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# Samuchit Enviro Tech: Improved Cook Stove Projects (2015 onward)

1. **Installation of 1000 improved cook stoves for tea estate workers with the aim to reduce fuel consumption (October 2015)**

Funded by: Help A Child India, Chennai (Project initiated through ICCo India)

Location: Tinsukia in Assam

Step 1: Assessment of User Priorities: Surveys of 50 randomly selected households were carried out and user priorities as per the cooking energy service parameters were identified.

Step 2: Identifying Stove Design and Technical Assistance: Based on our assessment of user preferences, we identified a single pot ICS design that reduced the fuel consumption and smoke emission by about 50% compared to the traditional stoves, and fabricated a mold for the same. We decided to use potters' clay as the stove material (along with a few metallic components, obtained locally) as this allows the user to carry out minor repairs and maintain the stove on her own and increase its useful life.

Kitchen with traditional stove

Training - Clay Preparation

Training – Mold Assembly

Training – ICS Construction

Stove installed, with User

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A group of youth was given training in installation of two and one pot ICS using the mold. However, based on people's preference, only single pot stoves were installed in test homes under the trainers' supervision. Our training team comprised of a stove expert and a master trainer, who is a potter entrepreneur with more than 30 years of experience of installing ICS. The stoves were installed on raised platforms in the colony that is prone to flooding during rains, and on the ground in other locations.

The project intended to install 1000 stoves in three tea estate worker colonies, however our assignment ended with providing the training.

UPDATE: According to informal feedback received from the local co-ordinators, by May 2018, the trained teams have installed nearly 4000 improved cookstoves and majority of the users are quite happy with the stoves and continue to use them as per a third party evaluation report.

**2. Improved Biomass Wood Stove Survey in Khasi Hills REDD+ Project (September 2016)**

Funded by: Ka Synjuk Ki Hima Arliang Wah Umiam Mawphlang Welfare Society

Location: Mawphlang, Meghalaya

In this case we used the AIREC decision support tool methodology[1]. Data was collected through surveys of 21 randomly selected users in the project area and one focused group discussion was carried out with a group of 12 users. The objective was to identify their priorities of cooking energy service. Based on the data, we recommended single and double pot fixed ICS, to be constructed on location, which are expected to reduce fuel consumption by at least 30-40% and smoke by about 50-60%.

Traditional Stove Types

[1] Dr Priyadarshini Karve, Dr Svati Bhogle and Dr Rekha Krishnan worked as a team to develop the Tool in 2014 based on the idea of assessing stakeholder preferences for various features in a cooking energy device. This tool was developed under the umbrella of Ashden India (then known as Ashden India Renewable Energy Collective) with funding from GIZ New Delhi.

