



Findings from the MECS Electric Cooking Outreach (ECO) Follow up Studies

Friday 7th April 2023, Kathmandu





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2021 - MECS Electric Cooking Outreach (ECO) Pilot Studies

Four 6-month pilot studies (completed Dec 2021-Feb 2022)

- First large-scale, evidence-based research of this kind in Nepal.
- Monitored uptake and consumer experiences of eCooking with over **300** households and the impact on the local electricity supply.
- Used energy efficient appliances such as Electric Pressure Cookers (EPCs)
- **MECS Cooking Diaries method used**
 - Captures how people cook in 'real life': Participants keep daily cooking diaries on what they cook, how, when, and for how many people
 - Diary data matched with quantitative measurements of energy consumption
 - Before and after approach: shows whether participants cooking practices change once eCooking appliances are introduced

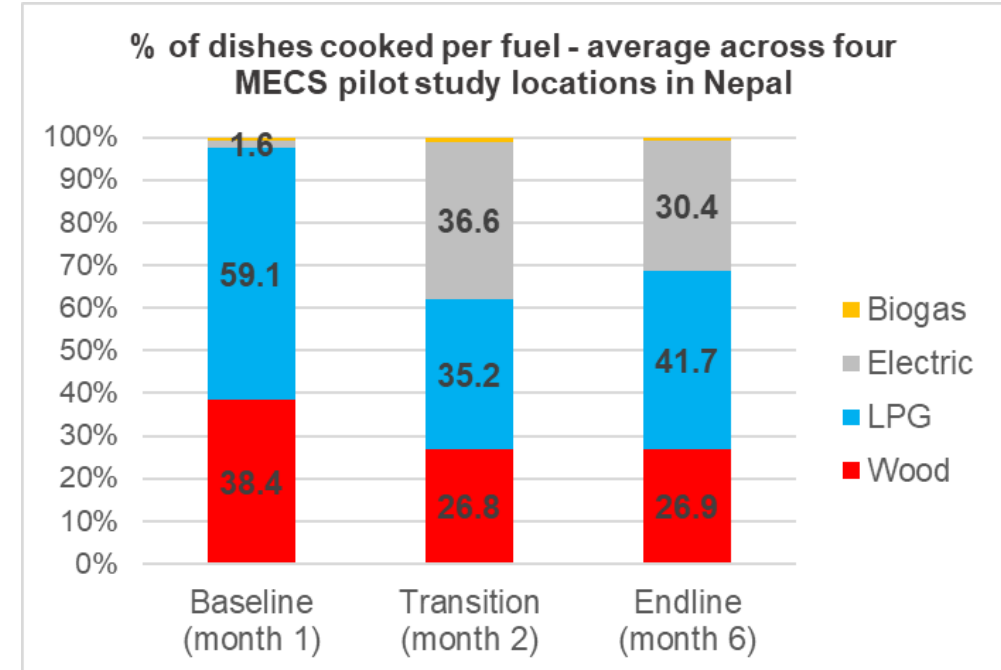




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Dec 2021: ECO Pilot Studies – key findings

- Electric cooking (eCooking) uptake was swift, significant and sustained in each pilot study
- Demonstrated efficient eCooking appliances (such as EPCs) are compatible with local menus
- Provided important insights which helped develop the beginnings of local eCooking supply chains.
- Households could use the eCooking appliances as much or as little as they wished. This more real-life scenario significantly advances the case for eCooking at scale **by showing that people from various cultural and socio-economic groups in both grid and off-grid locations are willing to use and pay for efficient electric cooking appliances (EECAs).**





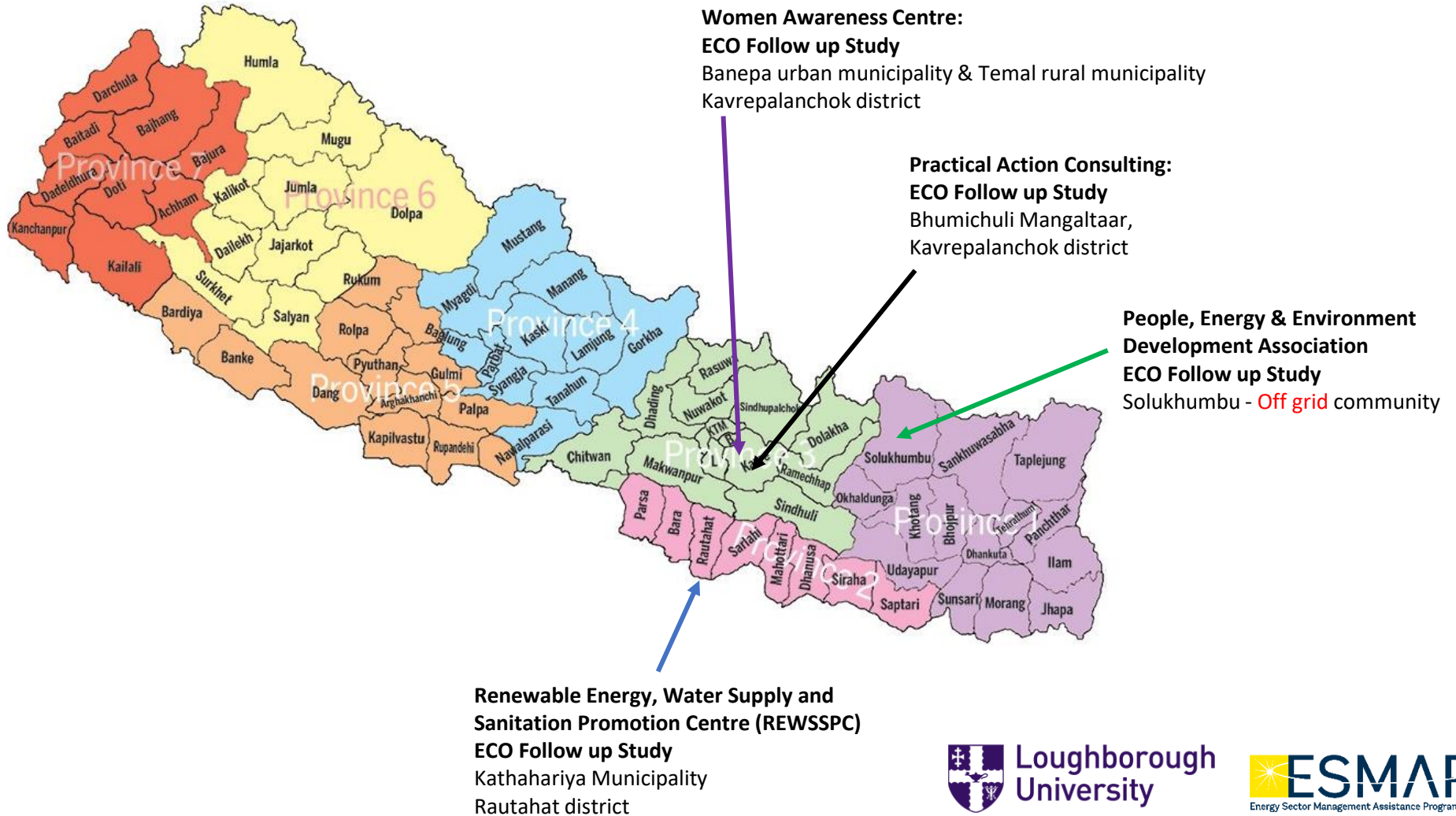
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2023 ECO Follow up studies: Research objectives

1. To understand the longer-term impacts of the ECO pilot studies on community cooking practices for both participants and non-participants of the original study?
2. To investigate the ways the ECO pilot studies could serve as launchpads to 'outscale' eCooking in the community and its surroundings?
 - 'Outscale' = generating additional interest and uptake of eCooking in the community and surrounding areas
 - Assumption - community word-of-mouth can be a far more effective awareness raising mechanism than interventions by external actors



ECO Follow up Study Locations





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Research methods used with ECO participants

- Cooking diaries study for two weeks with 10 participant households from the original ECO pilot study (ECO-participants)
 - replicates method in original ECO study allowing direct comparisons
- ‘Indicative cooking diaries’ study and survey with at least 30 households
 - households generate menu for two typical days describing dishes cooked and devices used. based on participant recall rather than monitoring
 - Less resource intensive allowing larger sample sizes





Research methods used with ECO non-participants

- Survey with 50 households from the community and surrounding areas who were not participants in the original study (ECO non-participants)

Aim: To understand the wider impacts of the ECO pilot studies including:

- Changes in cooking practices
- Uptake of eCooking
- Change perceptions of eCooking
- Opportunities and challenges to adopt eCooking



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Benefits of this research approach

- Policy makers, investors, suppliers – provides detailed picture of consumer demand: how people are willing to use and pay for electric cooking
- Utilities and mini-grid developers – provides detailed real-life picture of electricity demand and load profiles to support planning for scaling up eCooking
- Manufacturers – consumer user experiences and preferences informs design
- Informs on awareness raising and other mechanisms to scale up eCooking



From ECO Pilot Study to ECO Follow up Study: findings from three impact stories



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ECO Impact story 1

Women Awareness Centre Nepal (WACN)





Women Awareness Centre Nepal (WACN): Impact story 1

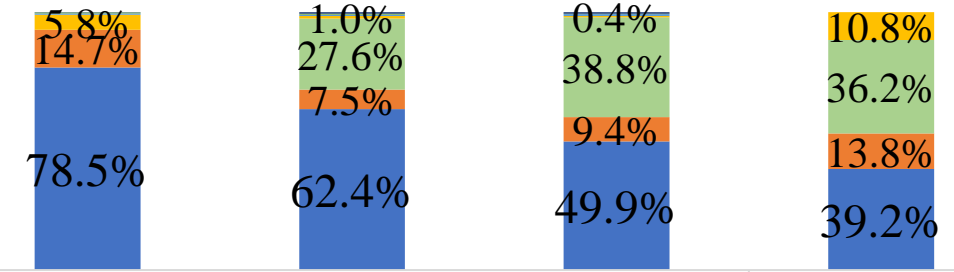


Location(s): Banepa Urban Municipality & Timal Rural Municipality (Kavrepalanchok District)

2021 ECO Pilot

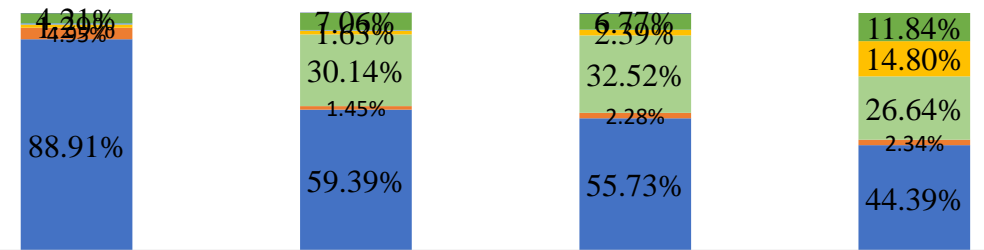
- 80 households
- **Key Conclusion:** The findings from the project further strengthen the evidence base for eCooking in Nepal by highlighting how women community networks and product quality facilitate swift and sustained eCooking adoption.

