

# Making a difference in Asia and the Pacific



Issue 6: December 2013

## India Promoting alternative energy

### In this issue

This issue describes how a number of IFAD projects have been supporting the production or use of alternative energy. These opportunities can increase household income (sustainable production of charcoal briquettes and supply of fuel to biomass power stations), save households money and increase the ability of households to function after dark (solar lighting, lanterns and water pumping), or provide alternative means of cooking (biogas and improved stoves). IFAD is also supporting research into second generation biofuel crops, and there is a report of a meeting to plan the implementation of this initiative.

### Latest News

#### Agreement signed for a new IFAD-supported project in India

A loan agreement was signed on 4<sup>th</sup> October 2013 to finance a new project in Jharkhand State. The agreement, between IFAD and the Republic of India, was signed by Mr Nilaya Mitash, Joint Secretary, DEA, Ministry of Finance, and Mr Nigel Brett, Country Programme Manager, IFAD. In addition, a Project Agreement between IFAD and the State of Jharkhand was signed by Mr Brett and Mr Khiangte, Principal Secretary to the Government of Jharkhand.

Under the terms of the agreement, IFAD will provide a loan of US\$51 million to finance the Jharkhand Tribal Empowerment and Livelihoods Project with the goal of improving the living conditions of tribal communities, especially 'particularly vulnerable tribal groups' (PVTGs), across Jharkhand. The project, with a total cost of over \$115 million, aims to empower and enable 136,000 tribal households including 10,000 PVTG households in 14 districts of the state. The project will foster community-based institutions to empower village communities, especially women, introduce sustainable natural resource management systems and enhance food security and cash incomes by introducing improved farming practices and proven production technologies.



Mr Mitash of DEA and Mr Brett of IFAD

#### Sustainable Mountain Development Summit III

The third Sustainable Mountain Development Summit (SMDS III) was held at Kohima in Nagaland from 25<sup>th</sup> to 27<sup>th</sup> September, 2013. This meeting is the platform of the Indian Mountain Initiative (IMI) for Indian Himalayan states to come together to share experiences, discuss priority issues, and find ways to influence national and state policies. SMDS III was supported by UNDP, the Swiss Agency for Development and Cooperation, GIZ, and the Ministry of Environment & Forests, Government of India, amongst others. Over 150 delegates attended from all the mountain states in India and key mountain development institutions. Mr Vincent Darlong of the IFAD India country office also attended, along with the IFAD-supported North East Community Resource Management Project (NERCORMP).

After the summit, Dr David Molden, Director General of the International Centre for Mountain Development (ICIMOD), and colleagues made a field visit to Senapati District of Manipur. The group met honey producers and women SHG members from the area around Mao Gate. These groups were promoted during the first phase of NERCORMP, when ICIMOD provided them with training in apiculture.

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### Exchange rate:

US\$ 1 = Rs (INR) 62.00

### Land area:

100 decimals = one acre = 0.4  
hectare

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There are now over 750 farmers producing honey in 8 or 9 villages in the Mao Gate cluster alone. Dr Molden and his team members were pleasantly surprised and appreciative of how the impact of the ICIMOD training had been sustained and replicated. The honey producers highlighted the challenges they face, including the availability of wood for making bee hives, honey extraction, purification and packaging, and conservation and management of habitats for flowering plants. The farmers also requested support to strengthen their organisation (the Honey Producers Band).



*Dr David Molden, DG, ICIMOD (in green T-shirt) flanked by bee farmers from NERCORMP-I*

## Planning alternative crops for biofuel.

The World Agroforestry Centre (ICRAF), one of the international agricultural research centres, has started implementing a four-year grant-funded project to support the development of biofuels in India and other countries. The Programme for the Development of Alternative Biofuel Crops has the objective of improving the productivity of non-cereal biofuel crops that have higher oil, starch or sugar productivity than conventional biofuel crops. The project aims to develop market-ready products that will enable small farmers, including women, to increase their incomes, provide food security and improve access to affordable energy.

