Government led Biomass Cookstove Initiatives in India

by

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National Program on Improved Cookstoves (NPIC)	
Objectives	Conserving and optimizing the use of fuelwood, reducing degradation of forests, increasing rural job opportunities, and generally improving household living conditions. The initiative addressed one of the key drivers of deforestation and forest degradation and was thus an important contribution to the successful implementation of forest landscape restoration activities.
Duration	27 years (2012-2039)
Target area to be restored	NA
Stakeholders and organisation	Rural communities, women, government

1. Background

Ill health of women caused by smoke and heat exposure in the kitchen and the drudgery in collecting firewood is one of the more serious problems facing the poor in rural and semi-urban habitations in India. The traditional Indian cookstove has barely 8 percent thermal efficiency (FAO, 1993) which can be enhanced using existing low cost technologies reducing both smoke and consumption of wood (GACC, 2013).

2. Objectives

With household and semi-urban restaurants consuming more than three fourths of fuel biomass in India, the central government launched a national pilot project for the demonstration of improved cookstoves in 1983 with the objectives of conserving and optimizing the use of fuelwood, reducing degradation of forests, increasing rural job opportunities, and generally improving household living conditions (Kishore & vRamana 2002, FAO 1993)).

An improved cookstove can save 30-40 percent of fuel for the same calorific output and average fuel saving for an average household was expected to be about 700 kg/year (FAO, 1993) which by itself is a very significant economic saving for a poor rural household. A multi-agency approach was adopted for the implementation of the program to enhance its reach and provide a limited range of competitive maintenance in at least a few areas (Sinha 2002). Local people were trained and encouraged to

undertake construction, installation and maintenance work on a contract basis (FAO 1993, Sinha 2002). A number of designs were developed to suit the requirements of family sizes, fuel types, households' ability to pay, and the need for portability. Some of the more popular designs available for selection by users were mud-built fixed cookstoves, mud-clad pottery-lined fixed cookstoves, portable metallic cookstoves and portable metal-clad ceramic-lined cookstoves (FAO, 1993)[1]. The option of including chimneys provided additional price flexibility for this extremely price sensitive market.

The enthusiastic response to this pilot project led to its conversion into a National Program on Improved Cookstoves (NPIC) in April 1985 under which a total of 30.6 million units were planned across the country by the end of the 8th Five Year Plan in March 1997 (FAO, 1993). A country-wide survey conducted in 1995-96 indicated that 71 percent of the cook stoves were in working condition and 60 percent were in actual use. The program was continued in the consecutive Five Year Plan and by September 2000 a total of 32 million units had been supplied covering almost 25 percent of the total potential of 120 million households (Sinha, 2002).

This massive demand for improved cookstoves led to significant improvement in associated technologies and the central government felt the usage of these cookstoves could now be given a huge boost to bring it to a level comparable to other clean energy sources such as liquid petroleum gas and compressed natural gas. This gave birth to a more comprehensive National Biomass Cookstoves Initiative (NBCI) launched by the Government of India in 2009 placing emphasis on the use of state-of-the-art technologies and strengthening research and development for more efficient, cost effective, durable and easy to use devices and also for testing, certification and monitoring facilities. A number of pilot scale projects across the country were initiated aiming at location specific cleaner cooking energy solutions and studying their impact on social and economic development caused by mitigating drudgery of women, fuel saving and reduction in indoor pollution, their climate change mitigation value and exploring possible benefits under the Clean Development Mechanism (CDM) of the Kyoto Protocol. The performance data is also expected to help in preparing strategy plans for the expansion of the project (CDM 2012).

3. Achievements and Outcomes

A pilot project for Community Sized Biomass Cookstoves taken up in 2010-11 for community applications showed encouraging results with a reduction in fuel consumption of 20 to 45 percent, emissions reduction of 45 to 86 percent and cooking time reduction of 17 to 43 percent (GACC 2013). In the following year, four pilot scale projects for demonstration of four separate models of family sized/portable cookstoves with subsidies amounting to up to half the cost, were initiated. These are being implemented in public-private-civil society mode through experienced NGOs, community groups, manufacturers and entrepreneurs..

Carbon financing through voluntary and mandatory carbon markets has also begun. Climate change mitigation credits generated in organized rural cookstove programs are in demand among voluntary

offset purchasers and a Clean Development Mechanism Program of Activities (PoA), with credits eligible under EU-ETS (Emissions Trading System), was registered in December 2012. The PoA involves introduction of efficient firewood cook stoves in households across India using an appropriate mix of carbon revenues and state subsidies thus reducing the cost of change for the households. It provides an international legal framework binding the government and participating organizations including entrepreneurs, research institutes and civil society into a commitment for distribution, capacity building and maintenance to ensure full returns from this investment. The program ensures the fulfillment of the important condition of 'additionality' under the provisions of the CDM by going beyond the scope of the existing cookstoves policies. Furthermore, the condition of additionality has to be met at the level of each component project activity (CPA) constituting the PoA. An important aspect of this PoA is that the project investors are permitted to access the entire range of subsidies and other government and non-government benefits that might be available and deploy all technologies and measures that save more than 50 percent biomass in producing the same amount of energy output.

The CDM PoA meets the requirements of sustainable development (CDM, 2012) by fulfilling the test of social , economic, environmental, and technological wellbeing set up by the Indian National CDM Authority. The assessed environmental benefits are reducing fly ash, suspended particulate matter, dust and protecting forests to a high degree, moderately preventing soil erosion, and slightly reducing SOx, NOx and Non Methane Volatile Organic Compounds (NMVOCs) while the assessed social benefits include high levels of reduction in health damaging indoor air pollution and disease prevention, project-related knowledge dissemination, improving working conditions, community advancement and optimized women's empowerment, and moderate levels of new short-term jobs and income generation. Among the assessed economic benefits are high levels of new investments and infrastructure, improvement in energy supply, access, affordability and reliability of energy, introduction, development and diffusion of better technologies, adaptation of new technologies to local circumstances, moderate levels of enhancement of productivity and new business opportunities and limited enhancement in new industrial and commercial activities.

