IMPROVING DESIGN AND TECHNOLOGY OF THE ECOLOGICAL COOKING STOVES IN MEXICO

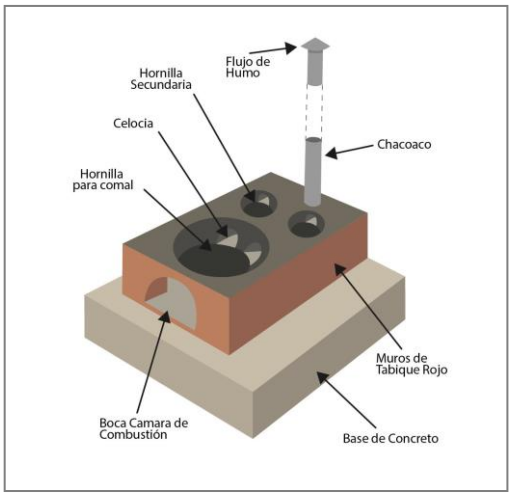
The website of the Fund for Energy Sustainability of Mexico reports that the Laboratory of Bio-energy of the Instituto de Investigaciones en Ecosistemas y Sustentabilidad de la Universidad Nacional Autónoma UNAM and the Grupo Interdisciplinario de Tecnología Rural Apropiada GIRA continue in working on the improvement of the wood stoves used in all rural households of Mexico.

The relevant result attained by this partnership of innovators is the design, production and distribution of the Patsari stove, an improved stove with a reduced consumption of wood and less production of smoke leaking in the households. The Patsari stove is an improved version of technical qualities of the Lorena stove used in all rural areas of the country. The Patsari stove is the result of a long process of collective design that has involved women users, farmers, organizations, technicians, farmers, promoters and researchers, to improve the use of energy and reduce the cost and time of construction.

The same group of innovators is actually implementing a new version of the Patsari Stove, with the support of the Solid Biofuel Cluster (CBS) of the Mexican Centre for Innovation in Bioenergy (Cemie-Bio). The cluster has been created in 2016, associating 16 national and international institutions, research centres, universities and companies.

In 2006 the Patsari stove has won the Ashden Award on Sustainable Energy. In the documents presented by GIRA for the Award it is possible to find useful information on the stove's characteristics, its advantages and the results obtained in 2006.

The stove leads to a 95% decrease in air pollution inside households, reducing the risk of respiratory and eye infections and burn injuries. Studies carried out suggest that using these stoves leads to a 30% decrease in respiratory infections and a 50% decrease in eye infections. The stove enables to reduce by 60% the wood consumption used by 90% of the rural population in México for daily cooking of meals



The interior of the Patsari stove is made of mud, sand and cement; its exterior is made from red bricks. It has a chamber that improves the combustion of the wood and a main cooking plate (sealed to prevent the escape of smoke) to which most of the heat generated is transferred. It also has secondary burners with deflectors that improve the transfer of heat from the gases to smaller cooking plates, in which the food can be preheated and reheated.

The web site of Apropedia presents a guide with design specifications and step-by-step construction instructions for the Patsari stove.

The production and use of the Patsari stove brings the following advantages:

- It increases forest conservation by reducing of 60% the wood consumption:
- By expelling the smoke from the house through the chimney, reduce the indoor air pollution of homes by 95%, avoiding illnesses;
- It can reduce the global impacts resulting from the emissions of greenhouse gases;
- By reducing wood consumption, families can save the time devoted to collect and transport wood, meanwhile reducing the costs of other energy sources needed to cook;
- The cost is low because it is built with locally available materials, buying only the prefabricated parts such as the chimney; Its construction is simple and fast and can be assured by local craftsmen. Through training courses, the GIRA project has managed to form a consistent number of skilled artisans in the construction and maintenance of the stove.
- The stove is easy to be used and with a proper use and maintenance it has an expected life of more than ten years;

The data of the promoter group show that in Mexico 250,000 Patsari cook stoves have been installed, most of them in rural areas of Michoacán, Oaxaca, Chiapas and Guerrero States and in the Sierra Tarahumara of Chihuahua. Moreover, thanks to its innovative features and its ability to provide an effective solution to the needs of rural populations, the Patsari stove has also achieved great success internationally.

The UNAM researcher Omar Masera, co-inventor of the Patsari stove, and the GIRA group are actually working to implement new models of *Patsari Turbo stoves*, performing a micro gasification of the wood to achieve a much cleaner combustion. Working in different designs and with different manufacturers, the idea is to develop options that can be adapted to different models of stoves, which can be commercialized by the more than 20 manufacturers of wood stoves operating in Mexico. The prototypes will be tested in 2019 and the use of pellets and chips will also be experienced to further reduce emissions of polluting gases.

To know more

Proyectofse website

Manual Estufa Patsari in bioenergylist.org

Ashden Award 2006 Patsari stove

Grupo Interdisciplinario de Tecnología Rural Apropiada GIRA

Patsari construction step by step in Appropedia

Article in itd.upm.es sitio web

Estufa Patsari in Slideshare.net

Patsari construction in Youtube

Videos in Youtube

Info in rembio.org.mx

Article in nuviamayorga.org

Patsari stove in ecoinflexiones.org

Article and video in ecotec.unam.mx

Article in IINGEN UNAM

Article in dgcs.unam.mx

Patsari stove in ecotec.cieco.unam.mx website

Unidad de Ecotecnologías UNAM

Patsari stove in WHO/PAHO website