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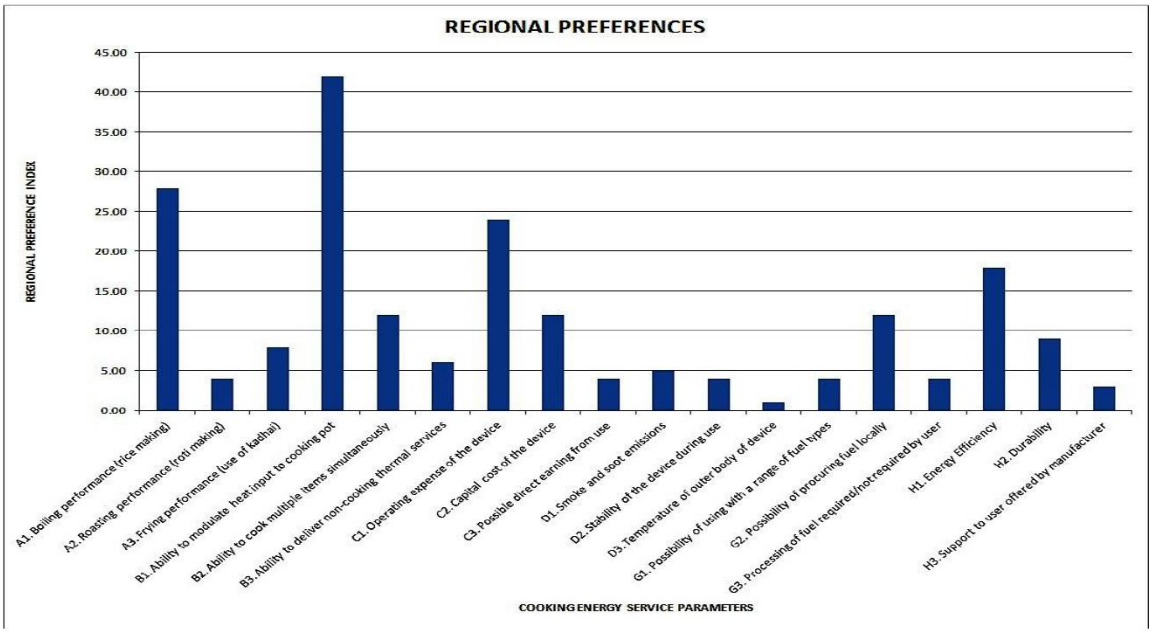


Regional Preference Map based on AIREC Tool

### 3. Testing ICS Models for Adoption at Melghat Tiger Reserve Forest Area (October 2016)

Funded by: Wildlife Research and Conservation Society & Maharashtra State Forest Department

Location: Village Kanjoli, Melghat, Maharashtra

Our assignment was to install several models of improved cook stoves to gather user feedback and identify one or two designs for wider dissemination in the villages inside the tiger reserve forest area.

Our team of Expert and Installer installed 20 stoves, 5 each of four types of improved cook stoves in test user homes. The four types of ICS were:

- Traditional Stove with a retrofitted grate in the fire chamber.
- Bharatlaxmi Stove, which consists of a thermally insulating inset around which the stove body is build using local clay and other materials.
- Single Pot Clay ICS
- Double Pot Clay ICS

All the stoves were expected to reduce fuel consumption by at least 30-40% and smoke emission by at least 50%. The WRCS staff monitored the use of the stoves and also taken feedback from the test users. They identified that the single pot clay ICS is the most favoured design.

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Traditional Stove Retrofitted with cast iron grate

Bharatlaxmi Stove being installed

Installation of Two Pot ICS

Single Pot ICS installed

Test users with installed stove

Orientation of test users and project staff

**4. Installation of Two Pot Stove with Chimney for tea estate workers (March 2017)**

Funded by: ICCo India

Location: Dibrugarh, Assam

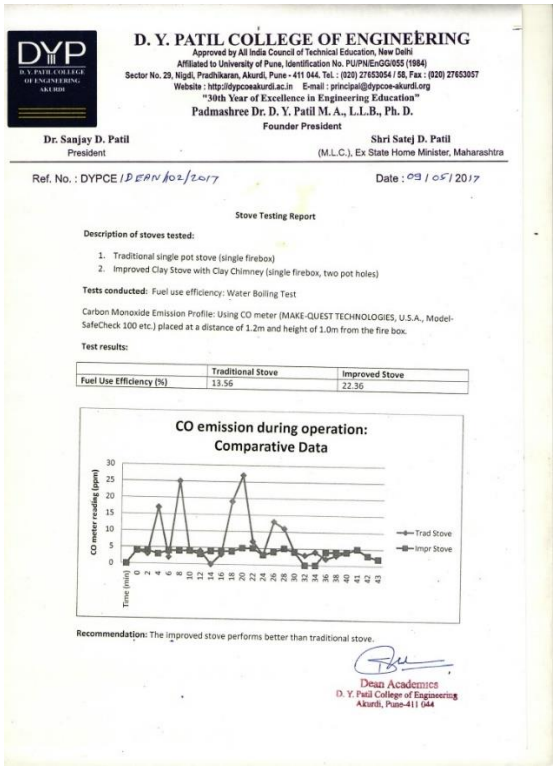
ICCo India has planned to install 10-12 thousand ICS for tea estate workers in 20-22 tea estates in and around Dibrugarh. The funding was available in phases, and local groups were to be trained in phases. Each trained installer group has installed about 1000 to 1500 ICS in its neighbourhood. The

stove design has been pre-selected by the funder as Two Pot Clay Stove with Chimney. Our assignment was limited to providing the design to meet the funders' specifications and provide training to installer groups.

