

## NEERDHUR: Ensuring clean and efficient cooking for everyone

The inhabitants of Charanka and Fangli villages of Patan District, Gujarat, since ages have relied on traditional mud cook stoves for cooking. This traditional method of cooking meant emission of hazardous pollutants and a deteriorating indoor air quality in non-ventilated kitchens wherein the primary person responsible for cooking was exposed to various potential health issues.

It was in January 2018, that Mahindra Susten brought the matter into CLEAN Member CSIR-NEERI's notice. CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) is a research institute created and funded by Government of India, established in Nagpur in 1958. NEERI is a pioneer laboratory in the field of environmental science and engineering and part of Council of Scientific and Industrial Research (CSIR).

Responding to the traditional cooking scenario that was negatively impacting the community, CSIR-NEERI immediately started monitoring the micro-environment kitchen concentration of PM<sub>2.5</sub> and CO emitted from traditional cook stove for 24h duration in sample households (pre and post Improved Cook Stove intervention). The results highlighted severe concentration of pollutants in the kitchen microenvironment, creating stimulus for intervention of an improved cook stove. NEERDHUR, CSIR-NEERI's innovative multi-fuel improved cook stove developed with high overall thermal efficiency, reduced fuel consumption and reduced emissions was identified as a good fix for the demanding situation. NEERDHUR shows a thermal efficiency of 33.33% with emission levels as CO: 3.78 g/MJd, TPM: 340.10 mg/MJd at a power output of 1.70KW. It is rated among the best cook stoves in terms of thermal efficiency under the 2KW domestic natural draft biomass



stoves

Through the CSR initiatives of Mahindra Susten, CSIR-NEERI demonstrated and deployed 400 units of NEERDHUR - domestic natural draft multi-fuel Improved Cook Stove (ICS) in the villages. To help households (mostly women) realize maximum gains in terms of fuel saving and reduced emissions, CSIR-NEERI trained them on using NEERDHUR cook stove. The results were favourable, the follow up survey after 3 months of usage showed significant emission reductions with NEERDHUR ICS replacing the traditional cook stoves. Substantial reductions in black carbon emissions were witnessed, positively impacting the lives of community members.

Another survey after 6 months of the intervention found that ICS adoptions were 53.3 % and 54.3 % in Charanka and Fangli respectively, which actually doubled in 3 months with continued IEC efforts i.e. by spreading awareness about harmful health impacts of exposure to solid fuel combustion vis-a-vis benefits of NEERDHUR ICS.

The adoption rate (despite sponsored NEERDHUR units) clearly suggested poor awareness levels of villagers about repercussions on health due to solid fuel based cooking. It also shows the lack of awareness on the concept of fuel saving.

Innovative measures such as this initiated by CSIR-NEERI not only offer efficient DRE technology solutions to the last mile but also point out the need for better awareness in rural areas on how fuel efficient cooking can ensure better health conditions as well as help in saving fuel.

Apart from the above life changing interventions, **CSIR-NEERI in association with CLEAN, also hosts an Improved Cook-stove Testing (ICT) centre at its laboratory at Nagpur**, to help the ICS developers gain more insights on their developed products with regard to its performance.

***Written by: CSIR-NEERI***