% dishes cooked per stove - Rural



Baseline Transition Endline Follow-up
Eco pilot C.Diaries (n=40) Follow-up C.Diaries (n=5)
■ LPG stove ■ Firewood Stove ■ EPC ■ Induction ■ Rice cooker ■ Electric kettle

% dishes cooked per stove - Urban



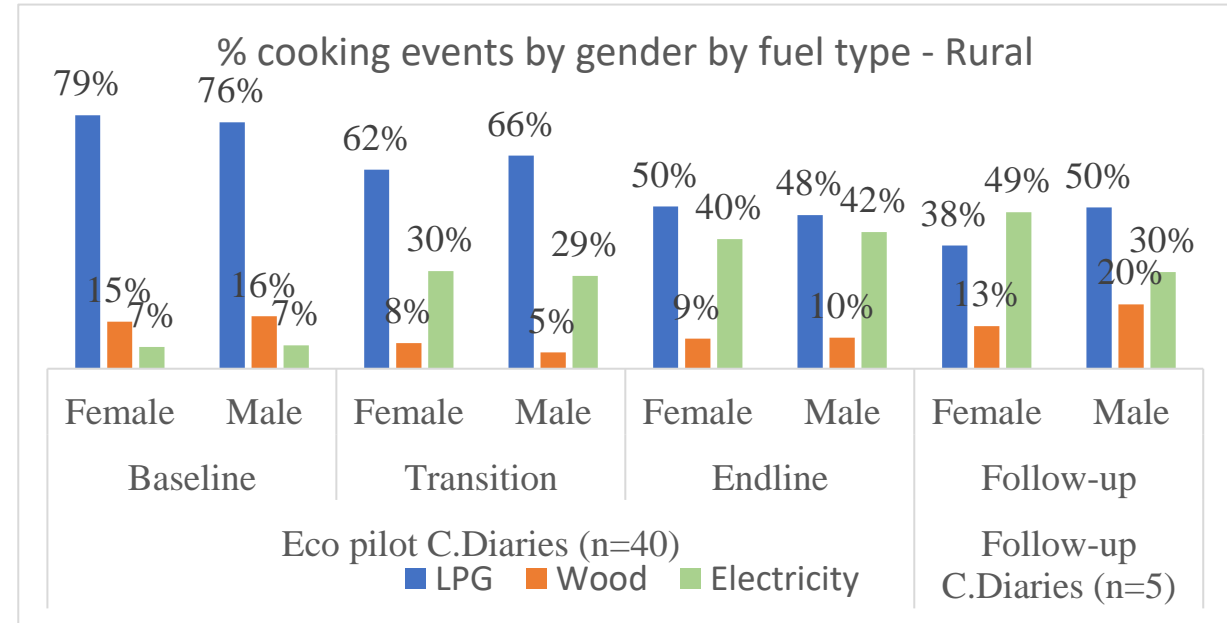
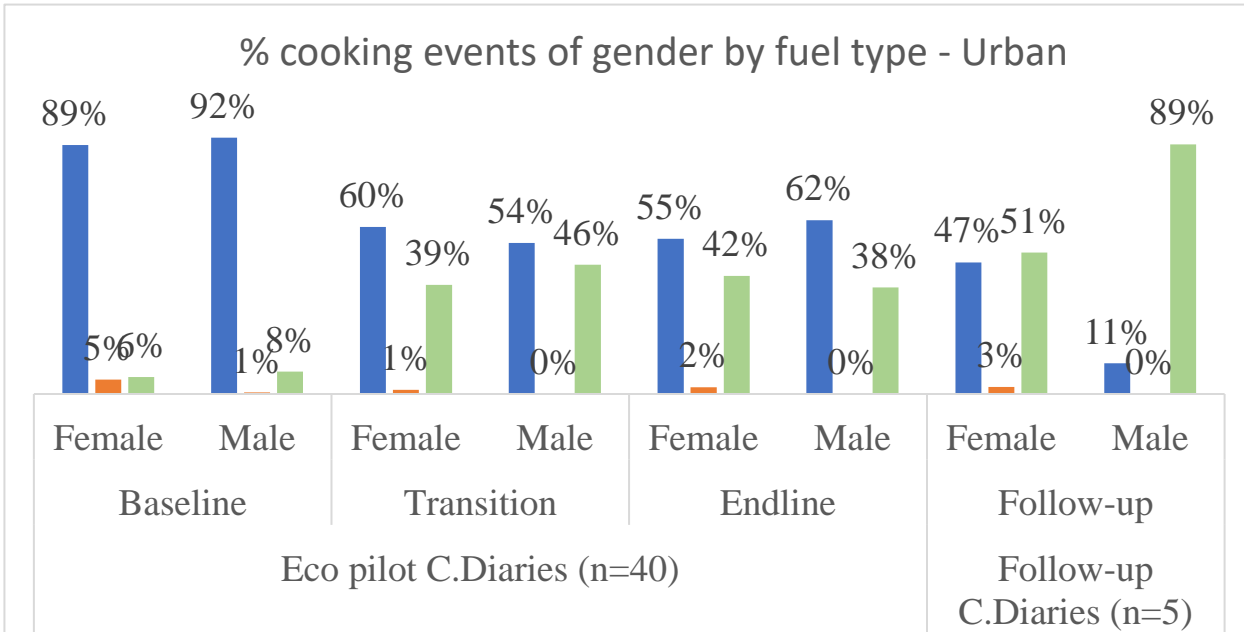
Baseline Transition Endline Follow-up
Eco pilot C.Diaries (n=40) Follow-up C.Diaries





2023 Follow up study: ECO participants

- All participants still using eCooking appliances
- Share of eCooking in total cooking/heating events has increased to 47% in rural community and 53% in urban communitiy
- Changes in cooking practices -Gender roles

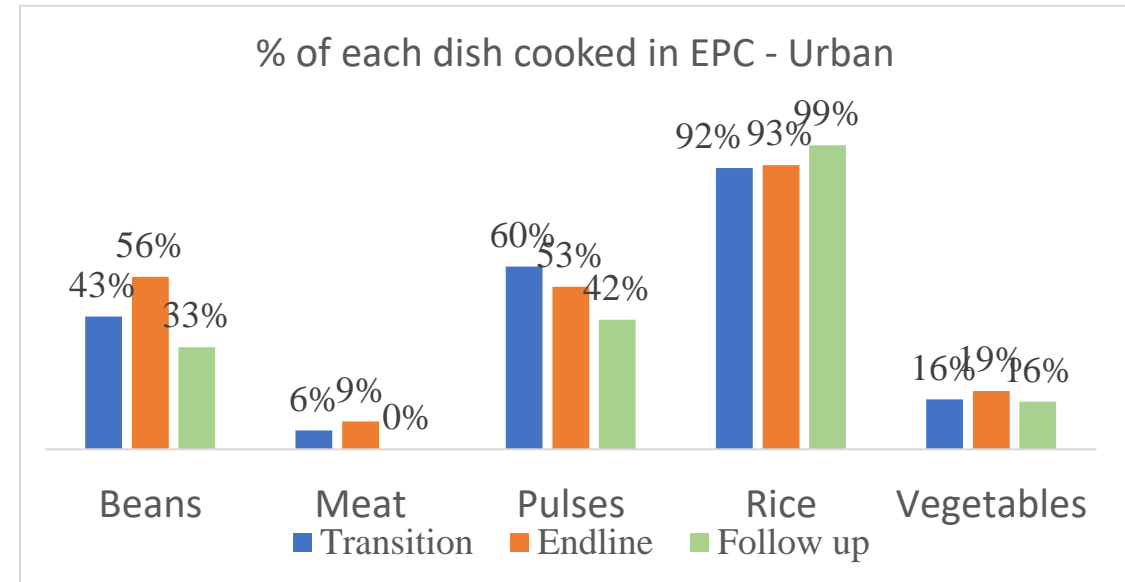
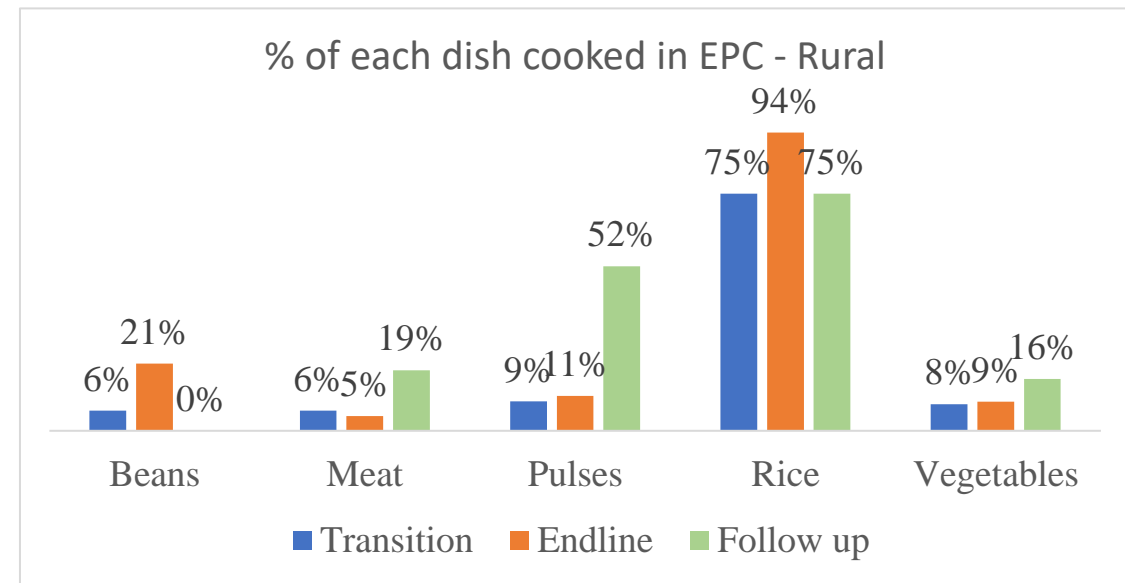