As there was no scope for assessing user priorities in this project, we used the data from the previous project in tea estates in the same region for optimising an existing design of two pot clay ICS with chimney to suit the local pot shapes and sizes as well as cooking habits. We then developed molds and construction and installation procedure for the same. We also developed the design for a clay chimney with outlet through the side wall of a house, and a mold for constructing the same. This had to be developed specifically for this project as it was too expensive to obtain cement pipes for chimney in the region.

The first training was imparted by us. The test stove was assessed for efficiency and emissions as per the funder's requirement, in comparison with a traditional stove commonly used in the project area. The third party testing was carried out in a test user home in Konkan, Maharashtra, under supervision of Dr. S.K. Babar, Department of Applied Sciences, D Y Patil College of Engineering, Akurdi, Pune.

As per informal feedback received from the funder, overall feedback of the users has been positive. Future trainings were organised locally.



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Ref. No. : DYPCE/DEAN/02/2017 Date : 09/05/2017

**Stove Testing Report**

**Description of stoves tested:**

1. Traditional single pot stove (single firebox)
2. Improved Clay Stove with Clay Chimney (single firebox, two pot holes)

**Tests conducted:** Fuel use efficiency: Water Boiling Test

Carbon Monoxide Emission Profile: Using CO meter (MAKE-QUEST TECHNOLOGIES, U.S.A., Model-SafeCheck 100 etc.) placed at a distance of 1.2m and height of 1.0m from the fire box.

**Test results:**

| | Traditional Stove | Improved Stove |
|---|---|---|
| Fuel Use Efficiency (%) | 13.56 | 22.36 |



**Recommendation:** The improved stove performs better than traditional stove.

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Stove Testing Report

Two pot clay ICS with clay chimney in test user home, Konkan, Maharashtra

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Stove Production Training

Two pot clay stove with clay chimney constructed by trainees

Stove installed and being used in the kitchen

5. **Improved Cook Stove Construction and Installation Training for Melghat Tiger Reserve Forest Area (December 2017)**

Funded by: Wildlife Research and Conservation Society & Maharashtra State Forest Department

Location: Village Kanjoli, Melghat, Maharashtra

Based on the outcomes of user testing in a previous project a single pot clay improved cook stove was identified as the most preferred option by the test users. A stove construction and installation training was therefore organised for youth selected by WRCS for this stove design. WRCS is promoting the improved cook stove in its work area in Melghat Tiger Reserve Forest Area with the help of the trained improved cook stove builders. Due to the resultant reduction in pressure on the local forest, WRCS is being supported by the local forest department authorities in this endeavour.

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Active Involvement of local Forest Department officials

Trainees working on finishing of the stove

**6. Improved Cook Stoves for Sundarban (May 2017 to May 2018)**

Funder: Green Energy Against Poverty, Germany

Location: Working Area of Kolkata Mary Ward Social Centre (KMWSC) in Sundarban around Gosaba

Step 1: Cooking Energy Needs Assessment: The funding allowed us to use the AIREC Decision Support Tool in a full-fledged manner. Data was collected through surveys of 31 randomly selected houses, and four FGDs with 10-20 users each in four different settlements. The analysis of the data helped us identify service parameters critical to the community, and on that basis, we identified that two pot improved clay cook stoves, with or without chimney will be the most appropriate cooking energy devices for the region.

