Small-Scale Community Roll-Out of Electric Cooking Solutions

Final Report

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(PEEDA)

Acronyms

GRM	-	Gaurishankar Rural Municipality
HH	-	Household
KG	-	Kilogram
LPG	-	Liquefied Petroleum Gas
NEA	-	Nepal Electricity Authority
NPR	-	Nepali Rupees
PEEDA	-	People, Energy and Environment Development Association

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Background

Nepal, a country that relies heavily on traditional biomass fuels such as firewood, animal dung, and agricultural residues for households (HHs) cooking. Over 65% of households, particularly in rural areas, depend on firewood as their primary cooking fuel. This reliance has far-reaching social, economic, and environmental consequences. Traditional cooking methods contribute significantly to indoor air pollution, leading to respiratory illnesses, especially among women and children. Moreover, firewood collection imposes a significant burden on women and children, consuming time and effort that could otherwise be spent on education, income-generating activities, or leisure. On a broader scale, extensive use of biomass accelerates deforestation and contributes to greenhouse gas emissions, exacerbating climate change challenges.

Nepal has made notable progress in expanding its electricity grid, with more than 95% of households now connected to electricity, according to the Nepal Electricity Authority (NEA). The country's increasing hydropower capacity, which provides a renewable and clean source of energy, presents a unique opportunity to promote electric cooking (e-cooking) as a sustainable alternative. E-cooking appliances, such as induction stoves, are energy-efficient and environmentally friendly, offering households a cleaner and healthier way of cooking. Transitioning to electric cooking could reduce indoor air pollution, improve health outcomes, and alleviate the burden of firewood collection, especially for women and children. Despite these potential benefits, the adoption of electric cooking in Nepal remains limited. Major barriers include the high upfront cost of e-cooking appliances, limited awareness, cultural cooking practices, and concerns over electricity reliability.

Electric cooking has high technical perspectives and is still at an infant stage in Nepal. The successful adoption of electric cooking requires the target groups to be ensured with the complete package of technology hardware, quality education on the technology, and affordable and reliable electricity. To make consumers adapt to electric cooking technologies continuously and not return to traditional cooking methods, rigorous community mobilization and sensitization, technology demonstration, technical backstopping, and monitoring are highly essential.

Objective

The project aims to understand the change in cooking behavior by transitioning from biomass-based fuels or other polluting fuels to electric cooking in 80 households of wards 1 and 2 of Gaurishankar Rural Municipality (GRM) within Dolakha district of Nepal.

Implementation Approach

Engagement with local government:

The project conducted a kickoff meeting and consulted with the representatives of the local government, and let them know of the project details. The representatives assured us of their full support and cooperation for the success of the project and enabled the integration of clean cooking technologies on the project site.

Household Selection and Baseline Survey:

In the same site, PEEDA had formed farmer groups as a part of other climate change projects in the previous year. Households were selected from these farmer groups that would represent the profile of the project site. For the baseline situation, desk work was conducted to prepare a baseline survey questionnaire to assess the existing cooking practices and

habits, along with the type of fuels used, with consumption patterns. The survey questionnaire was incorporated in the KOBO Toolbox. 54 households were surveyed using the baseline survey questionnaire.

Community Mobilization: PEEDA conducted sensitization among the local community, women in particular, through word-of-mouth communication, especially during the baseline survey and technology demonstration events, to make them aware of various electric cooking solutions.

Technology Demonstration: Technology demonstrations of electric cooking technologies were conducted in June to July before the support of the technologies to create demand, awareness of the technology, and user experience. Besides, technology demonstration, the field facilitator engaged households on the usage of the electric cooking technologies post demonstration on a regular basis to ensure that target households are well equipped with the complexity of electric cooking technologies and that they become more open in sharing their views and opinions on electric cooking with the team.

Technology Installation and Household Wiring Upgradation: Post-demand creation, PEEDA installed the induction stoves in the households that were willing to adopt the technologies and contributed financial support as part of project ownership, allowing the households to gain experience with those technologies. Appropriate household wiring upgrades were conducted to meet the requirements of using those technologies.

Endline Survey: PEEDA conducted an endline survey of around 40 households (50% of supported users) after 2 months of technology usage by the users. The survey focused on assessing the change in behavior, fuel stacking options, cost-benefit analysis, user experience, challenges of using induction stoves, and any other experience or change as expressed by the users.

