

## **Current Improved Cookstove (ICS) Activities in South Asia<sup>1</sup> A Web-based Survey, September 2006**

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Prepared for the WHRC/IIMB Project,

Clean Energy Technologies:  
Sustainable Development and Climate Co-Benefits in India  
(CETSCO)

### **Nepal<sup>2</sup>**

#### **National ICS Program**

Nepal currently seems to be the only country in this region, and perhaps in the world, with a concerted national program to disseminate ICS.

The first iteration of Nepal's national ICS program was introduced in the 1950s, when two Indian improved stove models were promoted in rural communities. Beginning in the 1980s, the National Planning Commission included ICS dissemination as a component of its overall development plan with the aim of reducing deforestation in rural areas. Nepal's ICS programs at this time were implemented in conjunction with the FAO's Community Forestry Development Project, as well as with national and international NGOs. These organizations' efforts focused on top-down, supply driven approaches to ICS introduction, and resulted in the dissemination of 57,000 ceramic stoves in Nepal. However, this project proved to be misguided and ineffective, as a significant portion of these stoves were broken or damaged during the transportation process.

Nepal's ICS program was revamped in the 1990s with the introduction of a new improved mud brick stove by the Research Center of Applied Science and Technology (RECAST). The updated program adopted a subsidized bottom-up, demand driven approach for the new stove. Unlike previous models, the RECAST stove can be built by local artisans using native materials. In 1995, a formal ICS network was established in Nepal that is supported by ARECOP (Asia Regional Cookstove Program) and managed by the Centre for Rural Technology (CRT), Nepal.

The new national initiative was launched formally in 1999 and 40-thousand ICS were disseminated during the period 1999-2005. It is implemented through the Alternate Energy Promotion Centre (AEPC), which also promotes other renewable energy technologies. Nepal's 10<sup>th</sup> Plan (2003-2007) target is to install an additional 250,000 stoves in rural households. The program emphasizes the establishment of sustainable, community-based markets for ICS that utilize local materials and labor. In place of direct, end-user subsidies, the program supports ICS

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<sup>2</sup> See appendix for historical reviews

development indirectly through awareness campaigns, training, monitoring and evaluation, and human resource development.

The national ICS program being implemented through AEPC by CRT (<http://www.crtnepal.org/new/>) is funded largely by the Danish aid agency, DANIDA, but involves over 25 governmental and nongovernmental organizations. See <http://www.aepcnepal.org/> and [www.icsnetwork.org](http://www.icsnetwork.org)

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Among the documents available about the current Nepal ICS program, are

Shrestha SK, R Thapa, K Bajracharya. National improved cookstove dissemination in the mid-hills of Nepal, experiences, opportunities, and lesson learnt. Asia Regional Cookstove Program.

[http://www.arecop.org/zip/ICS\\_midhill.pdf#search=%22national%20improved%20cook%20stove%20dissemination%20nepal%22](http://www.arecop.org/zip/ICS_midhill.pdf#search=%22national%20improved%20cook%20stove%20dissemination%20nepal%22)

Improved Cookstove (ICS) Development: A Case from Nepal.

[http://www.inforse.dk/asia/pdf/Nepal\\_%20ICS.pdf#search=%22improved%20cook%20stove%20development%20nepal%22](http://www.inforse.dk/asia/pdf/Nepal_%20ICS.pdf#search=%22improved%20cook%20stove%20development%20nepal%22)

#### Practical Action

[http://practicalaction.org/?id=household\\_energy](http://practicalaction.org/?id=household_energy)

- Coordinates programs in Bangladesh, East Africa, Latin America, Nepal, South Asia, Southern Africa, Sudan
- Overall goal is to promote locally available and appropriate technological solutions for indoor air pollution
  - Improve home insulation, improve stove design to reduce fuel use, install smoke hoods
  - Utilizes participatory approach to evaluating smoke reduction technologies
- Designed metal smoke hood that vents smoke outside the house, can be made locally
  - Seems to still be in testing phase, not yet distributed on large scale
- Priority is urging other development organizations to take up IAP mitigation through financing, increased awareness, and network formation via the National and Regional Forum for Smoke, Health, and Household Energy
- Collaboration with SEARCH Nepal (NGO), Institute of Medicine (Tribhuvan University), local governments, DEPROSC (micro-finance), Nepal Bureau of Standards