Traditional Stoves and Cooking Areas

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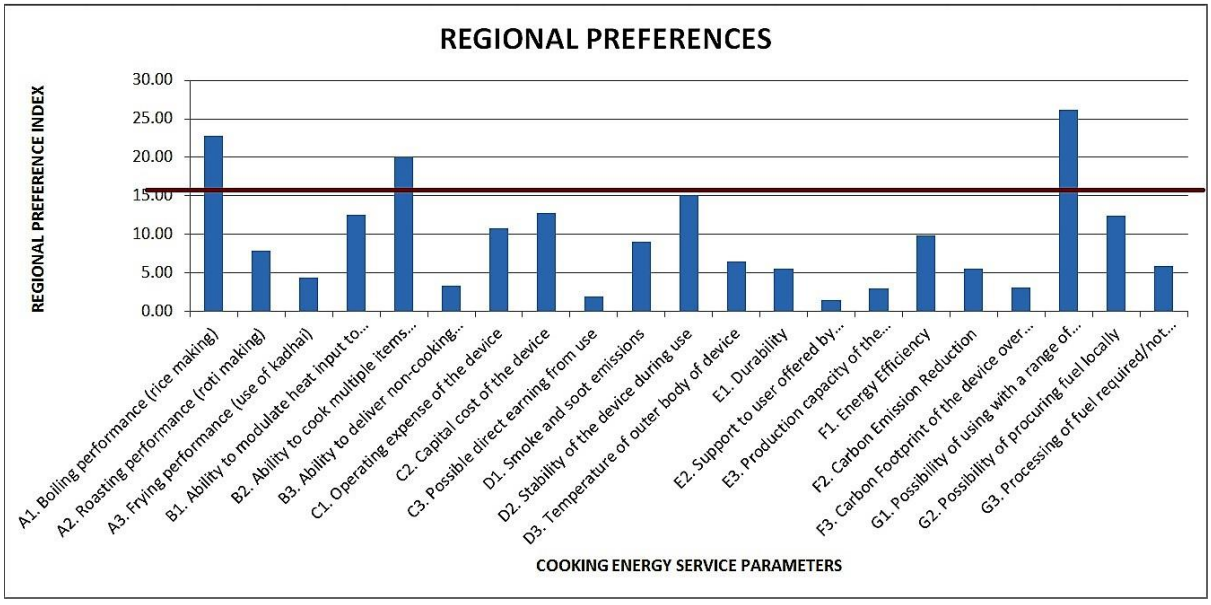
Survey being conducted by Samuchit Expert and staff of KMWSC, Kolkata

FGD being conducted by Samuchit Expert and staff of KMWSC, Kolkata




Regional Preference Map according to AIREC Tool

Step 2: Training in ICS installation and User Testing: Training was conducted for a group of artisans (6 women and 4 men), selected with the help of the local partner KMWSC. During the training process, test stoves were also constructed and installed in test user homes and the users were trained in use and routine maintenance. In the process the installers got trained in how to interact with future costumers. The entrepreneurs followed up with the test users and collected feedback. The test users are also an important component of the future marketing strategy for the improved cook stove installers.

We also helped the artisan team in forming pairs, and developing a business plan for their operation as an improved cook stove enterprise. We also worked with the local partner to tie up with suppliers of metallic parts required for the stoves and the chimney pipes, for streamlining the logistics of the

raw material supply for the enterprises. Seed funding for the factory-produced components of the stoves was provided by the funder, a part of which was also used for subsidising stoves for the BPL people in the community, and partly to create a revolving fund for the enterprises. Initial surveys showed that there was capacity and willingness to pay for the improved stove, if an appropriate instalment payment option is made available.


Trainees learn use of metallic mold


Trainer explains installation of chimney


Trainees work on their business plans


Trainers from Samuchit, KMWSC team and trainees

Step 3: Continued Back up and Monitoring: We worked with the local partner to develop awareness campaigns on the link between traditional cook stoves and indoor air pollution and the resultant health impact.

