include time spent by fuel and stove type and gender roles in cooking.
- Electric cooking for productive uses. As women identify entrepreneurial opportunities in small-scale cooking, it potentially has substantial benefits in gender outcomes.
- Women's engagement in the electric cooking market supply chain to build on specific marketing and social mobilisation skills, increased adoption rates, sustained use, and project effectiveness.
- How flexible payment modalities might be designed and targeted to achieve higher levels of uptake among low income customers.
- Differences between male-headed households and female-headed households in access to electricity and electric cooking appliances.
- Characteristics of pots and stoves that may increase the use of induction stoves by users. In our study, many informants mentioned about the induction stove not being appropriate for cooking several traditional dishes, pots not being of appropriate size, and the number of pots being high.
- Cooking on an infrared stove. We studied induction stoves and rice cookers as complementary forms of electric cooking. Infrared stoves may provide a different balance

of costs (investment and use) and benefits (utility, availability of utensils in different sizes, and for cooking traditional dishes) and safety.

ABBREVIATIONS

ABF	Ajummery Bikash Foundation
AEPC	Alternative Energy Promotion Centre
CREE	Community Rural Electrification Entity
FGD	Focus Group Discussion
GESI	Gender Equality and Social Inclusion
KII	Key Informant Interview
MECS	Modern Energy Cooking Services
PAC	Practical Action Consulting
PPI	Poverty Probability Index®
NRs.	Nepalese Rupees
SHG	Self-Help Groups

GLOSSARY

Key concepts

Access to energy services: the ability of an end user to utilise energy services (such as lighting, cooking, motive power, etc.) that require an energy appliance and suitable energy supply. Access to energy services does not necessarily imply control or decision-making

Access to energy supply: the ability of an end user to utilise an energy supply that can be used for desired energy services. Energy access is taken to refer to both physical availability of supply and ability to use the supply. Access to energy supply and access to appliances are necessary for access to energy services

Access to resources: the ability to use and benefit from specific resources (material, financial, human, social, political, etc.), although this can be curtailed if there is no control over resources (see below: Control over resources)

Agency: the human capability to exert influence over one's functioning and the course of events by one's actions. It is the ability of a person, or agent, to act for herself or himself

Appliance: technology that converts energy supply into energy service

Control over resources: entails ability to make decisions over the use of resources, including whether others have the right to use or enjoy the benefits of a resource or not

De facto women/female-headed household: households in which the male head of household is absent and outside the village for a considerably long period (mostly in-country or outside country job or business and sometimes for education, etc.) as opposed to de jure women-headed households

Economically active: persons who are making cash/direct income from service, business, cash crop farming, etc.

Empowerment: expansion in individuals' ability to make strategic life choices in a context where this ability was previously denied to them

Energy access: physical availability of an energy supply at household level (for electricity, this implies the presence of a connection to electricity grid or the presence of a solar system within the household and for LPG, this implies the presence of stove and initial cylinder in combination with refill opportunity in proximity to the household with local definition of proximity)

Equal opportunities: the absence of barriers to economic, political and social participation on the grounds of sex and gender and other characteristics

Gender: the socially-constructed attitudes, values, roles and responsibilities of women and men, in a given culture and location, which are learnt and change over time

Gender approach: the design and implementation of policies and projects in such a way that they are more gender-sensitive in their objectives, implementation and outcomes

Gender equality: the condition in society when both men and women are attributed equal social value, equal rights, and equal responsibilities, and have equal access to the means (resources and opportunities) to exercise them

Gender goal: the desired state for women and men to be achieved by a policy or project

Gender issues: identification and framing of incidence of gender inequality

Gender-responsive: actions that reflect an understanding of the realities of women's and men's lives and address the issues, taking into consideration the implicit and explicit social norms

Gender roles: sets of behaviours, activities, tasks and responsibilities assigned to men and women, differentiated according to the cultural norms and traditions of the society where they live which define perception of what it is to be male and female and hence shape identity

Gender sensitivity: the ability to recognise gender issues and the different perceptions and interests of women and men arising from their different social locations and gender roles

Legally/de jure women-headed household (or legally/de jure female-headed household): households where houses are registered legally under women's name (in some cases, single parents)

Practical needs: requirements that women and men perceive as immediate necessities, such as water, shelter and food

Productive needs: the inputs required for the work done by both women and men for payment in cash or kind, including both market production with an exchange value, and subsistence/home production with actual use value and also potential exchange value

Sex: the biological differences between male and female bodies

Sex-disaggregated data: separation of data by sex as the basis of gender analysis

Stacking: the use of multiple energy carriers to meet an energy demand
(Women's) strategic interests: women's strategic interests are those related to women changing their position in society, gaining equality with men and empowerment in all its senses

Uptake of energy appliance: the acquiring of an appliance through purchase, gift, grant, etc.

Women's empowerment: a process by which women and girls gain power and control over their own lives through awareness-raising, self-confidence-building, expansion of choices, increased access, ownership and control over resources and actions, to transform the structures and institutions that reinforce and perpetuate gender discrimination and inequality

1. STUDYING GENDER-RESPONSIVE ELECTRIC COOKING

1.1. Rationale for studying gender-responsive electric cooking in Nepal

Electric cooking provides new opportunities for increasing access to clean cooking. Transition to clean cooking is necessary for protecting the health and lives of all those who suffer from the health and environmental impacts of current cooking practices. This concerns not only the 2.7 billion people who lack access to clean cooking but also the 1.3 billion people with inadequate access to clean cooking, totalling approximately 4 billion people who are not able to cook efficiently, cleanly, conveniently, reliably, safely, and affordably (ESMAP and MECS 2020). While the pathways to clean cooking have focused on improving traditional cookstoves, biomass and biogas stoves, and cooking with LPG, with recent and ongoing developments, electric cooking is becoming an alternative for a growing part of the population. It has become important to understand the benefits and challenges that different forms of electric cooking may bring and to build insights into the acceleration of access for lower income households. An important approach towards the goals of sustainability and inclusiveness is to go beyond the supply side of providing physical access to electricity and cooking appliances by viewing clean cooking as a service. From a modern energy cooking service perspective, the users and their needs and requirements for cooking are central to achieving results. Optimising outcomes for the women who stand to benefit the most from clean cooking will result in electric cooking significantly contributing to the transition to sustainable energy for all.

As cooking is typically a task that women are engaged in, understanding the barriers to and opportunities of transition to electric cooking from a gender perspective is necessary. A gender perspective will expand the understanding of the uptake and use of electric cooking appliances, not only by disaggregating between men and women as both customers and users, but also by recognising that purchase and use decisions are influenced by the different roles, aspirations and access to resources that men and women may have.

As a leading country committed to promoting efficient electric cooking, Nepal provides a relevant research context. The Government of Nepal considers electric cooking an integral part of its electrification strategy. Article 73 of the government's White Paper (Ministry of Energy, Water Resources and Irrigation, 2019) states: "Under [the] 'electric stove at every home' programme people will be encouraged to install [an] electric stove at every home. Implementing this programme, import of cooking gas will be substituted minimising the trade deficit."

The policies and programmes rolled out in the coming years will have a great influence on the opportunities for electric cooking.

With more than 90% of the households using electricity for lighting, as well as with a huge potential for hydroelectricity, Nepal is well-positioned to make fast progress in electric cooking.

The large number of ongoing electric cooking programmes in the country indicates the shared perception of priority to the transition to clean energy, as well as the need for increasing the understanding of appropriate dissemination approaches.

At least seven projects implementing electric cooking appliances are ongoing between 2019 and 2023. To support this development, there is a high urgency for information to inform programme and project decision-making. This study is one of a range of research projects that are being implemented in Nepal. By providing a gender perspective and a user approach, it complements studies covering topics ranging from market assessments, development of standards, to uptake strategies.

1.2. Introduction to this study

The objective of this study is to offer insights into how gender issues and gender norms influence electric cooking uptake by broadly exploring gender perspectives based on user experience with electric cooking in Nepal. The study was set up to identify key gender issues and explore opportunities to improve gender-responsiveness of approaches of the projects and programmes on electric cooking, to identify areas of priority for future research to achieve gender goals through electric cooking, and to build insights into gender-responsive research. Gender goals may include meeting the needs of women and men and supporting them to fulfil gendered roles and tasks, increasing gender equality through clean cooking, and designing a gender-responsive approach and access structures. The evidence provides insights into policies and projects on electric cooking to support the development of a gender-responsive approach and strategy and presents recommendations for further research to inform development towards gender-responsive electric cooking in Nepal.

To fulfil this broad objective, a set of specific research objectives was developed:

- To increase understanding of the gender issues in access to and use of electric cooking from the user perspective.
- To increase understanding of the impacts of electric cooking from the gender perspective.
- To provide evidenced recommendations for programmes and the private sector to enhance the uptake, use, and benefits of electric cooking from a gender-responsive approach.
- To provide a broader context of electric cooking in Nepal, the gender issues relevant to electric cooking and drivers and barriers to gender-responsive approaches to electric cooking in Nepal.

To meet these objectives, we focussed the empirical data collection on the following areas of research:

- Factors that influence uptake and use, including gendered motivation, need for and access to information for uptake, and gendered access to and control over financial and other resources;
- Perspectives of men and women on the benefits of electric cooking, exploring specific impacts, such as time associated with cooking, financial impacts, changes in roles and agency, and empowerment; and
- Dissemination approaches and their gender-responsiveness for a programme (induction stove dissemination programme) and a private sector product (rice cooker).

Furthermore, a landscape study was performed based on desk research and interviews with selected key stakeholders at national level.

The study was conducted by a consortium led by ENERGIA, in which Practical Action Consulting (PAC) -Nepal and 60 Decibels carried out separate studies, coordinated by ENERGIA. The empirical data collection by PAC-Nepal consisted of a household survey (covering 50 households), focus group discussions (FGD) (covering 61 participants), and key informant interviews (KII) (8 at local and programme implementation level). 60 Decibels carried out a phone survey of 302 respondents in 194 households, with an extended lean data approach. ENERGIA led the development of this report.

1.3. Report outline

This report presents the main findings of the different components of the study from a gender perspective. It brings together evidence that was developed through a set of different methods as separate reports and synthesises the findings with a focus on gender issues, gendered differences in uptake, and the use and benefits of electric cooking. By comparing the findings and discussing quantitative data in relation to the local context and programme, the study explores the patterns that can serve to understand the choices and behaviour and uncover the opportunities to enhance the uptake and benefits of electric cooking.

Chapter 2 presents the research methodology, providing an overview of the approach, scope, and data collection through phone surveys, household surveys, FGDs, and KIIs. Chapter 3 provides a snapshot of the background information, including on the respondents. This chapter also provides an introduction to policy and gender situations as well as a description of the key elements of the study sites and the induction stove programme. It then briefly describes the context of cooking and energy access and supply in Nepal. Finally, it provides a snapshot of the respondents before presenting an analysis of the uptake and use of electric cooking.

Chapters 4-6 form the empirical section of the report. They present synthesised findings and an analysis of gender issues. In these sections, the factors that influence the uptake and use of electric cooking from a gender perspective and how men and women perceive the benefits of electric cooking are presented. This not only presents gender-differentiated findings but also highlights the issues and narratives that reveal what is relevant to the cooks in Nepal. This empirical section firstly focuses on the uptake and use (in Chapter 4), followed by a focus

on the impacts of use (in Chapter 5). Chapter 6 provides an assessment of the gender-responsiveness of the induction stove programme in one of the research sites.

Finally, key lessons and messages are formulated in Chapter 7. These lessons entail both implications of the findings for gender-responsiveness of policy and programmes on electric cooking in Nepal and in other countries and recommendations for further research.

2. RESEARCH METHODOLOGY

2.1. Research approach

The research approach aimed to meet the objective of providing messages that are directly useful for both policy and practice in Nepal to enhance gender-responsiveness of electric cooking programmes. It also sought to develop lessons on doing research and performing data collection that brings out gender issues. For this, the scope of the study was set to learn from different electric cooking technologies and dissemination mechanisms in more than one field setting by employing a set of different research methods.

In the preparation phase, the gender approach adopted in this study consisted of:

- identifying issues for inclusion on fieldwork from literature study and expertise on gender issues in the research team, both within-household and context factors;
- identifying questions that are relevant to women;
- identifying issues for comparison between men and women; and
- identifying drivers and barriers to gender approach as perceived by key stakeholders.

Topics explicitly included:

- Men and women's role in decision-making on uptake and use;
- Differences between men and women as to the sources of information that influenced them and the content of information that they found relevant or missing;
- Control of budget and access to financial resources of women;
- Men and women's perceptions of benefits and disadvantages of electric cooking;
- Differences between men and women in the use of cooking appliances;
- Differences between men and women in terms of role and time spent on cooking and changes in gender roles; and
- Roles of different generations of men and women within the household.

This study includes impacts of electric cooking both in the short term, concerning changes in practical and productive needs, and in the long term, regarding initial changes in strategic interests, in which women gain equality with men as well as empowerment in all its senses. Such a change in position entails shifting gender norms and practices at household and societal level, and it typically is a process that spans a substantial time period and many different influencing institutions and factors. As cooking is a task with a strong gendered role pattern, large time implications, and a relatively high (potential) household budget component, it can produce a crucial influence in shifting the gender roles, gendered responsibilities, and decision-making. We, therefore, looked out for emerging changes in roles, narratives, and practices that may evidence initial steps to shifts in gender norms and changes in empowerment of women induced by electric cooking.

The core of the study is the development of empirical evidence. We used different research methods for the empirical data collection: phone surveys, FGDs, household surveys, and KIIs. These methods were selected to complement one another and to provide findings on differences in their application to study gender issues. The phone surveys were performed by 60 Decibels using their tested lean data approach. The phone surveys made it possible to

reach a large number of respondents registered either as customers or as users of a product and capture customer experience on a broad range of topics related to uptake, use, and satisfaction. The data collection was designed to be largely standardised. The lessons of this study are envisaged to inform 60 Decibels for designing future surveys to enhance findings on gender issues. The household surveys, FGDs, and KIIs were carried out by PAC-Nepal. The household surveys offered some opportunities for interactions between the respondents and the enumerator, such as through clarification questions. The survey household sampling, according to the factors of key interest and the positioning of findings in the local context informed by key informants, provided opportunities for additional exploration in the interpretation of findings. However, the number of household interviews was very small due to the time and logistical constraints. FGDs provided opportunities for hearing voices and opinions, as well as for developing understanding of the local context factors and differences between social groups based on open interactions. This was implemented by organising discussions among groups of mixed groups of male and female, women only groups, women in business, housewives, and women from disadvantaged communities.

Scoping the study to enhance the opportunities for learning the different aspects of electric cooking, this study included both the induction stove and the rice cooker. Induction stoves are not commonly available in the market in rural Nepal; so, the research focussed on the key dissemination programmes on induction stoves. Rice cookers are widely available in the market.

Furthermore, for empirical data collection, we took a broad understanding of the term 'cooking', to include all services that can be provided by electric cooking appliances. This means both cooking of main meals and preparation of tea and snacks. Where the study looked into other stoves, we also asked the target households about their uses.

The starting point of selection of respondents was households with electricity access, with focus on users of electric cooking appliances. Non-users of electric cooking appliances were included only in an FGD.

An overview of the data collection approaches used by 60 Decibels and PAC-Nepal is provided in the data collection method. For the analysis of data, the emerging findings from different approaches were triangulated. The synthesis of findings included hypothesis building with the main researchers, performing additional disaggregated analysis, and iteration with key informants.

2.2. Geographic focus

The empirical research for this study was performed in four municipalities in three geographical regions. The field study sites follow from the locations of induction stove programmes and availability of data on market-driven rice cookers. Those induction stove programme sites were selected where the stove had been in use for a substantial period to study the use after uptake thoroughly. As data on rice cookers is not available, since customers of such appliances are not registered, we used the information provided by CREEs. The available information indicated that rice cookers were used in Roshi (near Temal) and Kamalamai, and they were hardly used in the areas where the induction stove programme was implemented. The selection of two sites each for the induction stove programme and

rice cookers each allowed learning about the gender issues and programme and market contexts from diverse sources of information.

Empirical data was collected in four sites. Temal, in Kavre district, Bagmati Province and Baijanath, in Banke district, Lumbini Province were the study sites for the induction stove. Roshi, in Kavre district and Kamalamai in Sindhuli district, both in Bagmati province, were the study sites for the rice cooker. Table 1 and Photo 1 provide details on these sites.

Table 1: Overview of data collection sites

Province	District	Municipality	Survey village
Bagmati	Kavre	Temal Rural Municipality	Many villages from all wards
Bagmati	Kavre	Roshi Rural Municipality	Mangaltaar village, Ward no. 9
Lumbini	Banke	Baijanath Rural Municipality	Many villages from all wards
Bagmati	Sindhuli	Kamalamai Urban Municipality	Many villages from different wards

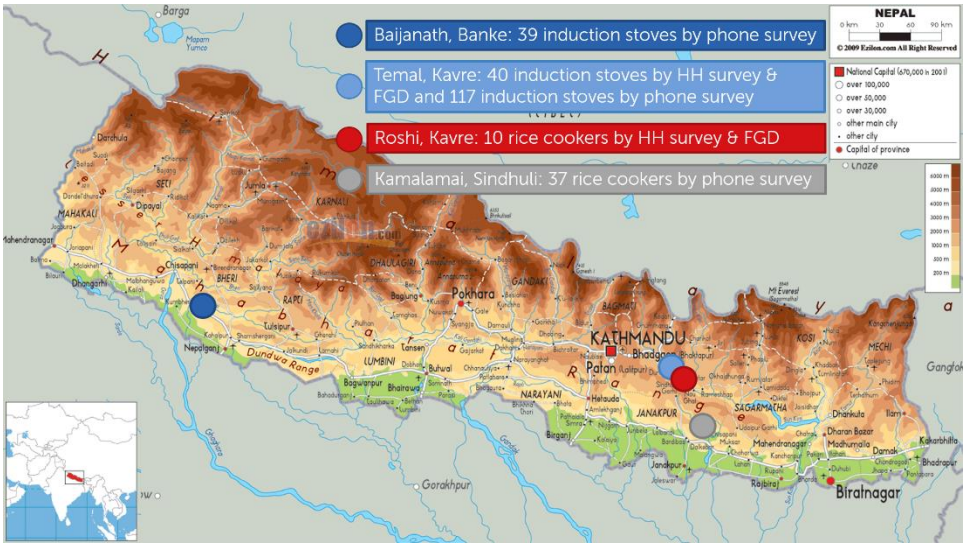


Photo 1: Field research areas in the map of Nepal

2.3. Phone survey

The phone survey sampling was designed to include two induction stove programmes and rice cookers as a case of market-based electric cooking appliances. The phone numbers were provided by the local electricity distributor organisations, the Community Rural Electrification Entities (CREEs). The CREEs register the persons that are registered as electricity meter owners as customers of the induction stove programme.

Based on a random sample of 194 out of 426 listed households, a total of 302 phone interviews were completed in August-September 2020. Second respondents were also interviewed in 108 of these households. In the total 194 households, both male and female members were interviewed in 56% of the households, only male members were interviewed in 34% of the households and, only female members were interviewed in 10% of the households.

The distribution of sampled electric cooking appliances was as follows:

- Rice cookers: 37 households in Kamalamai
- Induction stoves: 117 households in Temal and 39 households in Baijanath

To reach this dataset, three phases of data collection were undertaken.

In Phase 1, interviews were conducted either of the respondents who were in the database provided or of the main user referred to by the first respondent. The interview script specifically asked to speak to the main user of the induction stove or rice cooker in the household even if they were not the registered customer. An evaluation showed a large percentage of men reporting themselves as main users, leading to a low percentage of women surveyed. Phase 1 consisted of a total of 135 interviews, with 78% male and 22% female respondents.

In Phase 2, a revised survey script was used to ensure the main users were the ones answering the questions. In this Phase, four additional questions were included:

- Are you responsible for the majority of the cooking in the household, specifically with respect to the induction stove/rice cooker?
- How often do you use the induction stove/rice cooker a week?
- Is there anyone else who uses the induction stove/rice cooker?
- If yes, how often do they use it?

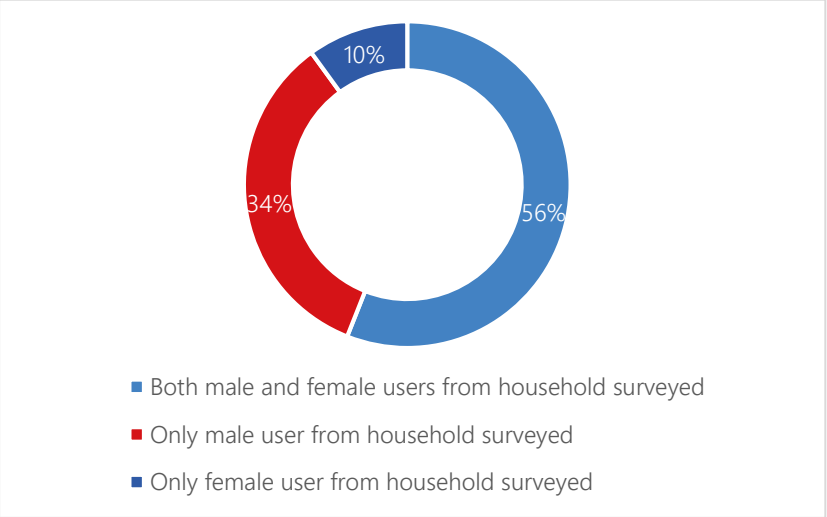
Phase 2 consisted of a total of 23 interviews, with 39% male and 61% female respondents.

In Phase 3, purposive sampling was adopted to sample female respondents and also to interview both male and female members of the same household. This approach allowed us to use the data already collected from the male respondents in Phases 1 and 2 by offering an opportunity to analyse the differences in the responses of the male and female respondents of the same household. Interviews with respondents of the opposite sex were performed in 49% (n=77) of the initial set of households. To reach the target sample size of 300 interviews, 36 new households, with 36 first respondents and 31 second respondents, were added.

Phase 3, therefore, led to an additional dataset of 144 respondents: 36 new respondents and 108 second respondents.

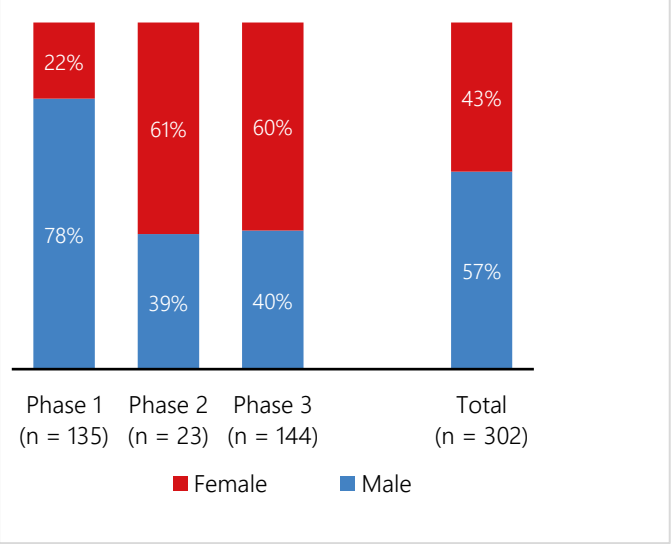
Graphs 1 and 2 present this data collection approach.

Graph 1: Type of respondents surveyed per household (n=194)



Source: Phone survey

Graph 2: Gender of respondents per sampling phase (n=302)



Source: Phone survey

The phone survey also used standardised tools.

- The Net Promoter Score®, developed by Bain & Company and used globally as a gauge of customer satisfaction and loyalty, allows comparison of user satisfaction between products, projects or geographical areas. The score can be anything from -100 to 100, and anything above 50 is considered very good, while a negative score is an indication of poor satisfaction.
- The Poverty Probability Index® (PPI) is a poverty measurement tool used by organisations and businesses to determine the likelihood that a household is living below the poverty line. This calculation is based on responses to country-specific questions about a household's characteristics and asset ownership. For this study, we measured how the income profiles of respondent households compare with the national average.

2.4. Household survey

A stratified survey was administered on 50 electric cooking appliance user households from Temal and Roshi Rural Municipalities in September 2020.

The household survey was done with the main cook, and, in one case, with both husband and wife. The main cook was a female in all but one case in which a widower was the main cook.

Sampled households were selected purposively based on electric cooking appliance (induction stove or rice cooker), sex of household head, income level, and distance from motorable road as described below:

i) Electric cooking appliance users: Only those households that used electric cooking were sampled for household survey. Among them, 40 induction cooktop user households and 10 electric rice cooker user households were sampled purposefully. The sample plan was met by extending the geographic scope from Temal, where the induction stove programme was implemented, to the nearby Roshi to include 10 rice cooker users. All 10 rice cooker users were from Roshi.

ii) Sex of household head: Households were purposively stratified based on the sex of the household head. We considered both de facto and de jure women-headed households as women-headed households. Although effort was made to include an equal number of male- and female-headed households in the sample, as it was difficult to find female-headed households as users of both induction stoves and rice cooker, the final sample includes more male-headed households than female-headed households, especially for Roshi (rice cookers) (Table 2).