4. Contributions to Climate Change Mitigation and Adaptation

Mitigation

The climate change mitigation achievements of the project are expected to be about 11,000 tCO2 per annum for the first CPA approved along with the approval of the PoA (GACC, 2013). This is expected to rise as more and more CPAs join the PoA between now and the date of the closure of the project in 2039.

Adaptation

The project serves to reduce vulnerability of forests to the changing climate by enabling the forests to recuperate, limiting degradation and enhancing protection of biodiversity by reducing pressure on them for fuel wood. It reduces local and global environmental pollution, and also reduces the need for water

for cleaning vessels, with reduced generation of smoke. The project encourages development of useful energy saving technologies that can also be used for other parts of the developing world.

The project also serves to help poor communities adapt to the effect of changing climate on the forests by reducing their vulnerabilities linked to forests. One likely effect of climate change is lowered ecosystem tolerance for harvesting of biomass, the reduced demand for fuel wood due to improved cookstoves prepares the communities for this likelihood. It improves the quality of life for women and girls through reduced drudgery, less time spent in collection of fuel wood and less time needed for cooking thereby more time for education, alternate income generation, and other social goods. Reduced smoke from kitchen improves health in general and particularly that of women and girls. High capital and maintenance investments in the project bring increased incomes and fresh employment opportunities. Lowered expenditure on purchase of fuel wood leads to increased household savings and better standards of living.

Improvement of equity

The beneficiaries of this program are essentially poorer people since the more well-off tend to use gas cylinders for cooking purposes. The investments in it are therefore designed to enhance equity in favor of poorer sections of the society. The project has also created employment in villages for cookstove erection and maintenance workers that includes women in significant numbers.

Table 1: Summary of Government led Biomass Cookstove Initiatives in India

In place	✱
Partly In place	★
Not in place	✕

Theme	Feature	Key Success Factor	Implementation level
Motivate	Benefits	Project generates economic benefits	✱
		Project generates social benefits	✱
		Project generates environmental benefits	✱
	Awareness	Benefits are publicly communicated	✱
		Opportunities for project implementation are identified nationwide	✱
	Crisis events	Crisis events like firewood shortage and breathing related sicknesses are leveraged	✱
	Legal requirements	There are no legal barriers in project implementation	✱
Enable			
	Market conditions	High demand exists for improved cookstoves	✱
		Post sale maintenance services are adequate	✱
	Policy conditions	International CDM Program of Activities policy environment	★

		is helpful	
		Policies affecting widespread use of improved cookstove in rural and urban households in India have been streamlined	❋
		Subsidies provision is attractive	❋
		There has been continuous improvement in policy environment through evaluation and feedback	❋
	Social conditions	Women users of improved cookstoves are empowered to take appropriate decisions	★
		All socio-economic sections are able to take advantage of the project	❋
	Institutional conditions	Roles and responsibilities of institutions are clearly defined	❋
		Effective institutional coordination is in place	❋
Implement	Leadership	National and local champions exist	❋
		Sustained political commitment exists	❋
	Knowledge	Relevant "know-how" exists	❋
		"Know-how" transferred via peers or extension services	❋
	Technical design	Cookstove design is technically sound and up-to-date	❋
	Finance and incentives	"Positive" incentives and funds for project outweigh "negative" incentives for *status quo*	❋
		Incentives and funds are readily accessible to end user	❋
	Feedback	Effective performance monitoring and evaluation system is in place	❋
		Early wins are communicated	★

Table 2: Summary of mitigation and adaptation aspects of cookstove project in India

In place	❋
Partly In place	★
Not in place	✕

Mitigation/ Adaptation/ Transformation	**Objective**	**Mechanism**	**Restoration Activity**	**Implementation Level**
Mitigation	**Sequester carbon**	**Reduced forest degradation**	**Indirect effect with reduced demand for firewood**	★
	Reduce emissions	**Enhanced efficiency of fuel burners**	**Increased use of efficient cookstoves**	❋
Adaptation	**Reduce dependence on forests**	**Lowered demand for firewood**	**Preparing communities for a future with lowered availability of forest products**	❋
	Improved economic condition of communities	**Lowered demand for firewood**	**Reducing expenditure on household energy consumption**	❋
				❋
	Maintain carbon stocks	**Reduce degradation**	**Reduced demand for firewood with widespread use of more efficient wood burners**	❋
	Maintain other forest functions	**Improve biodiversity**	**Reduced demand for firewood from forests**	★

		Enabling forests to recuperate	**Reduced demand for firewood**	
	Manage for resistance	**Reduce vulnerability to stressors**	**Reduced demand for firewood leads to healthier forest ecosystems**	★
	Manage for resilience	**More dense forests**	**Reduced forest degradation due to lowered firewood demand**	★
		Expand forest users' choices	**Lowered demand for firewood widens users' choices**	★
Transformation	**Novel community-ecosystems relationship**	**Society invests in responsible use of forests**	**Efficient use of biomass energy**	❋
		Society takes better care of women's health	**Significant reduction in health damaging indoor air pollution**	★
		Society takes better care of women's education	**Reduced need for collecting firewood provides more time for girls' education**	❋
		Improves equity in favour of poor	**Project focuses on the poor**	❋

5. References and Further Reading

CDM, 2012. Small-Scale CDM Programme Activity Design Document Form (CDM-SSC-CPA-DD) - Version 01, Improved Cook stoves Programme – India. Bonn: UNFCCC.

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