

# An Innovative, Scalable, Pro-poor Home Cooking-based Charcoal Production Value Chain For Women

## Grant factsheet

### Programme goals and objectives

The goal of the programme was to develop home-based charcoal production from cooking with firewood into a new livelihood opportunity and sustainable value chain for the economic empowerment of poor rural women.

Women from poor rural households in Ethiopia, India and Tanzania were trained to put out fires when they had finished cooking to prevent smouldering, collect household charcoal through the clusters, process it into briquettes through innovative partnership-based enterprises and market the output.

The objectives of the programme were to:

- Raise awareness and introduce selected women and households to the concept that residual charcoal from cooking with firewood generates incremental income without incremental work, and introduce carbon economy awareness and carbon credit systems to communities.
- Establish supporting institutional systems such as (i) collection clusters, cooperatives/enterprises, (ii) strengthening, activating and utilising the existing self-help groups (SHGs) and their federations which have microfinance linkages, and (iii) financing and logistics mechanisms that enable on-the-spot payment for the charcoal, its collection and aggregation.
- Develop simple quality standards for direct volume sale, processing into charcoal powder, briquettes, activated charcoal, and other value-added applications.
- Initiate a step-by-step process to incentivize and introduce growing of sustainable bamboo/other biomass and use of pyrolytic gasifier cooking stoves. These stoves have similar cooking times to common rural wood stoves but with reduced firewood consumption, producing higher and improved quality charcoal, and reduced emissions for better domestic air quality and health.



Map of Grant areas (highlighted in red)

### Target group/beneficiaries

Almost 15,000 poor rural women directly benefitted from the grant: 7619 from Rajasthan, India, 4349 from Tanzania and 2990 from Gujarat, India. Their households were indirect beneficiaries. In addition, in Ethiopia 22 community kitchens and the women working there producing charcoal and charcoal briquettes also benefitted. The number of women who participated and benefitted from the grant was five times more than the original target of 3000 women. The benefit to the individual was greater in areas with low base incomes.



#### At a glance (GRIPS ID 10000004257):

**Grant Implementing Agency:** International Network for Bamboo & Rattan (INBAR)

**Theme:** Empowering poor rural women

**Benefitting Countries:** India (Rajasthan & Gujarat), Tanzania, and Ethiopia

**Total Programme:** Cost: USD 335,000

**IFAD Contribution:** USD 300,000

**Co-financing (other donors):** USD 20,000 - CIBART for India & USD 15,000 - INBAR for Ethiopia

**Partners:** Centre for Indian Bamboo Resource & Technology (CIBART), Isongole Bamboo Society, WODGRA & Jan Chetna Sansthan (JCS)

**Effectiveness and duration:** 25 May 2012 to 30 September 2014

## Major results

### Strengthened natural resource and economic asset base

- Resilience to climate change: The Household charcoal (HHC) model takes cooking using fuelwood, an activity that happens on a daily basis throughout the year, rain or shine, and helps poor rural households earn additional income from the sale of the waste charcoal. HHC is non-degradable and can be stored.
- Market transformation: HHC is a new economic asset that has been developed. It can potentially benefit the 500 million households that cook food using fuelwood. It can transform the charcoal markets across Africa and elsewhere. Work is underway to address issues of the need for lower density, easier to light HHC briquettes, and a single-phase lower cost briquetting machine, as a prelude to further replication and scaling up. Following this step, a wider outreach programme to government, public and private donors, ongoing loan projects, and climate change funds, would be undertaken through a dedicated institutional vehicle since this would go beyond INBAR's mandate, and the number of potential beneficiaries is quite large.
- Environment and climate change focus: The volume of HHC currently produced by 500 million poor rural households at 10% yield is nearly four times that of commercial wood charcoal in the world. The Grant demonstrated that using a basic rocket stove with quenching of the hot charcoal produced while cooking is enough to double the yield from 10 to 20%. Globally, at 10% yield, the 500 million HH annually produce 183 million tons of HHC worth US\$ 37 billion, which is 669 million tons of CO<sub>2</sub> sequestered. At 20% yield with the improved stoves, 365 million tons of HHC worth \$73 billion is produced annually, which is 1338 million tons of CO<sub>2</sub> sequestered.