Table 2: Distribution of sample households by sex of household head (unit in number of households)

Households disaggregated by sex	Total users	Sample plan	Actual sampled
Temal RM			
Male-headed	518	20	23
Female-headed	47	20	17
Mangalataar			
Male-headed	NA	5	9
Female-headed	NA	5	1

iii) Income level: One of the stratification dimensions is income level, which was planned to be distributed over four income groups based on observable characteristics of the house or local data (Table 3). It was subsequently found that the proxy of the roof material used, a commonly used indicator, is not a good proxy of income for Kavre. It was because the government had provided GI sheet roof material free there, under the earthquake 2015 reconstruction programme; so the majority of low income households also have GI sheet roofing. This led to the inclusion of the indicator, "having TV at home", to categorise houses in four different income groups (Table 3).

Table 3: Categorisation of income groups by type of roof and sampling

Income Group Categorisation		Sampling (Number of households)			
Type of roof and TV	Income group	Temal		Roshi	
		Planned	Actual	Planned	Actual
Cemented roof plus TV	High income	10	2	2	3
GI sheet or tile roof plus TV	Higher middle	10	24	3	7
GI sheet or tile roof and no TV	Lower middle	10	14	3	0
Straw/thatch or earth/mud plus TV or no TV	Low income	10	0	2	0

Effort was made to ensure equal representation of all income groups in the survey, but as there are very few high income and low income households in the sampled locations, most of the households in our sample belong to the higher middle income group, followed by the lower middle income group (Table 3).

iv) Distance from nearest motorable road: To include respondents who lived in more or in less remote locations in this rural area, the household survey was also stratified on the basis of the distance from the nearest motorable road. Table 4 shows planned and actual sample size based on distance.

Table 4: Number of sampled households according to distance from nearest motorable road

Distance	Planned sample households	Actual sampled households		
		Total	Temal	Roshi
0-5 km	12	4	0	4
6-10 km	13	19	16	3
11-15 km	13	21	18	3
>15 km	12	6	6	0
Total	50	50	40	10

2.5. Focus group discussions

FGDs were held in seven locations: six in Temal and one in Roshi. To gain better insights into different groups in the population, the discussion groups were designed to include men and women, users and non-users of electric cooking appliances, economically active women and non-economically active women, women belonging to SHGs, persons from majority groups and from the minority marginalised Dalit community, and rice cooker users in Roshi.

Hypotheses include:

- For economically active groups, the capacity to pay, access to information, priority given to health, time saving, etc. in the household, will be higher for both men and women. Possibly also, there will be different impacts for economically active women as well as different gender norms.

- For marginalised groups, the capacity to pay and gender norms may be different than those for other groups, influencing both interest in uptake, ability to pay for uptake, and use.
- Women have different priorities in access to information and benefits of electric cooking than men of the same household.
- Women in SHGs may have better access to information and loan, accordingly electric cooking uptake and use.

Of the total 61 FGD participants, 52 were female and nine male (Table 5), following the purposive contrasts between groups.

Table 5: Summary of FGD participants

Type of FGDs	Sex of participants		Users/non-users of electric cooking	Location
	Male	Female		
1. Women only (economically active) group	0	7	Users (10)	Ward No. 9, Temal
2. Women only (members of SHGs)	0	11	Users (11)	Ward No. 7, Temal
3. Dalit women group	0	8	Users (4) and non-users (4)	Ward No. 7, Temal
4. Women only (only housewives)	0	9	Users (9)	Ward No. 6, Temal
5. Men and women mixed group (economically active) group	5	7	Users (12)	Ward No. 7, Temal
6. Men and women mixed group	4	3	Non-users (7)	Ward No. 7, Temal
7. Women only (housewives)	0	7	Users and non-users mixed	Roshi-9
Total	9	52		

The social structures in Nepal, especially in rural areas, are highly related to caste and ethnicity. To capture a diversity of ethnic groups, two of the FGDs specifically sought participants from Dalit and marginalised communities, leading to representation of four participants of the induction stove programme and four non-users of induction stove from the Dalit community.[1]

The key informants included representatives from municipality and ward (the smallest local unit under municipality), the CREE, and a shopkeeper from Temal and Roshi each.[2] They were consulted between August and November 2020. Table 6 provides further details of the key informants by category.

[1] More information on caste and social structures is provided in Chapter 3.

[2] In addition, eight national-level stakeholders at decision-making level in six organisations key to programme implementation of electric cooking were consulted, mainly to inform the landscape study.

Table 6: Number of key informants at local level

Key informants	Number in Temal	Number in Roshi
Local government decision maker	1	-
Local government representative	2	1
Local project implementation management	1	1
Private sector (local shopkeepers)	1 (male)	1 (female)

2.6. Impacts of COVID-19 on the research project

The global COVID-19 pandemic significantly impacted this study. The pandemic and the policy measures influenced not only the lives of the respondents but also the research approach. Due to the measures limiting both international travel and travel between districts in Nepal, the team members could not meet in person the authors and the leads of the empirical work for the FGDs and household surveys could not visit the field sites. Therefore, the empirical work for the FGDs and household surveys was performed by local enumerators, following the development of detailed research protocols and online training and workshops. A COVID-19 safety protocol was implemented to ensure the safety of the enumerators and respondents.

3. SNAPSHOT OF THE CONTEXT AND RESPONDENTS

This chapter provides an overview of the context of cooking, gender issues, and the research sites. It also introduces the respondents as a background to the presentation of findings, which focus on gender issues and gendered findings on the uptake and use in chapters 4-6. The first two sections, 3.1 and 3.2, offer insights into gender-responsive cooking in Nepal and gender issues relevant to electric cooking from a national perspective. Section 3.3 provides a snapshot of geographic, energy, and social characteristics of the four study sites. Section 3.4 introduces the induction stove programme, which forms the background to a large part of the empirical work. The descriptive information on cooking and energy supply in sections 3.5 and 3.6, based on the empirical data, provides background information to help understand expectations and alternatives around cooking. The snapshot of the respondents in section 3.7 is a short overview of the key characteristics of the respondents and participants of surveys and FGDs and is meant as a short introduction and reference. Finally, in section 3.8, a reflection is provided on the effect of COVID-19 on the studied communities.

3.1. Gender-responsive electric cooking in Nepal: a policy perspective

This section presents the findings of the landscape study that was carried out for this research project.

In Nepal, electric cooking gained attention after 2018, when the electricity supply was extended to a sufficiently high level to end load shedding. Together with this development in electricity supply, programmes on wider use, including promotion of electric cookstoves, have been launched, especially in rural areas. Specific policies on electric cooking have yet to be formulated in the country, which provides an opportunity for advocating for gender and social inclusion agendas. The projects implemented till date have not considered the gender aspects of electric cooking. According to the project implementers, the primary objectives focus on the technical aspects rather than on social elements. The aim hence has been to ascertain the potentials and challenges of existing infrastructure to withstand the additional electric load. There is a general view amongst the stakeholders that the focus on gender and social inclusion may distort the market approach. However, donors and implementers of electric cooking have indicated an interest to keep a balance between inclusion and scale with market approach. The stakeholders agree that there is a need for maintaining gender disaggregated data, gender-sensitive implementation approaches, and monitoring and evaluation through a Gender Equality and Social Inclusion (GESI) lens.

National commitments to expand electricity through generation, transmission, and distribution are underway. The White Paper (MoEWRI, 2019) articulates a clear strategic direction for the electricity sector, including the following key sector goals:

- To reach 5,000 MW installed capacity in five years and 15,000 MW installed capacity in 10 years.
- To expand access to electricity and clean cooking to 100% of the population in five years.

- To increase the per capita consumption of electricity to 700 KWh within five years and 1,500 kWh in 10 years.

Electricity has reached 95.5% of Nepal's population as of 2017. Only 1.3 million out of 29 million Nepalese remain to be connected to electricity supply. The country expects to achieve 100% access to electricity within the next few years, well ahead of the target year of 2030 set by the Sustainable Development Goal 7. (The Kathmandu Post, June 4, 2019)

Drivers for the uptake of electric cooking from a policy perspective were identified from desk research and consultations with implementing organisations:

- Reducing health implications associated with the use of fuelwood, agri-waste and animal dung: About 80% of the country's population live in villages and about 75% of this population use unprocessed biomass, like firewood, animal dung, paper, residue leaves of trees, as cooking fuel (Ranabhat et al, 2015). In Nepal, acute respiratory infection, including acute lower respiratory infection, is the leading cause of child morbidity and mortality, with significant increase in its incidence over the last few decades (Dhimal, M. et al, 2014). The Ministry of Health and Population recognises it as one of the major public health problems among young children (NHRC, 2016). Women and children are at greater risk to household air pollution. Consequently, household air pollution is responsible for a large proportion of all deaths from ischaemic heart disease, stroke, lung cancer, and COPD in women compared to men. Altogether 58% of an estimated 3,600 child deaths due to acute lower respiratory infections are attributable to household air pollution.
-
- Reducing dependency on LPG imports. As Nepal has no fossil fuel resources, reducing dependency on imports is an important driver towards energy security, which increases the relevance of electric cooking options, compared to fossil fuel-based clean cooking options, such as LPG. Nepal consumes about 1.5 million tons of LPG every year, all of which is imported. Experts argue that replacing LPG by electricity for cooking at household level alone can greatly relieve the country from the trade-deficit burden (Chitrakar, 2019; Nakarmi, 2019). According to the former Managing Director of Nepal Electricity Authority (NEA), Mr Kulman Ghising, NEA is encouraging consumers to use induction stoves instead of LPG for cooking (*The Himalayan Times*, August 2020).
-
- Utilisation of surplus electricity supply.
- Improving the economic viability of grid supply by increasing the predictable demand for electricity and balancing the load over the day.

Institutional drivers are also relevant for both electric cooking and gender inclusion:

- The Constitution 2015 emphasises equal access to and sharing of benefits as well as economic empowerment of women, which can come only through uptake of time-saving activities that are not monetised and investment in economic activities. Electric cookstoves can save time, help reduce drudgery, and improve safety and convenience of cooking for women and marginalised groups.
- As a signatory of the SEforAll (Sustainable Energy for All) and Sustainable Development Goals, the country is duty-bound to adhere to its objectives and targets.

In policies and programmes of Nepal, gender is typically combined with other social inclusion issues under the header of GESI. GESI has now been recognised as one of the main factors influencing development outcomes in Nepal (ADB, 2018). Development policies and programmes are increasingly promoting interventions and supporting GESI outcomes, mainstreaming GESI issues in implementation, and promoting GESI-sensitive policies and programmes.

Table 7 provides an overview of the programmes for the dissemination of electric stoves in Nepal and the way GESI is addressed. It shows that several smaller programmes have distributed around 1,400 stoves and two large programmes, viz. Nepal Renewable Energy Programme, with 25 thousand electric cooking stoves, and AEPC Terai cookstoves programme, with 500 thousand stoves, will have large-scale impacts in the coming years.

Table 7: Electric cooking promotion programmes in Nepal

Organisation	Programme/project name and financing model	Duration and type of funding	Number of electric cooktops	GESI focus
1. GIZ EnDev	Market-led Promotion of Electric Cooking in Temal Community Rural Electrification Area	June 2019-February 2020	569 induction (completed)	GESI neutral
2. Practical Action	Result Based Financing for improved cook stove market development in Nepal	January-December 2020	500 induction (in progress)	Priority to women-headed and marginalised households but no focussed support package
3. SNV	Improving access to clean energy through ICS (EnDev-III)	2020-2021 (in progress)	500 induction (planned)	
4. NREP	Nepal Renewable Energy Programme (NREP)	February 2019-March 2023	25,000 electric cooking (planned)	In process to design GESI strategy
5. ABF and NACEUN	Promotion of electric cooking with support of different donors	March 2019-ongoing	200+ induction (completed)	GESI neutral
6. CCA	Demonstration on the environmental and health benefits of electric cooking	2018	42 induction (completed)	GESI neutral
	Maximising the Health Benefits of Clean Cooking in Urban Nepal	July-December 2019	95 induction (completed)	GESI neutral
7. AEPC	Terai cookstoves programme	2021-2025 (planned)	500,000 (planned)	GESI neutral

Economic empowerment of women is one of the focus areas of Nepal's Fifteenth Five-Year Plan (NPC, 2020) and also for local governments. Universal access to energy and engaging women in the supply chain are two pathways to economic empowerment.

In this study, interviews with key stakeholders indicate that gender-responsive approaches are considered as a means to promote and create demand for electric stoves and an interest in gender disaggregated monitoring and gender transformative approach for the implementation of electric cookstove dissemination projects.

3.2. Gender issues relevant to electric cooking in Nepal

Understanding gender aspects in the adoption and use of electric cooking appliances is key to their uptake and sustained use. In this section, the gendered impacts of indoor air pollution associated with fuelwood for cooking are described, followed by a number of key gender issues.

Gender norms and roles make women responsible for most household chores, fuel collection, and child care. In Nepal, women walk long distances to collect fuelwood, spending an average of 2.37 hours every day (Das, K. et al, 2017). The workload distribution heavily leans on women: 43%, as against 26% for men and 31% for both. Women play a large role in the production of goods for their own final use. Nepal's Central Bureau of Statistics reports that, for subsistence food production, manufacturing of household goods, fetching of water, collection of firewood, and construction of or major repairs to own dwelling, 66% of female and 51.4% of male respondents had been involved in the last 30 days prior to survey (CBS, 2017/18).

Low literacy is also gendered. Only 69% of women and 89% of men are literate. (MoH, 2016)

Women in decision making and governance

The local election of 2017 made significant contributions to female political representation in Nepal. The Election Commission mandates that at least 40.4% of total nominees be female, including a rule mandating that the chief and deputy chief nominations put forth by each political party in each local unit be gender-even. Accordingly, in each of the municipalities, if a man has been elected for the mayor's position, a woman has been elected for deputy mayor, or vice versa. As a result of this affirmative action, 40.9% of elected local seats are now held by women. However, this increased female representation in recent Nepali parliaments has been accompanied by criticisms of "tokenism". A common perception is that there is no "meaningful participation" of female elected representatives (Asia Foundation, undated). The study also made the following observations:

- Elected representatives (both men and women) have very limited understanding of the GESI concept and its operationalisation. Those that had some understanding of GESI and understand the need to act on issues of women empowerment and pro-GESI budgetary decision-making have not been able to act strongly or meaningfully on the issue because of their own lack of capacity and skills.
- The men underscored the prevailing mindset among most male elected representatives and that of the community that subscribes to deeply-entrenched gendered expectations and biases. It was clear that patriarchy continues to dominate the discourse not only around the GESI issues but also around broader women's issues. Many male

representatives who participated in the FGDs were not hesitant to express that the quota system was the only reason for the election of so many women representatives in the recent local elections.

Gender issues in asset ownership and access to finance

Land ownership is a significant indicator of wealth, power, and political and social security in Nepal. However, according to the 2011 census, only 19.71% of women enjoy ownership over land and property. "Strengthening women's land rights increases their bargaining power within the family; provides a sense of security and confidence; contributes to better social status in the society; ensures better education, health and nutrition of their children; contributes to the reduction of gender-based violence, among other positive effects" (IOM, 2016).

According to the study, carried out in three districts of Nepal, viz., Morang, Nawalparasi, and Surkhet, by IOM:

- Fewer than 20% of women in all three districts were aware of the provisions of tax exemption when registering land in their names and the minimal registration cost (NRs.100, approximately 1 USD) for joint ownership.
- Only 12.9% of women knew what documents were required for the registration process.

According to MoH (2016), almost eight in 10 women (79%) know how much property or land their households own, and nearly 9 in 10 (89%) know under whose name the property is registered. The proportion of men and women who hold a bank account is 40% and 41% respectively. Among women, those residing in urban areas (46%) and the hill zone (46%) have bank accounts as compared to women in rural areas (32%) and other geographical zones (MoH, 2016).

Women in the workforce

The Nepalese labour force is 71% of its population. 55% of this group are women and only 26% of this group of women are formally employed. Of this female workforce, 33% works in agriculture (compared to 14.7% of the male workforce), 31% are technicians and associate professionals, while 43% are in services and sales; only 5.3% are plant and machine operators and assemblers (CBS, 2017/18).

In general, if households can afford it, women are confined to non-market (unpaid) work in the care economy and family enterprises. They are responsible for processing, cleaning, and storing of farm produce, kitchen gardening, and cooking food for home and for the eateries run by male family members. When they do work for pay, women are confined to less productive jobs. Of those in employment, a much higher proportion of women than men are to be found working in the informal sector at the lower skill levels. MoH (2016) shows that:

- Seventy per cent of women are working in agriculture in contrast to 33% of men, and this pattern holds true across all ethnic/caste groups.
- The proportion of women currently employed in the formal non-agricultural or "modern" occupational sector is lower (30%) than that of men (67%).
- Women continue to be confined primarily to unpaid family labour. Nearly 72% of currently employed women fall in this category, compared to 27% of men.

Out-migration of men: In Nepal, male migration to India or to the plains within the country, either to operate small microenterprises or for wage labour, has made women de facto heads of families in the hills of Nepal. For poorest households, mostly the so-called low castes, migration becomes a survival strategy. For those who are better off (so-called upper castes, such as the Brahmin or Chettri), remittances from migrant family members provide capital for purchasing more land or other assets. According to CBS (2017/18), 0.4% of women migrate as compared to 3% men.

Differences in energy access between male- and female-headed households: The ESMAP and MTF study (2019) finds similar rates of electricity connection and higher levels of access to clean cooking for female-headed households compared to male-headed households. With 18.2% of households in Nepal being headed by women, this is a relevant finding, especially as female-headed households mostly belong to the bottom quintile of household expenditure.

Gender inequalities and social exclusion are strengthened by geographic and infrastructural factors. Collecting fuelwood, water, and fodder are highly tiring and time-consuming tasks in mountainous areas, and difficulties are compounded by large family sizes (80% have 4-9 members) and difficult terrain. Only 32% of households in Nepal can reach the nearest basic service centre within 30 minutes; only 28% can reach the nearest bank (ADB, DFID and World Bank, 2012). The government lacks human resources to deliver services or offer effective outreach to the remotest communities, while lack of adequate service providers in remote areas is a major barrier. As a result, poor rural populations lack access to information about risks and legal rights, as well as skills to develop access to markets, improve income, and manage risks.

Ethnicity and social structures influence gender norms and gender equality. In Kavre, a majority of the population belong to the Janajati communities (indigenous peoples). The Janajatis are disadvantaged groups in Nepal that, on average, have higher levels of poverty. The Janajati women are also known to have higher mobility and voice than typical in many other communities in Nepal. According to the gender equality assessment in the energy sector (ADB, 2018), this often acts as a disadvantage as women who do not comply with gender norms are often not appreciated and may be excluded from the community.

3.3. Four study sites

3.3.1. Temal Rural Municipality: induction stove programme

Geographic

Temal is a rural municipality consisting of a population of 5,513 households belonging to several different communities. It is located in Kavrepalanchowk district, Province 3. The central community in Temal is located 8 km from the national highway, which connects Kathmandu to the eastern Terai region.

Photo 2: A typical house in Kavre

Photo 3: A well off house in Kavre

Photo 4: A community in Temal

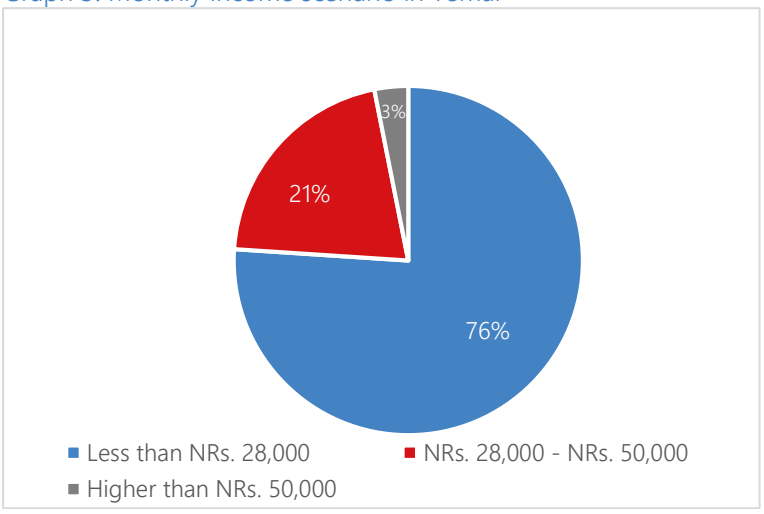
Photo 5: Market area in Temal

Photos: Mina Basnet

Economic situation

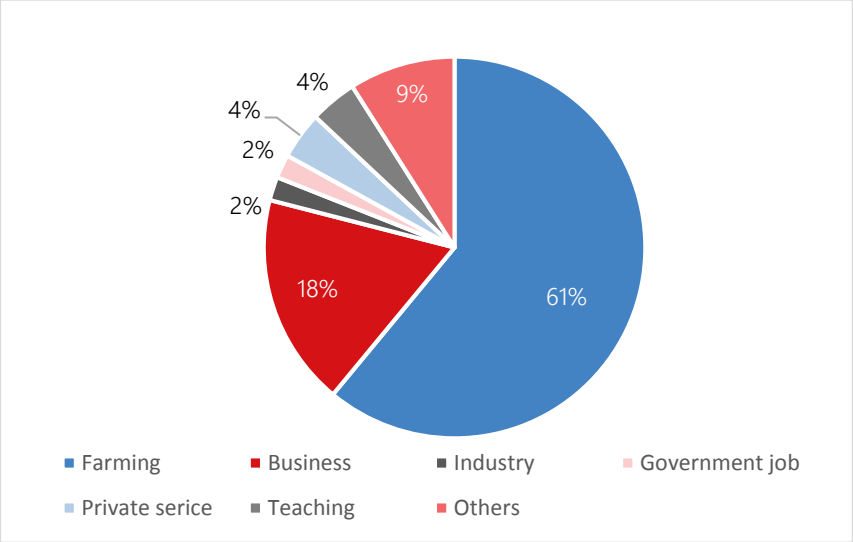
The poverty rate in Kavre district is 10.8% (ADB, undated). In the Temal rural municipality, 73% of households have an income less than NRs. 28,000 per month (Graph 3). Main local sources of income are farming (both agriculture and animal husbandry) and business. Tourism is starting. Incomes from remittances within the country and abroad also play an important role, as indicated by our survey, in which 58 out of 208 members of 40 households normally work away from home. This includes both men and women. (See Graph 4 for distribution of the sample households by occupation.)

Graph 3: Monthly income scenario in Temal



Source: ABF (2020), Project Completion Report

Graph 4: Occupation scenario in Temal



Source: ABF (2020)

Energy
The municipality was connected to electricity in 2005. Following the ending of load shedding in 2018, the electricity supply became available round the clock.

Programme for electric cooking in Temal: Market-led Promotion of Electric Cooking in Temal Rural Electrification Area

Implementation partners: GIZ/EnDev jointly with NACEUN and Ajummery Bikash Foundation (ABF) and the local partner Temal Community Rural Electrification Entity (CREE)

Castes and ethnic groups: The population in Temal consists of different ethnic groups. Janajatis make up approximately 84% of the population, the Brahmin, Chettri, and Thakuri groups make up 12%, and Dalits, the most disadvantaged population group, make up a low 3%. The Janajatis in Temal can speak, read and write Nepali.

3.3.2. Baijanath Rural Municipality: induction stove programme

Baijanath Rural Municipality lies in Banke District, Lumbini Province, which lies in the southern plain area close to the border with India. The municipality covers an area of 141.67 km^2 and has a population of 54,418, comprising 11,066 households. The Human Development Index of the municipality sits at 0.575, with per capita income of USD 1,133. The poverty rate of Banke District is 8.5% (ADB, undated).

Castes and ethnic groups
The majority of families belong to the Tharu ethnic group, followed by Brahmin/Chettri/Thakuri group.

Energy
About 80% of households have electricity access from the national grid. Baijanath CREE manages electricity distribution in the municipality.

Programme for electric cooking

In 2019, the CREE, with financial support of Baijanath Municipality and technical support of ABF and NACEUN, distributed induction cooktops to 150 households. The programme is ongoing and has the target of distributing 400 induction cooktops.

3.3.3. Roshi Municipality: rice cooker market

Roshi Rural Municipality lies in Kavrepalanchowk District, Bagmati Province. It lies in mid-hills and is located along the Arniko Highway, which is one of the major highways connecting Kathmandu to the border with China. The municipality covers an area of 178 km^2. There are 6,262 households, forming a population of 39,068, with an average family size of 6.2 persons. The poverty rate is 10.8% (ADB, undated).

Ethnic groups

The Janajati community, comprising 77.5% of the population, is the largest group, followed by the aggregated group of Brahmin, Chettri, and Thakuri, at 13.0%. About 4.8% of the population belongs to the Dalit community.[3]

Energy

About 83.3% of households are grid connected, while 14.9% use solar energy. The village was first connected to the national grid in 2009. Bhumechuli Mangaltaar Gramin Bidhyut Sahakari Sanstha (CREE) manages the electricity distribution in Ward No. 9 of the municipality, serving around 1,050 households. Further 4,166 households get electricity through the Nepal Electricity Authority (NEA) and 933 households from solar home systems. About 89% of the households in the village use solid biomass fuel for cooking, followed by 8.4% who use LPG.

