

Producing and selling charcoal: income for women and benefits to the environment

GRANT RESULTS SHEET



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The goal of this grant was to create more income for women without more work by selling charcoal from cooking with firewood

Goals and objectives

The goal of the grant was to develop home-based production of charcoal from cooking with firewood into a new livelihood opportunity – and thus create a 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 in order to prevent smouldering, and to collect household charcoal through collection clusters, process it into briquettes and market the output through innovative partnership-based enterprises.

The objectives of the grant were as follows:

- Introduce selected women to the concept that residual charcoal from firewood can generate income without creating work.
- Establish local systems such as collection clusters, cooperatives and microenterprises; strengthen existing self-help groups that have microfinance linkages; and provide financing and logistics that enable on-the-spot payment for collecting and aggregating charcoal.
- Develop simple quality standards for direct sale and for processing into charcoal powder, briquettes, activated charcoal and other products.
- Introduce the concepts of carbon economy and carbon credit systems.
- Initiate a step-by-step process to promote the cultivation of sustainable bamboo and other types of biomass and the use of pyrolytic gasifier cooking stoves, which have cooking times similar to those of common rural wood stoves but require less firewood, produce more and better charcoal, and reduce emissions for healthier domestic air quality.

Beneficiaries

Poor rural women were 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 male-dominated. Since cooking takes place throughout the year, it is possible to generate year-round benefits, income security and resilience. The women involved are pleased their role now extends beyond that of housewife to include self-employed entrepreneur.



Facts at a glance

Grant implementing agency

International Network for Bamboo & Rattan (INBAR)

Theme

Empowering poor rural women

Benefiting countries

Ethiopia, India (Rajasthan and Gujarat) and Tanzania

Total programme cost

US\$350,000

IFAD contribution: US\$300,000

Fund leveraging

US\$20,000 – CIBART for India

US\$15,000 – INBAR for Ethiopia

Partners

Center for Indian Bamboo Resource and Technology (CIBART), Isongole Bamboo Cooperative Society, Wodgra and Jan Chetna Sansthan

Effectiveness and duration

May 2012 to September 2014

Linkages to IFAD investment projects

- Community-based integrated natural resources management project, Ethiopia

Widows (in widows' associations in Tanzania) and single mothers are able to get by with the income HHC provides. In Mandla (India), 15-20 per cent of charcoal was produced from cooking, with a daily production of 0.8-1.0 kg/household. This has become an important source of income in India and Africa.

Almost 15,000 poor rural women directly benefited from the grant – five times the target of 3,000: 7,619 from Rajasthan, India, 4,349 from Tanzania and 2,990 from Gujarat, India. Their households were indirect beneficiaries. In Ethiopia, women in 22 community kitchens produced charcoal and charcoal briquettes.

Main results

- Market transformation HHC** is a newly developed economic asset. It can potentially benefit the 500 million households that cook food using fuelwood. It can transform charcoal markets across Africa and elsewhere. Work is under way to address 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. 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, given that this goes beyond INBAR's mandate and the number of potential beneficiaries is high.
- Environment and climate change focus.** The volume of HHC (which is non-degradable and can be stored) currently produced by 500 million poor rural households at 10 per cent yield is nearly four times the volume of commercial wood charcoal produced worldwide. The grant demonstrated that using a basic rocket stove and quenching the hot charcoal produced while cooking is enough to double the yield from 10 to 20 per cent. Globally, at a 10 per cent yield, 500 million households annually produce 183 million tons of HHC worth US\$ 37 billion, which is 669 million tons of CO sequestered. At a 20 per cent yield with improved stoves, 365 million tons of HHC worth US\$73 billion is produced annually, which is 1,338 million tons of CO₂ sequestered.
- Incentivized plantings of woody biomass.** The fact that fuelwood collection contributes significantly to forest degradation needs to be strategically considered when popularizing the HHC model. Not only is HHC a means of generating income, it is also a value-added product that is of greater value than the fuelwood it derives from. Biomass is now seen as a means to value addition, which is an incentive to women to undertake planting. HHC is thus an incentive for reversing 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. Cultivation of other biomass plants was also encouraged.
- Development of appropriate processing machinery and stoves.** A low-cost pulverizer was developed in Ethiopia and replicated in India. A simple foot-operated hydraulic briquetting machine was also designed. Extrusion briquetting of diverse agri-wastes using screw-briquetting machines to produce sustainable "fuelwood" was tested and is being taken forward under another grant. A trial of the common concrete mixer to mix pulverized charcoal, binder and water is planned. In addition, the introduction of gasifier cook-stoves that produce two to three times more charcoal – and hence generate two to three times more income – would constitute a further economic incentive to use 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 and has begun to bring in an additional income for 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 are able to manage profitable, sustainable and resilient farm and non-farm enterprises.** Each household becomes a microenterprise and the women become microentrepreneurs.
- **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 to the briquetting enterprise. Three inclusive processing enterprises were established using an innovative **NCPP** enterprise institutional model with the local **NGO, Community women and development Professionals in Partnership.** Policy dialogue has taken place with regulators/forest department to distinguish HHC from commercial charcoal and to establish a common legal framework for HHC production, processing and transportation.

