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THE LEONARDO DA VINCI OF SMOKELESS CHOOLAS

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INDIA, IDRC -- Friends call architect Madhu Sarin, of Chandigarh, the "Leonardo da Vinci of smokeless choolas". Choolas are cheap, home-made clay stoves used every day by millions of Indians who resignedly put up with attendant irritations like smoke-blackened kitchens and streaming eyes.

Sarin's own involvement with smokeless choolas began when, in the course of her work on an irrigation project for the Ford Foundation, she came across an enterprising untouchable woman of Nada village rebuilding her own choola.

"Why are you doing that, Sheila?" she asked the woman.

"Because I cannot stand the smoke," Sheila replied. "Besides, it uses too much fuel, and I always have to fight with my son at night to fetch more wood."

To give him credit, Sheila's teenage son labours all day in a nearby cement factory, and is often too tired at night to face the additional task of walking for miles to fetch heavy loads of wood.

When Sarin realized that Sheila's only solution consisted of moving her choola from one side of the kitchen to the other, without altering its basic design, she decided to apply her architectural training to improve the stove.

On hands and knees, up to her elbows in mud, she experimented with the stove. Sheila and other untouchable women helped her. They tested Sarin's products critically until all were satisfied with the results. Today, their kitchens are spotless. Whitewashed walls show barely a trace of smoke, and fuel consumption is down.

Madhu Sarin's improved choola boasts rectangular dampers of asbestos which can be raised or lowered to control the heat, the flames, and the smoke. The back damper, when open, allows smoke to escape through an exhaust pipe leading out of the kitchen. The front one allows air to feed the flames. When closed, they retain the heat, assisted by clay stoppers or by cooking vessels placed on openings in the clay stove that are custom-moulded to hug their rounded bases.

While Sarin's own rough estimates suggest fuel savings of about 40 percent, she is awaiting confirmation before making any public claims. She hopes the laboratory tests currently being carried out will confirm her tentative observations that a traditional choola filled with wood will bring to the boil only 7 litres of water, while the improved choola will boil 12 litres of water; similarly, that a traditional choola filled with dried cow dung will boil only 6.79 litres of water, compared to 10.27 litres for the improved model.

The traditional choola appears to light faster, with a quicker flame, but allows no control and dissipates very quickly. The new stove takes longer to heat up, but allows the user control of the flame, retains much more heat, and directs all the smoke out of the kitchen through an exhaust pipe.

Another measure of increased efficiency comes from the caste villagers. Those caste Hindus of the village who own animals, traditionally boil milk slowly for hours on a separate wood stove to thicken and sweeten it. Sarin's improved choola retains heat so well that it is possible to forego the use of a second stove for this traditional method of heating milk.

In the meantime, the enterprising woman who triggered the whole process, Sheila, has become a recognized choola mason in her own right. She can now claim a fee equivalent to about one dollar for each choola she builds.

Sheila begins by making a sturdy mud frame against the kitchen wall near a pre-constructed exhaust pipe. An S-shaped channel leads from the tightly fitted front damper to the equally snug back damper. Both dampers are cut to size from asbestos sheeting. She then balances over the channel two rings of baked clay fashioned to hold the family's cooking utensils.

Before proceeding any further, Sheila places each cooking vessel on the rings to make sure that they can be accommodated. More mud is carefully moulded around the rings to fit the cooking vessel bases, before the whole stove is neatly encased in clay. Finally, Sheila moulds clay stoppers for each hole, and whitewashes the completed choola.

At present there is a marked difference between the spotless whitewashed kitchens in the untouchable hamlet of Nada village, and the smoke-blackened caste Hindu kitchens in nearby Sukhomajri.

"They (the caste Hindus) do not come here (to the untouchable hamlet) because of this wretched business of caste differences," Sarin points out. "However, I managed to get Sheila to build a choola in another village. Because she is untouchable they will get a priest to purify the stove before they use it. Now, when they see the advantages of the new choola, maybe it will catch on there too."

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