Rice cooker market

The rice cooker users in Mangaltaar had purchased their rice cooker either from urban markets or from abroad without any programme or project support. Rice cookers are becoming increasingly available in the local market. The cost of a rice cooker varies from NRs. 2,000 to NRs. 5,000, depending on quality and brand. Rice cookers were being used by at least 20 households when this study started.

3.3.4. Sindhuli: rice cooker market distribution

Kamalamai is an urban municipality in Sindhuli district in Bagmati Province in central south Nepal. The city is in a plain valley formed by the Kamala River. It is 153.3 km from Kathmandu. Spread over an area of 482.57 km^2, Kamalamai Municipality is the largest municipality in Nepal. There are 13,568 households and a population of 77,845, with an average family size of 5.7 persons.[4] The poverty rate in Sindhuli is 10.8%.[5] Kamalamai is an urban community and district centre with a population of around 40,000 (CBS, 2011).

Energy

About 70% of households have access to electricity from the national grid there, and another 9% own solar home systems. Many families use electric rice cookers, which they purchase from the local market.

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[3] https://roshimun.gov.np/sites/roshimun.gov.np/files/Roshi%20Profile%202075_4.pdf

[4] https://kamalamaimun.gov.np/ne/node/3

[5] ADB (undated) Country Poverty Analysis (Detailed) Nepal

Project support: No

Cost of rice cookers: NRs. 2,000-NRs. 5,000

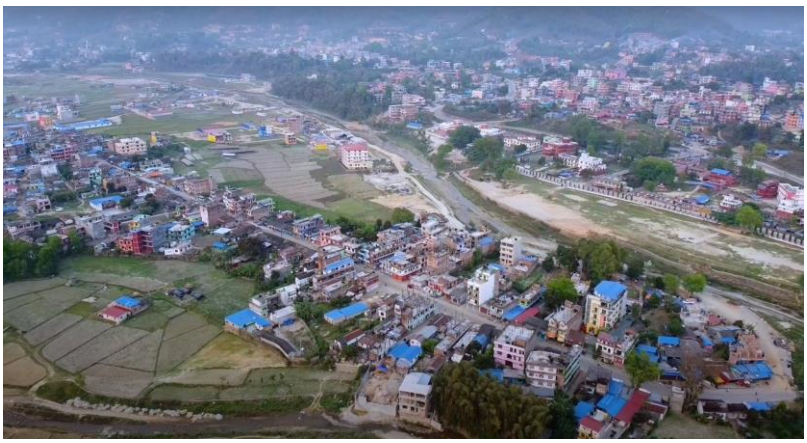


Photo 6: A bird's eye view of Kamalamai, Sindhuli
Source: https://www.facebook.com/kamalamaisindhuli/

3.4. Induction stove programme in Temal

Programme for electric cooking in Temal: Market-led Promotion of Electric Cooking in Temal Rural Electrification Area

Implementation partners: GIZ/EnDev, jointly with NACEUN and Ajummery Bikash Foundation (ABF) and Temal Community Rural Electrification Entity (CREE) as local partner

Duration:	June 2019-February 2020
Total CREE members:	5,513 households
Electric cooking:	569 induction cooktop user households (the programme reached 10.2% of CREE members)

Induction stove package: As the typical pots available in Nepal cannot be used on induction stoves, the programme provided its customers with a standard package consisting of a stove and pots that are suitable for cooking on induction stoves. The package consisted of a single-potholder induction stove of 2000W, one pan, one pressure cooker, and one frying pan. The programme price for the package is NRs. 4,750.[6] The costs of the induction stove and pots amount to about 60% and 40% respectively of the package costs. Due to supply issues, pots of different sizes (3L and a few 5L) were provided in different batches.

Programme support: After purchasing induction stoves and pans in bulk in Kathmandu and delivering them to the customers in a package, the programme provided financial incentives, technical support in terms of wiring before uptake and mediating repair after uptake, where necessary. Information and awareness raising activities for institutions and potential customers and users were also part of the programme. The role of the CREE was central in the local implementation of the programme. As a local entity for supply, maintenance and

[6] The package cost is equivalent to GBP 30 at GBP 1 = NRs. 158.

collection of payment for electricity consumption at household level, the CREE was able to supply the induction products without confirmed demand and pre-payments.

The financial incentives consisted of:

- Product discount (19%): The price for customers was reduced from the market price of NRs. 6,850 to NRs. 4,750, which became possible due to bulk purchasing, and NRs. 1,100 project incentive per household; and
- Electricity bill discount of NRs. 150 per month for the first six months. This discount was for households with an increase in electricity consumption of at least 20kWh per month.[7]

Technical support included adapting household wiring and placing sockets for cooking, as needed, to use the induction stove. In our study, seven of the forty sample households had their wiring repaired and upgraded.

The programme information and awareness activities included:

- Sensitisation and orientation programmes on benefits of electric cooking, project provisions, and role of the CREE in the project for CREE executives and staff.
- Sensitisation of local governments, leaders, and financial institutions to create an enabling environment for wider uptake of induction cooktop in the community.
- Awareness creation through informative leaflets, video documentaries, awareness and promotion events, including live cooking demonstrations, door-to-door visits, a Facebook group, and display of banners at central locations in communities.
- Providing a discount incentive to motivate potential consumers to purchase the induction cooktop package within the project period.

Selection of participant households
The programme used two criteria to select participant households:

- *First come first serve basis:* for those who were willing to pay for the induction cooktop package
- *Capacity of transformer:* to avoid grid instability, 10% of households per transformer can join the programme.

Inclusivity of the programme: The programme had no specific target for inclusion by sex, ethnic or income groups. Technical considerations, however, increased its reach to different locations and thereby to a diverse range of communities. The technical considerations follow from the limited load-carrying capacity of the transformers. In some load centres, the project had to limit the number of induction stove users to 10% of connected households per transformer to reduce the risk of overburdening the transformer. Due to this, with the target number of induction stoves dispersed, the stoves reached different locations and different ethnic groups without targeted activities for inclusion being conducted. In some load centres, the programme had to make extra efforts to motivate villagers to buy induction cookstoves.

[7] The cost of 20 kWh household electricity consumption is approximately NRs. 160. Electricity tariffs are staggered, with the first 10 units free. Many typical users in our household survey, with consumption level below 50kWh/month pay NRs. 8.1/kWh. Consumers using 51-15 kwh/month pay NRs. 9.5 per kWh.

The programme has reached a broad range of communities, including ethnic groups, but the most disadvantaged groups, Janajatis and Dalits, are underrepresented (Janajatis constituting 75% of registered users of induction stoves and 84% of the population and Dalits 1.5% and 3% respectively).

3.5. The context of cooking in Nepal: food, stove, and kitchen pots

Different stoves are used for cooking, making snacks, and heating fodder. The household interviews and the FGDs with induction stove users indicated that cooking two or three meals a day is most common, but one of the forty households reported cooking only once a day, while three reported cooking four times a day. In Roshi, people cook twice a day. Next to the full meals, snacks and tea are prepared several times a day. The term 'cooking' is used by most respondents either in general for all uses of stoves or for the cooking of the main meal.

Heating of fodder for livestock is a common requirement. In the sample households, this is only done on traditional biomass stoves. The FGDs informed that this typically takes place outside the house, near an animal shed.

Fuelwood is used in all rural households, irrespective of availability of other forms of energy. Fuelwood is used not only for cooking meals but also for preparing animal feed, where it is more difficult to replace. The charcoal from burning fuelwood is also used for warming the food, for rituals and heating in winter. The use of ash for cleaning vessels is a common practice in both Temal and Roshi.

Space heating: In the study areas, fuelwood is used for space heating occasionally in the higher hill areas.

In Nepal, kitchens are mostly a room inside the house, but are sometimes located outside the house and sometimes in the living space. In the phone survey sample, 99.5% of respondents had kitchens, of which 87% had kitchens inside the house and 13% had outside. Of the 40 induction stove users interviewed in the household survey, 75% cook in the living space or in part of the house, while 25% of kitchens were in a separate building. In Roshi, of the 10 sampled households, 6 do not have a separate kitchen, but cook in the main living area. The household survey also asked for other factors describing the kitchen. Out of the 40 households, 34 had a mud/earth floor, 36 had semi-open kitchens, and ventilation was reported to be satisfactory in 29, good in 8, and poor in 3. It may be noted that even semi-open kitchens are not always well-ventilated. The induction stove programme in Temal also supported the improvement of house wiring, including fixing sockets for cooking.

Electric cooking appliances are often placed on a counter or a table. This was stated by 97% of phone survey respondents and by 45 of 50 respondents of the household surveys. The remaining customers placed the appliance on the floor.

Photo 7: Cooking with induction and traditional stove in a kitchen

Photo: Mina Basnet

Photo 8: Cooking with Induction stove in the main living area

Photo: Mina Basnet

Pots and pans for cooking: The induction stoves were provided through the GIZ-EnDev Programme, whereas the rice cookers were purchased in the market. The induction stoves were provided as a package in combination with a pressure cooker, a saucepan, and a frying pan.

The pots varied in size due to the batch purchase by the programme. The project implementers stated that they did not monitor how many pots were provided of what size, but most of the pressure cookers were of 5L, followed by 3L. The saucepans were mostly 2L, and pots of up to 5L were provided. No size was given for the saucepan; however,

observations indicate that 2L is a typical size. Alternative pots appropriate for induction stoves are not available in the market in Temal, but in Banke, several respondents mentioned purchasing pots from the market.

Pressure cookers (non-electric) are widely used in Nepal. Pressure cookers are widely used in the field study areas. As the pressure cookers commonly available in the market cannot be used for cooking on induction stoves, the programme provided a pressure cooker compatible with the induction stove as standard part of the package. Both FGDs and household surveys indicated that the 5L pressure cookers provided with the induction stove package were used by 100% of the participants.

The FGDs with non-users of induction cookers indicated that people are familiar with using pressure cookers, as nearly three quarters of the participants use the standard pressure cooker.

Electric rice cookers are available in the market. Their prices range from NRs. 2,000 to NRs. 5,000. Most of the users in Roshi are using cheaper products, which cost around NRs. 2,500.

Photo 9: Cooking on pressure cookers on an induction stove and an LPG stove

Photo: Mina Basnet

3.6. Energy supply and access: electricity, fuelwood, and LPG

Electricity supply is available 24 hours but is unreliable. As part of the induction stove programme, house-wiring systems were improved, with technicians inspecting the wiring system and electrical safety status of every household that placed an order for the induction cooktop package. In Roshi, an electricity expansion programme was launched. In Kavre, high fluctuations are experienced, especially during the rainy season, mainly because of the large number of wooden poles used for distribution. The capacity for induction stoves is sufficient due to the programme design of allowing only 10% of households per transformer to apply

for the induction stove programme and also due to the fact that there are no large electricity consumers in the area.

Electricity infrastructure improvements are being planned. To improve the electricity supply, as well as for expanding the option for electric cooking, 12 50KVA will be upgraded to 100KVA and, for households at the end of the long single-phase distribution lines in the area, there is a plan for installing additional 10 transformers.

Fuelwood is freely available in both Temal and Roshi. With prohibitions from community forests, fuelwood collection is limited to areas around one's own area or unclaimed areas. Wood residues and other waste are used for space heating in the winter in the hills.

Although available at a distance, LPG is widely used. In both Temal and Roshi, almost all users acquire LPG cylinders from Banepa, a market town at a drive of 2.5 and 1.3 hours respectively. Two common practices are: i) ordering from a distributor in Banepa, who delivers by vehicle when he is delivering other goods and ii) depositing empty cylinders and collecting refilled cylinders from the market. Despite the presence of local retailers, LPG users rarely buy from them, largely due to higher costs and also due to uncertainty of the time a refill will take. Also, the distance is not certainly an advantage for customers, as the Banepa service may deliver close to home, whereas the local retailer may take more than an hour's walk to reach. When the refill service is taken from local retail shops, the empty cylinder is given in for refilling and can be collected only after it has been refilled. This becomes a problem when a household has only one cylinder. In rural areas of Nepal, LPG is frequently scarce. In such periods, customers have to wait their turn for a refill, which can take a few days.

> *"We rarely buy from local retailers as the cost is higher by 200 - 250 rupees than from the main market in Banepa. When delivered direct from Banepa, we need to pay a surcharge of only about 60 rupees as transport charge and the cylinder is delivered closer to the house. When we refill at the local retailer, most often we have to carry the cylinder ourselves".*
>
> A participant of and FDG in rural Temal

3.7. A snapshot of the respondents

Gender: Forty-three per cent of the respondents of the phone survey were female. All but one (a widower) of the household survey respondents were female. The participants of FGDs were female in five FGD clusters, and male-female mixed in one group of economically active users (5 male and 7 female) and one group of non-users (4 male and 3 female). In total 51 women and nine men participated in the FGDs.

Household size: Household size shows a large range. The phone surveys showed an average family size of 5.7, while in the household surveys, it was 5.1 in Temal and 3.3 in Roshi, where there are more nuclear families.

Occupation/income sources: Agriculture is the main source of income for the majority of households. The sources of income of the male heads of household or spouse in the past 7 days of the 194 households that took part in the phone survey were: self-employment or long-term contracts in agriculture, for 62%; self-employment in non-agriculture, for 21%; and no work or daily wage work in agriculture or non-agriculture for the remainder. In Temal, of the 40 sampled households of the household survey, 2 households are totally dependent on earning of its female members, 1 on that of male members, while in 37 households both men and women earn. In Mangaltaar, Roshi, in 4 of the 10 households, only male members earn an income. Income is also often from outside the area: of the 240 members of the 40 households consulted in the household surveys in Temal, 20% of the women and 38% of the men are normally absent from the household due to work abroad or within the country. In the 10 households in Roshi, only two of the total 32 household members were absent.

The FGDs specifically included economically active women. Four women operated tea shops. The other economically active women were involved in non-timber forest production, mainly selling *Buddhachitta* or *Bodhichitta* (a woody seed used as prayer seeds). There were also people, mostly Dalit women, working on daily wages, which are typically low levels of income.

Age: The average age of the respondents of the phone survey was 43 and that of the household surveys was 38.

Position within the household: For the household survey, the sampling was designed to include both male- and female-headed households and, within each household, the main user of the electric cooking appliance. The final set of respondents mainly consisted of female heads of households (15) or spouses of male heads (27) and also respondents with a different position in the household, namely daughter-in-law (4), daughter (2) or son (1) (Table 8).

Table 8: Respondents by sex and position in household

Sex of household head	Relation of respondent with household head	Respondents		
		Male	Female	Both
Male	Wife		27	1
	Daughter-in-law		2	
	Daughter		1	
	Son	1		
	Total	1	30	1
Female	Head		15	
	Daughter-in-law		2	
	Daughter		1	
	Total		18	
Total	Head		15	
	Wife		27	1
	Daughter-in-law		4	
	Daughter		2	

	Son	1		
	Total	1	48	1

Source: Household survey

Education level: The respondents of the phone surveys have higher levels of literacy than the Nepal average. The highest level of education is higher secondary or tertiary for 84% of household members and primary level only for 1%. Of the 240 members from the 50 households consulted in the household survey, 50 reported themselves as being illiterate.

Social/ethnic background: Around 60% of the sampled households for household surveys in Temal and Roshi were Janajatis, 30% were Brahmin/Chettri/Thakuri, and 8% were Dalits. Dalit are the most marginalised group in Temal, while Janajati, a disadvantaged community in Nepal, form the majority in Temal. Brahmins occupy the highest rung on the Hindu caste hierarchy.

Non-users of induction stoves: In the FGDs, a small number of individuals (11) were consulted from households not using induction stoves in the induction stove programme area. The non-users were five from Dalit, five from Janajati and one from Brahmin group.

The majority (85.7%) of the non-user households use an LPG stove as the primary cookstove, while the remaining households use traditional cookstoves. A hundred percent of the induction stove non-user households and 79.17% of the user households use traditional stoves as primary or secondary fuel.

The uptake of the electric cooking appliance had taken place at least six months before the interview for over 90% of the households in the phone survey. The system had been in use for six to twelve months for 83% of the user households. For 8% of the households the system had been in use for a longer period and for 6% of the households for a shorter period. For rice cooker users, this figure is six to twenty-four months for 48%, a longer period for 41%, and a shorter period for 11%. This period of use is only sufficient to provide information on the immediate use of induction stoves but not on long-term effects, such as behavioural impact. The period of use for the induction stoves follows from the period in which induction stoves were disseminated in the programmes.

3.8. Effects of COVID-19 on studied communities

COVID-19 has highly impacted the livelihoods of the studied communities. It has reduced job and business opportunities, leading to reduced income. Another outcome is the return of migrant workers from abroad. In the 40 households in Temal, 5 female and 7 male household members who were previously working abroad returned due to COVID-19, while 11 remained absent abroad and 35 remained absent within the country. There were no effects of COVID-19 on the availability, choice, and use of fuel and cooking stoves. More broadly, the government measures to control the spread of the disease, such as restrictions on travel between districts and limitation on the size of gatherings, restricted the daily lives and may have affected the way the respondents used, perceived, and valued the cook stoves.

4. PERSPECTIVES ON UPTAKE AND USE OF ELECTRIC COOKING WITH A GENDER LENS

This chapter is positioned around the issues of the uptake and use of electric cooking appliances. It starts with a short descriptive section on electric cooking and the meals that are cooked and subsequently presents the main lessons that are developed specifically from a gender perspective. Gender disaggregated data on electric appliance use, user perspectives, and factors that may influence the uptake and use of electric cooking appliances are presented.

To better understand the gender roles and differences in the uptake and use of electric cooking appliances, this chapter presents the key findings on:

- Decision-making on the uptake and use, as norms and power relations influence what is purchased and used, and gender differences can lead to energy demands of women as cooks not being met.
- Different motivations to buy and priorities of men and women.
- Access to financial resources and affordability, which may differ for men and women in a household.

The information on men and women as users of electric cooking appliances is presented as the key topic, which is followed by user satisfaction and user priorities to provide a basic understanding of cooking from the user perspective. We present all information on user satisfaction and priorities here, because this is key to understanding the uptake and use. Naturally, many topics related to user satisfaction and priorities also relate to impacts, which is the topic of Chapter 5. In Chapter 4, we present the findings related to the characteristics of cooking appliances and pots as a separate topic, as this was indicated by the users of electric cooking as a key factor influencing the satisfaction with electric cooking and the use of electric cooking appliances.

4.1. Uptake and use of electric cooking appliances

4.1.1. Dishes cooked on induction stoves, rice cookers, and other stoves

The induction stove is commonly used for boiling water, preparing lentils, tea, and snacks (egg, noodles, etc.), and cooking rice. There is a perception that the induction stove is not suitable for cooking many traditional dishes. For example, although it is used for cooking meat and boiling milk, the users did not find the stove ideal for this.

A number of common dishes and food items, such as vegetable curry and *Dhindo* (a staple food prepared by gradually adding millet, buckwheat or cornmeal flour to water until it has a solid consistency), are not cooked on electric cooking appliances. Electric cooking appliances are also not used for heating animal fodder and cooking in restaurants, as these purposes need large pans and high heat distribution and heating capacity.

Rice cookers are only used for cooking rice.

Photo 10: Woman in Mangaltaar, Kavre district, using a rice cooker
Photo: Indu Sharma

Table 9 shows the type of stove used for preparation of various dishes.

Table 9: Typical dishes cooked on electric and other stoves

Food items	Stove type
Rice and lentil soups	Induction cooktop
Tea and boiling water	Induction cooktop
Vegetable curry	Traditional stove or LPG stove
Boiling milk	Traditional stoves
Dhindo (millet porridge)	Traditional stoves
Feed for livestock	Traditional stoves
Cooking for commercial purpose or preparing food for large number of people	LPG stove

Source: Household survey and FGD

Preference for fuelwood. Milk is usually boiled on firewood because of the common preference for the smoky smell it produces. Also, the traditional stove is more appropriate for long simmering of milk, which makes it thick and creamy. There is also no need to attend to the pot while simmering the milk on fuelwood.

Utensils used on the induction stove. The 2L saucepan is used for most purposes: boiling water, preparing snacks (noodles, eggs), and making curry. The same pot is also used for making tea and other dishes. The respondents of the FGDs demanded larger pots, especially for cooking for guests.

4.1.2. Frequency of use of electric cooking appliances and stacking

The electric cooking appliances are used regularly and for various purposes. The household survey and the FGDs indicate that the induction stove was the main stove used for cooking of main meal and tea and snacks for the large majority of the respondents (37 out of 40 household surveys, 75% of FGD participants who use the induction stove) (Table 10).

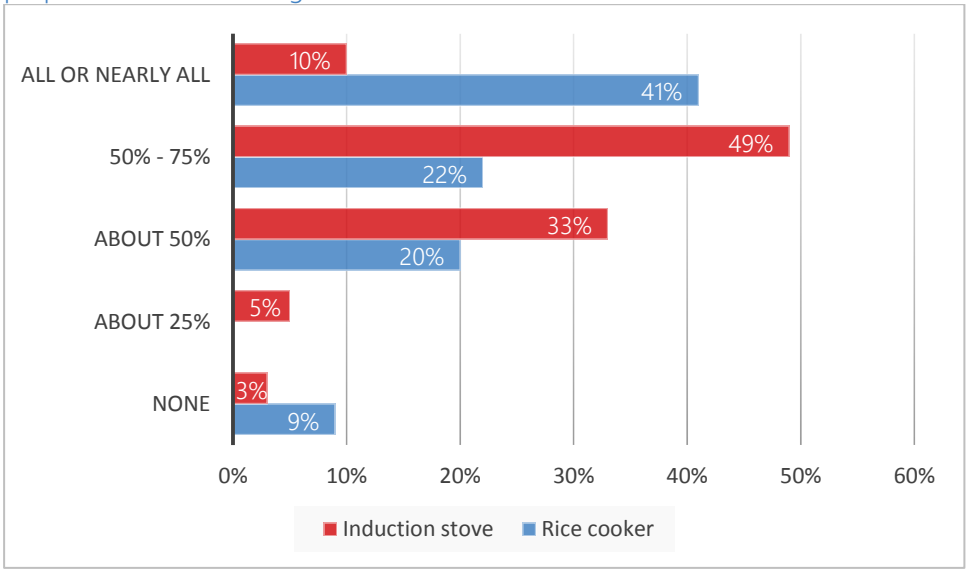
Table 10: Use of different stoves by purpose

Stove type	Cooking practices
Induction cooktop (n=40)	Cooking main meals, tea and snacks (N=37)
	Preparing only tea and snacks (N=3)
Electric rice cooker (n=10)	Cooking only rice (N = 10)
Traditional biomass stove (n=37)	Cooking main meals (N=1)
	Mainly making animal feed, occasionally other food (N=36)
LPG (n=32)	Cooking main meals and tea and snacks (N=10)
	Preparing only tea and snacks (N=20)
	Mainly cooking for commercial purpose (N= 2)

Source: Household survey

Stacking of fuels is a common practice for both induction and rice cooker users. About 50% of all respondents using the induction stove use it for 75% of their cooking, while only 10% do nearly all their cooking on the induction stove (Graph 5). Although rice cookers are suitable for boiling rice and grain, the respondents of phone interviews, household surveys, and FGDs indicated only using them for cooking rice. Of the phone survey respondents, 41% use the rice cooker for nearly all their rice. Also, if rice cookers are used, they are used for at least 50% of rice meals.

Graph 5: Proportion of cooking: induction stove proportion of all cooking and rice cooker proportion of rice cooking



Source: 60 Decibels PowerPoint 16 July

Three quarters of the users of induction stoves consider the induction stove to be their primary stove and the remaining quarter their secondary stove (FGDs). LPG and traditional biomass stoves are the most common complementary stoves (Table 11).

Table 11: Ranking of stoves by users and non-users of electric cooking in Temal

Type of stoves	% Households				Total
	Primary	Secondary	Third	Fourth	
Induction - Users (N = 43)					
Induction	75.00%	25.00%	0.00	0.00	100.00
LPG	14.58%	18.75%	31.25%	4.17%	64.58
Traditional biomass stove	10.42%	37.50%	31.25%	0.00	79.17
Rice cooker	0.00	4.17%	0.00	0.00	4.17
Biogas	0.00	8.33%	0.00	0.00	8.33
ICS	0.00	10.42%	12.50%	0.00	22.92
Total	100%	104.17*	75%	4.7%	
Induction - Non-users (N = 11)	100.0	100.0	0.0	0.0	
LPG	85.7%	0.0	0.0	0.0	85.7
Traditional biomass stove	14.3%	85.7%	0.0	0.0	100.0
Rice cooker	0.0	0.0	0.0	0.0	0.0
Biogas	0.0	14.3%	0.0	0.0	14.3
ICS	0.0	0.0	0.0	0.0	0.0

* This adds up to more than 100%, as the rice cooker is used in parallel with other fuels for cooking.
Source: FGD

A similar exercise was performed with the household survey respondents in Temal and Roshi. In Temal only interviewed users of induction stoves and in Roshi only users of rice cookers participated (Table 12).