2023 ECO Follow up study: ECO participants

User experiences with EPC

- Dishes being cooked in EPC are reduced but uses of other eCooking appliances has increased.
- 10% ECO participants have bought an additional cooking appliance (electric or non-electric) and 30% expressed an interest to do so out of which 35% EPC, 45% induction and 20 % electric kettle
- The financial problems, unavailability of deep discounts and unavailability of desired brand eCooking appliances were cited as the main reason for the delay in buying

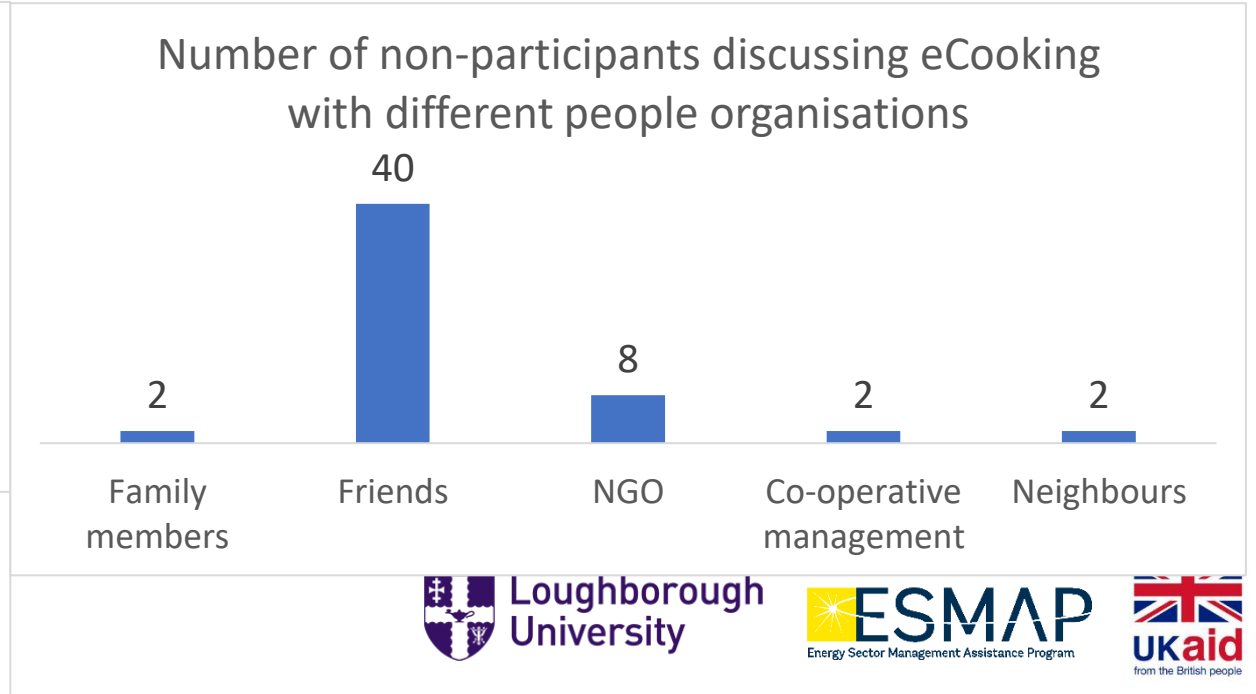
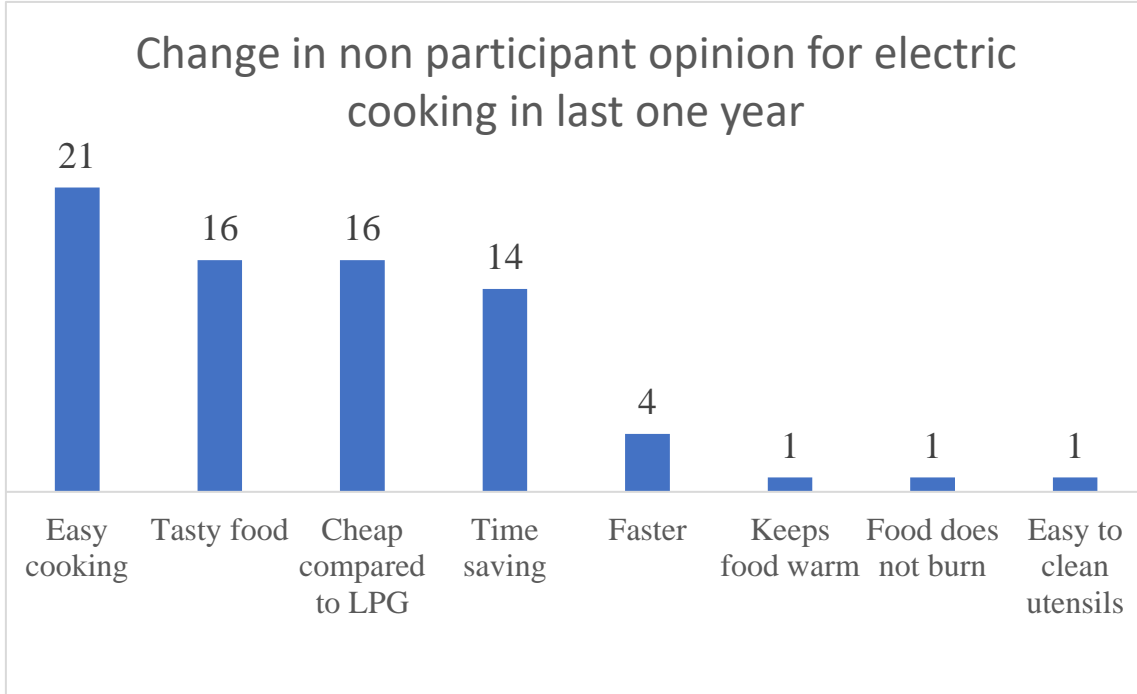
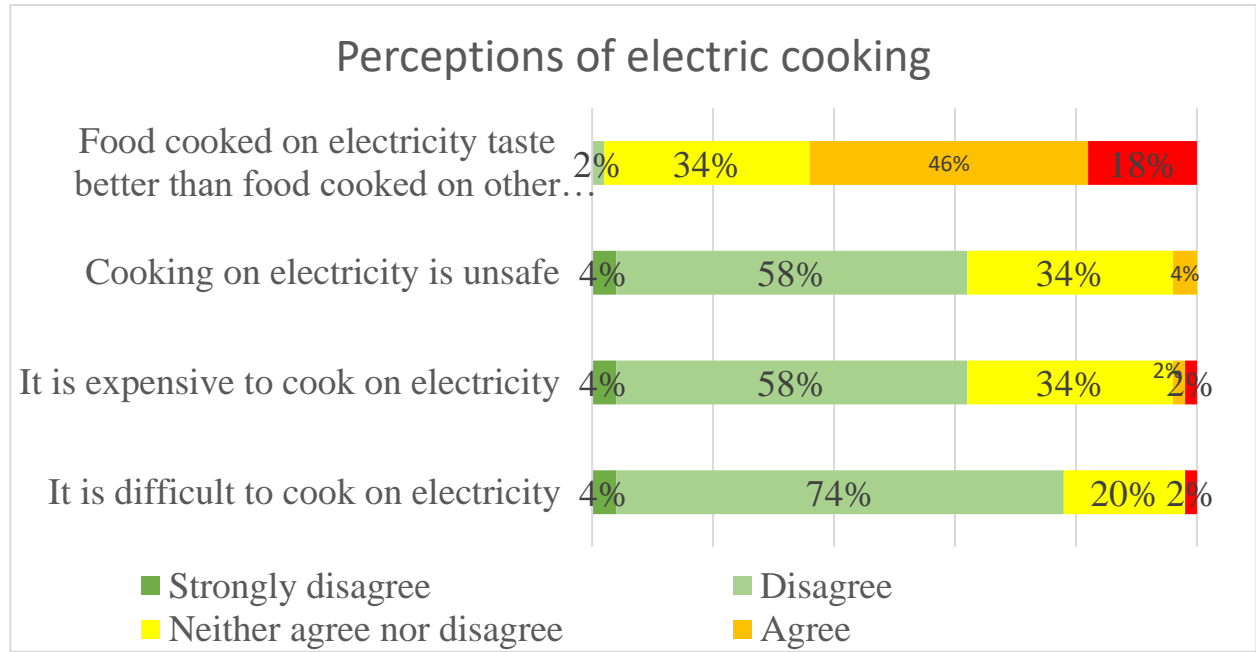