The intervention of introducing an improved cook stove in poor households through local enterprises has positive implications not just for the health of the women, but also from other perspectives such as livelihood generation, protection of forest, etc. From this perspective, we are helping the entrepreneurs in exploring potential collaborations with government and non-government entities working on these issues in Sundarban area.

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## 7. Field Implementation of Energy Service Approach to Household and Institutional Cooking (First Phase: July 2017, Second Phase: April 2018 to March 2019)

Funded by: Green Energy Against Poverty, Germany

Location: East Godavari and Srikakulum Districts, Andhra Pradesh

This is an ambitious project in collaboration with Laya, an NGO based in Visakhapattanam. The basic concept is to eliminate traditional cook stoves from homes and institutions in two blocks, one each in East Godavari and Srikakulum Districts, with focus on tribal areas (vulnerable and marginalised populations dealing with climate change and urbanisation impacts). We are taking the cooking energy service approach, and are considering solutions in the form of individual cooking energy devices as well as a stack of biomass and other renewable energy based cooking devices with or without LPG, induction stove, etc.

In the first phase we have trained Laya's field workers in the blocks in use of the Samuchit User Preference Mapping Tool[2] and also together with the team developed a methodology for comparative testing of indoor air quality (CO and if possible PM2.5, as a proxy to health impact) and fuel saving (as a proxy to climate change impact). This component was funded by Green Energy Against Poverty, and was completed in July 2017.

Training of the Laya Team on AIREC Cooking Energy Service Decision Support Tool

Trainees rehearsing the survey and FGD Processes

[2] Based on the experience of using the AIREC Cooking Energy Service Decision Support Tool in field, Dr Priyadarshini Karve realised that in most projects we need to understand the preferences of the COOKS and the HEADS OF HOUSEHOLD / BUYERS. There a simplified Tool was developed by Samuchit team, which is derived from the AIREC Tool, but focuses only on assessing the preferences of the end users of the cooking energy devices. The efficiency and emission performance requirements based on government policies and funder criteria as the case may be, are considered as nonnegotiable prerequisites in selection of ICS models.

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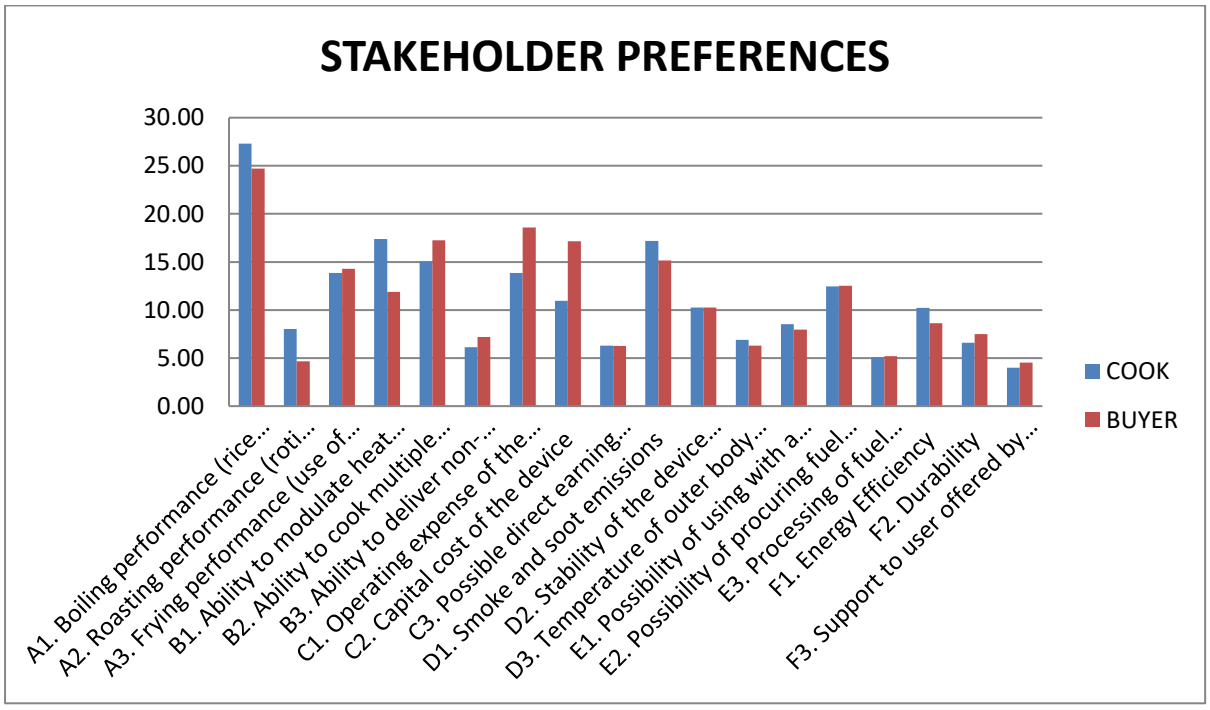
Trainees practicing FGD technique with the local community