Considering that fuelwood collection highly contributes to forest degradation, this is a major issue that needs to be strategically included when popularizing the HHC model and promoting it not only as a model for generating income, but also HHC as an incentive for limiting forest degradation. Bamboo for fuelwood and biomass was promoted as the most sustainable and affordable option as it is fast growing and grows year-round. Other biomass plants were also encouraged.

A complementary strategy that can be implemented immediately (subject to securing the investment needed) is to do extrusion briquetting of diverse agri-wastes using screw-briquetting machines and produce sustainable "fuelwood". This was trialled and succeeded. In addition, the introduction of gasifier cook-stoves that produce 2-3 times more charcoal – and hence generate 2-3 times more income – would constitute a further economic incentive for using fuelwood and biomass from sustainable sources.

### **Enhanced access to services to reduce poverty, improve nutrition, raise incomes and build resilience:**

The model was embraced enthusiastically by the women as an activity that is already an intrinsic part of their lives, began to bring in an additional income to them and their families. The round-the-year income from HHC builds resilience. The value of the HHC and briquettes produced exceeds that of the fuelwood used.

### **Poor rural women and men and their organizations able to manage profitable, sustainable and resilient farm and non-farm enterprises:**

The HHC is produced during cooking using fuelwood. The cookplace or cooking stove is effectively their processing charcoal "kiln". Each household becomes a micro-enterprise and the women, micro-entrepreneurs.

### **Enabling institutional and policy environments to support agricultural production and the full range of related non-farm activities:**

The HHC microenterprises are linked to collection centres and further to the briquetting enterprise. Three inclusive processing enterprises were established using an innovative **NCPP** enterprise institutional model with the local **N**GO, **C**ommunity women, and development **P**rofessionals in **P**artnership. There has been policy dialogue with regulators/forest department to distinguish HHC from commercial charcoal and to establish a common legal framework for HHC production, processing and transportation.

**Gender empowerment:** Poor rural women are the primary beneficiaries because they are typically responsible for cooking in households. Household charcoal (HHC) has the potential to change charcoal production globally into a female-dominated activity, in contrast to commercial wood charcoal, which is dominated by men. Since cooking takes place throughout the year, it is possible to generate year-round benefits, income security and resilience. Women are quite pleased that they are no longer only a housewife but a self-employed entrepreneur. Widows (in widows associations in Tanzania) and single mothers are able to get by with the income HHC provides. In Mandla (India), 15-20% charcoal was produced from cooking with a daily production of 0.8-1.0 kg/HH. This unrealized income has been now become an important source of income in India and a significant source of income in Africa.

## Knowledge generated

An innovative household charcoal production value chain that leverages charcoal produced as a by-product of daily cooking was developed that generates incremental income for women without incremental work. Women in poor rural HH around the world widely cook with firewood with the charcoal being produced commonly discarded. Cooking is usually done twice a day, 365 days a year. Since 500 million households around the world use firewood, all of them inherently produce charcoal – the rapid replicability and scalability is without parallel and has potential to be included in nearly all IFAD projects.

The experience and institutional model in Gujarat helped set up the unit in Rajasthan, and the combined experience helped with the Tanzanian unit. Transfer of technology from Africa to Asia (Ethiopia to India) of the appropriate-scale pulveriser helped decentralized charcoal powdering. Likewise work on stoves in the Indian locations is being replicated in Ethiopia and later Tanzania. A number of cases have been recorded; each household has a story to tell. HHC is touching lives of poor rural women in more ways than was expected and a book is planned. The HHC experience has been cited in the PTA How to do note on labour saving technologies to reduced the burden of the domestic workload. All knowledge products are being put on the INBAR and partner websites.