2023 ECO follow up study: Non-participants

Perceptions of eCooking

- Changes in opinion about eCooking/More positive
- Community influence



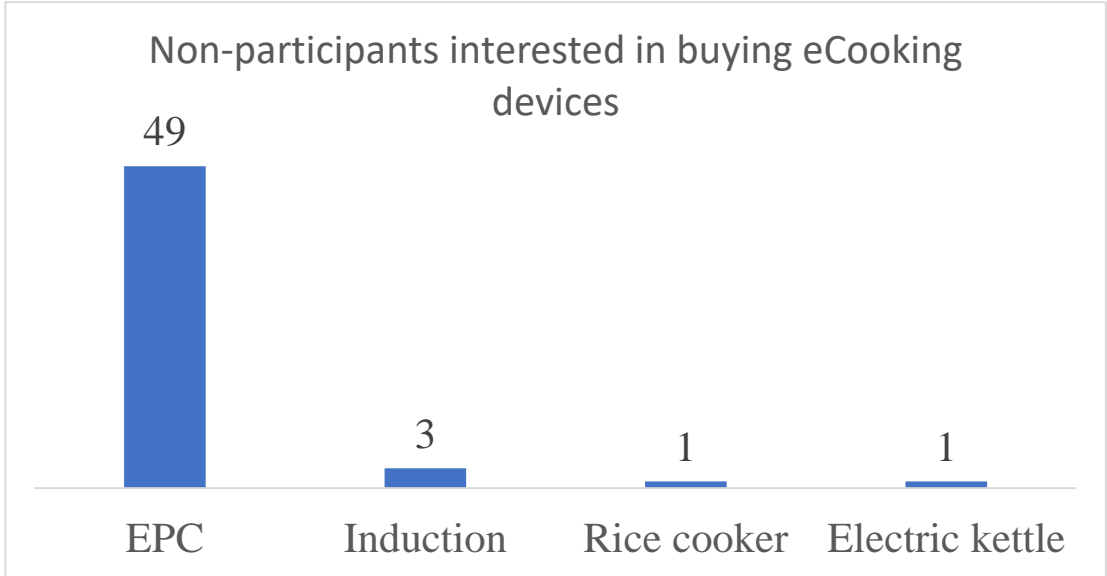
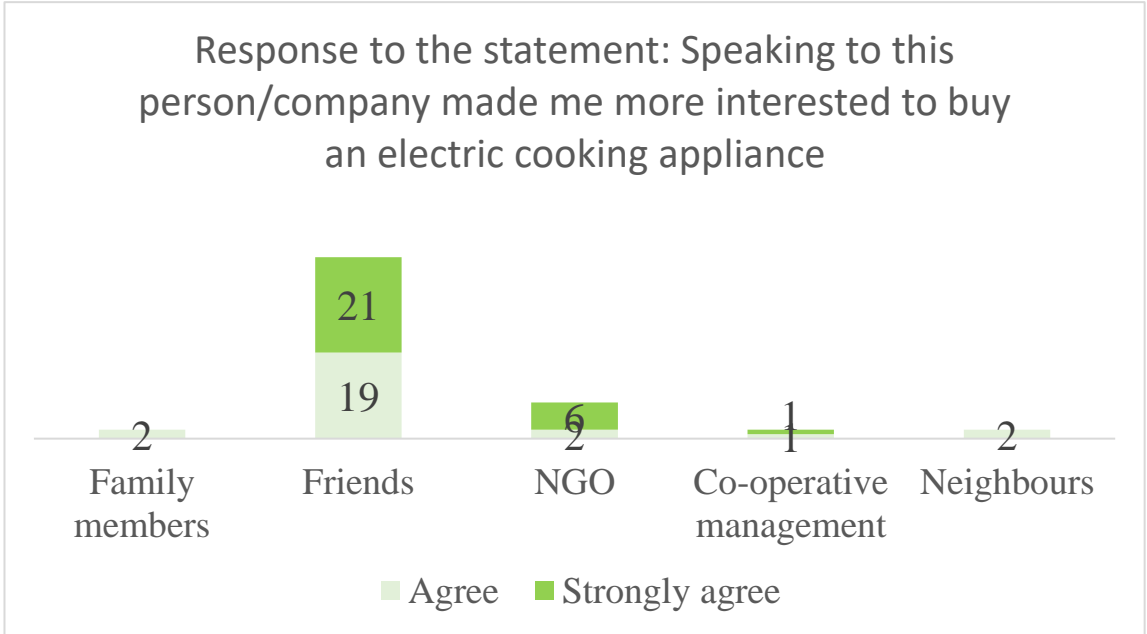


2023 ECO follow up study: Non-participants

- No of non-participants started using eCooking appliances in the last year
- Non-participants expressed interest in purchasing an eCooking appliance
- Opportunities/challenges for non-participants to adopt eCooking- 45 do not think there will be any challenges for them to access or use electric cooking; community awareness about eCooking has improved due to positive feedback

What I enjoy best about EPC is that you can cook anything in it and the meal you make using it tastes a lot like food you make with firewood 3 stone fire. I have also recommended others to use EPC."

Til Kumari Timalisina, Banepa Municipality





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Unlocking community outscaling opportunities

Conclusion: longer-term impacts of the ECO pilot studies

- Community cooking practices
- ECO pilot studies has generated additional interest and uptake of eCooking in the community and surrounding areas (i.e. 'outscaling impact')

Unlocking this outscaling potential

- Strengthening eCooking appliance supply chain
- Economic affordability (mitigating upfront capital requirement to possess eCooking appliances)
- Strengthening electricity supply infrastructure:
- Technology acceptability (awareness creation among the community about eCooking)
- Regulation, legislation and policies.

EPC-cooked food is quite good in taste. With all the time it has saved me, I can now work on my farm to cultivate leafy greens and vegetables and complete my other household chores. I have been using this EPC for 1.5 years. I consider EPC to be very cost-effective as my LPG cylinder now lasts two months instead of just one month like it did in the past."

-Mina Thapa Magar, Banepa Municipality



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ECO Impact story 2

People, Energy &
Environment
Development
Association (PEEDA)



Nechasalyan Rural Municipality, Solukhumbu



People, Energy & Environment Development Association (PEEDA): Impact story 2

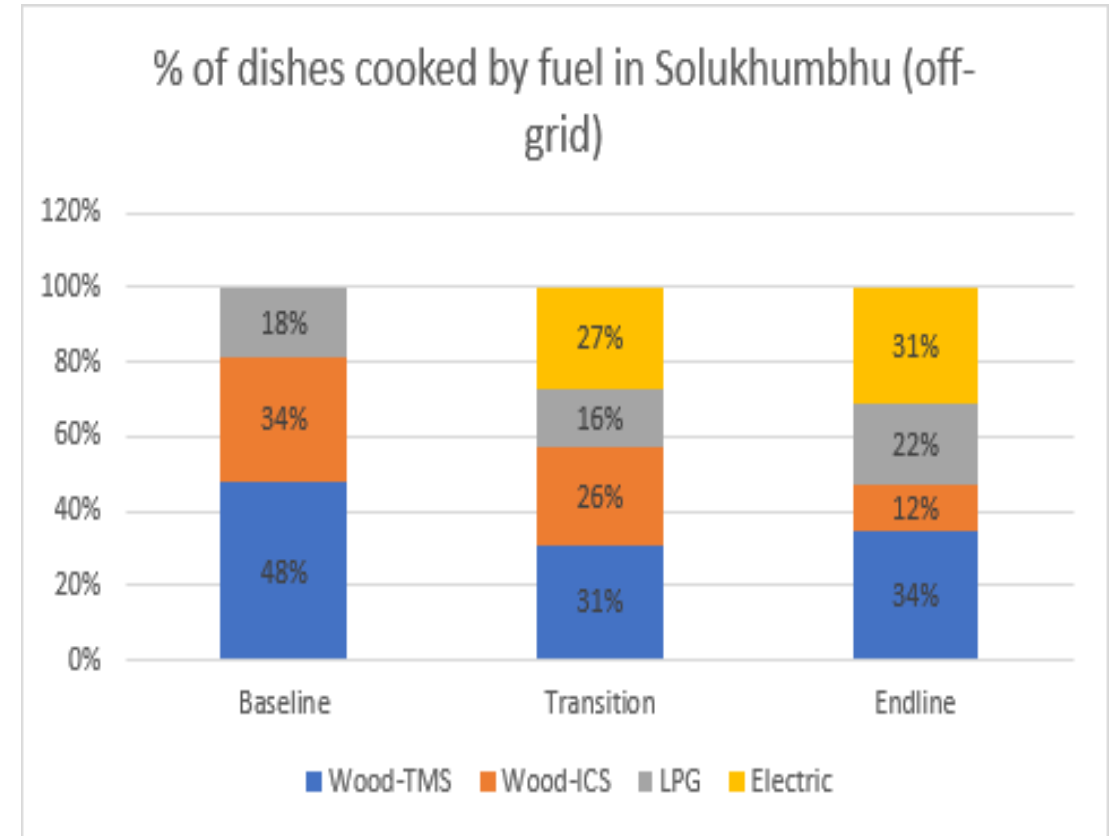


Location(s): Nechasalyan Rural Municipality (Solukhumbu District)

Project Partner(s):

2021 ECO Pilot

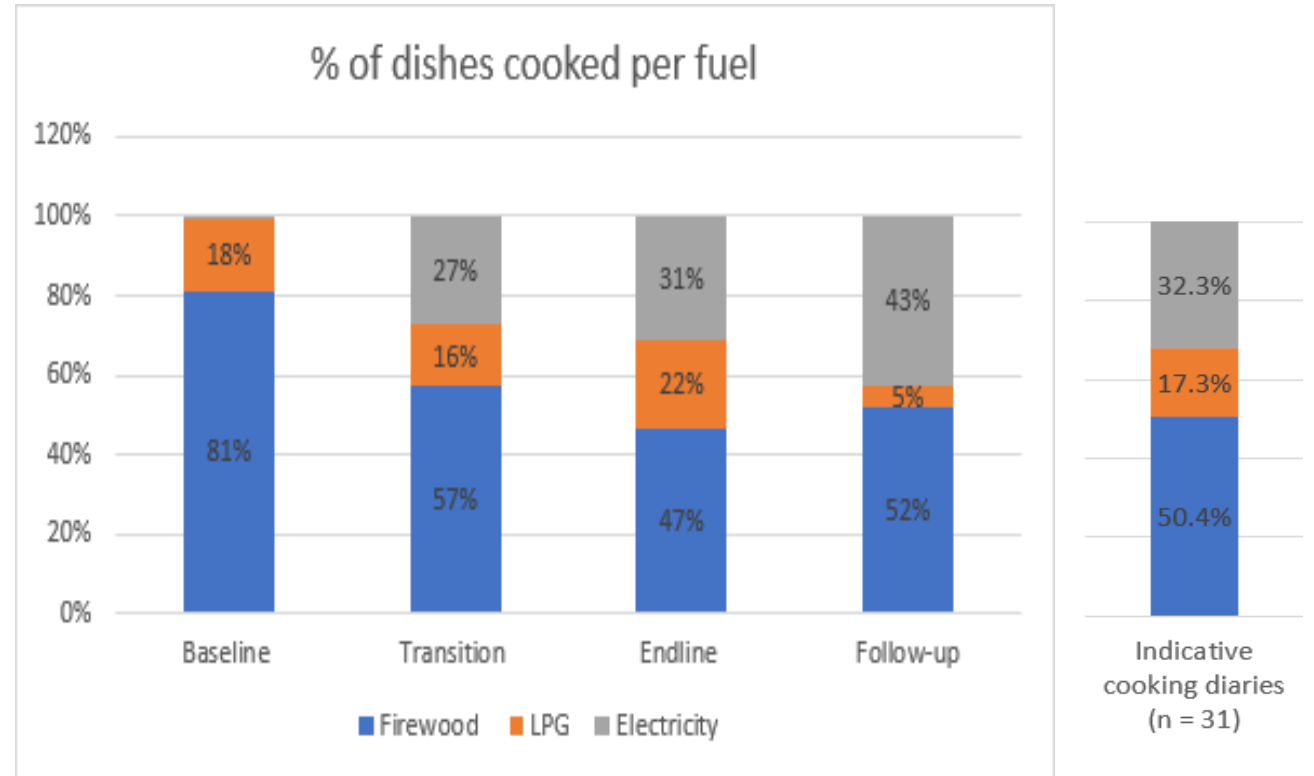
- 50 households in Solukhumbu (another 110 in South Lalitpur)
- **Key Conclusion:** The findings shows how low EPC power consumption unlocks eCooking access for a greater number of people even in off-grid locations or places with irregular grid supply. To expand eCooking further, a more reliable power supply and local after sales services are required.