Findings and Project Results

Out of 40 households met during the endline survey, 34 households had adopted electric cooking. Thus, the results below are those of the 34 households.

1. Current Cooking Practices

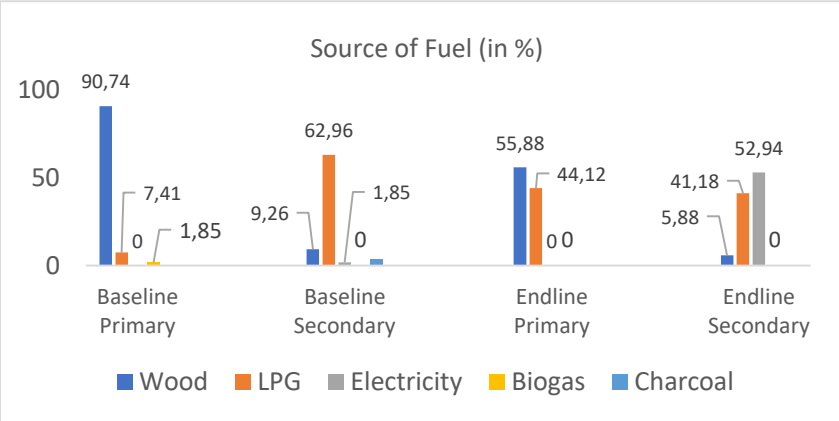

Figure 1: Source of Fuel (%)

Figure 1 shows that during the baseline survey, 90.74% and 62.96% of respondents use wood and LPG as primary and secondary fuel, respectively. At the endline, 55.88% and 52.94% of respondents use wood and electricity as primary and secondary sources of fuel. This shows that the use of electricity for

cooking increased significantly as a secondary fuel, as reflected in the endline survey.

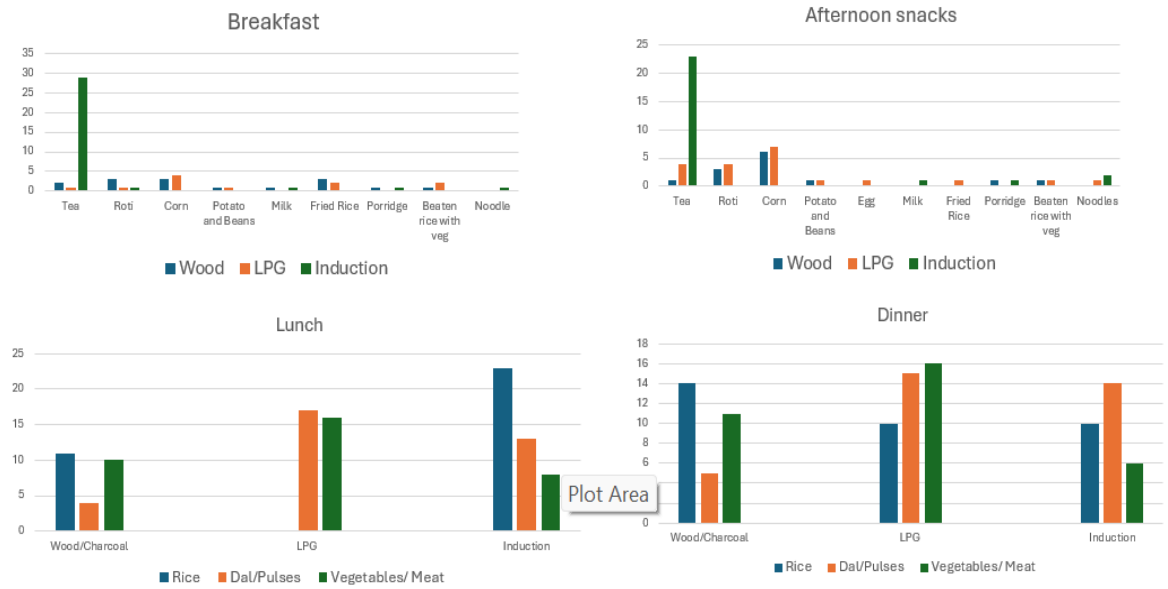

Figure 2: Use of Fuel Sources for Meals

Figure 2 above shows the use of different fuel sources (wood, LPG, and induction) during different meal courses – breakfast, lunch, afternoon snacks, and dinner post electric cooking adoption. It can be conveyed that tea is most prepared in an induction stove during breakfast and snacks, while there is a mixed response to the use of different sources of fuel in lunch and dinner.