#### Nepal's Biogas Support Program (BSP)

<http://www.biogasnepal.org/>

- Program initiated in 1992 to develop and promote use of biogas in rural areas
- BSP is an NGO that was cofounded by the governments of Nepal and the Netherlands
  - Provides subsidy to rural households for installation of biogas units
  - Provides training to users and biogas companies, manages subsidies, performs quality control, accredits private installers
- July 1992-May 2000, installed >124,000 domestic biogas plants

- Supported by Nepalese, German, Dutch governments
- Implemented by AEPC, Agricultural Development Bank of Nepal, Rastriya Banijya Bank, Nepal Bank Limited, and 50 private biogas companies
- This program, apparently, is the first Nepalese project approved under the Clean Development Mechanism (CDM) established as part of the Kyoto Protocol. See <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/0,,contentMDK:20909857~menuPK:176751~pagePK:64020865~piPK:149114~theSitePK:244381,00.html>

## India<sup>2</sup>

### Overview of India's National Programme on Improved Chulhas (NPIC)

The Indian government initiated the NPIC in 1983 in response to concerns about deforestation and rural fuel poverty. The NPIC was implemented by the Ministry of Non-conventional Energy Sources (MNES) in cooperation with regional, district, and state government offices. Under the original program, the NPIC provided a subsidy of at least 50% for households purchasing an improved cookstove. From 1983 to 2000, approximately 35 million ICS of various types were distributed; however, the NPIC has not been effective or successful over the long term in promoting a fundamental change-over to improved stoves in India. In 2002 the NPIC was deemed a failure and funding was discontinued; responsibility for continued ICS dissemination was passed to the states. Since this time, a handful of state governments and NGOs have continued ICS and related projects; however, the lack of Central government support and funding has thus far precluded initiatives in all states except Karnataka – see below.

The shortcomings of India's NPIC system as originally implemented stem partly from its top-down, subsidized approach to ICS dissemination. The Central government subsidy was applied directly to stove producers; as such, there was no need for these producers to regard consumers' preferences when constructing and marketing stoves. Improved stove dissemination was therefore relatively slow, and stoves that were distributed often did not significantly improve upon the efficiency of their traditional counterparts. Additionally, the large government subsidy inhibited efforts in the private sector to develop and produce other types of improved stoves. The lifetimes and reliabilities of the low-cost technologies distributed via the NPIC were low, leading to poor public perceptions of the "improved" devices.

Recent ICS programs in India have been implemented by both domestic and international NGOs and IGOs at the grassroots level. These efforts rely on bottom-up, demand-driven marketing techniques that involve the establishment of self-sustaining commercial enterprises in rural communities. Small commercial networks of stove producers, wholesalers, and distributors have proven much more responsive to consumer demands and preferences; these networks also create a flow of income that stays within the community. NGOs supply technical and entrepreneurial training to local participants, as well as provide assistance in locating financing for entrepreneurial units. Examples of such projects exist in Orissa (Gram Vikas), Maharashtra (ARTI), and in the Bundelkhand region (Development Alternatives). See below.

In 1981, the MNES implemented the National Project on Biogas Development that provides heavily subsidized household biogas plants under a very similar, top-down dissemination approach as was used for the NPIC. The program was still in force as of 2004; however, it has affected only 2% of Indian rural households thus far.