2023 Follow up study: ECO participants

- 23 out of 31 participants were still using eCooking appliances
- eCooking Shares 43% of total cooking/heating events
 - 32.3% from the EPCs provided in the original ECO pilot
 - The remainder from additional appliances bought since the end of the pilot
- Dishes cooked in EPC: Rice, Dal, Meat, Potatoes, Milk, Noodles, Tea, Vegetables



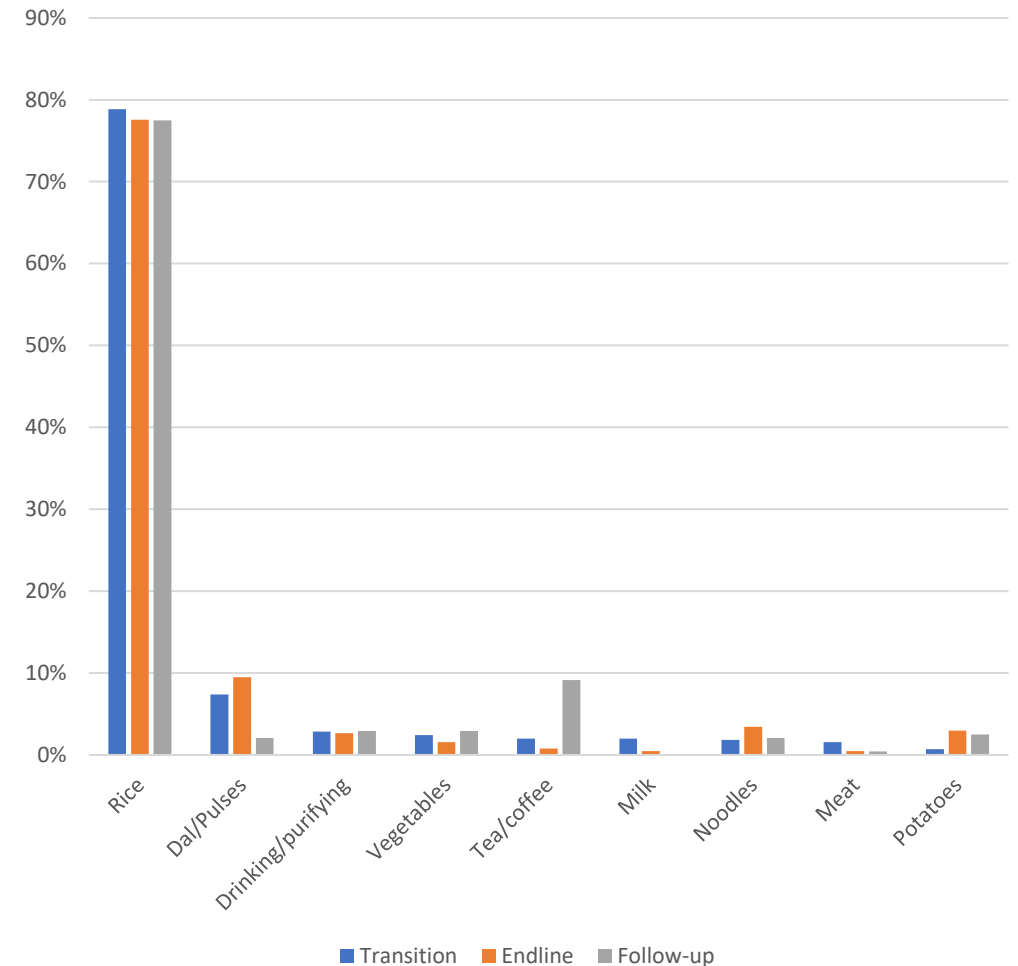


2023 ECO Follow up study: ECO participants

- 27% of ECO participants bought at least one other eCooking appliance (4 electric kettles, 1 water boiler, 1 induction stove, 1 infrared stove, 1 mixer, 1 electric rice cooker)
- 45% showed interest in buying new cooking appliances.
- Major Opportunities: Supply chain development, raise awareness, interest in, and usage of eCooking
- Major Challenges: Inaccessible repair centers, upfront cost of appliances, unreliable electricity supply.

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

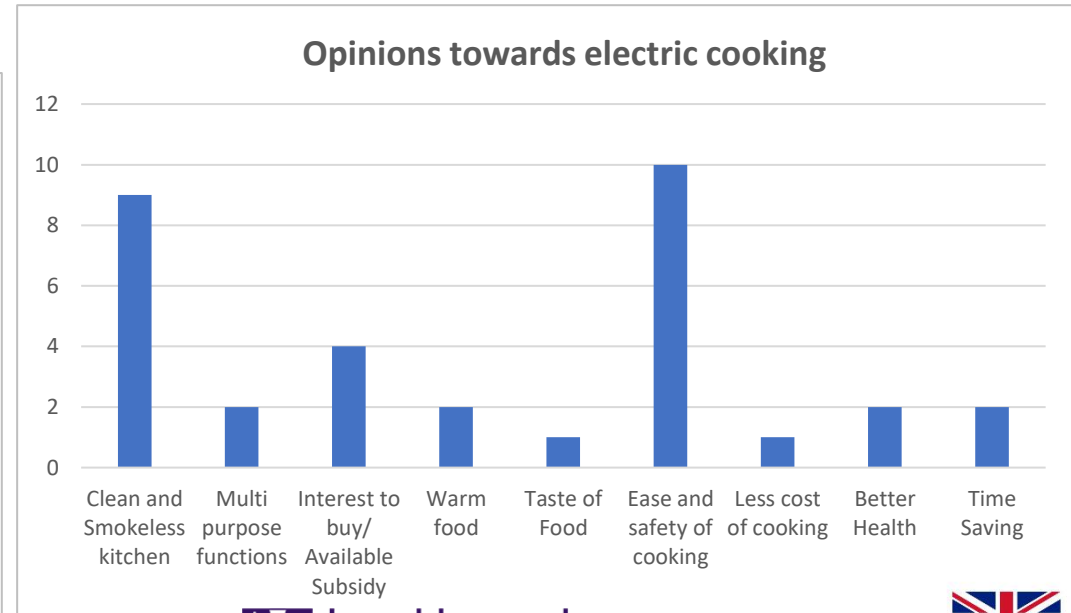
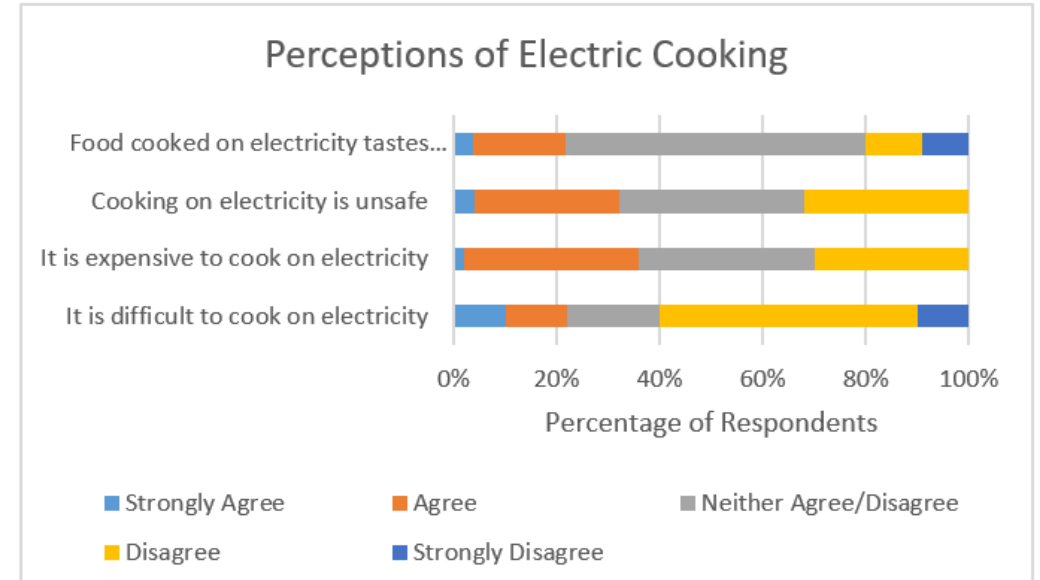
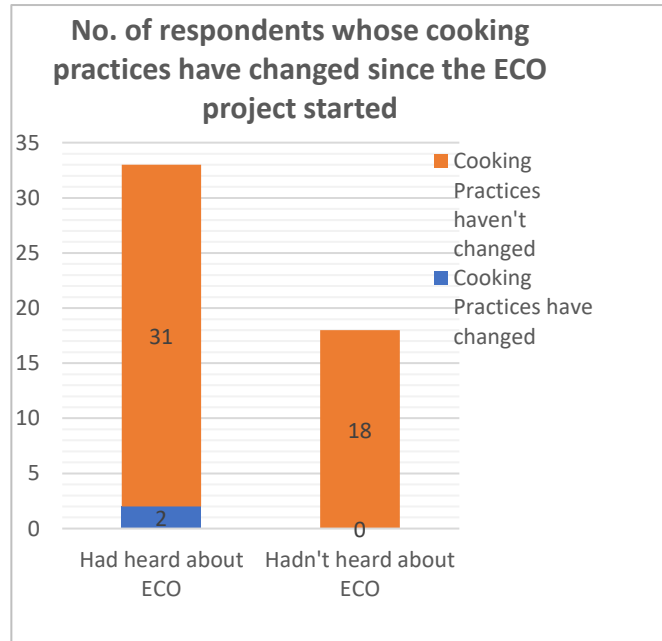
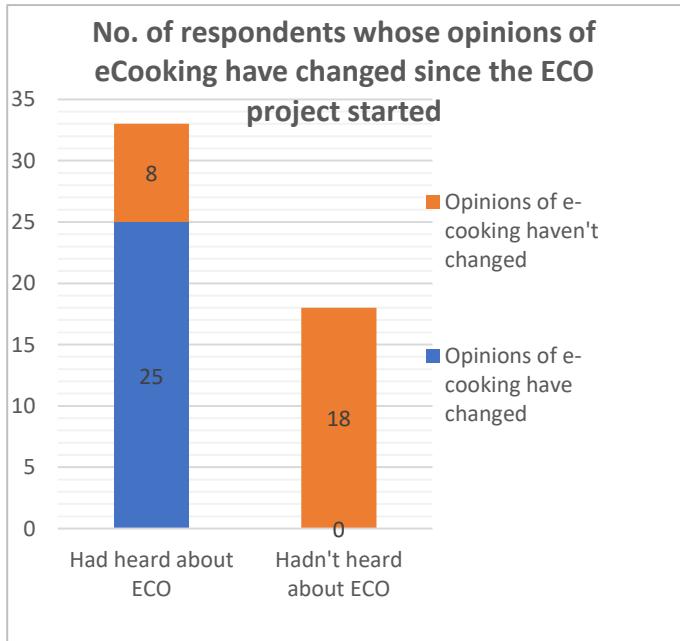
% of each dish cooked in the EPC