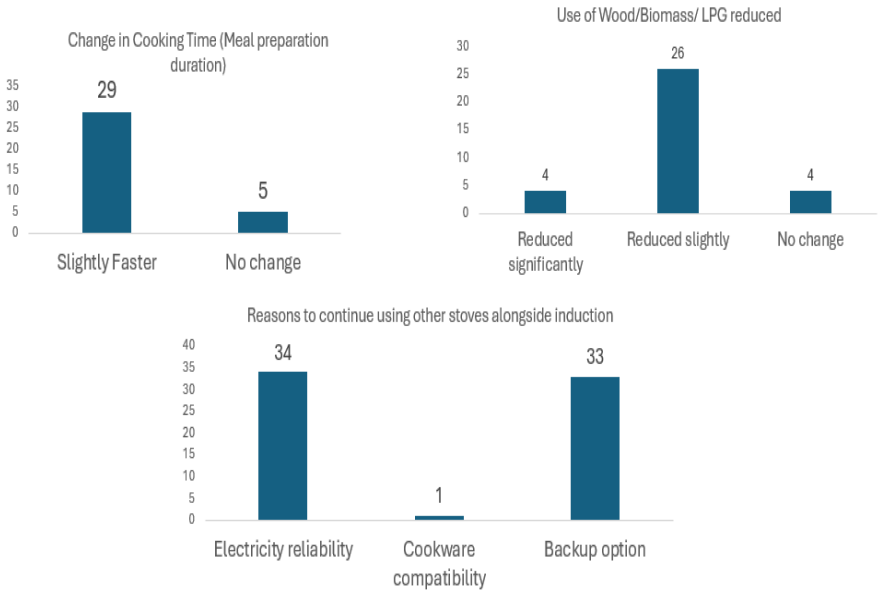

Figure 3: Behavioural Change Post Adoption

Figure 3 reflects views and opinions as expressed by the 34 respondents who adopted electric cooking. Out of 34, 29 expressed a slightly faster change in cooking meal preparation duration, while 5 did not.

Similarly, despite electric cooking adoption, 26 out of 34 respondents conveyed that there was only a slight reduction in the use of wood/biomass/LPG. In addition, all 34 respondents shared that due to unreliable electricity, they use other stoves alongside induction, while 33 respondents prefer the induction stove as a backup option.

2. Energy Use and Cost

Table 1: Energy Use and Cost

SN	Particulars	Baseline (N= 54)	Endline (N= 34)	% Change
1	Average Wood Quantity (in Bhari)	31.22	19.5	37.54%
2	LPG Sufficiency (in months)	4.86	4.09	15.84%
3	Average Electricity Bill Amount (NPR/month)	49.6	106	113.71%
4	Average Electricity Units	14.03	26.22	86.89%

Note: 1 bhari = 30 kg (approx.)

Table 1 shows the change in different parameters, such as average wood quantity used, sufficiency of LPG, and average consumption of electricity. It shows that post-electric cooking adoption, on average, 37.54% of wood consumption is reduced, 15.89% of LPG consumption is increased, while there has been a significant increase in the average electricity bill amount, and electricity units increased by 113.71% and 86.89% respectively.