Table 12: Ranking of stoves by primary stoves by respondents in Temal and Roshi

Municipality	Stove type	% of Households		
		Primary	Secondary	Third
Temal (n=40)	Induction cooktop	92.5	7.5	0.0
	Traditional biomass stove	2.5	67.5	15.0
	LPG	5.0	25.0	25.0
	Total	100.0	100.0	40.0
Roshi (n=10)	Electric rice cooker	0.0	80.0	20.0
	Traditional biomass stove	0.0	20.0	10.0
	LPG	100.0	0.0	0.0
	Total	100.0	100.0	30.0
Total (n=50)	Induction cooktop	74.0	6.0	0.0
	Electric rice cooker	0.0	16.0	4.0

	Traditional biomass stove	2.0	58.0	14.0
	LPG	24.0	20.0	20.0
	Total	100.0	100.0	38.0

Source: Household survey

Among the users of induction stoves, there is a clear difference by social groups in the use of induction stove as primary stove. The FGDs indicate that the use of the induction stove as primary stove is highest (100%) among housewives and lowest among Dalit families (Table 13). Of the four Dalit induction stove users, two used the induction stove and the traditional biomass stove as primary stove. The economically active women who did not use the induction stove as primary stove indicated that uncertainty in electricity supply would hamper their work and that the pots for induction cooking were not appropriate for their need, and that, therefore, LPG was more convenient for them to use. The businesses of these women, such as tea shops, are run from the same building as the home.

Table 13: Primary cookstoves in different types of families in Temal (in %)

Group type	User type	N	Induction	LPG	Traditional
Male/Female (economically active)	User	12	91.7	0.0	8.3
Housewives	User	9	100.0	0.0	0.0
Dalit female	User	4	50.0	0.0	50.0
Dalit female	Non-user	4	0	0.0	100.0
SHG member (female)	Users	11	72.7	18.2	9.1
Women (economically active)	Users	7	40.0	50.0	10.0
Male/Female (economically active)	Non-users	7	0.0	85.7	14.3

Source: Focus Group Discussion

An estimation of the actual duration of the use of the induction stove, through a calculation based on the data on increased electricity consumption, indicates that the induction stoves were used 1-1.4 hours a day on average. This calculation is based on the average monthly consumption of 25.6 kWh, derived from the household survey data,[8] and an assumed typical use of 1200 W-1600 W for the stove of 2000W capacity. We refer to this informed estimate as we did not measure the time that each stove was used, and respondents referred to the time spent on cooking rather than the time each stove was used. The time spent on cooking may include use of several stoves simultaneously and chopping of vegetables, for example.

Some of the findings of the household survey on the time spent on typical activities were:

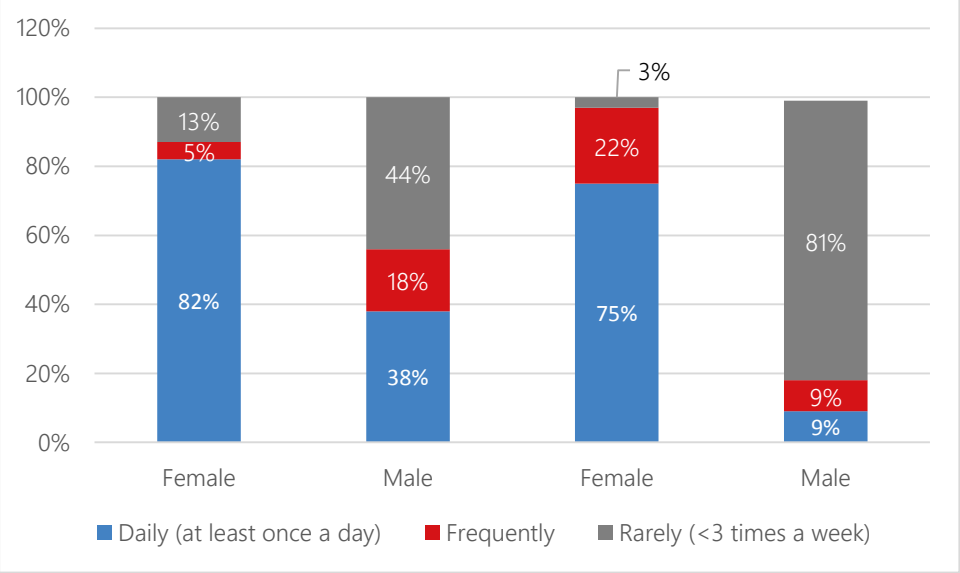
- The time spent by induction stove users on cooking main meals and tea and snacks is just under three hours per day (N=37).
- The time spent on making animal feed on biomass stoves is 1.15 hours per day (N=36).
- The time spent on making tea and snacks on electric cooking appliances is 50-75 min per day (N=23).
- Two persons who run a small business spend around four hours a day on cooking activities for the business.

[8] Based on the average increase in electricity consumption data from the household survey (Table 20), changes in fuel uses and electricity consumption for income groups and LPG (non-)users (household survey).

4.2. Men and women as users of electric cooking appliances

Although women are the main users, men also use electric cooking appliances. Men use induction stoves more frequently than rice cookers. This pattern was found in both phone surveys and household surveys. With the uptake of the induction stove, men have started to take up cooking activities (graph 7, and tables 14 and 15), even if it is just making tea and snacks, but no such change was noticed in the case of rice cookers. In phone interviews, respondents were specifically asked how frequently they and other household members used the stove. The analysis of the results is presented in Graph 6.[9]

Graph 6: Frequency of use



Source: Phone interviews

Table 14: Cooking by men before and after uptake of electric cooking by stove type

Stove type	Before uptake		After uptake	
	Yes	No	Yes	No
Induction stove (N=40)	15	25	32	8
Rice cooker (N=10)	7	3	7	3
Total	22	28	39	11

Source: Household survey

[9] The graph was developed by ENERGIA based on the responses to the following three questions that were posed in Phases 2 and 3 of the phone survey: 1: "How often do you use the [induction stove/rice cooker] in a week?"; 2: "Is there anyone else who uses the [induction stove/rice cooker]" and 3: "How often do they use it?"
The sex of the respondent is known, and, for the purpose of this graph, the sex of other users was derived from the answer to question 2, which typically mentioned wife, daughter, husband, etc. The graph only includes users where the sex was clear (excluding users for whom sex cannot be derived, such as 'parent'). The results of this constructed sample provide information on the frequency of use for 82 men and 100 women for the induction stove (n=182) and 32 men and 36 women for the rice cooker (N=68).
For the analysis of frequency of use, the most frequent answers were categorised and then grouped for the graph presentation into: "daily" (using the appliance once or multiple times a day); "frequent" (using the appliance somewhere between 3 and 6 times a week); and "rarely" (using the appliance fewer than 3 times a week).

The principal responsibility for cooking the main meal is that of women, although men have also started using the electric cooking appliances after the uptake of electric cooking. Men have started to make tea and snacks, spending about half an hour a day on cooking. A similar pattern emerges from the open questions on frequency of use of appliances in the phone survey. Although the information on what is cooked by men is only available for nine male induction stove users. Six reported making only tea, three rice and tea, and none reported making meals. A first glimpse of how the sharing of responsibilities of cooking is perceived can be constructed based on the open question responses of the phone survey. Of the 51 households which reported sharing responsibilities, about half (26) stated that the distribution is equal between husband and wife, and the other half mentioned cooking on the electric appliance to help the female member who is mainly responsible. This suggests a topic for follow-up research.

Women spend more than two hours cooking a day, whereas men spend around half an hour, mainly making tea and snacks. The time cannot be attributed only to the induction stove, as it is not used throughout the cooking time and other fuel sources also may be used. The period of time which men spend in the kitchen often overlaps with that of women being in the kitchen (household survey) (Table 15).

Table 15: Time spent by men and women on cooking meal, tea and snacks after uptake of electric cooking

Stove type	Cooking meals, tea and snacks (hr/day)	
	Female	Male
Induction stove (N = 40)	2.10	0.62
Electric rice cooker (N=10)	2.40	0.35
Total	2.16	0.57

Source: Household survey

4.3. Within-household decision-making on uptake and use

Most decisions to purchase the electric cooking appliance are taken either collectively or by men alone, but female respondents more often reported joint decision-making or their own role in decision-making than men.

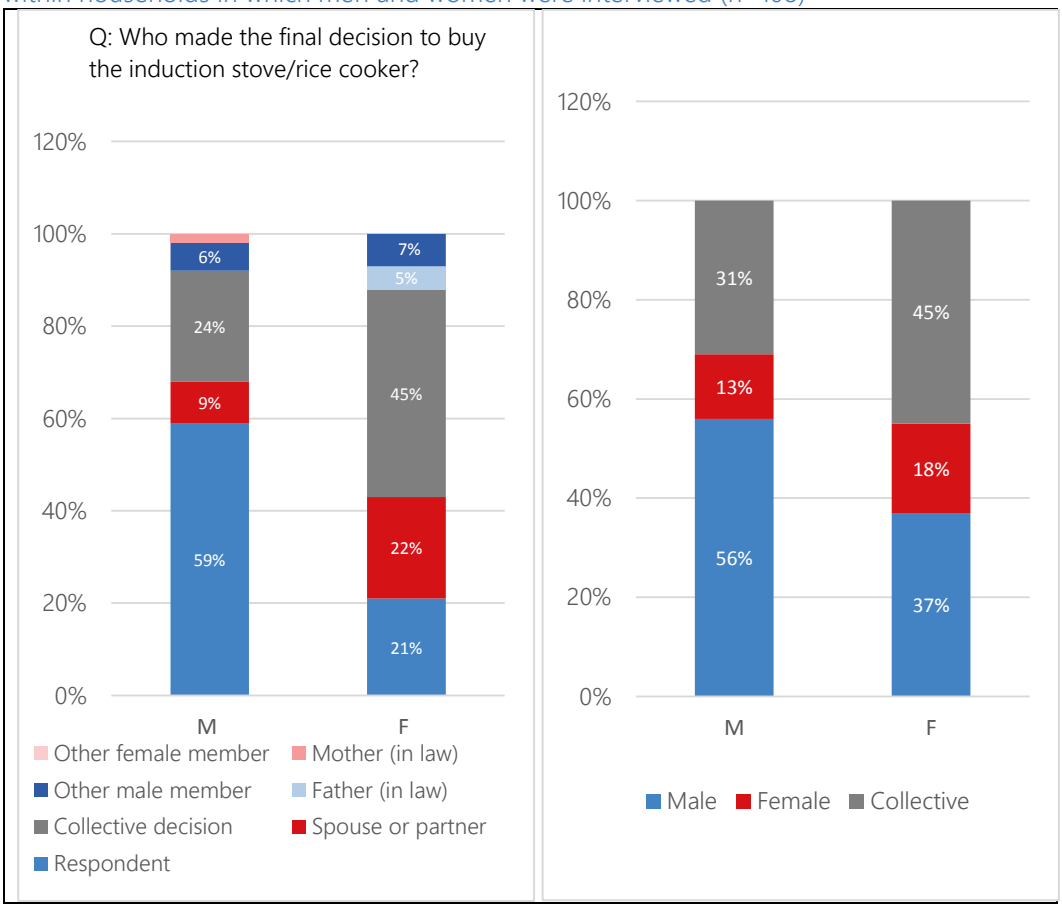
The male respondents of the phone survey reported that the decision was taken by male members in 65% of the cases, while only 21.5% of female respondents reported that the decision was taken by men (Graph 7). According to 9.4% of male and 20.5% of female respondents, decisions to purchase were taken by female members and, according to 24% of male and 45% of female respondents, purchase was a collective decision.[10] The household surveys show collective decisions being the dominant mode, reported by 29 of the total 50 households and even 23 of the 32 male-headed households. An explanatory factor of the high level of decision-making by women may be that gender inequality in the Janajati community is lower than in other communities in Nepal.[11]

[10] 60 Decibels: from segmented analysis Gp7

[11] Around 60% of the sampled households for household surveys in Temal and Roshi were Janajatis.

Even within the same household, men reported a higher role in their decision-making and more women reported joint decision-making on purchase of cooking appliances. Looking at those households in the phone survey in which both husband and wife were interviewed separately, it is clear that the differences in response on purchase decisions represent differences in (stated) perceptions on decision-making between men and women (Graph 7).

Graph 7: Statements on purchase decisions by men and women in total sample (n=302) and within households in which men and women were interviewed (n=108)



Source: Phone survey

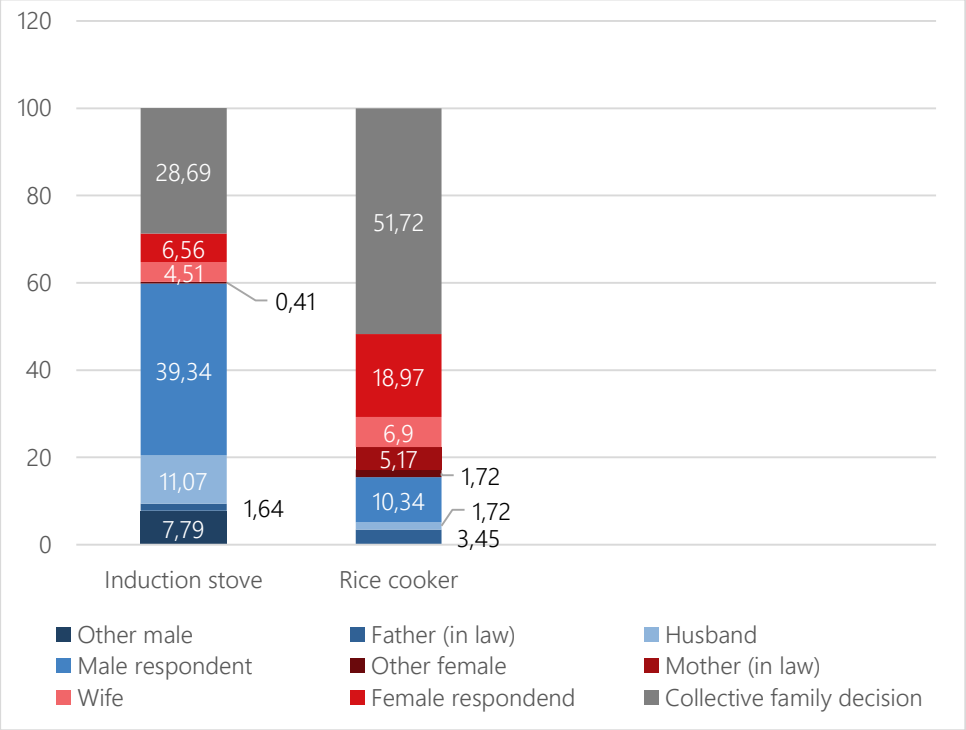
The registration of the owner of the electricity meter as 'customer' in the induction stove programmes reflects the head of household rather than the main decision maker for the uptake or main use of the appliance.

In de jure and de facto female-headed households, decisions are taken mostly by the female head, but men also play a role. The household surveys show that, in female-headed households, most decisions on purchase of electric cooking are taken by female members (12 out of 18 households), but male members also play a role, as decisions were taken collectively by the household head and spouse in six out of 18 households.

Decision-making on purchase differs by product. The phone survey findings indicate that, for induction stoves, decisions are more likely to be taken by men than women, while, for rice cookers, most decisions are taken by women or collectively. These differences may be related to the costs of the system (a package of induction stove, pots and pans costs NRs. 4,750,

whereas rice cookers cost around NRs. 2,500). However, in the smaller sample in the household surveys in Temal, an opposite pattern emerged, with decision on purchase being indicated as a shared decision by 70% and a decision by female members by 30% of the respondents using induction stoves. In the small sample of 10 households with rice cookers in Roshi, decisions were taken mainly by men or collectively (Graph 8). Differences may be related to the local nature of gender norms and financial situation, and also interactions with programme approaches and market.

Graph 8: Purchase decision by men and women for induction stoves and rice cookers



Source: Household Survey

For decisions on which fuel to use, women are the main decision makers in most households. The household survey shows that men take decisions with respect to selection of fuel and stove for cooking in 13 of the 50 households and women in the large majority of 37 (Table 16).

Table 16: Decision maker on use of type of fuel for cooking

Gender of household head	Decision maker	Temal (N = 40)	Roshi (N = 10)
Male (N = 32)	Male	8	4
	Female	15	5
	Total	23	9
De jure female head (N = 8)	Female	7	1
	Total	7	1
De facto female head (N = 10)	Male	1	
	Female	9	
	Total	10	
Total (N = 50)	Male	9	4
	Female	31	6

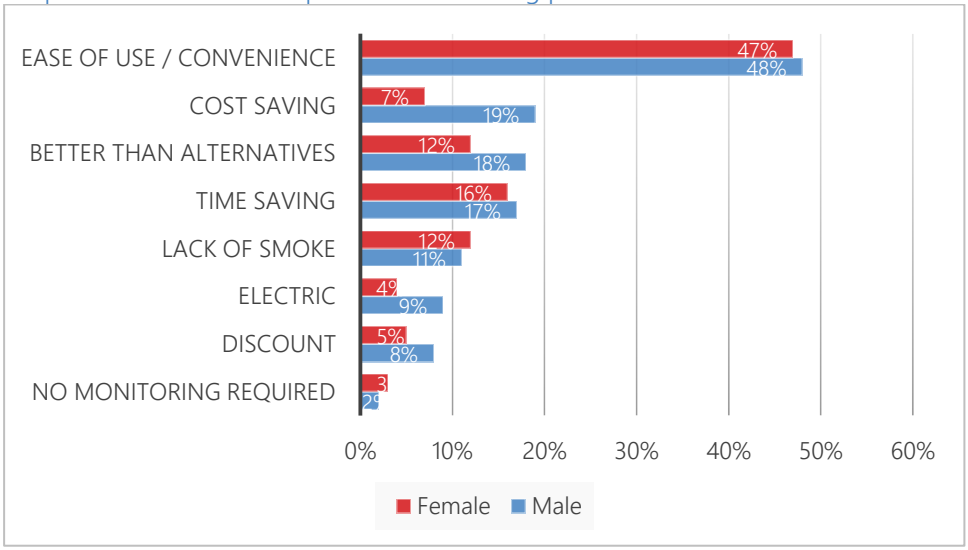
	Total	40	10

Women are usually, but not always, the main decision makers when it comes to what is to be cooked. In Temal, 80% of women claimed they had a higher role in deciding what to cook for meals, whereas 20% said this was a joint decision. In Roshi, all women reported being the only decision-maker on what to cook. As decision-making is a complex process of longer-term purchases and day-to-day decisions, further research is needed to investigate interlinkages between what is cooked and which stove is used and decision making on both.

4.4. Motivation to buy

The most common reason for the purchase of electric cooking appliances is ease of use. Ease of use was reported as the main reason by both women and men for both induction stove and rice cooker in the phone survey, and this reason ranked highest in the household survey. While nearly half of the respondents of the phone survey (47% of female and 48% of male respondents) mentioned ease of use as the motivation to purchase, significantly fewer (16% and 17% respectively) mentioned time saving as a motivating factor (Graph 9). The phone survey indicates that, for rice cooker users, time saving and the automatic nature of cooking were the other top reasons for buying the cooking device, while, for induction stove users, cost saving and the expectation that the product is better than alternatives were the top reasons after ease of use. Lack of smoke was reported as a reason by just over one in ten respondents, equally for male and female.

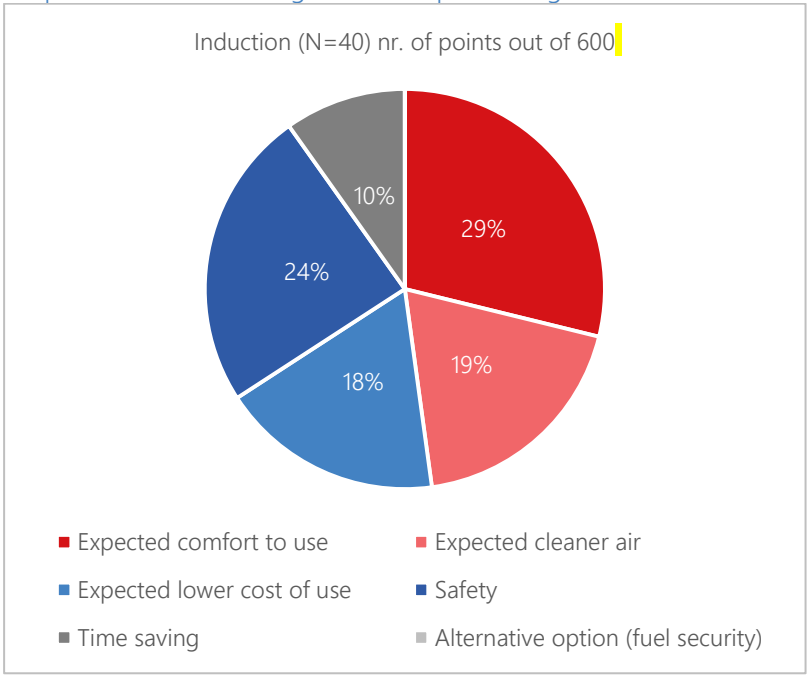
Graph 9: Motivation to acquire electric cooking product



Source: Phone survey

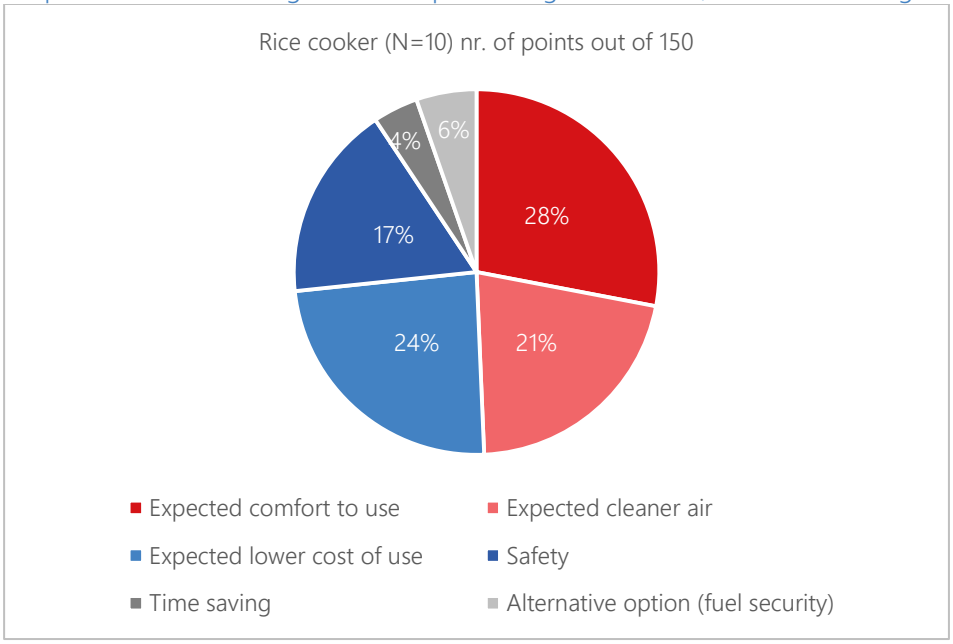
The exercise of ranking of main motivational factors for the uptake of electric cooking appliances shows that comfort, safety, and clean air were the key factors. The respondents of the household survey were asked to rank from 1 to 5 (5 being the highest) for i) expected comfort of use, ii) expected time saving, iii) expected clean air, iv) expected lower costs of use, v) safety, and vi) others (Graphs 10 and 11).

Graph 10: Main motivating factors for purchasing stoves based on ranking



Source: Household survey

Graph 11: Main motivating factors for purchasing rice cookers, based on ranking



Source: Household survey

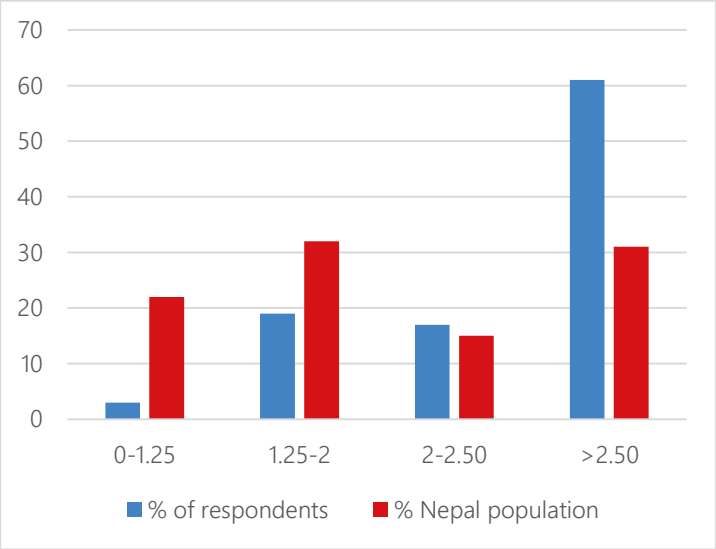
In the different data collection tools, the time saving factor received a different level of priority in the motivation to buy, while it is perceived as one of the main benefits of electric cooking, possibly as respondents relate time saving to comfort and ease of use. We further explore the interpretation of time saving in Chapter 5.

Motivation is similar for men and women. Of all the motivations mentioned in the phone interviews, the only one with a gender difference is that of cost saving, which was reported by more men than by women.[12]

4.5. Access to financial resources for uptake and use

The induction stove programme reached households that are relatively better off compared to the Nepal average. Also, rice cooker users are relatively well off, with high representation in high income groups. Altogether 59% of induction stove users and 69% of rice cooker users are categorised as above USD 2.50 per person per day (2005 PPP),[13] while the Nepal average is 31%. The findings from the Poverty Probability Index® (PPI) calculation[14] indicate that respondents from the 194 households (rice cookers and induction stove) were relatively well off compared to the Nepal population, and only 22% of the customers were poor or extremely poor, against the Nepal average of 54%. Altogether 61% of the customers were emerging middle class and above (Graph 12), while the average for Nepal is 31% (Schreiner, 2013).