2023 ECO follow up study: Non-participants

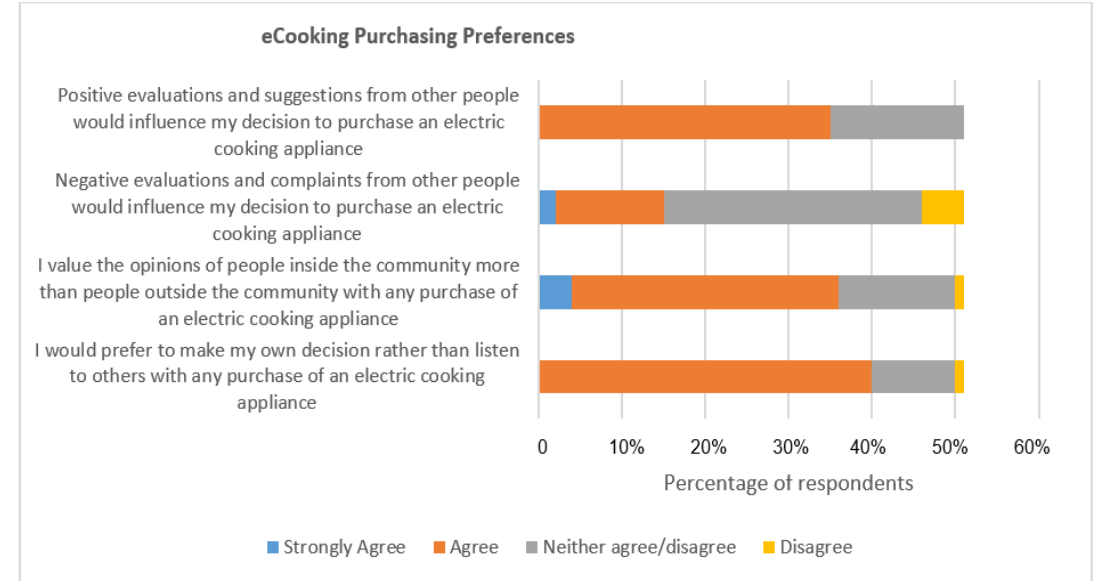
- ECO study played a significant role in changing opinion of e-cooking (who heard about ECO project)
- Positive changes in opinion about eCooking were reflected



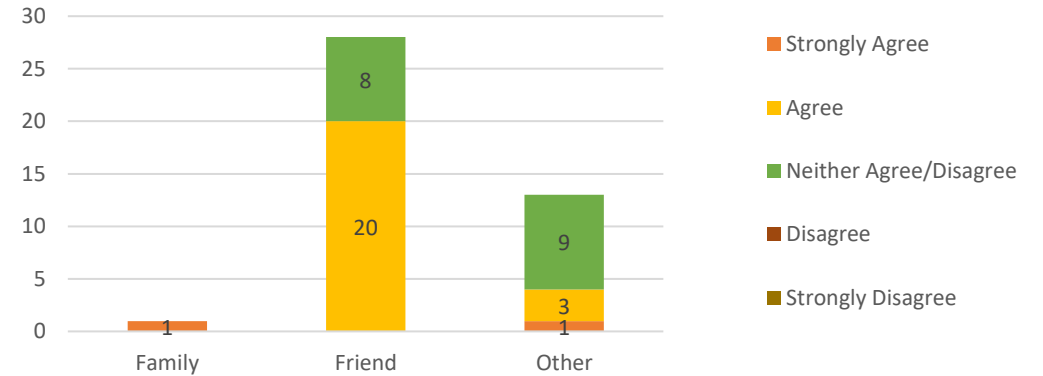


2023 ECO follow up study: Non-participants

- 11 out of 51 (21%) non-participants purchased an additional cooking appliance in the last year.
- 36 out of 51(70%) non-participants expressed interest in purchasing an eCooking appliance
- Opportunities: ECO participants can act as technology promoters
- Challenges: upfront cost of appliance, limited power availability.



Responses to the statement: Speaking to this person/organization made me more interested to buy an electric cooking appliance.





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Unlocking community outscaling opportunities

Conclusion: longer-term impacts of the ECO pilot studies

- Increased use of electricity for cooking purposes
- Both ECO (27%) and ECO (21%) non-participants have bought eCooking appliances
- 45% of ECO participants and 70% of ECO non-participants showed interest in buying new eCooking appliances

Unlocking this outscaling potential

- Accelerate the installation of grid infrastructure at the site
- Identify the repair technicians locally and train them
- Free trial of products and demonstrations to local vendors
- Further mobilize community based organizations for eCooking promotion

"The micro-hydropower committee does not employ a tariff system. Instead, we pay a fixed amount of 100 rupees per month, regardless of our electricity usage. Therefore, switching to pure electric cooking will not increase my monthly electricity bills. Moreover, it will save me the hassle of collecting firewood for days."





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ECO Impact story 3

Practical Action
Consulting (PAC)





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Practical Action Consulting (PAC): Impact story 3



2021 ECO Pilot (May 2020 to August 2021)

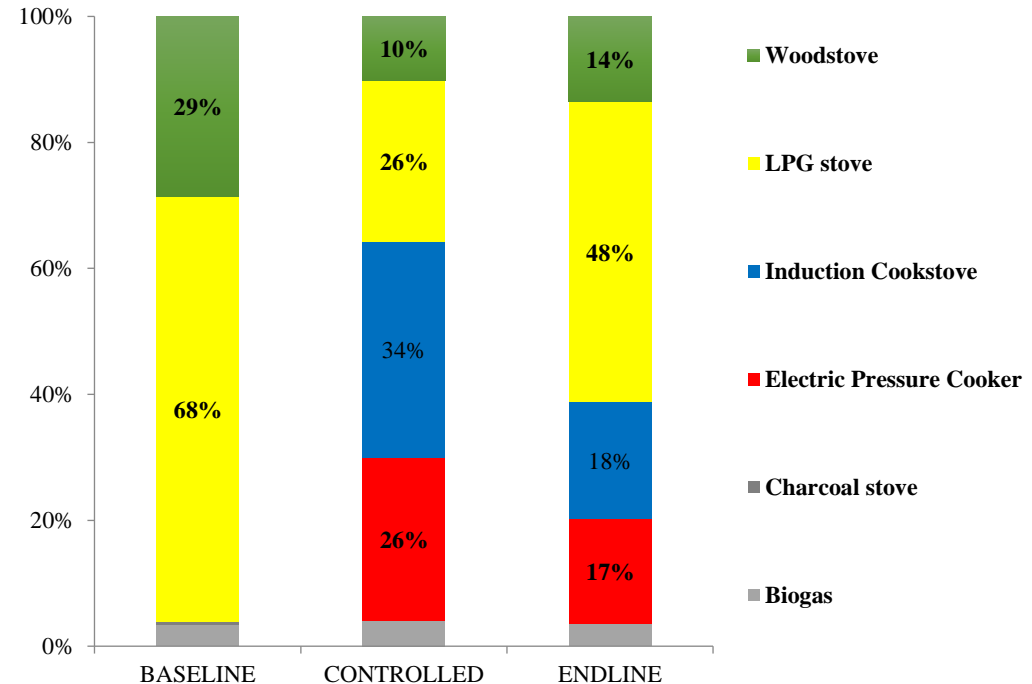
Location(s): Mangaltar Village, Roshi Rural Municipality (Kavrepalanchowk District)

Project Partners: Ajummary Bikash Foundation (ABF) and National Association of Community Electricity Users Nepal (NECAUN)

44 households (15 with EPCs, 14 with Inductions and 15 with both)

Key Takeaway: The large electric cooking uptake shows the clear benefits of an integrated electricity/clean cooking approach and the key role community scale electricity systems and entities (in particular CREEs) can play expanding the outreach of electric cooking in rural areas.