3. User Experience and Challenges

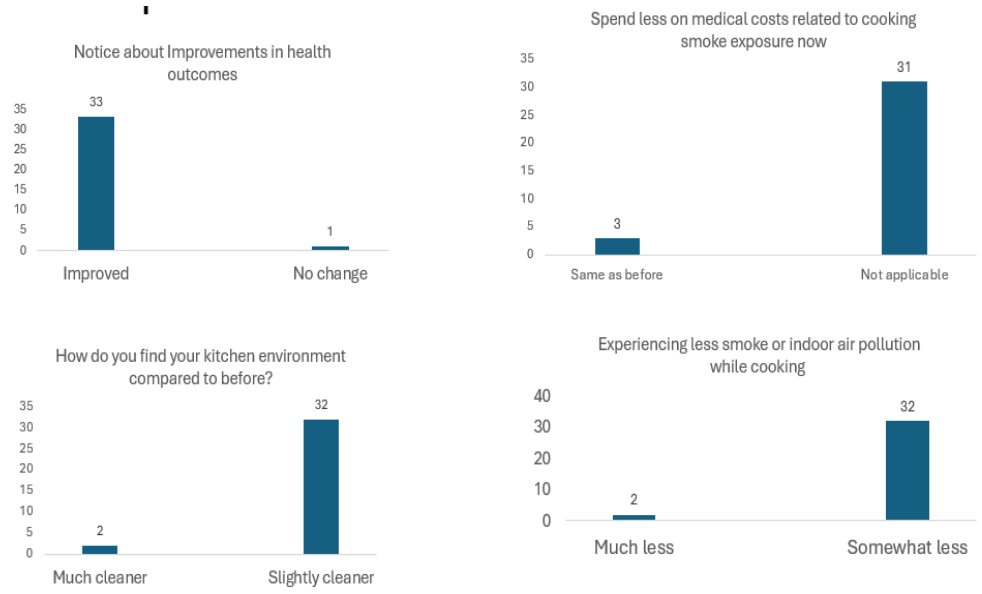

Figure 4: Responses towards electric cooking technology adoption

Figure 4 shows the various responses expressed by the users adopting electric cooking technologies:

- Out of 34, 33 noticed improvements in the health outcomes
- Out of 34, the adoption of electric cooking had no implication on expenses on medical costs to cooking smoke exposure.
- Out of 34, 32 find their kitchen environment slightly cleaner than before.
- Out of 34, 32 experience less smoke or indoor air pollution while cooking

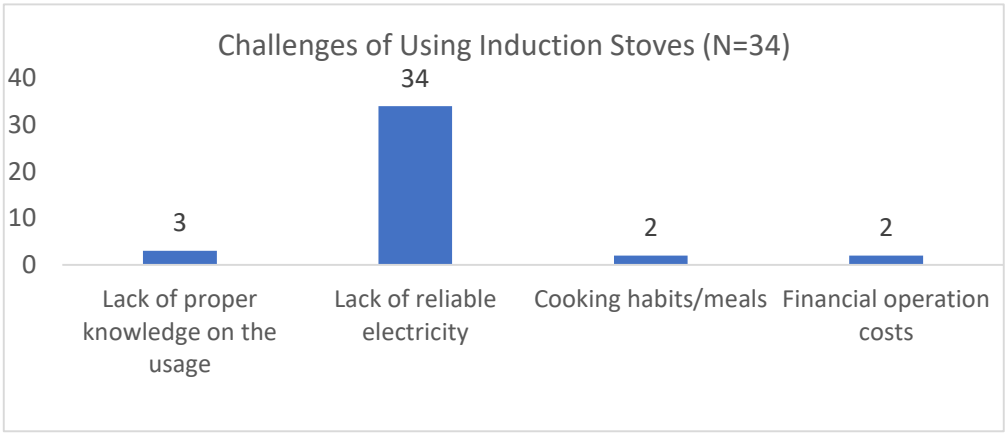

Figure 4: Challenge Users have faced

Figure 5 shows that the lack of reliable electricity is the major hindrance to electric cooking adoption in rural households, as expressed by all 34 households. Besides that, the other challenges of using induction stoves were lack of proper knowledge on the usage (3 HHs), Cooking habits/meals (2 HHs), and financial operation costs (2 HHs). 2 households found some meals difficult to cook on induction stoves, and 2 households expressed the higher financial electricity costs of using induction stoves as a challenge.