A number of documents have addressed the NPIC over the years. Here are two recent publications:

Sinha B. 2002. The India stove programme: an insider's view—the role of society, politics, economics, and education. Boiling Point No 48.  
[http://www.itdg.org/?id=bp48\\_contents](http://www.itdg.org/?id=bp48_contents)

Partnership for Clean Indoor Air. 2004. Household energy, indoor air pollution and health: Overview of experiences and lessons in India. Winrock International. [Nora, what is this fragment here?]  
[http://www.pciaonline.org/assets/India\\_Household\\_Energy\\_and\\_Health\\_Overview.pdf](http://www.pciaonline.org/assets/India_Household_Energy_and_Health_Overview.pdf)

#### Shell Foundation Breathing Space Program

<http://www.shellfoundation.org/index.php?menuID=3&smenuID=10&bmenu=5>

- Aims to increase the demand for household energy projects through social marketing to rural women, a guaranteed supply of stoves and fuel, and consumer financing
- “Enterprise solutions to poverty”
- Goal = creation of sustainable networks of entrepreneurs and NGOs to maintain commercial dissemination of ICS to rural households
- The Shell Foundation has funded two ICS pilot projects in India: the first is run by the Appropriate Rural Technology Institute in Maharashtra and Gujarat, the second is coordinated by Development Alternatives in the Bundelkhand region.
- Contracts to develop and test monitoring and evaluation methods for these projects related to meeting objectives of stove performance, air pollution, and health were established with Liverpool University and the University of California. See <http://ehs.sph.berkeley.edu/hem/page.asp?id=30>
- Currently planning a large-scale “roll out” of ICS, with targets totaling several million. (see below)

#### Appropriate Rural Technology Institute (ARTI)

<http://www.arti-india.org/content/view/44/42/>

- Goal = commercialization of improved biomass fuels and cooking devices in India
- “Commercial approach to rural upliftment” and the creation of a sustainable business supply chain for clean biomass energy cooking products
- In the pilot phase of the project, ARTI coordinated with 10 grassroots NGOs in Maharashtra to conduct ICS market testing and technical and entrepreneurial training of local potters and distributors
  - At the conclusion of the pilot, network consisted of 120 rural enterprises and ~75,000 households using ICS
- Scale-up phase of project instigated late-2005
  - Goal = 1.5 million stoves in Maharashtra

### 50,000 stoves in Gujarat

- 5 ARTI rural energy products: compact biogas system, charcoal briquetting set, char briquettes, Sarai charcoal cooking system, Vivek portable gasifier stove
- ARTI served as the technical back-up unit for Maharashtra under the NPIC. It's market-based, community-oriented approach to ICS development and dissemination is currently regarded as the most successful model for distribution in India.

### Development Alternatives

<http://www.devalt.org/da/tsb/focus.htm>

- Operates in Bundelkhand region
- Systems under investigation = gasification for decentralized power, charring and briquetting, biogas production for water pumping
- Focus is on energy systems for household and commercial cooking, also involved in energy crop and biomass management at community level
- Goal = develop local markets for energy technologies and products
- (Lists WHRC as an international partner research institution)

### Gram Vikas

<http://www.gramvikas.org/>

- Operates in Orissa
- Five interventions in renewable energy: biodiesel, micro-hydro, smokeless chulhas, solar (PV), wood-based gasification
- ICS program goals = reduce indoor air pollution and reduce fuelwood consumption
  - There is very little information on Gram Vikas' ICS program on their website. For the most part, the organization seems to be involved primarily with testing new chulha models and introducing rural households to new technologies. They are also collaborating with the Centre for Micro Finance, Chennai, and the Massachusetts Institute of Technology to study the health impacts of indoor smoke reduction resulting from improved chulhas.
- Wood-based gasifier pilot project in cooperation with TERI and Sorane Sa (Swiss). Charcoal-based gasifier yields producer gas that is used in a 100% PG generator capable of generating 10 kW. The power from this generator is used by 11 households for 5 hours a day for electric water pumping, a flour mill, and a rice huller.
  - From May 2004-April 2005, gasifier operated for 306 days, with 13 days downtime. The engine ran for a total of 1,500 hours and generated ~7,400 kWh electricity. Average fuel consumption was 36 kg charcoal/day at Rs 6.45/kWh fuel cost and Rs 50/month household fee.