Graph 12: Income relative to Nepal average living on x USD 2005 PPP per person per day



Source: Phone survey

The fieldwork in Temal indicates that the majority of the villagers from the survey locations belong to middle income groups, and this is reflected in the users of electric cooking appliances and in the sample of respondent households (Table 17).

[12] A chi-squared test reveals that the information on uptake was not significantly different for men and women and also health benefits motivated male and female respondents similarly.

[13] Due to the small sample size for rice cookers (58), this is only an indicative number.

[14] The methodology is described in Annex 2.

Table 17: Respondents of household survey across income groups

Stove type	Income group	N
Induction (N = 40)	High income	2
	Higher middle	24
	Lower middle	14
	Total	40
Rice cooker (N = 10)	High income	3
	Higher middle	7
	Total	10

The assessment of the inclusivity ratio indicates that the representation of respondents below different poverty lines is relatively low, and therefore, access to financial resources within the studied households can be assumed to be relatively high compared to the Nepal average. The calculations of the inclusivity ratio based on a standard question set, indicate that 41% of the induction stove programme respondents were below the USD 2.50 PPP poverty line (against the Nepal average of 69%), and an indicative 31% of the rice cooker users are below this line.

The PPI methodology is presented in detail in Annex 1.

The affordability of induction cooking, especially the running cost, despite the measures taken to reduce the tariff and cost of the package, was raised as a concern by most women in both FGD and household surveys. This concern was raised by Dalits as well as housewives in FGDs. The participants of the FGD of induction stove non-users expressed their interest but on the condition that they get some financial support.

The potential for scaling up dissemination of induction stoves is high but is perceived to be dependent on financial support. According to the chairperson of the Temal CREE, the interest of the community in adopting the induction stove is growing. He believes that about 1,000 more households will adopt the system. The growing interest is mainly due to the subsidy provided on the package as well as on the monthly electricity tariff. However, the CREE is in no position to continue with the provisions that were available during the project period.

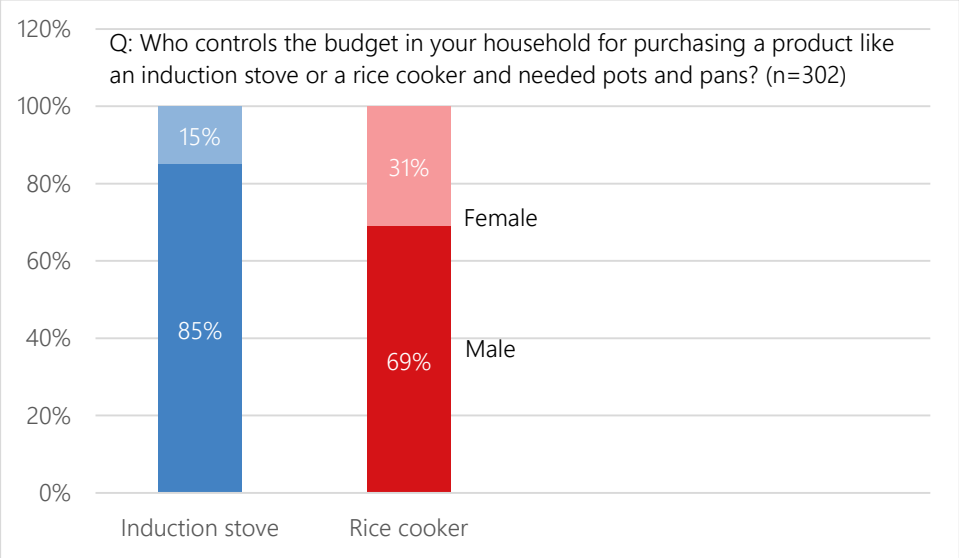
Loans were taken to purchase induction stoves by lower middle income households. In four of the forty respondent households in Temal, female family members had taken loans from a women's savings and credit group to purchase induction stoves. None of the households in Roshi had taken loans for buying rice cookers. Loans were taken only by those respondent households that had been classified as lower middle income, which constituted 14 of the 40 sampled induction stove users.

This finding points to the role of local financing in increasing access of the lower middle income households to induction cooking by facilitating upfront investment of NRs. 4,750. Respondents from the lower middle income and low income groups also mentioned that they might not be able to pay the increased electricity tariff with electric cooking, implying that long-term sustainability of use through an incentive and support system that only focuses on uptake is not guaranteed for these income groups.

The only loans taken were those by women affiliated with a savings and credit group. Savings and credit groups are local groups in which members save money and provide loans to members, where the interest on loans is shared across members of the group. The advantages of taking loans from such groups, especially for poor customers, are that they do not require collateral and allow short-term loans.

About 80% of phone interview respondents indicated that men control the budget for the purchase of products like induction stoves or rice cookers. The control of women over the smaller budget for the rice cooker is higher than over the larger budget for the induction stove package. A comparison of the responses of male and female members of those 108 households showed that responses differ in 25.5% of the households and both male and female respondents indicated that they were the one in charge of the budget (Graph 13).[15]

Graph 13: Control of budget for purchase of induction stove and rice cooker



Source: Phone survey

Women have a high level of control over the day-to-day budget for cooking fuels, as they often contribute to the payment and decision-making for electricity bills and LPG refills. The women across the FGD claimed they played a high role in payment and decision-making. In the household surveys, women in over half of the households in Temal stated having a high role in payment and decision-making on LPG and electricity use and a shared role with men in other households, while in Roshi it was mainly male or collective control.

The influence of who earns the income on the uptake and use of electric cooking is not evident. Although it can be hypothesised that the uptake and use of cooking appliances that are more convenient, safer, and cleaner would be higher in those households where the main cook earns an income and thereby likely to have a higher agency as to access to financial assets and higher decision-making than in households where the main cook does not earn an income, more enquiry is needed to investigate these links. Our data from the household survey is in line with such a hypothesis, but due to the diversity of income earning and low sample size, no conclusions can be drawn on this issue. In Temal, in 37 of the 40 households

[15] From the within-household analysis by MECS.

interviewed, both men and women earn income, while, in Roshi, in all 10 households, only men earned income.

4.6. Information dissemination for uptake and use

4.6.1. Induction stove programme information campaigns

A wide range of information channels were used to reach and motivate potential customers to shift to induction stoves. The project activities included promotional demonstrations for awareness of correct use, printed materials (handouts, posters), interpersonal communication (through phone calls, door-to-door visits, and events), videos (promotional, tutorial), and a Facebook chat group. The information was provided in Nepali.

Both external and local people were involved in information dissemination. This included CREE staff members and lines persons for repairing electricity lines and meters and social mobilisers, who were contracted by the programme for the project duration. The social mobilisers were two women and one man from Kavre District.

Community events formed the core of official information dissemination programmes. Events were organised to raise awareness and to answer potential buyers' queries and concerns about cooking on the induction stove. Each of these events included a live cooking demonstration on how the induction cooktop works by making tea as the simplest use of the stove. During the events, a video was shown and flyers were distributed. According to the project implementers, NACEUN and ABF, the event successfully created a platform for live learning about the technology as well as for consulting with experts and other attendees.

An awareness and demonstration event was organised at each electricity transformer station area. In total, over 30 events were organised (ABF, 2020). The load stations are centrally positioned within each target area so that the event is at most half an hour's walking distance. The events lasted three hours and took place in the morning or afternoon or evening.

Invitation and publicity for the events was provided on the phone by a CREE committee and social mobilisers and through door-to-door distribution of flyers, display of posters and notices at the CREE office and at dairy cooperative office, and display of banners in the market.

Each event targeted to have 10% of households participate in the induction stove programme, which amounts to around 20 households per transformer.

The information provided covers a broad range of issues to inform and motivate potential customers. The packages provided by ABF provided information on: how to use the induction stove; advantages of the electric stove; case studies: voices of motivators; users' guide: what utensils to use and how to use them; safety measures; comparative costs with LPG[16]; source of cookstoves and point of collection; post-purchase services, etc. (Photo 10).

[16] The exact costs were not provided in programme documents as these may be time bound.

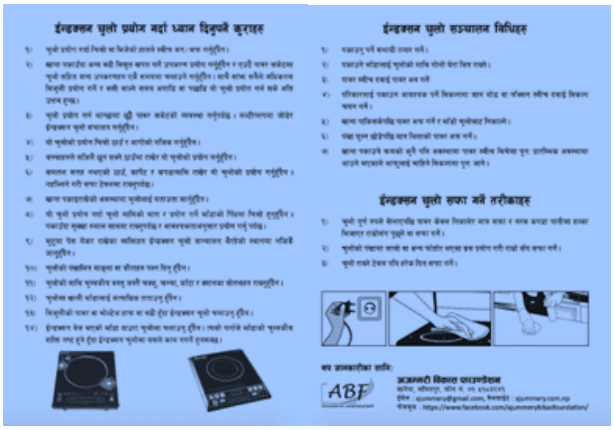
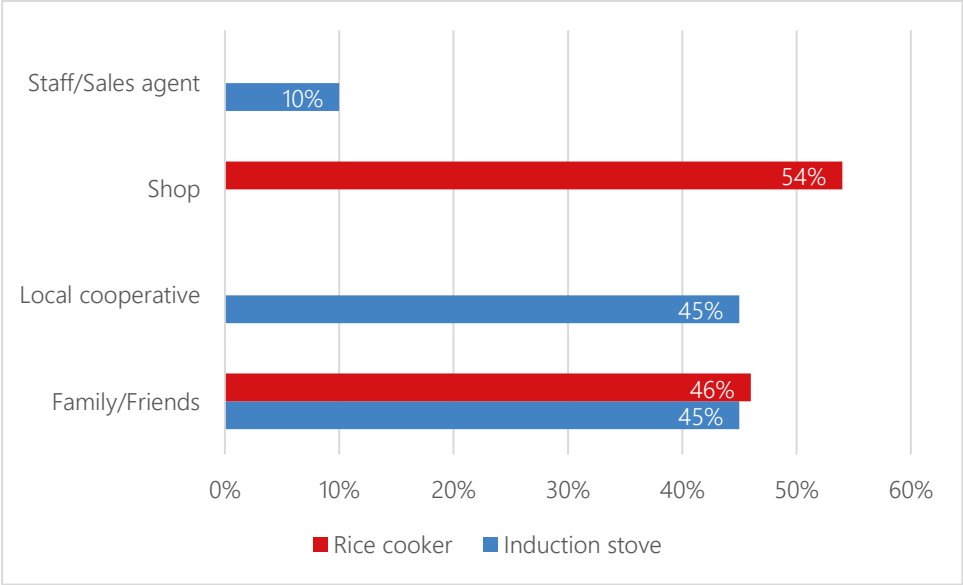


Photo 10: Handout on correct use and maintenance of induction cooktop

4.6.2. Information channels used to reached potential customers

Information on induction stoves reached customers through either friends and family members, or through the programme information channels, or both. For customers of rice cookers, who bought their appliances in the market, also family and friends were a key source of information. The role of family and friends is significantly high for the users of the induction stove (Graph 14), at a level similar to that of the rice cookers, where no specific local awareness campaigns were conducted.

Graph 14: Sources of information on rice cookers and induction stoves



Source: Phone survey

The source of information differs between men and women, and women were often not reached directly through official channels. While women were more likely to have heard of the induction stove through friends and family members, in the phone surveys, more male than female users reported local cooperatives and staff or sales agents as their initial sources of information. This suggests that outreach and marketing activities conducted through the induction stove programme were more effective in reaching men than women. This is confirmed by the information on the awareness and demonstration events from the household surveys (Table 17).

Table 18: Number of households informed by the induction programme through awareness and demonstration events, by sex, in Temal

Municipality	Who was informed	Household Head		
		Male	Female	Total
Temal	Male	17	3	20
	Female	6	14	20
	Total	23	17	40

Source: Household survey

Awareness and demonstration events were key to the outreach in Temal, where more men than women were reached. A large difference between men and women in the induction stove programme was found: 75% of men were informed by the programme compared to only 25% of women (household survey). Although the project campaign indicated that a male and a female member from each house were to attend the awareness event, only one member participated from most households, and this was more often a male than a female. Especially in male-headed households, the programme information often did not reach the female main cook directly (Table 18).

In the assessment of the gender-responsiveness of the induction stove programme (Chapter 6), we explore the reasons for the low level of reaching women compared to men.

Households with good information networks were more likely to participate in the induction stove programme. As the number of induction stoves was limited to 10% of households per transformer, with demand being higher than 10% in most areas and participation being based on the first come first serve basis. Only the families who got information on time and made timely decisions received them. These were mainly people who were relatively better off and with better networks. Mobilisers targeted households they believed would be likely to join the programme, and, therefore, actively targeted information and awareness activities at more well-off households (KII with social mobilisers). In the FGD with non-users, participants said the information had not reached them.

The programme information missed reaching people from the lowest income segments of the community. In the Temal induction stove programme area, an FGD was held with some people who had access to electricity but who were not among the 10% of the households who participated in the programme. This group indicated that programme information had not been disseminated to the whole population. According to these non-users, mainly Dalits, they heard about the programme only after the event had ended. However, the evidence from participants and KIIs on the distribution of participants shows that a level of spreading over persons from different communities, including income levels, was maintained, largely due to the need to adhere to the load limitation, which induced the spreading of induction stove programme participants over a large number of transformers.

The main information source on rice cookers differs per district. While in Kavre, information on the rice cooker was received through relatives and neighbours who used it, in Sindhuli, 62% of rice cooker users first heard about the products through shops and 38% through friends and family members. In Kavre, most of the rice cookers were purchased in urban markets rather than in the local area, but, with the increasing availability of choices in the local market, this trend is changing.

Households with lower literacy benefitted from the door-to-door promotions as well as from the after sales support. Door-to-door promotions only took place in areas where the demand was not high enough even after awareness and demonstration events. Some of the information channels, such as Facebook, did not reach potential customers, but other information channels, like leaflets, were widely received.

Trust is created through participation of locally known stakeholders. The CREE being a local entity helped build the confidence of the potential clients, as it not only supplied the product and compatible utensils but also undertook to provide necessary support for repair and replacement of stoves. According to the CREE, very few cases of damage had occurred and had been taken care of.

A combination of types of information and targeting different user groups as well as both men and women is effective to reach customers and to allow exposure and opportunities to follow after initial uptake in the community.

> *"It was easy for me to decide about purchasing the stove as my husband was there, too, at the demonstration event. He quickly understood the technicalities and agreed to help me with the operations. Besides, my neighbours were getting one for themselves. When more people registered for purchase, our confidence in the technology increased."*
>
> SHG member in Temal

4.6.3. Information content: user perspective

Information about electric cooking is important, as this was the first purchase of an electric cooking device for nearly all customers of induction stoves, while most customers of rice cookers had used the electric cooking appliance in the past. The induction stoves were the first introduction to any form of electric cooking for 97% of phone survey respondents who used induction stoves and 92.5% of household survey respondents. For rice cooker users, however, 22% had used an electric appliance for cooking before (phone surveys) as had all of the 10 households in Roshi (household survey).

Information on ease of use and time saving influenced purchase decisions the most. Other useful information includes instructions on usage and health benefits, while only a few customers indicated that information on discount or warranty influence their purchase decision. Both men and women found similar information useful, but 11% of women indicated that they did not make the purchase decision.

Many induction stove users wanted more information about the product, especially on access to repair and utensils. Sixty-one per cent of the induction stove users required additional information compared with only nine per cent of the rice cooker users, indicating the requirement for more information (phone survey).

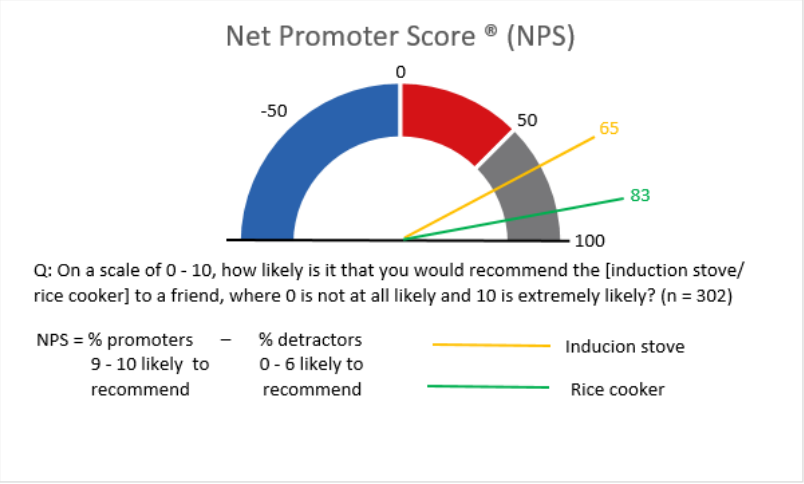
According to ward-level women and Dalit representatives, lack of information on how to operate and address problems in the system is one of the reasons for single women and marginalised groups not adopting the technology.

The availability of alternative electric cooking appliances appears to be higher in Sindhuli and Banke compared to Kavre. Especially for rice cookers, the respondents reported that it would be easy for them to find a good alternative to the rice cooker in the market, while for induction stoves, 30% reported that this would be easy and 29% were not certain (phone survey). There is no significant difference in the knowledge of alternatives between male and female respondents from the same households.

4.7. User satisfaction, challenges, and user priorities

The Net Promoter Score (NPS)® indicates that the level of satisfaction was high for induction stoves and very high for rice cookers. With an NPS® of 83 for rice cookers and 65 for induction stoves (Graph 15), the scores were good and higher than the 60 Decibels' Benchmarks—the global average score being 41 and cooking company average being 55. There was no difference in NPS® between male and female customers.

Graph 15: Net Promoter Score for induction stoves and rice cookers



The score is based on the question: "On a scale of 0 to 10, how likely is it that you would recommend the induction stove or rice cooker to a friend, where 0 is not at all likely and 10 is extremely likely?" The respondents who provided a rating of 9 or 10 (70% of the total) stated that they appreciated: the ease of use and convenience, the time saved by products, and that the product is better than its alternatives. The respondents who provided a rating of 7 or 8 (28% of the total) also cited ease of use and convenience and time saving as the main benefits, but complained about increased electricity usage. Only 2% stated that they would not recommend the product to a friend (rating provided 0-6), citing requirement of additional utensils, household budget constraints, and not yet using the product as reasons.

Explanations for the differences between induction stove and rice cooker users are not clear, but it may be hypothesised that factors that play a role are that the expectations from

induction stoves were higher than from rice cookers and also that the induction users come from a broader range of income groups, whereas rice cooker users belong to high income and higher middle income groups. Further research is recommended.

The main challenges users faced were unavailability of appropriate pots and pans, product damage and repair, issues with electricity supply, and costs. These were reported in the phone surveys, FGDs, and household surveys. In the phone surveys, about 15% of the respondents reported challenges, with very little difference between induction stove users and rice cooker users. Safety concerns due to the use of electricity were also raised, where women indicated that they were initially afraid to use the induction stove. The disadvantages experienced by the users were: unavailability of the special utensils required for the induction stove in the local market, reported by 45% of the respondents of the household surveys, and unsuitability of the system for large families, reported by 20%. Altogether 20% mentioned not being able to prepare traditional dishes on this stove and a further 20% stated irregular electricity supply as problems. With regard to rice cooker users, all had only one complaint: not being able to get the appliance repaired locally (Table 19).

Table 19: Disadvantages of electric cooking reported by respondents

Disadvantages	Induction (%) respondents (N=40)	Rice cooker (%) respondents (N=10)	Total (%) respondents (N = 50)
Several Nepali dishes (eg *Dhindo)* cannot be cooked	18	0	14
Repair and maintenance is a problem	0	100	20
Requires special type of pots which are not available in the local market	45	0	36
Not sufficient for large families	20	0	16
Electricity is not regular	18	0	14
Total	100	100	100

Source: Household survey

Reasons for stopping using the product are diverse, but some can be addressed through consumer information. Among the 13 of the total 302 respondents of the phone survey who indicated no current use of the induction stove or rice cooker, six said they stopped using the product. The reasons for stopping using the induction stove included: yet to buy pots; higher consumption of electricity; and food not tasting as good as those cooked on traditional stoves. For rice cookers, the only reason cited was that it had stopped working.

Relatively few respondents indicated irregular electricity supply as a problem. The low reliability of electricity supply was mentioned as the main disadvantage of electric cooking by 14% of the household survey respondents and 3% of the phone survey respondents.

4.8. User perspective: effects of characteristics of cooking appliance and pots on uptake and use

The induction stove programme provided a standard package of a single potholder stove and a set of pans. Issues of uptake and use of the system related to design and system design are recognised.

The pots were too small for some typical uses. Further analysis is, however, needed on the ability and willingness to pay for the systems that have the heating capacity for larger pans and the associated electricity consumption.

The perception of cooks is that pots provided are not suitable for cooking traditional staple dishes, such as *Dhindo* (millet porridge). Several traditional dishes can, however, be prepared with a different way of cooking. Information on recipes and different ways of cooking is not provided by the programme.

There is no flexibility in the choice of pots and pans to meet household demands. For timely delivery and cost reduction, a uniform set of pots and induction cooktops was purchased in bulk. In Temal, even those families who are able to pay for more pots of different sizes or higher quality had not purchased these as they were not available in the local market.
The issues with pots are illustrated by the following quotes:

> *"We have been cooking rice, lentil soups, beans, milk, and tea on an induction cooktop. But when it comes to cooking for a large number of people, we use the biomass or LPG stoves."*
>
> All FGDs in Temal

> *"We prefer to cook meat and green vegetables on firewood. We cannot cook certain food items (such as Dhindo, roti) on the induction cooktop."*
>
> All FGDs in Temal

Damage of cable or glass surface and lack of repair services at local level are main problems. In Temal, the local CREE provided support necessary for repair and replacement of the induction stoves. These services are appreciated despite the fact that there was a considerably long waiting time before the repair or replacement.[17]

Pots and pans are unsuitable for cooking some typical Nepali dishes. Pots do not evenly distribute heat over the food so that food burns. This problem was especially noted for *Dhindo* and curry dishes (FGDs and household surveys).

[17] The system had to be taken to a dealer in Kathmandu. The replacement and repair depended on the available stock and spare parts.

Establishing market access to electric cooking appliances and utensils closer to users may stimulate uptake and use of the appliances. Of the 48 respondents of the phone interviews who provided specific suggestions for improvement, 21 induction stove users said they wanted additional products or wanted to have better access to a store where the product is sold.

The issue of safety related to electric cooking is both a key benefit and a major challenge. All the users of electric cooking appliances, both rice cookers and induction stoves, expect either a substantially lower occurrence of burns (total 88%) or some reduction of burns compared to other forms of cooking. The risk of fire and explosions was feared, especially by those respondents who did not have a separate kitchen but cooked in the main living space (8 out of 40 in Temal and 6 out of 10 in Roshi). Fortunately, no such incident was reported. The feeling of safety is illustrated by the following statements:

> *"We feel safe with the induction stove. With LPG, there is the fear of a blast."*
>
> All FGDs

> *"The technology is easy to use, though initially, we were scared of getting electrocuted."*
>
> All FGDs, Temal

5. IMPACTS: HOW ELECTRIC COOKING HAS AFFECTED MEN AND WOMEN'S NEEDS AND INTERESTS

This chapter describes the impacts of electric cooking on the lives of men and women. It begins by presenting the users' experience of what the effects of electric cooking have been for them, followed by a more technical background analysis of the impacts by looking into what fuels were substituted. The next sections then present the following dimensions of outcomes and impacts of electric cooking:

- Changes in time spent and understanding of time saving
- Outcomes of time saving through an indication of how time is spent
- Health impacts
- Financial impacts
- Changes in comfort and ease of cooking
- Increasing agency and empowerment as the final steps towards gender equality.

5.1. Perceptions of outcomes on quality of life and main benefits

Nearly all users indicated that electric cooking had improved their life, although in most cases change was minimal. In the phone survey, 14% of induction stove users and 9% of rice cooker users mentioned that the quality of their life had significantly improved; 95% of induction and 93% of rice cooker users mentioned some improvement; the remainder experienced no change; and none experienced worsening of quality of life. According to the 60 Decibels Benchmark, the percentage of respondents stating that their life had 'significantly improved' is lower than that for other cooking companies or products. However, as the scores for user satisfaction was higher and the ease of use (no challenges) were better than the Benchmark on these issues, it can be assumed that users are satisfied with the product and find it reasonably easy to use, but its usage is not transformative for their lives.

The level of impact relates to the proportion of cooking done with the stove and to which degree fuel has been substituted. For the induction stove users, the level of impact was found to relate to the proportion of cooking done with the stove, while for the rice cooker users, no such correlation was found (phone interviews). Respondents (of the phone interviews) who previously used firewood or charcoal were reported that their lives had significantly improved (12 out of 40, or 30%) than those who used LPG (18 out of 139 or 13%) or only used LPG as main fuel previously (6 out of 62 or 10%).

"I can finish other chores while the rice is being cooked; so, I don't have to wait once I have switched it on. Also, the rice remains warm after it is cooked."