The HHC model was met with great enthusiasm on all the occasions it was promoted and explained, which were numerous. A network has been initiated across several Indian states. The HHC model was shortlisted amongst 7 global finalists for the 2013 Global Development Network award for the 'Most Innovative Development Idea category'. The award submission was praised for its clarity and unique outreach to substantial numbers of poor, rural households. Newspapers wrote about the gasifier installation and its benefits to HHC project participants. Finally, several case studies on HHC have been prepared.

### Reports, Manuals, Business Plans:

- HH charcoal survey reports, collection data, incremental income calculations
- Awareness raising/training kit on charcoal production
- Manual for social workers on HHC, honeycomb briquette making
- Institutional model and business plans
- Calorific test reports
- Pyrolytic gasifier and rocket stoves, and charcoal briquette stoves
- Pyrolytic biomass gasifier producing quality charcoal and power
- HHC case studies from India and Tanzania

### Videos:

- Charcoal hammer mill: <https://www.youtube.com/watch?v=uQIHM0htODI>;
- Charcoal briquette mould: <https://www.youtube.com/watch?v=ecRuXGpWCFI>;
- Honeycomb briquettes made in Ethiopia <https://www.youtube.com/watch?v=EDx2TmusyVA>

## Lessons learned

- HHC is easily replicable everywhere and hugely scalable.
- Charcoal pulverising and briquetting machines that work on single-phase power working with lower volumes are better suited for rural areas.
- Consumers prefer briquettes that light up quicker. That would add to attractiveness of HHC briquettes to the market, which already appreciates their longer burning time.
- Policy advocacy and dialogue is needed to encourage larger-scale HHC use as income and environmental conservation and needs to be contrasted with charcoaling of timber.
- Seed capital is needed as a revolving fund to set up the processing facilities that could be repaid through HHC sales - especially in areas where the poor do not have the investment capital.
- HHC briquettes are a new and better charcoal and need initial promotion.
- The pyrolytic biomass gasifier that produces both power and charcoal is an excellent entry point in areas where power is not available for briquetting and domestic lighting.
- HHC incentivises women to grow bamboo fuelwood; biomass briquettes from farm agriwaste is also sustainable fuelwood (and HHC when burnt) and should become the policy norm. Together, they would help trend towards reduced deforestation
- HHC (charcoal) is value-added to the extent that even if the women buy the fuelwood, they still make a profit on the charcoal produced.

## Way forward

**Potential for scaling up and replication:** The scalability of the initiative is unprecedented because of its simplicity and the 500 million households already producing HHC but do not realise its value. HHC is proven to be a resource available in large quantities; strategies could be developed to take advantage of it while benefitting women producers.

HHC is the most objectively measurable and simple means for carbon capture and storage (CCS), which would greatly enlarge the market. It also has potential as biochar for nutrient delivery and agricultural productivity enhancement.

Policy support is needed to encourage larger-scale charcoal collection and processing. HHC is a step towards environmental conservation and needs to be contrasted with destructive and low-yield charcoaling of timber. Social, carbon and sustainable certification of HHC with its attributes of gender empowerment and equality would help enlarge the market and reduce environmental degradation.

### Grant linkages to IFAD investment Grants:

- CBINeRMP, Ethiopia

### Links to grant documentation:

- Grant Design Document: [https://rms.ifad.org/OfficialRecords/OP2/INBAR/001375/\[0000222846\]%20RE%20INBAR-1.eml](https://rms.ifad.org/OfficialRecords/OP2/INBAR/001375/[0000222846]%20RE%20INBAR-1.eml)
- Grant Completion Report: [https://rms.ifad.org/OfficialRecords/OP2/INBAR/001375/\[0000222836\]%20INBAR-1375.eml](https://rms.ifad.org/OfficialRecords/OP2/INBAR/001375/[0000222836]%20INBAR-1375.eml)
- Grant website: <http://www.inbar.int/search/node/charcoal%20women>

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