The first project steering committee meeting, held in Bangalore in August, was attended by steering committee members: Rodney Cooke, Eric Tollens and Alexander Mueller, with Carlos Sere from IFAD as an observer. Informative presentations were made by the representatives of the biofuels park of the University of Agricultural Sciences, Bangalore, by Boeing on the Sustainable Bioenergy Research Consortium's biofuels/aquaculture research activities in Abu Dhabi, by Cleanstar Mozambique on their cassava-based ethanol production system for charcoal replacement in Maputo, and by Embrapa biofuels on their research programme. The steering committee decided that the project will focus on three countries with the following thrusts:

- I. Biofuels for livelihoods: local energy provision for smallholder farmers in India, working in states such as Karnataka, Maharashtra, Meghalaya and Rajasthan.
- II. Biofuels for clean energy provision: replacing charcoal to preserve biodiversity and the health of women in Mozambique.
- III. Sustainable biofuels involving smallholder farmers: linking with private sector partners in North East Brazil.

Apart from these, it was decided that the project will also provide technical support for the development of biofuels in marginal land, especially under saline conditions. Biofuel crops will be selected on the basis of local agro-climatic conditions. Crops being considered include: Macaúba, Pongamia, Cassava, Sweet Sorghum, Simarouba, Tropical Sugar Beet, Salicornia and Nipa palms, many of which are suited to marginal or degraded land. The highlight of the meeting was the visit to the Biofuel Park at Hassan in Karnataka (<http://biofuelpark.org/>).

In June, prior to this meeting, Navin Sharma, the biofuel programme manager at ICRAF's Delhi office, along with biofuel partners from Mozambique and Brazil, attended the Bonn Climate Talks, and gave presentations at a side event on the IFAD-ICRAF Biofuel Programme.

## Potential partnership with Unilever

A Strategic Partnership Meeting was held in at the IFAD headquarters in Rome on 13<sup>th</sup> September with a senior management team from Unilever, the multi-national food and consumer goods company. Unilever has committed to sustainably source 100% of its agricultural raw materials (about 8 million tons) and improve the livelihoods of 500,000 small farmers by 2020. The company is actively seeking new partners to meet these goals, and linking with IFAD projects may help them link up with large numbers of small farmers, as well as providing these farmers with better livelihood opportunities.

The Unilever delegation was comprised of Marc Engel, Senior Vice President, Global Procurement, Miguel Veiga-Pestana, Vice President, External Affairs and Media Relations, and Giulia Di Tommaso, General Counsel, Unilever Italia. This team met IFAD operations management staff, including Nigel Brett, Country Programme Manager for India. In the Asia Pacific region, India was selected as a priority country, with opportunities for developing tomatoes in Maharashtra and possibly tea in Meghalaya. In addition there is potential for projects to connect with Unilever's corporate foundation in India, the Hindustan Unilever Limited Foundation, who might be able to support capacity building for small farmers.

## List of projects supported by IFAD loans in India:

### [North Eastern Region Community Resource Management Project II](#)

Total cost: US\$38.2 million  
IFAD loan: US\$20.0 million  
Project dates: 2009-15  
[www.necorps.org](http://www.necorps.org)

### [Odisha Tribal Empowerment and Livelihoods Project](#)

Total cost: US\$91.4 million  
IFAD loan: US\$20.0 million  
Co-financing: DFID, WFP  
Project dates: 2003-14  
[www.otelp.org](http://www.otelp.org)

### [Tejaswini Rural Women's Empowerment Project – Madhya Pradesh](#)

Total cost: US\$84.6 million  
IFAD loan: US\$16.5 million  
Project dates: 2007-15

### [Tejaswini Rural Women's Empowerment Project – Maharashtra](#)

Total cost: US\$84.6 million  
IFAD loan: US\$16.5 million  
Project dates: 2007-15  
[www.mavimindia.org](http://www.mavimindia.org)

### [Post Tsunami Sustainable Livelihoods Programme for Coastal Communities of Tamil Nadu](#)

Total cost: US\$68.6 million  
IFAD loan: US\$29.9 million  
Project dates: 2007-15  
[www.ptslp.org](http://www.ptslp.org)

### [Women's Empowerment and Livelihoods Programme in the Mid Gangetic Plains](#)

Total cost: US\$52.5 million  
IFAD loan: US\$30.2 million  
Project dates: 2009-17

### [Mitigating Poverty in Western Rajasthan Project](#)

Total cost: US\$62.3 million  
IFAD loan: US\$31.1 million  
Co-financier: SRTT US\$3.2 million  
Project dates: 2008-14  
<http://mpowerraj.gov.in/>

### [Convergence of Agricultural Interventions in Maharashtra's Distressed Districts Programme](#)

Total cost: US\$125.6 mill.  
IFAD loan: US\$41.1 million  
Co-financier: SRTT US\$16.1 million  
Project dates: 2009-17  
[www.caim.gov.in/](http://www.caim.gov.in/)