Proportion of times cooking appliance was used during different phases in ECO Pilot Study





2023 Follow up study: ECO participants

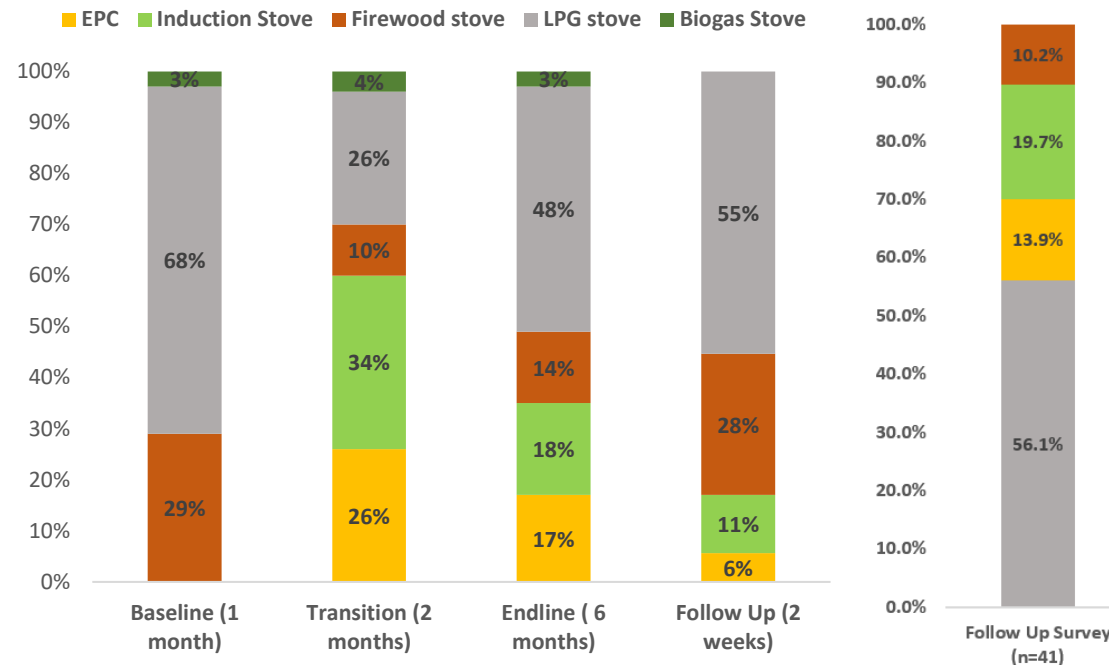
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-41 HHs among ECO's 44 households
-2 week cooking diary for 10 HHs.

- **92% of the ECO participants** are still using the ECAs provided through ECO Pilot study.
- **Electric cooking** has been **integral part of Household with increase in penetration of the ECAs** from the baseline phase of ECO Pilot.
- The usage of ECAs has slightly decreased among the ECO Pilot participants but it accounts **around 20% of dishes cooked** compared to the **none (0%)** in the baseline phase before the ECO Pilot's intervention.
- **EPC for Rice, Lentils, Curries, Meat** while **Induction** also **rice, lentils and curries**. Additionally, **Induction** are used in **boiling events**.
- **ECAs, mostly Induction, are used 58% of water boiling events** compare to **31% in ECO Pilot Endline** phase.

Gender Role	ECO Pilot	Follow UP
Male Spouse interest in e-cooking has increased	32% responses	58% responses
Other Family members use of ECAs	36% responses	38% responses



Comparing Cooking Diaries of ECO Pilot to Follow Up and HHs Survey

Stove Types	Overall Use	3 time a day	2 time a day	Once a day
LPG	98%	32%	46%	17%
EPC	56%		49%	
Induction	56%	5%	41%	10%
Firewood	34%	2%	20%	7%





2023 Follow up study: ECO participants

“Electrical Cooking is expensive and is unsafe are no longer the Taboo in Mangaltar neighbourhood.”

10% participants have added ECAs in their Kitchen (after damage, added Induction etc).

During ECO pilot exit survey, 97% of the participants had expressed interest to buy the equipment in future. However, in ECO Follow Up study, 34% participants expressed their interest to buy ECA (65% chose Induction Stove and rest EPC)

ECO Pilot Introduced to Electric Cooking in Rural Setting and Broke the Taboo (83% recommended to others).

Over 170 ECAs deployed in the area after ECAs, local suppliers quoted the awareness created by ECO helped such deployment

The experience of the participants and the **word of mouth** have also created a positive perception in the community.

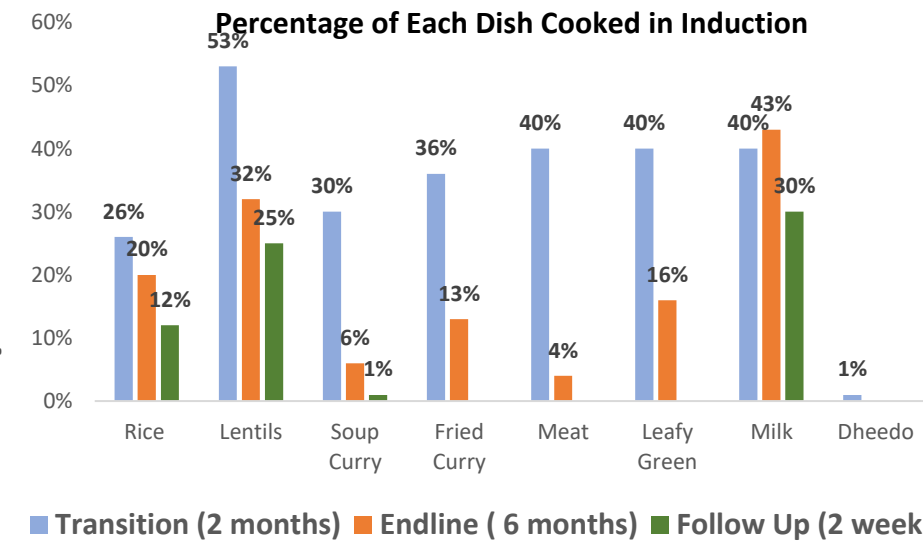
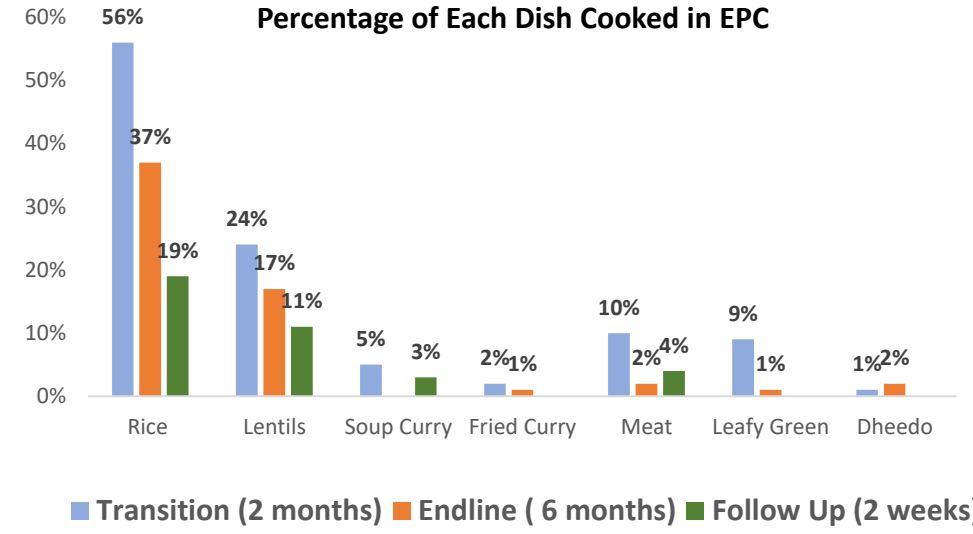


Electrical Supply: 80% respondents had power cuts few times a week.

High Upfront Cost: interest to replace or add new ECAs low hence.

After Sales services: 7 cases of damages, 4 beyond repair, lack of spare parts.

Household Electrical System: current wiring unsupportive to ECAs, replaced while deploying.





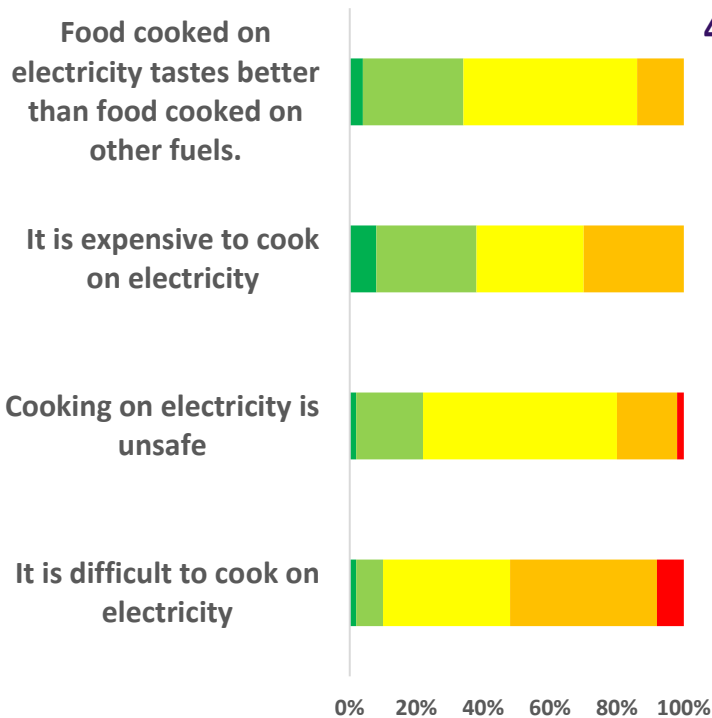
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2023 ECO follow up study: Non-participants

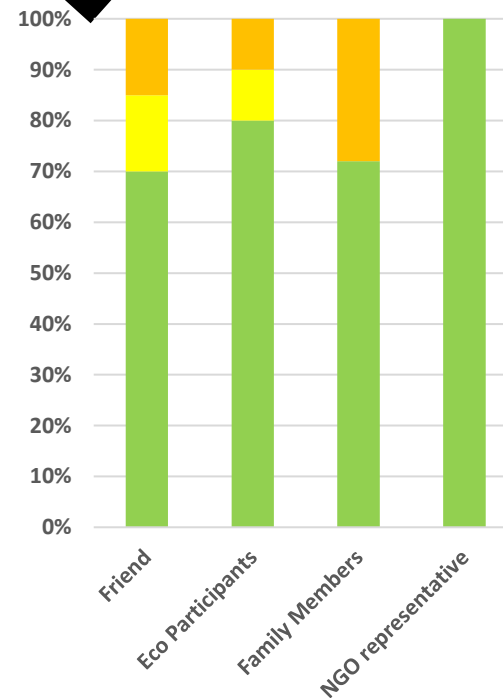
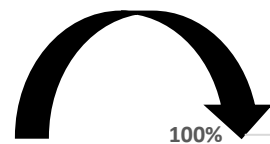
-50 Households who were not part of ECO Pilot Study but live nearby to the ECO Participants.