Emission testing of a traditional stove under field conditions




Cooking Energy Service Preferences of COOKS and BUYERS in Visakhapatnam District

In the second phase, which was implemented from April 2018 to March 2019, Laya's field team used the Tool and the test protocols to generate preference maps and also quantify the baseline. Based on this data a few portable and fixed household and institutional wood burning cooking energy devices were tested in a few test kitchens. User feedback as well as comparative impacts on health and climate change were also mapped for these test homes.

On the basis of the data generated in the second phase, it was felt that a further improved version of a clay ICS already accepted by the communities would be the best fit for moving forward.

In the third phase, Laya team is aiming to develop a climate finance proposal with health co-benefits on this basis, aimed at eliminating traditional cook stoves in household and institutional kitchens in the project areas. We are supporting them with technical advice on improvements in the stove design, and also other aspects of the project.

**8. Consultancy to support IGEN-ACCESS in piloting and monitoring clean cooking energy access program in Sundarban, WB (Sept 2018 to March 2019)**

Funded by: GIZ New Delhi

Location: Sundarban, West Bengal

This project aimed at creating livelihood options for self help group members in Sundarban area through construction-installation and off-the-shelf sale of clean cooking energy devices in Sundarban area of West Bengal. The project was conducted by KPMG Kolkata, SwitchON, and Vishwabharati University. Our role was that of technical consultant to support the project in identifying the cooking energy devices best suited to the cooking practices in the region.

We conducted a training for the Vishwabharati team in the Samuchit Preference Mapping Tool and its analysis, helped them in identifying suppliers of cooking energy devices best suited to the preferences of the end users.

One of the stoves identified was the fixed clay two pot chimney stove that we had designed in our earlier project in the region. We therefore also provided training to the SHG member entrepreneurs in construction and installation of the fixed ICS.


ICS Construction and Installation Training for SHG member entrepreneurs in Sundarban, WB

The feedback from the users clearly indicated highest acceptance for the fixed ICS, due to convenience and cost, along with a preference for induction cook stove in the semi-urban areas with decent electric supply.

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**9. ICS Design Development and Training of ICS Entrepreneurs in Tribal Areas of Thane and Melghat (March-April 2019)**

Funded by: Econet, Pune

Location: Jawhar, Thane & Melghat

We were approached by Econet, Pune to conduct ICS construction and installation trainings for forest communities that Econet is engaged with. Due to our previous work in Melghat, we already had an idea of the cook stove model that was preferred by the people in that area. We conducted Preference Mapping Surveys for Jawhar, Thane, and developed a fixed clay ICS design suited for the preferences. We then conducted trainings in construction and installation of the respective models in the two locations.

ICS Training – Jawhar, Thane

ICS Training – Melghat