### [Integrated Livelihood Support Project](#)

Total cost: US\$258.8 mill.  
IFAD loan: US\$89.9 million  
Project dates: 2012-19

### [Jharkhand Tribal Empowerment and Livelihoods Project](#)

Total cost: US\$115 million  
IFAD loan: US\$51 million  
Project dates: 2013-20

## National workshop on improved technologies for small farmers

To address the challenge of increasing the income of small farmers, better access is needed to improved technologies and natural resources. With this in mind, a national workshop was held on 3<sup>rd</sup> and 4<sup>th</sup> October in the National Agricultural Science Centre in Delhi. This event was hosted by ICRAF and jointly funded by IFAD and FAO. The workshop focused on sharing knowledge for high potential technologies that are ready for scaling-up at state level. The Chief Guest was Mr R B Sinha, Mission Director, National Mission for Sustainable Agriculture and Joint Secretary Ministry of Agriculture, Government of India, and the workshop was facilitated by Dr V P Singh, Regional Director of ICRAF. A total of 54 senior officials of State Departments of Agriculture from across India attended the workshop, as well as eight officials from the Ministry of Agriculture in Delhi. The workshop validated six high priority technologies for immediate scaling-up. These were: (i) selection of varieties for cereal crops; (ii) seed selection in cereal crops; (iii) integrated farming systems for rainfed eastern India; (iv) enhanced fodder production and supply systems for livestock; (v) extending the productive life of old mango trees; and (vi) integrating trees into food production systems.



Workshop session in progress

## IFAD reviews and supports India portfolio

In addition to the events described above, between June and November 2013, IFAD staff and consultants, along with Government and project staff, participated in the following missions and events:

- The 25th Anniversary of the Foundation of the M S Swaminathan Research Foundation. Carlos Sere attended the celebrations in behalf of the President of IFAD, and then visited the Post Tsunami Sustainable Livelihoods Project.
- Tripartite Portfolio Performance Review Meeting with the Department of Economic Affairs, Government of India – held in Nagpur, with field visits to the CAIM project area.
- Mid-Term Review Mission of the Women's Empowerment and Livelihoods Programme in the Mid Gangetic Plains
- Supervision Mission of the Mitigating Poverty in Western Rajasthan Project
- Supervision Mission of the Post Tsunami Sustainable Livelihoods Project
- Supervision Mission of the Tejaswini Rural Women's Empowerment Project – Madhya Pradesh
- Implementation Support Mission for the Convergence of Agricultural Intervention in Maharashtra programme.
- Implementation Support Mission for the Integrated Livelihood Support Project
- Implementation Support Mission for Women's Empowerment and Livelihoods Programme in the Mid Gangetic Plains
- Project Completion Review Mission of the Uttarakhand Livelihood Improvement Project for the Himalayas
- Formulation & Appraisal Missions for the Meghalaya Livelihood and Access to Markets Project
- Inception mission for the Odisha Particularly Vulnerable Tribal Groups Empowerment and Livelihoods Improvement Project.

## Household charcoal in Gujarat and Rajasthan

### Sales of waste charcoal generate extra income for poor women

Every day, like 500 million other women around the world, Keli Bai Reshma cooks using firewood. The two or three daily meals that she prepares are an essential part of family life for Keli, her husband and four growing children. But recently, cooking has become more than that - it has become an opportunity for Keli and the other women of Dhamsara village of Abu Road block in western Rajasthan. An initiative of the International Network for Bamboo and Rattan (INBAR) supported by IFAD, has helped Keli realize that the



The charcoal produced by cooking six chapattis

## List of projects in India supported by IFAD grants:

### [Crop-based Production Systems for Raising Agricultural Productivity in Rainfed Areas](#)

Lead implementing agency: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

### [Asia and the Pacific Region Project Management Support \(APMAS\)](#)

Agency: Asian Institute of Technology (AIT)

### [Rewards for Use of and Shared Investment in Pro-poor Environmental Services \(RUPES II\)](#)

Agency: World Agroforestry Centre (ICRAF)

### [Consortium for Unfavourable Rice Environments \(CURE\)](#)

Agency: International Rice Research Institute (IRRI)

### [Enhancing Adaptation Capacity and Resilience of the Poor to Climate and Socio-Economic Changes](#)

Agency: International Centre for Integrated Mountain Development (ICIMOD)