Female respondent on the benefits of using a rice cooker

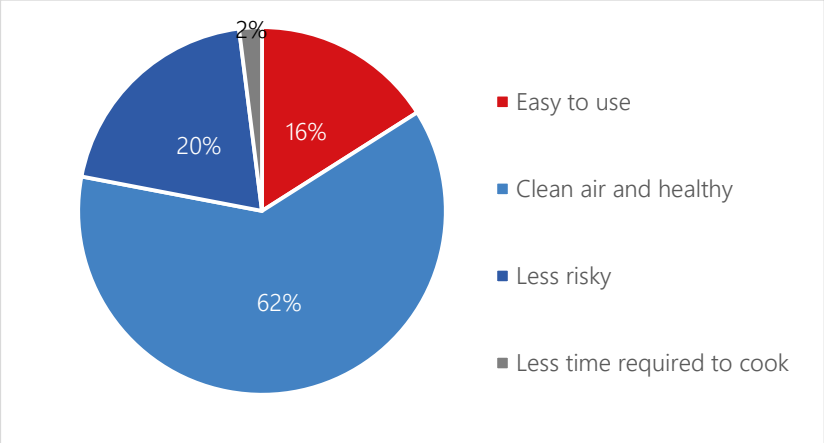
The biggest benefits perceived by the users are time saving, clean air, safety, and ease of use. Clean air and ease of use emerged as the most highly appreciated benefits from phone surveys, household surveys and FGDs, and safety was mentioned in all three data collection approaches. Time saving emerged strongly from the phone surveys and FGDs.

The top benefits mentioned by the respondents are: time saving and faster food preparation; easy or convenient to use; absence of smoke; and the allowing of multitasking (the phone survey). Table 20 presents the outcomes from the FGD with women, reporting the benefits they and their male counterparts in the household observed. The list of benefits of induction cookstoves presents the users' experience in detail. Sixty-two per cent find it clean and healthy to use; 20% find it easy to use; 16% find it less risky, while 2% stated it takes less time to cook (Graph 16).

Table 20: Benefits of induction stoves as perceived by men and women (FGDs)

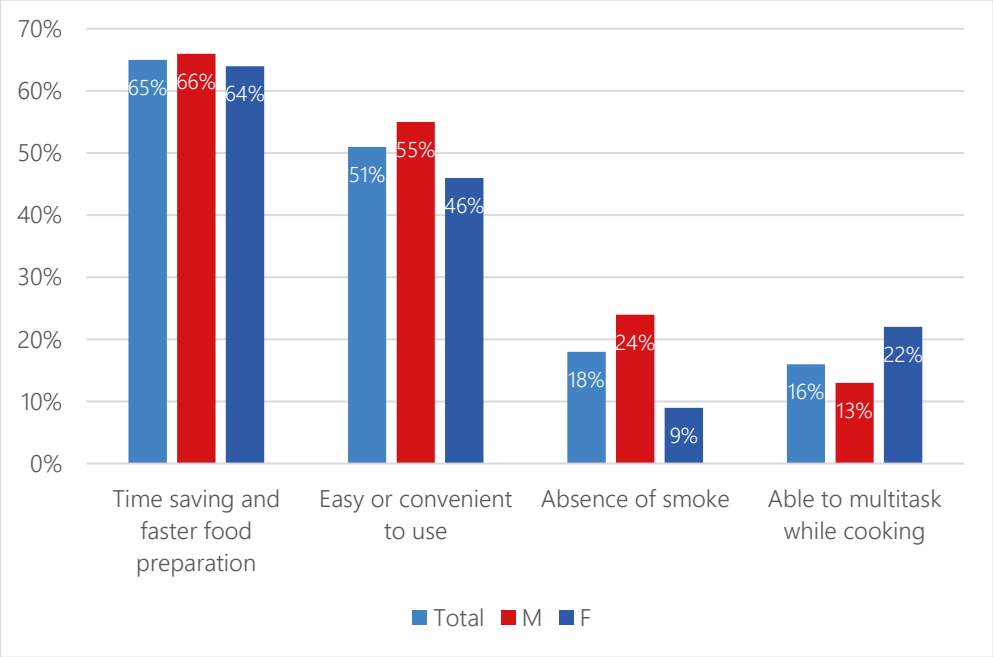
Women	Men
• No indoor air pollution; so, better health and health cost saving • Increased cleanliness in the kitchen • Time saving on washing utensils • Easy to cook, so male members have also started to cook • Easy to wash utensils, so male members have also started to wash utensils • Can be cooked standing • Cost effective compared to LPG • It is portable. Unlike the traditional biomass cookstoves, it can be moved to other locations as per need. • Don't need to waste time and worry about collecting fuel. • Increased safety compared to LPG and traditional biomass cookstoves, as the project had upgraded household wiring, where necessary.	• Cheaper than LPG • Increased cleanliness in the kitchen • Less smoke in the kitchen

Graph 16: Main benefits of electric cooking



Source: Household survey

Graph 17: Self-reported outcomes (% of the 94% of respondents who reported improvement in quality of life)



Source: Phone survey

Perception of benefits differs between male and female users for some outcomes. The absence of smoke was mentioned by more male respondents than female respondents of the phone survey and being able to multitask was mentioned by more female respondents. Analysis of phone survey responses to an open-ended question indicates that almost an equal number of male and female respondents, at 66% and 65% respectively, perceived time saving (Graph 17).[18] However, comparing the responses of male and female members of households shows that the perceptions of benefits differ between them.[19]

[18] Excluding the 6% who reported no change

[19] Analysis by MECS, memo forthcoming

The quotes below also illustrate the differences between the benefits perceived by men and women:

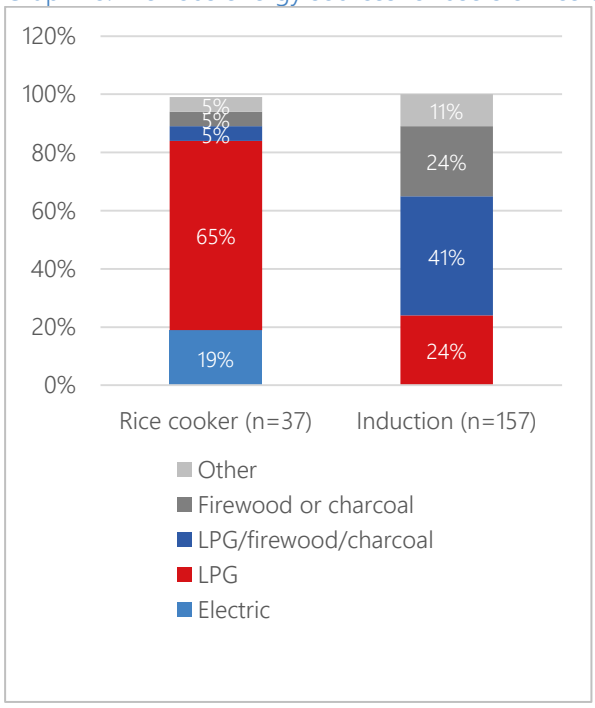
> *The cookstoves provides us free time as we are able to finish cooking within a comparatively shorter time.*
>
> (FGDs, women)

> *Lower health impact and lower running costs of the system make it attractive. Use of biomass makes it uncomfortable to stay in the kitchen for a long time. The operation cost is also lower than that of LPG.*
>
> (FGD, men)

5.2. Implications of electric cooking on fuel use

Previous energy sources: Prior use is a relevant factor in understanding the changes that are experienced due to the uptake of electric cooking and the alternatives available to users for cooking. Prior to the uptake of electric cooking, of the induction stove users, 41% had been using a combination of LPG, firewood or charcoal, 24% used only LPG, 3% used either LPG or biogas, and none used electricity (Graph 18). Of rice cooker users, two-thirds used only LPG, and one in five used electricity.

Graph 18: Previous energy sources for users of rice cookers and induction stoves



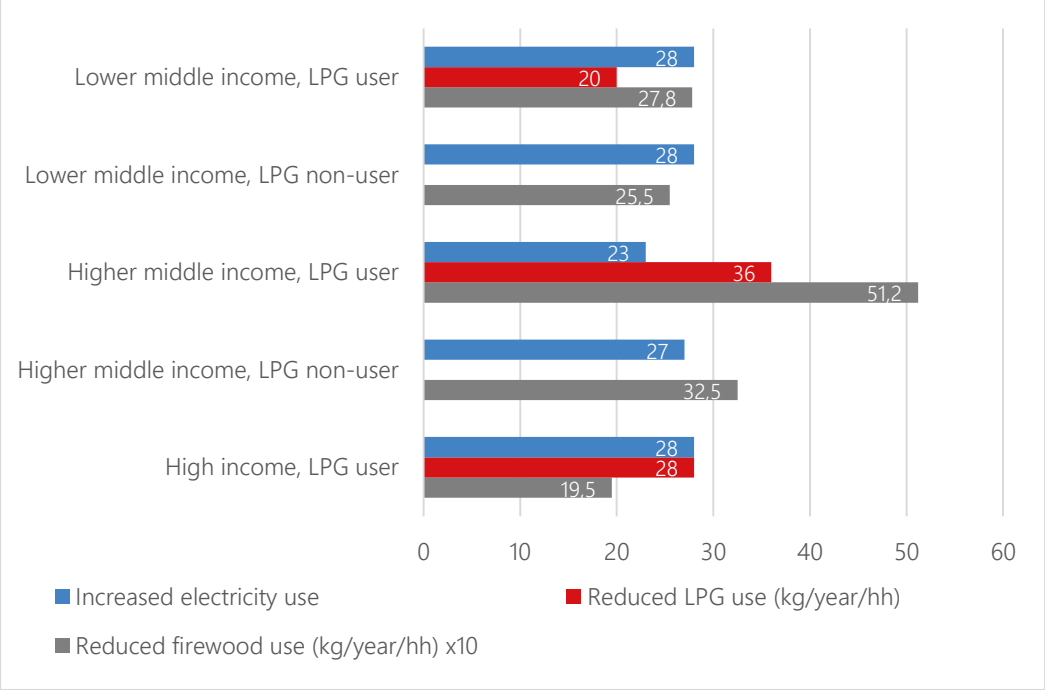
Source: Phone survey

In the majority of households, both LPG and fuelwood were used for cooking prior to the uptake of electric cooking and electric cooking substituted both. Graph 19 and Table 21 show the changes in annual consumption of wood and LPG before and after the uptake of electric cooking and the metered difference in electricity consumption as reported by users (household survey). For the induction stove users, there was an average increase in electricity consumption of 25.6 kWh/month and an average (estimated) reduction in firewood use of 383 kg/year and, for LPG users, an average reduction of LPG use by around 50% or 34 kg/year (household survey).

The analysis of data shows that the difference in changed electricity consumption between income groups is relatively small (between 23 and 28 kWh/month for induction stoves). When comparing LPG users and non-users and users with different levels of reduced fuelwood use, there is no clear pattern of the extent to which electricity consumption increased due to the use of induction stoves.

More analysis is needed to establish causal links between the changes in fuel use to changes in electric cooking and the total cooking fuel pattern, as the sample was too small for detailed analysis and there was a large number of key influencing factors to really understand the substitution patterns. A key uncertainty in our data is about the reported use of fuelwood. Fuelwood is collected and quantities are not measured by the users, and, furthermore, an overview of collection over a year may be lacking. Therefore, the reporting on fuelwood is expected to give an indication of percentage change rather than a representation of the volume of fuelwood collected. Graph 19 indicates that it would be relevant to compare induction stove users with and without LPG in their substitution behaviour, as it seems that in some cases fuelwood reduction has been higher for LPG users than for non-LPG users. This shift away from fuelwood by LPG users may indicate that the provision of electric cooking is triggering a more complete shift to clean cooking for this group, possibly due to the fact that LPG users are already used to cooking with modern fuels and are aware of the benefits of clean air and reduced drudgery. The high reduction of fuelwood used by the high middle income group of LPG users is not understood based on available data. All 10 users of rice cookers in the sample were using LPG before and indicated a reduction of LPG following the use of the rice cooker (Table 21). The three cases in which fuelwood is used for cooking also indicate a reduction in fuelwood use. Further research on a larger scale is recommended to identify patterns of substitution.

Graph 19: Changes in fuel use and electricity consumption by income groups and LPG for users and non-users of induction stoves



Source: Household survey

Table 21: Fuel use and electricity consumption as perceived by income groups and LPG users and non-users

Stove type	Income Group	LPG	Firewood (kg/year/HH)			LPG (kg/year/HH)			Electricity (kwH/month/HH)		
			Before	After	Saving	Before	After	Saving	Before	After	Increased
Induction	High income	LPG user (N=2)	330	135	195	57	28	28	24	51	28
	Higher middle	LPG non-user (N=6)	1150	825	325	0	0	0	17	44	27
		LPG user (N=18)	742	230	512	76	39	36	27	50	23
	Lower middle	LPG non-user (N=6)	585	330	255	0	0	0	12	40	28
		LPG user (n=8)	476	199	278	50	20	30	15	43	28
Rice cooker	High income	LPG user (N=3)	0	0	0	151	109	43	21	58	37

	Higher middle	LPG user (N=7)	289	194	94	142	95	47	22	46	24

Source: Household survey

5.3. Change in time spent on cooking

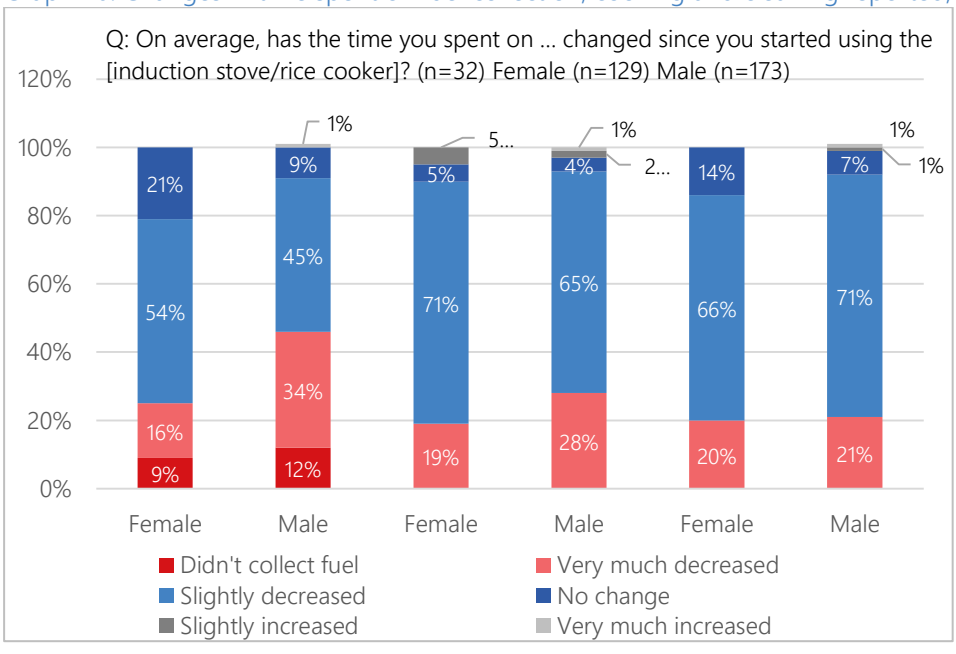
Time saving from a gender perspective. While typically time saving is considered to take place through substitution of other fuels, leading to a time saving in fuel collection, faster cooking of a dish, and time saved in cleaning, we add dimensions related to multitasking and other family members taking up cooking activities, so that we come to the following paths relevant to assess possible time saving:

- Time saved in fuel collection
- Time saved in cooking of a dish
- Time saved in cooking through simultaneous cooking (due to increased number of potholders)
- Time saved in cleaning
- Time saved in multitasking while cooking
- Time saved with men (or other family members) taking up cooking

The evidence shows that the time saving that is actually realised depends on many factors, which we discuss below.

Reduction of total time was reported by most respondents for all tasks (fuel collection, cooking, cleaning), with fuel collection showing substantial numbers of both high and no reductions and cooking showing an increase in some cases (phone survey). We look at each task separately below. Graph 20 gives an overview of phone survey results on changes in time spent collecting fuel, time spent on cooking, and time spent on cleaning.

Graph 20: Changes in time spent on fuel collection, cooking and cleaning reported, by sex



Source: Phone survey

Time is saved by faster cooking of a dish and through simultaneous cooking, amounting to approximately an hour a day when fuelwood is replaced. The time spent on cooking was reported to decrease in over 90% of phone interviews. Induction stoves allow faster cooking of a dish and may also be used as an additional stove. The household survey indicates a time saving of one hour a day for the majority of households that use the induction stove as main stove and of two hours a day for the one household that used the induction stove in parallel with other stoves, while for rice cookers the time saving is mainly through simultaneous cooking with this extra pot (Table 22). The FGDs indicate a time saving of about half an hour compared to the two hours spent on cooking per complete meal with biomass cook stoves (which is an hour a day for two meals), but similar cooking time of around 1.5 hours compared with LPG.

Table 22: Time saved through faster or simultaneous cooking

Stove type	Parallel cooking	Cooking hours/day		
		Before	After	Saving
Induction (Temal)	No (N = 39)	3.69	2.74	0.96
	Yes (N = 1)	4.00	2.00	2.00
Rice cooker (Roshi)	Yes (N = 10)	3.87	2.74	1.13
	Total (N = 50)	3.73	2.72	1.01

Source: Household survey

Sometimes, electric cooking increases time spent on cooking. Although 90% of female and 93% of male respondents reported time saving, 5% of female and 3% of male respondents of the phone surveys reported an increase in the time spent on cooking. The FGD indicates that cooking rice on a rice cooker usually takes longer time than on fuelwood or LPG but still can save time as it allows simultaneous cooking.

Time spent on fuel collection is especially related to substitution of fuelwood. Time spent on the collection of fuelwood is considerable in Temal, where walking to and from for collection of firewood takes around three hours. The average time per day women spend on this activity is 1.5 hours, because fuelwood is not collected every day. Reducing the frequency of fuelwood collection can, therefore, substantially affect the time spent. The household survey indicates an estimated annual average reduction of fuelwood consumption of 382 kg for induction stove users, which could amount to a time saving of around 20 fuel collection trips of three hours (less if the load reduction is spread over trips). The average time spent on collecting an LPG cylinder is 1.93 hours in Temal and 1.25 hours in Mangaltaar, and given the duration of use, this results in time expenditure of typically two hours per two months. The household survey indicates an annual average reduction of LPG consumption by 50% for induction stove users, which amounts to a time saving of around four fuel collection trips of two hours. The time spent on fuel collection decreased for 85% of induction stove users compared to 34% of rice cooker users (phone interviews).

Time spent on cleaning is reduced by substitution of fuelwood use, especially for households where water collection is a separate time issue. Time spent on cleaning the kitchen 'significantly decreased' for 24% of the induction stove users and 5% of the rice cooker users (phone interviews). The FGDs indicate that time spent on cleaning is reduced, saving 10 minutes per cooking session in the case of induction stoves and around 6 minutes per cooking session with the use of rice cookers, compared to the 18 minutes per cooking session with

traditional fuelwood. This can, therefore, amount to time saving of more than 40 minutes a day for fuelwood users. The range of time saved is influenced not only by the fuel substituted but also by the time spent on water collection, which can vary as some households have a tap inside the kitchen or the house, while others share a source.

The benefits of time saved in fuel collection accrue differently to men and women. The benefits of time saving in fuel collection depend on what is substituted by the electric cooking appliance. In terms of time saved in fuel collection, in general, replacement of LPG benefits men more than women, whereas replacement of fuelwood benefits women more. The household surveys and FGD indicate a gendered role division in which women are more involved in fuelwood collection and men more in LPG collection.[20] Especially if firewood is collected in nearby locations, the collection is done mostly by women. Women are involved in fuelwood collection in 100% of the households and men in 75% of the households (household survey). Therefore, time saving in firewood collection benefits both men and women, but women slightly more. For LPG collection, in 89% of the households of the household survey, this is more the role of men than of women. Time saving in LPG collection, therefore, also benefits both men and women, but men slightly more. In the phone survey sample, 34% of men reported that their time in fuel collection (wood and LPG) has significantly decreased, compared to 16% of women, which may be due to men's higher involvement in LPG collection.

5.4. How saved time is used

With the time saved in collecting fuelwood, cooking, and cleaning utensils, as well as the reduced need to watch the cooking process, women have been able to give more time to children and also to personal care (household survey and FGDs). The women indicated that the time saved provided new livelihood opportunities for women to engage in activities other than household tasks, such as vegetable farming for food sufficiency, working in shops for economic enhancement and watching television.[21] Likewise, as there is no smoke with an induction cooktop, children prefer to stay in the kitchen; so, the cook can pay attention to their children's studies.

> *"The time saved gives us an opportunity to share more time with the family, caring for the children and the elderly".*
>
> FGDs with Dalits and housewives

> *"We are now able to give more time to our eateries, vegetable garden and income generation activities".*
>
> FGD with economically active women

[20] This finding is in line with the finding of the literature: "For fire wood collection in Nepal women are found to be involved more than men" in Nepal P. Adhikari* & M. Jaishi, 2018, Workload Analysis in Firewood Collection Activities by Gender in Kailali Rural Municipality of Kailali District, p1754.

[21] This information was collected after a relatively short period of use and participants may have stressed what they felt were desirable answers. Follow-up research is recommended for learning long-term outcomes.

5.5. Health impacts

The perception of health improvements is substantial. Of the phone interview respondents, 71% of the induction stove users reported noticing improvement to health compared with only 5% of rice cooker users. The three most frequent comments related to health were:

- reduced dust and smoke;
- improved eye health or lack of eye irritability; and
- reduced coughing.

In the household surveys, a perception of health improvement was reported, which can be linked to reported improvement in household air quality after the uptake of electric cooking. The majority (78%) perceived substantial improvement in air quality in the kitchen and 22% perceived some improvement. Although the overall sample shows that more men than women reported health impacts, an analysis by the households where both men and women were interviewed shows no significant difference between the number of male and female respondents reporting health improvements.

The physical burden associated with fuelwood collection has reduced, depending on the level of substitution of wood. According to the participants of an FGD in Temal, fuelwood collection typically entails carrying a 20kg load of wood for at least 1.5 hours per trip. This impact was mentioned not as a health benefit by the respondents but as a benefit in terms of ease of use and comfort.

5.6. Financial impacts

The amount of monthly electricity payments has increased following the uptake of electric cooking by an average factor of 2.6 for induction stoves and 3.5 for rice cookers, with higher increases for higher income groups (household survey). An analysis of monthly payments for different income groups shows higher bills for highest income groups, which appears to indicate that affordability may be a limiting factor in the use of electric cooking to full demand (Table 23).

Table 23: Increase in electricity bill after uptake of electric cooking by income groups

Stove type	Income group	N	Unit/month		Electricity consumption for electric cooking (kWh)	Electricity tariff (NRs./month)		Extra electricity costs due to electric cooking (NRs./month)
			Before	After		Before	After	
Induction	High income	2	24	51	27	135	404	269
	High middle	24	24	48	25	150	339	189
	Lower middle	14	14	42	28	73	260	187
	Average induction	40	21	46	25	122	315	193

Rice cooker	High income	3	21	58	37	106	483	377
	Higher middle	7	22	46	24	116	351	235
	Average rice cooker	10	22	50	28	113	390	277

Source: Household survey

According to the household survey data, for induction stove users, the costs for electricity consumption increased from on average NRs. 122 per month (for 21 kWh) before the uptake of electric cooking to an average of NRs. 315, which is an increase of on average 25 kWh per month. It may be noted here that, in respondent households, electricity as a cooking energy source is stacked with LPG and firewood.

For middle income groups using LPG, monthly fuel expenditure has decreased due to the uptake of induction cooking. Table 24 calculates financial savings based on the reported data on LPG use (measured in kg/year) and metered electricity consumption (household surveys). It provides an indication that savings are less for higher income groups as they have not reduced LPG consumption as much as the middle income groups and use electric cooking appliances more.

Table 24: Implications on energy costs with the use of induction stoves and rice cookers

Stove type	Income group	LPG use or not	Reduced LPG consumption (NRs./yr/HH)	Increased electricity consumption (NRs./yr/HH)	Cost saving
Induction stove users	High	LPG user (n = 2)	2900	3228	-328
	High Middle	LPG user (n=18)	3705	2361	1344
	Lower middle	LPG user (n =8)	3081	2393	688
Rice cooker users	High	LPG user (n =3)	4350	4524	-174
	High Middle	LPG user (n = 7)	4764	2820	1944

Source: Household survey

The long-term use of induction stoves is much cheaper than LPG, while investment costs are higher. The costs of induction cooking, including investments in the initial stove and appliances as well as running costs (for LPG refills or electricity), and maintenance over a five-year period, are around half of that for LPG. The total savings for a five-member household which only used LPG as cooking fuel by switching to 100% cooking on an induction stove over a five-year period is calculated to be around NRs. 25,000 (Table 25). The data for this calculation is based on KIIs with the project implementers, EnDev, ABF, and NACEUN, who use these data in their promotion of electric cooking and are in line with the data on consumption from the FGDs.