4. Gender Roles and Shift

Figure 5: User Experience

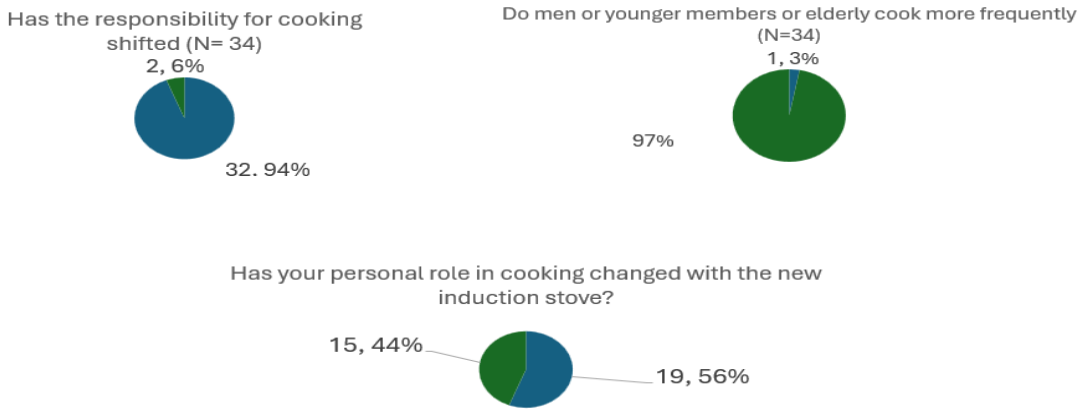

Figure 6: Gender Roles and Shift

Figure 6 shows the shift in gender roles and sharing of responsibilities for cooking post-adoption of electric cooking. It reflects that:

- 94% agree that the responsibility for cooking has shifted
- 97% agree that men, younger members, or elderly people cook more frequently in the induction stoves, particularly tea.
- 56% agree that their personal role in cooking has changed with the new induction stove

5. Perception of cooking with electricity

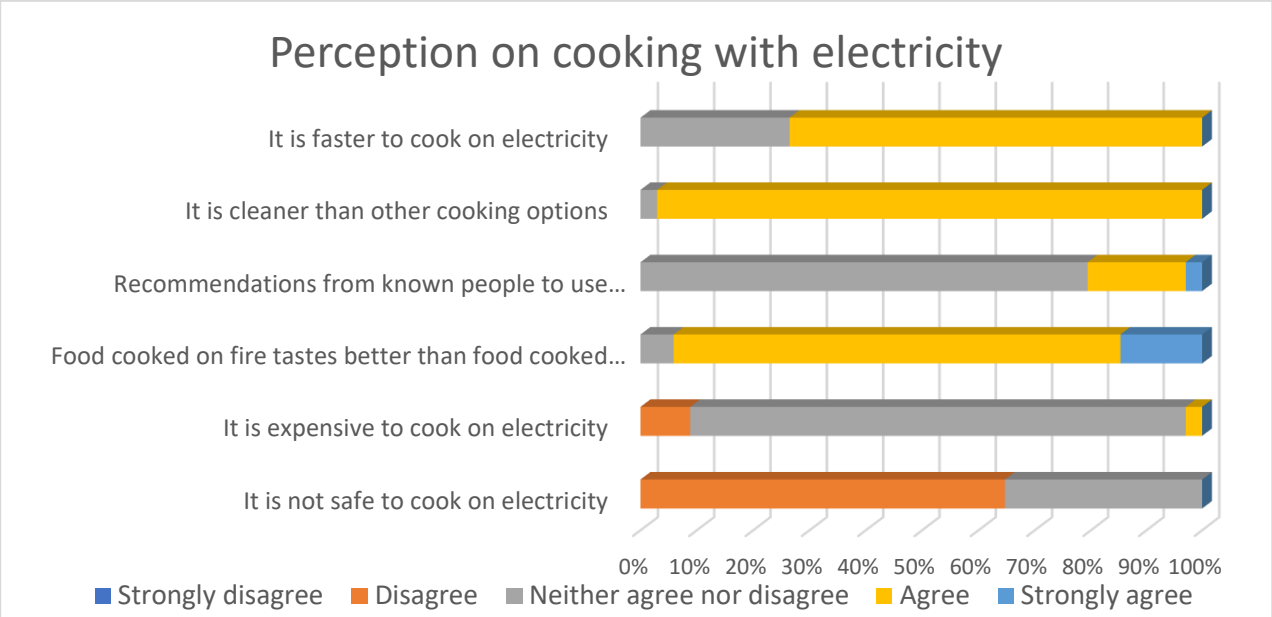

Figure 7: Perception of cooking with electricity

Figure 7 shows the various perceptions of 34 respondents on cooking with electricity. The majority of the respondents agree that it is faster and cleaner to cook on electricity, in addition to the taste of food being better while cooking on fire than on electricity. There was a mixed response from the respondents regarding the decision to use induction stoves based on the recommendations from known people in the community and the price to cook with electricity. Further, the majority disagreed (60%) that it is not safe to cook with electricity.

Photos

I. Glimpses of Baseline Survey

II. Glimpses of Endline Survey