### [Root and Tuber Crops Research & Development Programme for Food Security](#)

Agency: International Potato Centre (CIP)

### [Enhancing dairy-based livelihoods through feed innovation and value chain approaches \(MilkIT\)](#)

Agency: International Livestock Research Institute (ILRI)

### [Small ruminant value chains \(imGoats\)](#)

Agency: ILRI

### [Sending Money Home to Asia and the Pacific:](#)

Agency: World Bank

### [Collaborative research and capacity strengthening for monitoring and evaluation and impact assessment](#)

Agency: International Food Policy Research Centre

### [Innovative Charcoal Production Value Chain for Women](#)

Agency: International Network for Bamboo & Rattan (INBAR)

### [Development of Alternative Biofuel Crops](#)

Agency: World Agroforestry Centre (ICRAF)

firewood could become charcoal if she removed it from the stove after cooking and sprinkled it with water to stop it turning into ash. Every day she can produce up to 0.8 kg of charcoal, making as much as 5.6 kg per week, worth Rs45 if sold for Rs8 per kg. INBAR's NGO partners, CIBART in Gujarat and Jan Chetna Sansthan in Rajasthan, are capitalizing on their strong community networks to tell rural women about the income they can make from cooking - an activity they do twice or more a day, every single day of the year.



*Women bringing charcoal to a collection centre*

Bhakhar Bhitrot Adiwasi Vikas Manch, the Community-Based Organisation of which Keli Bai Reshma is a leader, is one of the networks that help reach out to these women. Instead of throwing away waste ash and charcoal, Keli and other women now collect charcoal in a basket and carry it every week to a local collection centre. This activity brings each of them an average of Rs 180 per month and in a year they earn over Rs2,000 without any additional work.

Once the charcoal is gathered at a collection point by a community cooperative, it is purchased by a briquetting factory that pulverizes the charcoal and turns it into high calorific value briquettes. Demand for these briquettes is growing rapidly. The briquetting company is a partnership between the NGO, community and private sector. The money earned by the NGO goes into a revolving fund to be reinvested in development projects for replication and up-scaling.



*Making charcoal briquettes*

The community benefits directly and immediately from the profits, which contribute towards community savings which are now reaching significant sums, although there is a lack of attractive opportunities for investment. The third part of the partnership are individual women who have each invested Rs100, and have the opportunity to get fully involved and earn a steady income.

This new source of regular income will make Keli Bai Reshma credit-worthy and empower her economically. Moreover, the power of collective thinking and empowerment is leading to more ideas within the community for economic development and change. "Consumables for charcoal" is one of those: instead of buying edible oil and other products individually from local shops, they are now thinking of buying commodities in large quantities from the manufacturer and distributing them in exchange for charcoal – increasing the value derived from charcoal three-fold.

But more than financial profits, charcoal collection has become a social outing for the 8,000 women in Rajasthan and 4,000 women in Gujarat (the partner NGOs in both states are aiming to reach 16,000 women). In the first 41 days of the project in Rajasthan, 6,500 women collected 235,000 kg of charcoal, a daily collection of 5,000 kg! Every week, the women dress up and carry the charcoal to their local collection centre, gossip with their friends along the way, argue that the charcoal is not being weighed properly and haggle on the price. Meals themselves have gained a new dimension: if the neighbours come around for dinner, more firewood will be needed for the cooking and more charcoal will be produced, while the guests will miss out on producing charcoal for that meal. Festivals and other events that involve more cooking have become an opportunity to produce even more charcoal, and children have been caught taking the firewood away to recover the charcoal before the food had even finished cooking!

Community Joint Forest Management programmes provide a framework for collecting firewood sustainably without contributing to forest degradation. This is the key for a supply chain that aims at being green and sustainable from production to consumption. This chain needs to reach a minimum of 12,000 households to be viable, and has good potential to reach even larger scales (16,000 households are ideal).

Records of charcoal collection are rigorously kept to ensure that the amounts produced are kept within the average amount that a household would produce as a by-product of cooking and that no firewood has been burnt solely for the purpose of producing more charcoal. In addition, this initiative has provided an incentive to grow sustainable firewood around homesteads and field boundaries. In Rajasthan 30,000 bamboo plants – a fast growing, renewable option for firewood – have already been purchased, and training provided to villagers on how to grow bamboo for firewood. Research shows that 77% of rural India's women would rather cook with firewood than with any other fuel. According to Keli Bai Reshma, firewood gives a special flavour to food. Now, thanks to household charcoal, Keli Bai Reshma has an even better reason to make her delicious homemade chapattis.