### Technology Informatics Design Endeavor (TIDE), Bangalore

<http://www.tide-india.org/>

#### TIDE projects related to India-Canada Environment Facility

[http://www.icefindia.org/sector\\_energy\\_projects.htm](http://www.icefindia.org/sector_energy_projects.htm)

- Diffusion of efficient biomass technologies in Karnataka and Kerala, 1998-2004
- Two goals = Improve the efficiency of fuelwood use in informal agro-processing and other industries; establish market mechanism for technology dissemination

- Technology and market project components
- 3 project phases
  - Create awareness for new products through demonstration projects
  - Train a network of masons and entrepreneurs
  - Establish market mechanisms and infrastructure to facilitate the diffusion of products
- Installed total 5,319 devices through December 2003, mostly in Karnataka
  - Biomass cookstoves, silk reeling units, jaggery units, tobacco curing units (all powered through biomass combustion or gasification)
  - Fuelwood savings as of June 2003 = 9,100 metric tons

#### TIDE projects not associated with ICEF

- Promotion of energy efficient stoves specifically for the charaka sector of silk reeling industry
  - Efficient stoves save 35-40% biofuel
  - Program started in 2001, goal is to install at least 2,800 stoves
- Pilot projects for community-scale biogas

#### Karnataka State Council for Science and Technology, Bangalore

<http://nitpu3.kar.nic.in/bioenergyindia/>

- Demonstration and dissemination of suitable bio-energy packages to meet rural energy needs in a sustainable and participatory manner
- Based in Karnataka, 2001-2006 (ongoing?)
- Goals = reduce GHG emissions and promote sustainable and participatory approaches to meeting rural energy needs
- Large-scale dissemination of gasifiers and community biogas plants
  - Development of 100% producer gas engine to supply rural energy services
- Develop financial, institutional, and market strategies to overcome barriers to technology adoption

#### Philips stove

<http://www.research.philips.com/newscenter/archive/2006/060227-woodstove.html>

- Successful technical pilot in India in 2006
- Reduces fuel consumption up to 80% compared to traditional 3-stone fires
- Efficient burning, high combustion temperature cuts smoke emissions up to 90% and VOCs up to 99%
- Electronically controlled fan forces air through stoves, is thermoelectric so does not need electricity to function
- Philips is currently looking for partners to market stoves in rural areas in India

#### British Petroleum Cookstove

<http://www.hinduonnet.com/thehindu/thscrip/print.pl?file=2005101502760200.htm&date=2005/10/15/&pr=bl&>

- BP has developed a hybrid LPG/biomass cookstove that they hope to market in India
- Marketing strategy includes home delivery of stove, an LPG cylinder, micro financing options, establishment of micro enterprises by local entrepreneurs

- Goal = stoves in 20 million households by 2020
- As of yet, no action on the ground

## **Sri Lanka<sup>2</sup>**

- There seems to be no current government policy to address biomass energy consumption in the household sector

### Integrated Development Association (IDEA)

(no web address available—information from the Partnership for Clean Indoor Air)

- Country contact point for ARECOP in Sri Lanka
- ICS program started early 1970s
  - 1970-1985 → cookstove design and testing
  - 1985-1991 → subsidized promotion and dissemination of older stove models adopted from India
  - 1991-2005 → commercialization of new “Anagi” stoves  
During this period, ~120 rural potters produced and distributed 300,000 stoves/year, for a total of ~2 million Anagi improved stoves disseminated as of 2005
- Emphasis is on integrated development

### Asia Regional Cookstove Program (ARECOP)

<http://www.arecop.org/index.php>

- ARECOP provides technical and entrepreneurial assistance with small-scale industrial and institutional stoves and ovens for cooking, wood-fueled stoves for heating, rice husk-fueled stoves for bakeries, and biomass fish drying units.
- Promotes use of Anagi stoves
- Aids in private sector promotion of gasifier stoves, ~3,000 stoves are produced and sold in Sri Lanka at the local level per year
- Conducting pilot study for off-grid wood-based gasification in 100 households—funded by Energy Forum—UNDP/GEF