Table 25: Comparative analysis of costs between LPG and electricity consumption for cooking

Cost type	LPG assumptions	Cost for LPG cooking (NRs.)	Induction stove assumptions	Costs for induction stove cooking (NRs.)
Capital cost	LPG stove: NRs.2,500 LPG cylinder: Rs.2,325	4,825	induction stove: NRs.4,000 induction-based utensils: NRs.3,500	7,500
Running cost for 5 years for full cooking for a family of 5	9 cylinders per year NRs.1,450/cylinder	65,250	Electricity costs 65kWh/month at NRs.9.50/kWh based on current tariff structure for consumers with 50-150 KWh consumption per month	37,030
Maintenance cost for 5 years		-		1,000
Total		70,075		45,530

Source: Consultations with the project implementers (by PAC)

The awareness of prices and the long-term cost reduction of induction cooking compared with LPG has reached a broad audience, as evidenced by this statement developed in one of the FGDs:

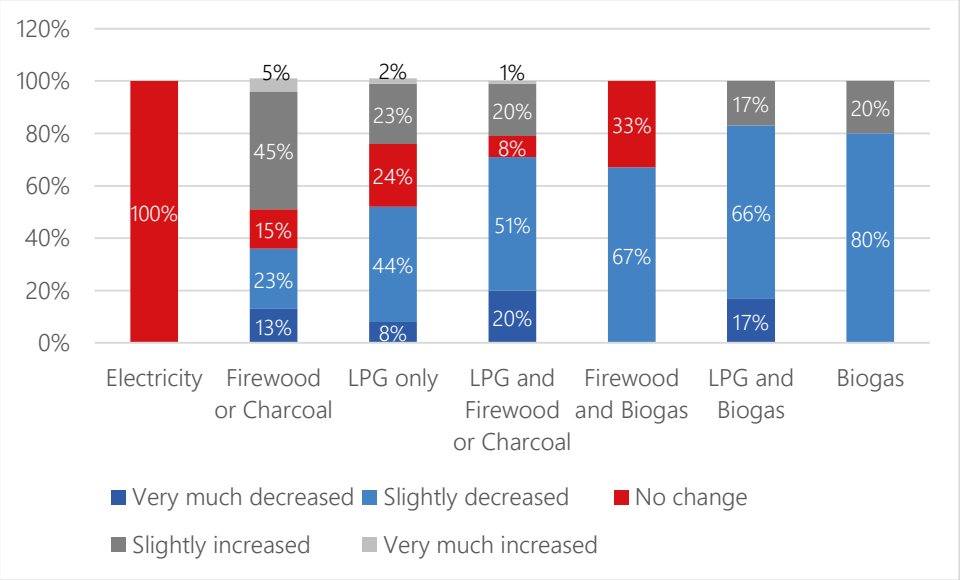
> *"Cooking on the induction stove is cheaper than on LPG. A cylinder lasts for two-three months and refilling costs NRs.1,700 (NRs.540-850 per month), whereas the electricity tariff is only NRs. 200-300 per month."*
>
> FGD with housewives

The effects of discounts and reduced tariffs are not clear from our data. The six-month discount provided as part of the programme incentives and the ending of this discount did not emerge spontaneously as an issue influencing the uptake or use of the induction stove. Also, a new tariff rate announced in early 2020 allows free use of the first 10 units. The users pay the minimum of NRs. 30 as a service charge plus costs of consumption above 10 kWh/month. Separate research is needed to assess the influence of the discount and the effect of the free first 10 kWh units, both on uptake and on sustained use. For the temporary discount, further research is also to assess any use changes after the end of the discount.

Differences between male- and female-headed households with regard to financial effects are not clear from the small sample size in this study. The research team with local expertise indicates that a number of de facto female-headed households have access to cash income as they receive remittances from abroad. This may be a reason for the relatively high use of electricity for cooking on the induction stove in Temal, compared to both de jure female-headed households and male-headed households who don't receive remittances. The difference between electricity consumption before and after electric cooking is NRs. 223 for de facto female-headed households (N=10) and NRs. 185 for male-headed households (N=185). However, electricity consumption for electric cooking is highest, at NRs. 286 on average among the nine male-headed households in Roshi who use rice cookers.

Contrary to the expectation that changes in financial expenditures on cooking follow clearly from prior source of fuel, the phone interview outcomes indicate mixed results. For example,[22] for the 62 households previously using only LPG, costs decreased for 52%, remained the same for 24%, and increased for 25%[23] of households (phone survey). Similarly, for households previously using firewood or charcoal as cooking fuels, 50% reported an increase in spending on cooking fuel, while 36% reported a decrease. For the 40 households using LPG and biogas, 67% reported a slight decrease and 17% a slight increase (Graph 21). Due to the small sample sizes and the derived nature of the correlation, follow-up research is recommended to reach robust conclusions on this.

Graph 21: Changes in expenditures after uptake of electric cooking by prior main source of fuel



Source: Phone survey

Graph 21 shows that the seven households previously cooking with electricity, all of whom reported no changes in expenditures, were all users of rice cookers, which is contrary to the findings of the rice cooker users, who are associated with the highest difference in electricity bills in Roshi. The findings on expenditures based on our evidence are, therefore, inconclusive.

[22] Graph and data on p 24 ENERGIA Analysis 2, new ppt November 17.

[23] Rounding to whole numbers

5.7. Comfort

The aspects of comfort that are highly valued are: the reduced need to monitor cooking, especially for rice cookers; and the option to place the induction stove and rice cooker on a counter or a table, unlike with traditional stoves. Altogether 97% of phone interview respondents and 45 of 50 household survey respondents placed their electric cooking appliance on a counter or a table. The participants of the FGDs appreciated the advantage of the ability to cook on electric cooking appliances in standing position and also the flexibility of using the induction stove between standing and sitting position, as illustrated by the following quote.

> *"It is portable. Can be moved to certain locations as per the need, which is not possible with the traditional biomass cookstoves."*
>
> FGD

5.8. Increasing agency and empowerment

Impacts in practical terms and in changing norms take place both by family members taking up the use of induction stoves and with more time being spent in the kitchen due to cleaner air. As described in Chapter 4, following the introduction of electric cooking, especially the induction stove, more and more men are taking up cooking tasks, even if only for making tea and snacks. Although the main responsibility and time commitment still lie with women, this change in pattern, as well as the fact that a number of men stated their role in cooking, may be considered a step towards changing gender norms (Table 26). The sustainability of the observed pattern and the extent to which this leads to more structural changes require further research, especially as the restrictions due to COVID-19 have forced a large number of men to stay at home, and possibly there are still some effects of gender roles around this new technology even after more than half a year of use. The quotes from the phone survey in Table 26 illustrate women's common perception that they themselves are responsible for cooking and that other family members, including husbands, help them or occasionally take over some cooking tasks.

Table 26: Responses of female cooks about other family members cooking

Gender	Are you responsible for the majority of the cooking in your household?	How often do you use the induction stove/rice cooker in a week?	Is there anyone else who uses the induction stove/rice cooker?	How often do they use it?
F	Yes	Every day	Yes	Husband helps with cooking 5-6 times a week

F	Yes	Every day	Yes	Husband uses it sometimes when I am busy with other work
F	Yes	Every day	Yes	Family members help with cooking every day

Source: Phone interviews

Men in households with economically active women or women who are members of SHGs are more engaged in cooking if modern fuels are used than men from other groups, and men in all groups sometimes cook with induction stoves. The discussions on LPG and electric cooking as modern fuels in focus groups identified patterns that seem to imply that, in households with more equal gender relations, men do cook but only if modern fuels are available. Further research is recommended to substantiate this finding (Table 27).

Table 27: Cooking by men and women by social groups

Group types	Type of FGD participants	Induction	LPG	Rice cooker	Traditional	Pressure cooker
Male/Female (economically active)	Users	Both	Female	N/A	Female	Female
Housewives	Users	Both	Female	N/A	Female	Female
Dalit housewives	Mixed	Both	Female	N/A	Female	Female
SHG member (Female)	Users	Both	Both	Female	Female	Female
Women (economically active)	Users	Both	Both	Female	Female	Female
Male/Female (economically active)	Non-users	N/A	Both	N/A	Female	Both

Source: FGD

Most information channels are insufficient to influence norms on decision-making by men and senior family members. In a KII, a local implementation decision-maker indicated that, despite efforts to engage female customers through demonstration events, the presence of women at such events cannot be interpreted as having influenced their agency in decision-making. He also indicated that the number of women participating was not high. However, he was of the opinion that training women to use the electric cooking appliances and informing them about replacement and repair services is important to build their confidence and contribute to their technical empowerment.

More structural changes in agency and empowerment will take time. As the interventions for induction stoves were done about eight or nine months ago only, changes in behaviour and in norms may still be developing. For example, 37 of the 40 respondents of the household survey claim to have experienced substantial reduction in drudgery. The FGD provided insights into changes in engaging in activities other than household tasks. Over time such changes can lead to conscious or unconscious movement towards empowerment of women.

6. GENDER-RESPONSIVENESS OF THE INDUCTION STOVE PROGRAMME IN KAVRE

This study looks in depth into one of the key programmes for induction stove dissemination in Nepal, which has already distributed a substantial number of stoves. The key elements of this programme, the Market-led Promotion of Electric Cooking in Temal Rural Electrification Area, implemented by GIZ/EnDev jointly with NACEUN (National Association of Community Electricity Users Nepal) and Ajummery Bikash Foundation (ABF) and a local partner Temal Community Rural Electrification Entity (CREE), are described in section 3.4. This section specifically focuses on gender-responsiveness of the programme drawing on the findings that emerged from the users of induction stoves as presented in the previous chapters.

The induction stove programme in Temal municipality did not have any specific objectives or targets for gender equality or inclusion, but the implementation design was gender aware. Although the participation of both a male and a female member of each household in the awareness and demonstration event was required, only a male member from most households attended the event.

Table 28: Who was informed by the induction stove programme

Municipality	Who was informed	Household Head		
		Male	Female	Total
Temal RM	Husband	17	3	20
	Wife	6	14	20
	Total	23	17	40

Source: Household survey

Based on the finding that fewer women than men were reached, despite the fact that they are the main cooks and main group to benefit from optimal and confident use of the induction stoves, the researchers went back to the respondents and key informants of both sexes to look into possible explanations and uncover opportunities to increase the extent to which appropriate information reaches women in the future.

A reason for the low attendance by women of the awareness event was the duration of the event. Women consulted in the household survey stated that the events were too long for two persons to attend and that they have many other priorities. The events were three-hour long.

Another factor that probably influenced the attendance of women in the events is the time of the day they were organised and the possible conflicting requirements on women's time at peak hours. According to social mobilisers and the CREE chairperson, more women were present if the event was held in the afternoon. In rural Nepal, generally, women prepare lunch in the morning and children leave for school and return only after 3 pm, which leaves them free in the daytime. Thus, women are free to use this time for activities other than those concerned with the household.

Furthermore, another possible factor influencing especially women's attendance is the location of the event. The attendance of women was found to be higher when events were held closer to the market. This may be due to the lower travel time as the distance to event is shorter.

In spite of this, according to the CREE chairperson, men believed that they were "better positioned to attend than women due to the technical nature of electric stoves."

Door-to-door visits were not targeted at women, and, therefore, did not compensate for the lower attendance of women at the awareness and demonstration events. The social mobilisers visited door-to-door to provide information on the stoves; however, such visits only took place if the awareness and demonstration event could not reach the target number of subscriptions. In areas where the subscription level after events was sufficient, women who did not attend the event, therefore, could not receive information through door-to-door visits. The effect of this approach was that mainly women in poorer communities received information through door-to-door visits, as the initial uptake in these communities was lower. These visits were reported to be very valuable to this group.

The unintended outcome that men were more highly engaged with programme implementers than women may be a risk to reducing gender-responsiveness of the programme and future programmes. As the local men were more represented at the local events, which were the main opportunity for engaging with programme staff and providing feedback, there was a disproportionately high number of men's voices sharing their perspectives on preferences and requirements related to the induction stove programme. This may be a risk to further gender sensitivity and learning of women's needs and wishes, as the interactions define the experience of project staff, which may influence product design, marketing and distribution strategies, as well as policy and donor programme design.

Listening to users in the selection of induction stove and pans. The package provided in the induction stove programme in Temal was originally based on prior experience and consultations with local people familiar with cooking habits, mostly CREE staff. It included a potholder stove, a pan, and a pressure cooker. However, due to feedback from potential consumers, both men and women, before the implementation of the project in Temal, a frying pan was added to the set of pots. The demand was aggregated by CREE to allow reduction of cost through bulk purchasing; so, there was no choice or flexibility in the package. For future programmes, increasing the participation of users (ensuring that women are reached as they are the main users), introducing flexibility in the selection of stoves and pots, and also strengthening the supply chain at local level for maximising the use of electric cooking may be ways to increase the uptake and use of induction stoves. Furthermore, utensils of better quality need to be provided. An induction stove user complained that the pan provided in the first phase was not good. So, his family had to buy another pan.

Involving women in the supply chain. Involving women at different stages of the value chain is typically beneficial to cooking programmes both from the perspective of accelerating uptake (for example, literature indicates that women are more likely to buy a product marketed to them by other women)[24] and from the perspective of direct contribution to

[24] Reference by PAC from the landscape study

gender equality by providing high quality income opportunities. During KIIs, the implementing organisations and the CREE expressed that they recognise the emerging opportunities, but no specific measures had been taken. Apart from the two female temporary social mobilisers, no women were actively involved in the programme.

There were no specific activities targeting empowerment of women or involving either local men or women in the supply chain, and local interest was low. The induction stove programme tried to create a market through local sales agents, but to no avail. The interviewed shopkeepers indicated that opportunities for local income generation through sale of electric cooking appliances are perceived to be small as there is no secure market for induction cooktops and induction-based pots, but there is some market for electric water boilers and rice cookers. In Temal, an electric appliance shop is being run by a woman with her family members (see Annex 3).

The programme in Temal resulted in increased awareness of the municipality officials of the potential to reduce gender gaps through electric cooking and to plan for increased use of induction cooking. The project contributed to the confidence of the local government on the feasibility and need for promoting electricity for transition in cooking energy. A convincing factor is the potential of electric cooking in reducing the persisting gap in gender equality. The rural municipality is planning to include electric cooking in its energy plan for the coming fiscal year. It is also exploring programmes which will enable them to provide free induction stoves to low income households.

7. LESSONS AND MESSAGES FOR STAKEHOLDERS IN POLICY, PRACTICE, AND RESEARCH

This study aims to inform stakeholders in policy, practice, and research by providing new insights into electric cooking from a gender lens. Below we present the implications of specific findings from this study for a number of areas that may directly inform programmes and policy, leading to changes that enhance the positive gender outcomes of electric cooking. These areas are: information and awareness raising, affordability, increasing effects on transformative changes in gender equity and increasing effects through site selection. Finally, we close this report with recommendations for further research.

7.1. Gender-responsive information and awareness

The empirical evidence in this study has led to a set of findings on information and awareness raising on electric cooking that has relevance for future programme design. The findings from Chapters 4-6 are presented below, as they inform the implications, messages, and insights into gender-responsive information and awareness of electric cooking. Information is provided under the topics of channels and sources of information, content of information, and decision-making.

On channels and sources of information:

- Information about electric cooking is important, since for nearly all of the induction stove customers, this was the first purchase of an electric cooking device; most users of rice cookers had already used electric cooking appliances in the past.
- In Temal, the community events that were organised to raise awareness and to answer potential buyers' queries and concerns about induction stove cooking were a key source of information.
- Information on induction stoves reached users both through friends and family and through the programme information channels. Customers of rice cookers bought their appliances in the market, and family and friends were key sources of information for them as well.
- The source of information differs for men and women; women were often not directly reached through official channels.
- In the induction stove programme, households with good information networks connected to a CREE were more likely to be able to participate in the programme.

On the content of information, the topics that resonate with customer motivation for purchase and benefits are ease of use, health improvements, cost saving (especially compared with LPG), and safety. Information on use and access to repair is highly relevant.

Decision-making is often shared between men and women in both male- and female-headed households, but household budgets are mostly controlled by men:

- Most decisions to purchase the electric cooking system are made collectively or by men, but female respondents more often reported joint decision-making or their own role in decision-making than men.
- In both de jure and de facto female-headed households, decisions are mostly made by the female head, but men also play a role.
- Men control the budget for the purchase of electric cooking appliances, like induction stove or rice cooker.

Implications for programme

For induction cooking programmes, these findings on first use imply that customers need to overcome the barriers of appropriate pots and pans and become accustomed to cooking with induction stoves. To ensure information reaches women through the channels that they most use and appreciate, demonstration events and informal sources of information from friends and family can be part of programme design. For women to have first-hand engagement through demonstration events, strategies should be developed to engage all women who could be main users of the stove. Demonstrations by friends and family are likely to be picked up through informal networks after an initial project implementation period. This spreading of information and possibly of demand is currently not captured, partially due to the limited capacity of the grid and partially due to project design with a fixed budget and period.

Messages and recommendations

In the programme design phase, conscious gender-responsiveness of package development awareness and information provision should include:

- Consulting women from different groups (family sizes, income groups, current fuel use or cooking methods) on package requirements and features of most interest, especially size, quality, and number of pots, as well as what needs families are looking to fulfil, such as time, spending, fuel use, etc.
- Targeting both men and women with information relevant to decision-making and use for typical cooking, considering targeted messaging, language, images, and themes that are appropriate for different groups within the target society and specifically to resonate with each gender.
- The demonstration events have been important in drawing wide attention of the illiterate population and also in reaching them. To create safe spaces for testing, asking questions, and airing reservations (which can ultimately inform design, development and delivery), demonstration events may be the most effective in same sex groups. Ensuring that timing and duration of events do not form a barrier to women's participation and ensuring that invitations explicitly reach women.
- Ensuring that women are confident to cook a range of dishes with the stove and are aware of what dishes can be cooked and how, through hands-on training and demonstrations or through local networks of friends and family members. The programme demonstrated the induction stove preparing tea, which is a lost opportunity to show the possibilities of this technology.
- Use established communication channels and women's networks complementary to CREEs. To make use of local women's networks and trust relations among women, women's groups, such as mothers' groups and health workers can play a role in awareness creation, information provision and for guidance of operations. In Nepal, local extension services of the Department of Health, female community health volunteers have now been

mobilised to create awareness of indoor air pollution. These women's networks can provide access to consumers in hard-to-reach markets. Evidence from the Green Inclusive Energy Project indicates that the mobilisation of local voluntary health workers was an effective means of information supply for fostering adoption of improved cookstoves. The health workers provided door-to-door information and helped mediate technical and financial issues.

For the development of responsive awareness and consumer training, it is important to ascertain:

- Between men and women, who is expected to use the stove more often—and consider if there are adjustments that can be made to better serve the needs of additional users in the household to encourage or facilitate that use—and who controls investment decisions?
- What features do women and men value in the stove and what benefits do women and men most look to fulfil/experience?
- What is the literacy and technical literacy level of women and men and how may this affect information channels, uptake, and adoption?
- What places do women and men frequent most and, therefore, would be most appropriate for displaying promotional materials? Who is doing the selling/distribution: male or female sales agents, or both?
- What images and language in promotional materials would be most appealing to men and women and how will they be perceived?
- Which duration of events, time of day, months or seasons are most suitable for conducting promotional campaigns and training programmes to reach men and women separately?
- Which would be the best venue to conduct the promotional activities?

7.2. Inclusive electric cooking programmes: lessons on affordability from a gender perspective

This study focuses on users of induction stoves and rice cookers. The findings on inclusiveness and affordability are, therefore, related mainly to the users' statements and assessment of who was reached. This focuses our attention on expenditures, payments and loans, including the dynamics within the household.

Findings

- The induction stove programme reached households that are relatively well off compared to the Nepal average. The rice cooker users are also relatively well off, with high representation of high income groups.
- The programme information missed reaching people from the lowest income segment of the community.
- The costs of monthly electricity payments have increased following the uptake of electric cooking by an average factor of 2.6 for induction stoves and 3.5 for rice cookers, with higher increases for higher income groups.
- The long-term use of induction stoves is calculated to be much cheaper than LPG, while investment costs are higher.
- Actual changes in total cooking expenditures after taking up electric cooking were inconclusive.

- Loans were taken to purchase induction stoves by families in lower middle income groups. The only loans taken were by women affiliated to a savings and credit group. The savings and credit group or women's SHGs supported access to finance as well as exchange of experiences on the use of the system.
- About 80% of phone interview respondents indicate that men control the budget for the purchase of products like induction stoves or rice cookers. Women's control over the smaller budget for a rice cooker is higher than over the larger budgets for the induction stove package. Men typically control the budget for the purchase of electric cooking appliances like induction stoves or rice cookers. Women have a high level of control over the day-to-day budget for cooking fuels as they often contribute to the payment and decision-making for electricity bills and LPG refills.

Suggestions to empower women both economically and in decision-making include:
Include flexible payment schemes so that women who have low access to and control over assets are able to pay for the stoves, e.g., make provisions for payment of the induction stove in instalments. The time granted will enable women as well as the poorer segment of the community to practise savings for payment. This mechanism becomes more credible if an existing agency, such as a CREE or local government, can stand their guarantee. In Baluwa, Kavre, this is already in practice with the CREE as a finance mediator.

7.3. Shifting gender norms

As stated in the introduction, cooking is a task with such a strong gendered role pattern, large time implications, and also a relatively high (potential) household budget component that it can be a crucial influence in shifting gender roles, gendered responsibilities, and decision-making. In this study, we have looked out for emerging changes in roles, narratives and practices that may evidence initial steps to shifts in gender norms and empowerment of women induced by electric cooking.

The findings presented below provide evidence of initial shifts in gender norms as well as inputs to strengthen more structural changes to reduce gender inequality through electric cooking and cooking programmes.

Findings

- Although women are the main users, the uptake of electric cooking appliances has induced men to cook. Men use the induction stove more frequently than they use the rice cooker. With the uptake of the induction stove, men have started to take up cooking activities, even if it is just making tea and snacks. In the first phase of the phone surveys, over 78% of male respondents reported themselves as main users of the induction stove or rice cooker.
- Impacts in practical terms and in changing norms take place both by family members taking up cooking with induction stoves and with more time being spent in the kitchen due to cleaner air.
- More structural changes in agency and empowerment will take time.
- There were no specific activities targeting empowerment of women or involving either local men or women in the supply chain, and local interest was low.

Implications

- The fact that male respondents chose to identify themselves as main users of the induction stove appears to reflect an emerging norm that using the induction stove is something that men can do and it is not exclusively in the realm of women.
- As men are taking up more cooking activities after the introduction of electric cooking appliances, even if only for making tea and snacks, electric cooking may be a step towards changing gender roles and norms.
- The future information and awareness activities should consciously target both men and women. By including men as a target group, men can be involved more, and this is an important step towards more gender equitable task sharing in cooking.
- Encourage men to take up cooking by providing information on the benefits that speak to men, providing role models, images used in marketing messages, language that resonates in sales pitches, demonstration events that engage men, strengthening the emerging patterns in which men are taking up cooking occasionally and for small cooking tasks, such as preparing tea and snacks, and the pattern of men spending more time in the kitchen.
- A separate pathway to support shifting gender norms is engaging women in quality jobs in the supply chain. This would benefit these women and create a role model function, depending on the visibility of their role, at the same time.

7.4. Selection of sites in relation to programme-level impact

The impact of cooking with electricity will depend on the fuel or technology it is replacing. If it is replacing firewood or charcoal, the impact on air quality, health, time saving because of shorter cooking times, cleaner kitchen and pots, and less time collecting fuel, are going to be considerably bigger than if it is substituting LPG. Most of the households in this study already used LPG, while the use of biomass was limited. This highlights sites where clean cooking programmes have the potential to have more impact on those communities with high biomass use for cooking.

Findings

- The main benefits of electric cooking are the impact on clean air, safety and ease of use, and time saving.
- The benefits of clean air and time saving are especially related to substitution of fuelwood.
- Time spent on fuel collection is especially related to substitution of fuelwood.
- Time spent on cleaning is reduced by substitution of fuelwood use, especially in households where water collection for cleaning pots is a separate time issue as water is not available within the household.

Implications

- The impact on time saving is largest in areas where cooking is highly dependent on fuelwood combined with scarcity of fuelwood. In these areas, the provision of alternative fuel for cooking is most urgent, especially compared to areas where electric cooking replaces LPG, where the financial benefits accrue to relatively well-off segments of the population.
- However, reaching the groups who would benefit most comes with additional challenges, as the people dependent on fuelwood are least able to afford electric cooking, and they often live in more remote areas with lower electricity reliability.

7.5. Increasing the use of electric cooking

The use of electric cooking can be increased for existing users and also through increased uptake. The empirical evidence in this study indicates that the opportunities for increasing the use of electric cooking appliances through substitution of other fuels are quite limited. The grid capacity limitations form barriers both to increasing the use by owners of induction stoves and to increasing the number of users. In general, a means to 'free up' capacity to extend the number of users within a given capacity constraint is the use of efficient appliances.