Keli Bai Reshma, Age 45, Dhansaram village, Rajasthan



Every day, like 500 million women around the world, Keli Bai Reshma cooks using firewood. And with four growing children and a husband who is hungry before and after working in the fields, daily meals are an essential part of family life. But cooking has become more than that – it has become an opportunity for Keli Bai Reshma and the other women of Dhansaram village to make money. Through this initiative she realized that the firewood she was burning for cooking became charcoal if she sprinkled water on it on time to stop it turning into ash and she could produce up to 0.8 kg a day. In a week, that would be as much as 5.6 kg of charcoal.

At INR 8 per kg, INBAR and NGO partners are making the most of their strong rural community networks to let women know about the income they can make from an activity they do every day. Bhakhar Bhitrot Adiwasi Vikas Manch, the community-based organization for which Keli Bai Reshma is a leader, is one such network that has helped reach out to the women. Instead of throwing away the waste charcoal, the women of Dhansaram village now collect it in a basket and carry it to the local collection centre every week. This brings them an average of INR 180 each per month; in a year, that amounts to more than INR 2,000, without any additional work.

Lessons learned

- The HHC model is easy to replicate in many contexts and has great potential for scaling up. Policy advocacy and dialogue are needed to enable larger-scale uptake.
- Charcoal-pulverizing and briquetting machines that operate on single-phase power and work with lower volumes are better suited for rural areas.
- Consumers prefer briquettes that light up quickly. Producing this type of briquette would further strengthen the appeal of HHC briquettes in the market.
- Seed capital is often needed as a revolving fund to set up processing facilities; loans could be repaid through HHC sales.
- HHC briquettes are a new concept and need initial promotion.
- The pyrolytic biomass gasifier, which produces both power and charcoal, is an excellent entry point in areas where power is not available for briquetting and domestic lighting.
- HHC encourages women to grow bamboo for fuelwood; biomass from farm agri-waste is also a sustainable source of fuelwood (and HHC) and should become the policy norm. Together, they would help reverse deforestation.
- Even if women have to buy fuelwood to produce HHC, they still make a profit on the charcoal produced.

15,000 rural women are pleased they are now self-employed entrepreneurs as well as being housewives

The HHC model was shortlisted for the 2013 Global Development Network award in the “Most Innovative Development Idea” category



Investing in rural people

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Way forward

The potential for scaling up the initiative is unprecedented because it is so simple to set up and some 500 million households are already producing HHC. Strategies could be developed to promote it further, for the benefit of both women producers and the environment.

HHC is the most objectively measurable and simple means of carbon capture and storage. 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, unlike the destructive and low-yield charcoaling of timber. Social, carbon and sustainable certification of HHC, with its attributes of gender empowerment and equality, would help expand the market and reduce environmental degradation.

Knowledge generated

For the beneficiaries, the knowledge that the charcoal produced each time they cook and which they once discarded without a thought has an intrinsic cash value is invaluable. That they can earn this income each and every day of the year without doing additional work makes them feel more secure.

For the associated NGOs and project staff, the knowledge of value is that here is a robust means of generating income in rural areas through an energy product that uses a set of validated methodologies, institutional systems, and logistical and financial arrangements, has been trialled in different markets and has been shown to be profitable.

For governments, it is important to know about this relatively benign charcoal production system that is already yielding four times the volume of commercial charcoal produced globally (and this could increase up to eight to ten times) because it could be the answer to the rampant deforestation caused in great part by the production of commercial charcoal.

Also of value is the knowledge gained through the South-South twinning of institutions across regions. The experience and institutional model in Gujarat were used to help set up the unit in Rajasthan and, together, they contributed to the establishment of the unit in Tanzania.

There is great interest in the benefits of HHC and in the pyrolytic gasifier installation, which also has other advantages. Several case studies on HHC have demonstrated the benefits this knowledge has brought to the women, their households and their wider communities. HHC is touching the lives of poor rural women in more ways than expected. CIBART and other partners plan to publish a book about this groundbreaking initiative.

Reports, Manuals, Business Plans

- HHC 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>