### *Organizations operating in both Sri Lanka and Bangladesh*

#### Partnership for Clean Indoor Air (coordinates NGO networks)

<http://www.pciaonline.org/partners.cfm>

#### Energy Research Centre

- Focus areas = technology development of biomass combustion and gasification and biomethanation; indoor air quality
- Has developed 35 models of household and community stoves
- There are currently 5 million ICS designed by the Centre in operation in India and surrounding countries
- Based in India, the Energy Research Centre consults on projects for Maldives, Bangladesh, Sri Lanka, Myanmar, Kirbati, Touvalu



### Practical Action

[http://practicalaction.org/?id=household\\_energy](http://practicalaction.org/?id=household_energy)

- Involved in improved stove and household energy projects in Sri Lanka, Nepal, and Bangladesh
  - Provides support through the Bangladesh National Network on ICS and Household Energy Development Organizations Network
  - Trains potters and installers in Sri Lanka, aids in setting up micro enterprises at community level

### **Bangladesh**

- There seems to be no current government policy to address biomass energy consumption in the household sector

Institute of Fuel Research and Development of Bangladesh (under Local Government Engineering Department)

[http://www.lged-rein.org/rd/rd\\_ret.htm](http://www.lged-rein.org/rd/rd_ret.htm)

- Research and development in several technology areas, including solar PV, solar hot water heaters, improved stoves, solar cookers and dryers, biogas
- Pilot-scale dissemination of technologies developed at the institute, including wood-burning ICS and 10,000 biogas plants for household use

Village Education Resource Center

<http://www.verc-ngo.org.bd/Home/Home.html>

- Operates ICS program in conjunction with the Institute of Fuel Research and Development and the Bangladesh Center for Scientific and Industrial Research
  - Goal of program = “To establish an indoor air pollution free society and healthy environment through ensuring the use of improved cookstove technology and healthy kitchens.”
  - Started ICS programs in 1987, 1988. These programs did not result in widespread acceptance and use of ICS.
  - New initiative in 2000 with the support of ARECOP—Indonesia. Formed National Network on ICS with 84 national and local NGOs that work through participatory techniques at the grassroots level.
    - ICS activities in 28 districts, with complete ICS coverage in 5 villages and 10 communities
  - New project in cooperation with Winrock International on reduction of exposure to indoor air pollution through household energy and behavioral improvement.
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## Appendix: Historical Reviews

Reviews of ICS activities in India, Nepal, and Sri Lanka as of about 1992 were part of the Project, **IMPROVED BIOMASS COOKSTOVE PROGRAMS: A GLOBAL REVIEW, 1991-3**. A Project of the East-West Center, the Energy Sector Management Assistance Program (World Bank), and the United Nations Development Program. Principal Investigator: Kirk R. Smith, East-West Center. [See http://ehs.sph.berkeley.edu/krsmith/page.asp?id=5#5](http://ehs.sph.berkeley.edu/krsmith/page.asp?id=5#5)

### Main Reports

1. "Results and Analysis of the Global Survey of Improved Cookstove Programs," J. Ramakrishna. (Survey done in collaboration with the Foundation for Woodstove Dissemination, Nairobi; Association Bois de Feu, Paris; and the Center for Mesoamerican Studies on Appropriate Technology, Guatemala.) 1991.
2. "The Design and Diffusion of Improved Cooking Stoves," D. Barnes, K. Openshaw, K.R. Smith, & R. van der Plas, World Bank Research Observer, 8(2): 119-141, 1993.
3. What Makes People Cook with Improved Cookstoves? D. Barnes, K. Openshaw, K.R. Smith, & R. van der Plas, World Bank Technical Paper #242, Washington, D.C., 1994.

### Country Study Reports from South Asia

2. "The Indian National Improved Stoves Program: A Status Report," J. Ramakrishna.
3. "Improved Cookstove Programs in Sri Lanka: Perceptions of Success," J. Bialy.
4. "The Status of Improved Cookstove Programs in Nepal," G.S. Shrestha, H.G. Gorkhali, & K.R. Smith.