The findings related to the opportunities for increasing the use of electric cooking, including enhancing energy efficiency:

Findings

- Stacking of fuels is a common practice for both induction and rice cooker users
- Combinations in stacking stoves often include gas stoves.
- The issues with electricity supply are related to power outages, but very few respondents mentioned this as a problem.
- Fuelwood is used in all rural households, irrespective of availability of other forms of energy.
- There is currently little opportunity to increase the use of electric cooking either by current users or by new users within communities due to electricity supply-side limitations. In the EnDev project in Temal municipality, only 10% of households were allowed to have electric cooking because of limited capacity of the load centres (transformers). This limited capacity is representative of the general situation in rural Nepal.
- There is a perception that induction stoves are not suitable for cooking many traditional dishes. Unless this perception is proven wrong, this will be an important barrier to the sustained use of electricity for cooking in Nepal.
- Establishing market access to electric cooking appliances and utensils closer to users may stimulate the uptake and increased use of the appliances.

Implications

- For more complete switching to electric cooking, the reliability of the grid, the capacity of transformers, and the customer experience and expectation of risks of power outage are key issues to be addressed.
- For larger cooking requirements, such as for larger families, electric cooking may be possible only for those families who can afford several induction cookstoves. For space heating and preparing animal fodder, electric cooking does not provide a solution, and stacking is likely to remain structural.
- Even with efficient appliances, such as electric pressure cookers, the capacity of the existing electricity distribution infrastructure is insufficient to allow a substantial increase in the number of households taking up electric cooking. An option could be using alternative (decentralised) sources of electricity for cooking for marginalised groups in remote areas of Nepal, such as is already being deployed through micro hydro grids.

Suggestions

- To reduce the demand for electricity per electric stove user, and thereby create room for more users to benefit from electric cooking, the use of efficiency measures can be stimulated. Examples are the use of insulation bags which can cook low temperature meals

or keep meals warm and pressure cookers, which are already highly used in Nepal. But pressure cookers appropriate for induction stoves are not widely available in the market.
- Promotion of cooking appliances with heat storage or battery storage that reduces the peak demands on the grid may allow more customers to benefit from a limited infrastructure capacity.
- If availability of electric cooking appliances is actively promoted through the market, a monitoring and information system at local level may be needed to inform potential customers of the 'remaining' capacity.
- A better understanding of cooking practices and other uses of energy at a household level could help to provide targeted solutions to the practices that are predominantly done with biomass.

7.6. Reflections on this research project

7.6.1. Reflections on data collection and analysis

One of the key limitations of this research project was the need to work within the restrictions of the COVID-19 measures. While the phone surveys were not affected and went ahead as planned, the field research in the rural areas in Nepal faced substantial challenges as neither the main researchers responsible for the household survey, nor the author and coordinator could visit the field sites. Instead, local enumerators collected local evidence. This approach was not found suitable for qualitative data collection and analysis.

The first issue with qualitative data collection and analysis is related to the level of understanding needed. Although the local enumerators had received training, for in-depth understanding, a high level of understanding of the research themes is required as is in-depth understanding of the research objectives and underlying assumptions. As this was lacking, and also because of the complex nature of presenting qualitative lessons, the presentation of qualitative field evidence from FGDs typically did not go much beyond quantitative overviews, statements, and quotes. Qualitative insights were based on broad scans and some quantitative overviews, and complemented by highlighting typical statements.

A second issue with qualitative analysis is the loss of data and loss of understanding of the deeper insights at each step from the participant/respondent to the final reporting, from oral to written text, from translation from Nepali to English, and from local to external understanding. In this case, due to the COVID-19 measures, this effect was exacerbated as neither the main researcher nor the principal investigator was able to visit the field sites or speak directly to the participants or respondents. The research team was able to largely compensate for this by many rounds of iteration between the principal investigator and the main researchers, as well as between the main researchers and the field researchers, to provide clarifications of evidence provided.

In the phone surveys, one of the issues faced with data collection was with the initial survey script. Over 78% of the respondents who reported themselves as the main user of the electric stove or rice cooker were male. In this script, the persons on the contact phone list[25] were asked if they were the main user of the electric cooking appliance. As the researchers felt this

[25] The persons registered as customer in the case of this study were the owner of the household electricity meter as registered by the CREE, typically the household head.

high percentage of male main users was unlikely to be a true reflection of actual use patterns of the electric stove, the script was adapted to ask: Who is responsible for cooking in the household?

The sample design was restructured both to ensure a higher percentage of persons responsible for cooking and to purposely include both views of male and female members of the same household (see the methodology section).

Reflecting on the fact that male respondents chose to identify themselves as main users of the induction stove instigated the note that this in itself is a finding that appears to reflect an emerging norm that using induction stoves is something that men can do and it is not exclusively in the realm of women.

The approach of speaking to both male and female members of the same household proved to be an added value of phone surveys, which would have been more difficult to achieve through household surveys. By allowing analysis of male and female responses even within the same household, the phone surveys provided an initial insight into the extent of differences in perspectives, such as on access to information and purchase decisions and benefits. Analysis of other data points could provide an indication of any differences in answers provided by men and women on factual data, such as on proportion of cooking done with the electric appliance.

Phone surveys were useful in capturing a large number of voices, which can be very useful for the selected pre-identified topics that the respondent will find easy to comprehend and for which short answers are possible.

Measurement of impacts

The data in this report on the use of stoves and fuels is self-reported, and the findings on impacts are developed based on the stated use and changes in use and on respondents' opinions of impacts. While one may argue that peoples' own perception of impacts is what counts most, for decisions at policy level to be made based on weighing of impacts, more robust measures of use and substitution may be required. Measurement, such as with sensors, is likely to provide more accurate data. Some topics require a lot of time to answer, and careful selection is advised as to which information is needed to inform programme design or market support to improve uptake and sustainable use, and meet goals, such as improving gender equity.

Measurement based on memory

The questions on the topics around uptake (purchase decisions, motivation to buy, etc.) are based on recollection. As the induction stove uptake took place six to twelve months before the interview, it was considered that the answers would be largely representative of the situation at the moment of uptake, as they are not very detailed.

Triangulation of findings from data collection methods

Triangulation of methodologies has been useful in the interpretation of emerging findings, where especially KIIs and iteration with key informants based on initial findings have been complementary to the phone surveys and household surveys. Key informants and researchers with experience in the research location also helped in the development of the sampling choices and strategies and informed the formulation of survey questions.

The triangulation of findings from the phone survey with the other data collection tools did not provide the additional dimension of understanding findings through comparisons that were initially envisaged. A reason for this is that data collection was performed in different areas, and that the number of factors influencing the researched issues proved to be so high that the data was considered as complementary rather than as triangulating.

A sequential implementation of phone survey and in-person surveys may be useful in future research, especially as methods and key topics have been explored and tested with this study. The in person and purposely sampled survey, which would include more open questions, would provide testing of hypotheses based on quantitative analysis from the larger phone survey sample.

7.6.2. Scope of the study

The study set out to explore a large range of issues and factors on the issue of uptake, use, and impacts of electric cooking. Especially for the household survey and FGDs that had the objective to provide deeper insights from the perspectives of men, women, different castes, income groups, and also to delve into complex issues, such as gender norms and changes in agency and empowerment, this proved to be too ambitious, especially as the retrieved data was largely factual and simplified rather than in-depth and, therefore, insights were developed through quantitative analysis complemented by discussions between researchers based on qualitative evidence and iterations with enumerators and key informants. The scope of analysis was, therefore, limited to selected priority issues around gender and issues that emerged as relevant for informing policy stakeholders and future research to improve sustainable uptake and use of electric cooking. This also meant that much of the data was not analysed in depth and has not been presented in this report.

This study did not explore or uncover sensitive issues, such as power relations within households, explicitly. For instance, on the topic of men more often attending demonstration events than women, our evidence showed that women indicated they were satisfied with the level of information provided and that they did not have time to attend long events. But we were also subsequently informed that husbands did not want their spouse to attend such events. With the focus of the data collection on uncovering such gender issues and skilled enumerators, further probing and exploration may have led to more in-depth understanding of such possibly sensitive gender issues.

Another highly sensitive issue that was excluded was that of the occurrence of gender-based violence (GBV). As such issues require appropriate setting and skills and focus to make respectful enquiries, this topic was not considered appropriate for this study, even though it may be relevant. The priority was given to collecting a large set of information per respondent rather than developing data collection around this sensitive topic. While the phone survey and household survey did not provide openings for this type of issue, also in the more open discussions setting of focus groups (most same sex, same community) it did not emerge, possibly due to the sensitivity of the topic and possibly also due to their low occurrence in the research sites.

7.6.3. Reflections on the concept of cooking and indicators

This study on cooking from a gender perspective has taken a broad understanding of the term cooking to include all services that can be provided by the electric cooking appliances.

This meant that we included both cooking of main meals and preparation of tea and snacks. Where the study looked into the use of other stoves in target households, we also asked about the uses of those stoves. For the collection of empirical data, we used terms specifically related to the use of stoves.

One of the topics of this study was time use and time saving rated to cooking and from the uptake of electric cooking. It was found that the time that stoves are in use is difficult to measure through interview questions. This is seen to be explained by the irrelevance of this indicator to respondents. Rather than the measure of use of a stove, what is relevant is the time spent on cooking a meal. The time spent on cooking a meal may include use of several stoves simultaneously and chopping of vegetables, for example.

7.7. Recommendations and suggestions for further research

A list of recommendations and suggestions based on recognised limitations of this study, new topics and insights identified during the study and recommendations from interest expressed by the key informants are provided below.

Proposed topics for further research with high relevance from a gender perspective are:

- A more detailed study of cooking practices, how they change with different fuels and technologies and how they depend on combinations of fuels and stoves. Such a study would specify the time implications according to fuel and stove type used, distinguishing between the elements we identify as components of the time narrative; time use in cooking-related tasks, flexibility, and household members' use of stoves and roles related to cooking.
- What is the value (financial and social) of time, and how might the relieved time be ideally spent, from both men and women's perspectives? A related topic is the value of women's time in the decision-making on the uptake and use of electric cooking, for instance whether the value of women's time is related to whether or not they earn an income.
- Electric cooking for productive uses. The study found that the supplied appliances are not used commercially, partially due to the current satisfaction with the use of LPG for business needs in cooking in small restaurants as well as the lower suitability of electric cooking for larger quantities and for instant cooking. A study into specific cooking appliances for specific business models, such as electric ovens, making sweets, etc., may uncover useful combinations of modern cooking that can reduce the use of fuelwood. As small-scale cooking typically provides a sector in which women identify opportunities as entrepreneurs, this potentially has substantial benefits on gender outcomes.
- Action research supporting women's engagement in the electric cooking market supply chain to capture and build on women's specific skills in marketing and social mobilisation, would also look into the outcomes of this engagement of women on adoption rates, sustained use, and project effectiveness.
- How flexible payment modalities may be designed and targeted to achieve higher levels of uptake without inducing risks to low income customers.
- In areas with established market access for induction stoves and utensils, a study from gender perspective, which focuses largely on a programme approach and no or limited market availability of induction stoves and pans, may present learning complementary to this study.

- The impact of electric cooking on the occurrence of GBV. Traditionally, GBV is known to be linked to food preparation, where delay in preparation of food or burnt food are the commonly cited reasons for beating female cooks. A study in areas where this form of GBV is known to occur may support approaches to reduce GBV or limit risks of GBV related to electric cooking. Electric cooking may be especially appropriate to reduce GBV if cooking is faster than traditional cooking, but may pose risks if electricity supply is unreliable.
- Differences between male-headed households and female-headed households in access to electricity and electric cooking appliances. Information on differences between male and female-headed households inform decision-making in targeting and approaches for inclusivity. Such differences did not emerge from our evidence, possibly due to the small sample sizes, and also possibly due to differences being relatively small in Nepal, as suggested by the MTF study (ESMAP and MTF, 2019), this may imply that indicators of poverty and of remoteness, or of social group may be more needed in achieving and assessing inclusivity. It is expected however, that in many contexts, the gender of household head is related to many issues of access to electricity and appliances, and that this a relevant issue to consider, especially in the context of developing approaches for inclusive access and benefits of clean cooking.

A large number of topics related to technical and market development would justify research, and as electric cooking is seen to benefit women, these could all be considered relevant from a gender equality perspective. We highlight a few that we came across in our research:

- Measurement of actual use of stoves, such as with sensors and cooking diaries
- Measurement of substitution of LPG and fuelwood in different contexts in terms of energy, expenditures, and time to provide insights into factors that influence the level of substitution of prior fuels by electric cooking and identify opportunities for increased substitution of fuelwood.
- Characteristics of pots and stoves that may increase the use of induction stoves by users. In our study, many informants mentioned that the induction stove was not the preferred stove for a number of dishes, pointing mainly to the pots not being appropriate for cooking preferred dishes, pot size and number of pots. Further research may study the effect of having different pot sizes and numbers of pots within a household, having access to purchasing pots of different sizes. Furthermore, the susceptibility to burning food through the quality of the pot may influence use. The ability and willingness to pay for pots would also be an element to include in such a study.
- Electric cooking by infrared stove. We have studied induction stoves and rice cookers as complementary forms of electric cooking. Infrared stoves may provide a different balance of costs (investment and use) and benefits (utility, availability of pots in different sizes and for cooking traditional dishes) and safety.

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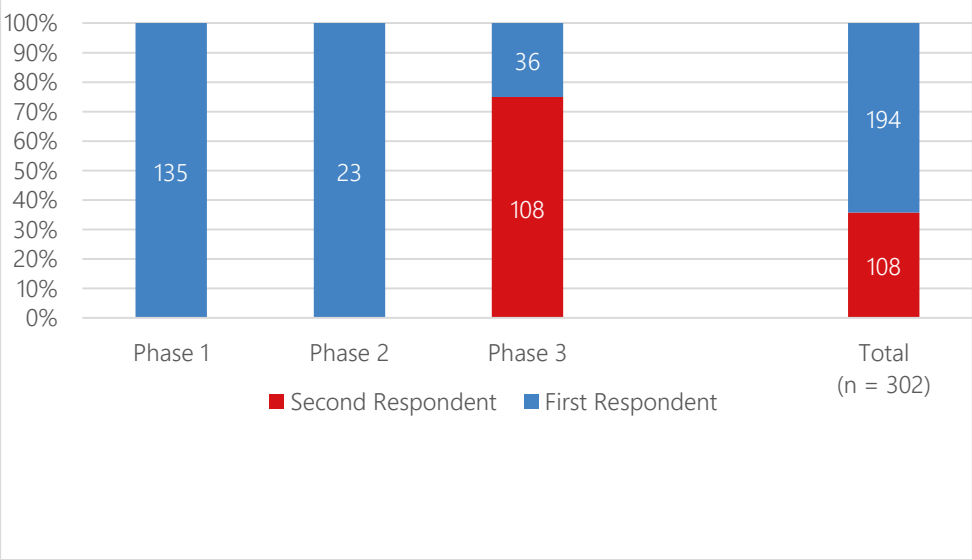
Annex 1

METHODOLOGY DETAILS 60 DECIBELS

1.1 Methodology details 60 Decibels

Three survey phases, first and second respondents per household

60 Decibels undertook three phases of survey collection, as presented in Chapter 2. In order to increase the female response rate and hear from more women, 50% of all households across Phases 1 and 2 were randomly called back to speak with second respondents.



Graph A: Respondent type by phase and number of interviews n=302

Source: Phone survey

Ultimately, the phone surveys had a 96% success rate in reaching a second respondent. Of the 4% where we were not able to reach a second respondent, this was due to: only one household members using the product (60%); household member living alone (20%); lack of co-operation from first respondent - a male - to pass the phone (20%).

Table A: Sample represented from database provided

Household-level data on sample presented, i.e., sample data and % population relates to first respondent (registered customer)	% sample	#	% population
Induction stove	81%	157	87%
Rice cooker	19%	37	13%
Male	71%	138	82%
Female	29%	56	18%
Temal	61%	117	68%
Baijanath	20%	39	19%

Sindhuli	19%	37	13%

Source: Phone survey

Data collection approach, including gender-sensitive approaches
60 Decibels used three female researchers and one male researcher. In the course of conducting the second interviews, the team found that the first respondents who were men were uncomfortable passing the phone to or providing their wives' phone number to a male researcher. The team, therefore, ensured that only female researchers called female second respondents, while the male researcher only called other male second respondents.

In order to reduce the time burden on a household in terms of interviewing two respondents in a single household, certain questions that were about the entire household were omitted in the question set for second respondents.

1.2 Poverty Probability Index® (IPA)

The Poverty Probability Index® (PPI), developed by Grameen Foundation, now housed at Innovations for Poverty Action (IPA), is a poverty measurement tool that is used by organisations and businesses to determine the likelihood that a household is living below the poverty line.[26] This calculation is based on responses to country-specific questions about a household's characteristics and asset ownership. Further information can be found here: https://www.povertyindex.org/country/nepal

For this study, we measured how the income profile of respondents' households compared to Nepal's national average. Given that poverty probabilities are calculated at a household level, the questions underlying the PPI computation in this study were only asked to the first respondent of the household.

The Inclusivity Ratio is a metric developed by 60 Decibels to estimate the degree to which an enterprise or product or service is reaching less well-off customers. It is calculated by taking the average of Company %/National %, at the $1.90, $3.20 and $5.50 lines for low middle income countries, or at the $3.20, $5.50 and $11 lines for middle income countries. The formula is:

$$\sum_{x=1}^{3} \frac{([\boldsymbol{Company}]\ \boldsymbol{Poverty\ Line}\ \$\boldsymbol{x})}{(\boldsymbol{Country\ Poverty\ Line}\ \$\boldsymbol{x})} / \mathbf{3}$$

1.3 Reflections on methodology 60Decibels

Lean Data Methodology
60 Decibels' Lean Data approach to collect data on operational and impact metrics typically involves phone interviews of 200-300 main users, customers, and beneficiaries of a particular product or service within a single study. The reasons behind this approach are multifold. By leveraging its network of trained research assistants who conduct the interviews in local languages and dialects, 60 Decibels provides companies and organisations with timely and actionable data and findings, which can inform an organisations' strategic or operational

[26] For more information, see https://www.povertyindex.org/about-ppi

decisions. The data and insights are collected and generated within a 10-12-week time period from being provided with contact details (i.e. customer phone numbers).

After extensive testing of this approach, 60 Decibels has found that 16-18 minutes is the optimal length of time for a phone interview with the quality of responses from respondents potentially being compromised as the time a phone interview takes increases. Moreover, 60 Decibels aims to keep the length of phone interviews short to respect respondents' personal time and as such collects as much data as possible through a mix of quantitative and qualitative questions.

Challenges with disaggregation using a Lean Data Approach

During the analysis phase, 60 Decibels runs an analysis across different segments, focussing on results that are conclusive. In this study, the sample was fragmented in several ways, firstly, to include both induction stove users and rice cooker users, and, secondly, through the phased approach to include main users, which led to men and women from the same household being interviewed, so that the total number of households for the 302 respondents was 194. Disaggregating analysis for indicators (e.g., First Access, Decision to Buy, Quality of Life) based on and within multiple segments (i.e. respondent type, product, gender, age, region, women-headed households, economic status, etc.) reduces the sample sizes so that they become too small to be conclusive.

Lessons for future research

When using relatively short phone interviews to conduct data collection, it is recommended that:

- Capturing both women and men's voices from within the same household may be an added value depending on the research question. This project indicated that this is a feasible approach which does lead to additional insights.
- For phone surveys using a Lean Data approach, representative samples are taken from the contact lists provided as 60 Decibels' standard practice. This may have a low representation of women, depending on the customer registration. When doing further research with a gender focus using phone surveys, it would be helpful to develop a contact list that includes a representative sample of women. Additional considerations can also be taken into account in terms of reaching more women.
- If the objective is to reach the main user, it is useful to develop identifying questions to add to the beginning of the survey. Follow-up questions on frequency of use from the outset can be helpful in checking whether the respondent is indeed the main user.
- To better understand how men and women may perceive and define the main user of a particular product differently, in the case of cooking appliances, additional follow-up questions at the beginning of the survey could include what they cook, what time of day they prepare meals, and who they are cooking for.
- The level of disaggregation required is comprehensively scoped as part of study design.
- Pilots and early analysis of pilot data are useful to allow modification of approach. Early adaptation data collection approach, if needed, enables a more consistent disaggregation and avoids challenges with the presentation of results.

Annex 2
METHODOLOGY DETAILS PRACTICAL ACTION CONSULTING

FGDs were held in seven locations: 6 in Temal RM and 1 in Roshi RM.

Focus groups
Type of group: Economically active women and induction cooktop users
District: Kavre; Municipality: Temal; Ward No.: 9; Village: Macche
Date: September 17, 2020

Type of group: Members of women's self-help group (Himachuli Savings and Credit Cooperative)
District: Kavre; Municipality: Temal; Ward No.: 7; Village: Chapakhori
Date: September 17, 2020

Type of group: Dalit women group
District: Kavre; Municipality: Temal; Ward No: 7; Village: Chapakhori Kaami Basti
Date: September 15, 2020

Type of group: Housewives
District: Kavre; Municipality: Temal; Ward No.: 6; Village: Thulo Parsel Singati
Date: September 15, 2020

Type of group: Economically active men and women
District: Kavre; Municipality: Temal; Ward No.: 7; Village: Kurubash
Date: September 13, 2020

Type of Group: Economically active men and women
District: Kavre; Municipality: Temal; Ward No.: 7; Village: Kurubash
Date: September 13, 2020

Group: Housewives - Electric Rice Cooker Users
District: Kavre; Municipality: Roshi RM-9; Village: Mangaltar
Date: September 12: 2020

Key informants at national level
In addition to the consultation at local level, consultations were carried out at national level with the project implementing organisations, GIZ EnDev, Temal CREE, Ajummery Bikash Foundation (ABF), and NACEUN, and with Alternative Energy Promotion Centre (AEPC) and SNV.

Annex 3
FURTHER INFORMATION ON THE COOKING CONTEXT AND PROGRAMME

3.1 Two cases of shops illustrating a local market perspective

There are a few electric shops in the project area, but none of them sell induction cooktops and induction-based pots. Mr Surya Man Tamang from Temal RM is one of them. He has been in this business for more than 15 years. He repairs and maintains electric appliances and sells electric water-boilers. Due to limited capital, he says he is unable to invest without confirmed demand. As there is no confirmed demand for induction-based pots, he does not sell them. Otherwise, he is also willing to do the business.

He sells about three to five electric water boilers a month, which costs around NRs.700/pot. In his shop, more men than women come to purchase electric appliances. According to him, the demand for electric appliances is increasing day by day with increase in reliability of electricity supply. He sees good future potential of the induction cooktop market in his area.

Ms Devi Shrestha has an electric shop in Roshi municipality, Kavre. She has been in this business for two years. It is a family business. Besides other electric appliances, she sells electric rice cookers, but she does not sell induction cooktops. In her shop, most of the customers are women. According to her, there is increasing demand for electric appliances. She thinks that awareness creation on the benefits and safe use of electric appliances and reliable supply of electricity would certainly increase the use of electric cooking. She is very hopeful about the future market of electric cooking. Although she has financial limitations, she is willing to expand her business to include other electric cooking appliances also in near future.

3.2 The practice of cooking in Nepal

Food preparation practices are observed to implicate the use of fuel (https://energypedia.info/wiki/Renewable_Energy_for_Food_Preparation_and_Processing_-_WISIONS). In Nepal normally people cook three items: (i) *Bhaat* (rice), (ii) *Tarkari* (vegetables), and (iii) *Daal* (pulses). The preparation of all three requires relatively low temperatures. Whereas in cooking vegetables and pulses, the food is allowed to boil until it becomes soft enough. Quite often people cook a maize porridge called "*Dhindo*", which involves a lot of stirring. The stove needs to be strong and stable enough to withstand this. Traditionally, people do not use the stove facing west. Typically stoves with two potholders help save time as two dishes can be prepared in parallel. Preferential food taste has come up as a criterion for fuel choice. Based on observations and discussions with Ms Niru Shrestha (Sindhuli), Ms Purnima Ghalan (Dalchowki), Ms Durga Maya Tamang (Temal), and Ms Purnima Sarki (Kavrepalanchowk), parallel use of fuel for preparing different dishes, in a day, in a typical rural household is tabulated below.

Table B: Fuel use for preparing various meals when prepared simultaneously

Meal	Food	Primary Fuel		Secondary Stove	
		Fuel	Stove Type	Fuel	Stove Type
Breakfast	Tea	Biogas/LPG	2-potholder	Fuelwood	2-potholder
	Milk	Biogas/LPG	2-potholder	Fuelwood	1-potholder
	Egg	Biogas/LPG	2-potholder		
	Roti	Fuelwood	2-potholder	Biogas/LPG	2-potholder
Lunch/ Dinner	Rice	Electricity	Rice cooker	Biogas/LPG/Fuelwood	2-potholder
	Daal	Biogas/LPG	2-potholder	Fuelwood	2-potholder
	Vegetable	Biogas/LPG	2-potholder	Fuelwood	2-potholder
	Beans	Fuelwood	2-potholder	Biogas/LPG	2-potholder
	Non-veg	Fuelwood	2-potholder		
Mid-day meal	Tea	Biogas/LPG	2-potholder	Fuelwood	2-potholder
	Noodles	Biogas/LPG	2-potholder	Fuelwood	2-potholder
	Vegetable	Biogas/LPG	2-potholder	Fuelwood	2-potholder

Three-stone stove with iron ring

Improved cook-stove

Dhindo preparation

Biogas stone with single burner

LPG stove with double burner

Figure A: Types of stoves in use

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