-24% of which have brought ECAs after ECO.

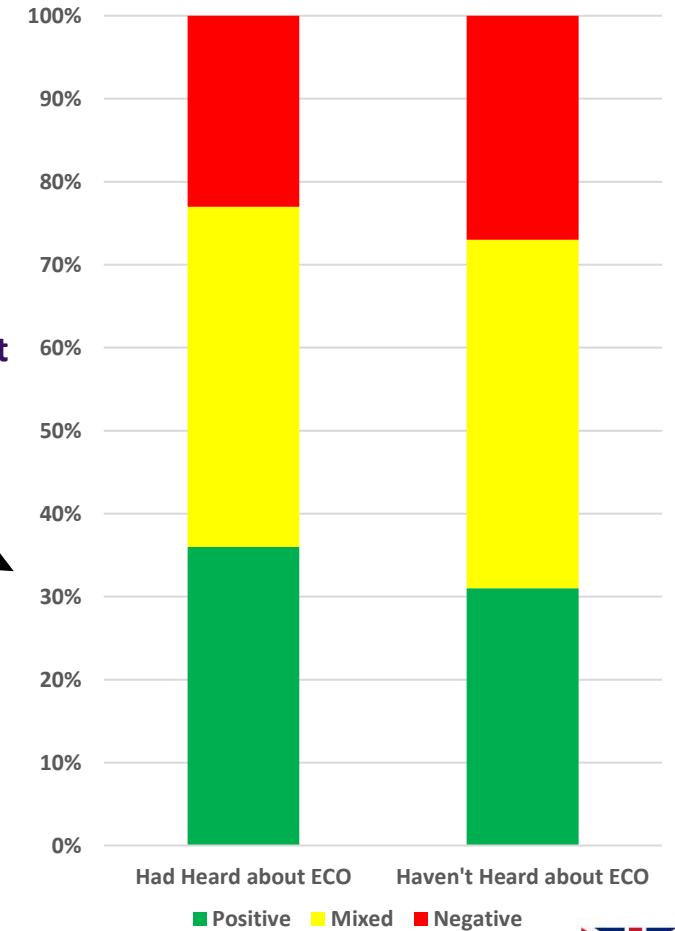
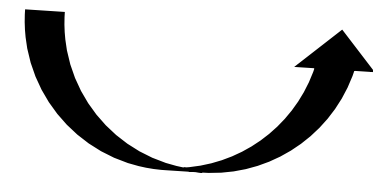
-Although large number of responses are neutral, Food taste and ease in ECAs have mostly positive perception while safety and finance of ECAs has mixed opinions. Did ECO impart these perceptions?



44% has changed opinion in last year



28% have heard about ECO



- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

- Agree
- Neither agree nor disagree
- Disagree

Who Influenced Change in Opinion?





2023 ECO follow up study: Non-participants

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-Around 78% of the responses from non-participants indicated their interest to buy ECAs.

- But only 24% have done so far.

ECAs operating cost is competitive:

Existing conflict has soared the prices of LPG, collection and availability of firewood is declining and cumbersome

Awareness of ECAs has increased:

46% have tasted food cooked in ECAs (before ECO none had such experiences in the area) Non-participants opinion have changed positively after ECO pilot and due to ECO participants

Electrical Supply system improved:

Energy Audits during ECO Pilot helped local CREE to strengthen local supply system (transformer addition, reducing length from substation), No voltage problem.



Low willingness to Pay

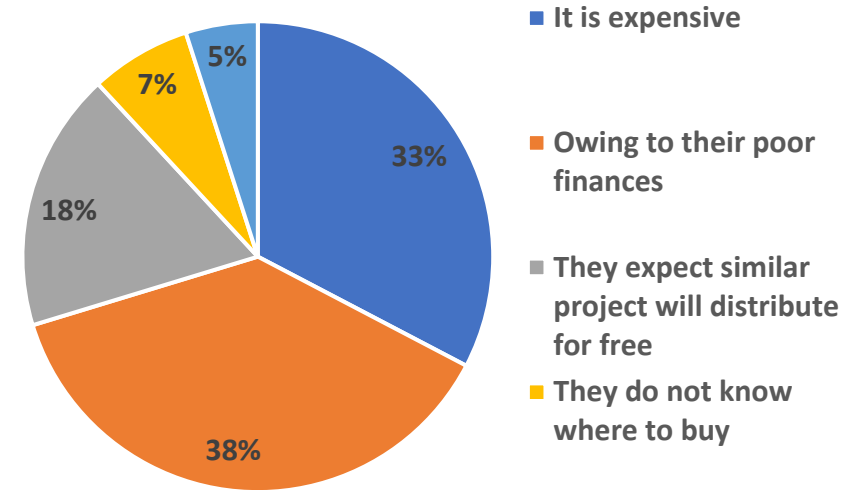
Free and Subsidy: expectations in the neighborhood are like ECO.

Awaiting subsidy or free distribution. Around 18% of non-participants perceive similar project will again provide them with free equipment.

This shall hamper market-based supply system and sales where people will expect the goods to be provided for free.

Awareness on the market system: majority are unaware where they can buy, what it costs.

Reason for not buying ECAs despite Interest to buy



The average willingness to pay for the non-participants to purchase ECAs was around 2000 NPR (12.8£) but an average retail price of the EPC is in range of 7000-10000 NPR (45-65£) and for induction cookstoves are in range of 3500-5000 NPR (24-32£).



Unlocking community Outscaling Opportunities

- ECO Pilot has stimulated transition in rural households from fossil fuel sources to clean fuel.
- Change in positive perception towards electric cooking (participants and non participants) is the major impact of ECO Pilot.
- Awareness created by ECO has allowed other market led intervention into the area.

“Initially everyone in the neighborhood were skeptic on electrical expenses from adopting ECAs, now after using them for around 1.5 years and with increase of monthly expenses around 150-200 NPR, ECAs are lot cheaper than their usual LPG” Dhanamaya Shrestha , Mangaltar

ECO Pilot Sites as Awareness Tool

- Utilize ECO learning
- The learning, outcomes from pilot study and pilot study sites can be a tool for awareness on electric cooking for rural communities.
- The pilot sites (from similar pilot in other part of country from ECO) can be utilized for demonstration, used as training facilities and the participants can be utilized as champion campaigner.

ECO in After Sales Services

- Development of comprehensive repair and maintenance manual for various types of ECAs.
- Training of ECO beneficiaries or project implementation team including local technicians and enumerators to operate the after sales services.
- Developing various disseminating materials such as brochures, pamphlets that provide generic guide for small repairs, provide details on available local suppliers, spare parts availability, details of various ECAs etc.

Building Standards of Electric Supply

- ECO Pilot cases have demonstrated standards of the electrical supply for promoting and sustaining an electric cooking in rural areas.
- The pilot learning can be populated in form of standard electrical system minimum pre-requirement for households, local CREE or local municipality for future connections so that their systems can be utilized/prepared for electric cooking in future.





Cross-project analysis: key takeaways and recommendations



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Cross project analysis: key takeaways

Long-term impacts of the ECO pilot studies

- Vast majority of ECO participants continuing to use eCooking regularly
- Significant proportion of dishes cooked with electricity in all studies:– this proportion has increased in 2 of the 3 studies to 40-50% of all dishes.
- eCooking use has become concentrated on staple dishes (e.g. rice and daal) – indicating eCooking will continue to be used regularly.
- Some ECO and non-ECO participants have purchased additional eCooking appliances – supports the original ECO study finding that households want to cook dishes simultaneously and that multiple appliance ownership can facilitate eCooking to become the primary mode of cooking
- MECS ECO pilots had a significant impact in introducing the Electric Pressure Cooker (EPC) and its multiple benefits to the Nepali market. Most government and donor eCooking programmes have mainly focussed on induction cookstoves.





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Cross-project analysis: key takeaways

Outscaling impact of ECO pilot studies

- Change in community perceptions towards eCooking – now realise eCooking is safe and not expensive overturning outdated perceptions
- Widespread interest among non-participants in purchasing an eCooking appliance
- All projects reported some non-participants had started using eCooking appliances in the last year
- Majority of ECO participants recommended eCooking to others in their communities
- Correlation between positive opinions of eCooking and engagement with ECO non-participants.



ECO pilot studies as launchpads to ‘outscale’ eCooking in the community and its surroundings?

Mechanisms to scale up

- ECO pilots have shown their scope to be demonstration sites which can facilitate ‘outscaling’ of eCooking in their communities.
- Potential of eCooking community influencers/champions among ECO participants
- WACN study demonstrated the potential for eCooking uptake to be expanded through a women’s cooperative network
- PAC study showed how coordinating on integrated planning can increase uptake: the local CREE partner increased supply in response to increased demand from eCooking during the pilot





Call for action to further increase eCooking

Increase access to financing to help convert in greater numbers interest in eCooking to appliance sales

- Support required to address lender reluctance to provide small loans for appliances – engaging local lending groups (e.g. SACCOs) may offer possibilities
- Clear communication required on the limits of subsidy schemes to manage community expectations

Improve local repair and maintenance

- Increase outreach outside major urban centres to increase consumer confidence
- Opportunities to engage local technicians/vendors/cooperatives to provide these services. Training courses and manuals need to be more widely disseminated.

Improve electricity supply reliability

- Helps build consumer confidence and enables greater eCooking use
- Develop mechanisms to certify/upgrade quality household wiring to ensure its suitability for eCooking

Increase awareness raising

- ECO pilots have demonstrated how effective sensitisation can help increase eCooking use.