*Contributed by: I V Ramanuja Rao, INBAR and Clare Bishop Sambrook, IFAD.*

## **Innovation in bio-gas production**

As reported in the last edition of this newsletter, IFAD's Innovation Mainstreaming Initiative (IMI) project, funded by the Department of International Development (UK), which primarily

works in Kenya, is launching its activities in India. This project is supporting a new generation of "Flexi" biogas systems made of reinforced plastic sheet - which have the advantage over fixed dome systems in terms of ease of construction, low cost, portability and ability to operate on small quantities of manure.

*The plastic bio-digester is housed inside a plastic tunnel to maintain the required temperature.*



IMI is working with the Odisha Tribal Empowerment and Livelihoods Programme (OTELP), where two systems became operational in July. The performance of these systems has been evaluated by a team from Indian Institute of Technology in Delhi who found both systems were working well, producing 400 litres of gas per day from 15 to 20 kg of manure. Users report that the systems take an hour per day to operate, but five hours are saved in avoiding the need to collect fuel wood. The gas produced is sufficient to operate a twin burner gas stove for 2½ hours per day.



*The plastic bag bio-digester inside the plastic tunnel.*

*Contributed by Prof. Virendra Kumar Vijay, Project Investigator, Biogas Development and Training Centre, Centre for Rural Development and Technology, Indian Institute of Technology, Delhi*

## **A Federation of Self-Help Groups turns solar lighting into a business venture**

Uttarakhand has significant hydro-power resources and most villages now have electric power connections. However the lack of generating capacity and increasing demand at the national level means that power supplies are often intermittent. The major flood disaster in June 2013 made matters much worse, destroying power lines and cutting villages off from the power network. In these circumstances rural households still have to rely on candles and kerosene lamps to provide much of their lighting. Such lighting is both inadequate, in terms of providing enough light for domestic activities to continue into the evening, and is also expensive.

In these circumstances solar power can provide an alternative source that is both cheaper to operate and provides more light than candles or kerosene lamps. Solar home systems (with a

solar panel on the roof, an automotive-type battery and a number of light fittings) are costly and only affordable for well-off households unless a government grant is available. In the last few years low-cost solar lanterns have been introduced, but these are still not widely available at the village level.

The Jhankarsaim Self-reliant Cooperative is a federation of SHGs set up in 2009 by the Uttarakhand Livelihood Improvement Project in the Himalayas, a project that was supported by IFAD. The federation works in Gurnabaj cluster of Dhaula Devi block in Almora district, with 600 shareholder members from 63 SHGs of 25 villages. The federation is supporting honey and seed production, eco-tourism and a solar lantern business. During its initial years the federation has faced many challenges, particularly in finding suitable and sustainable business activities to generate income for the federation and to provide benefits to its shareholders.

One of the problems faced by members of the federation is the erratic supply of electricity. This issue was discussed at SHG and federation meetings, and highlighted in district coordination meetings. In October 2012 the project organised a state-level workshop and fair, at which federations presented their produce to potential buyers, and agencies interested in linking to federations displayed their products and services. At this event, the federation held discussions with Sunshine Solar Pvt Ltd, a supplier of solar lanterns regarding the possible bulk purchase of lanterns for re-sale in its villages.

The federation then told villagers about these lanterns (which can also be charged from mains power supplies and are able to recharge the batteries of mobile phones), demonstrated the operation of the lantern, and made a list of households interested in buying these lanterns. Based on this list, the federation placed an order for 85 solar lanterns at a cost of Rs140,250. This amount was funded by the federation from its own resources and from an SHG as a short term loan.

Each lantern costs Rs1,650 and was sold for Rs1,800, making the federation a total profit of Rs12,750. People were happy to pay this amount as they were facing problems of electricity failure in the area. The lantern also saves them the cost of electricity and kerosene, and it soon became even more popular since it was environmentally friendly and provided good intensity light helpful in doing all types of work.



*Solar lantern*

After seeing the performance of the lanterns and assessing market demand, the federation procured 292 more lanterns at a cost of Rs478,000. With help from Sunshine Solar, a local person has been trained to maintain the solar lanterns and provided with a stock of spare parts. The federation plans to

increase its sales to 600 lanterns per year over the next three years, generating an annual profit of Rs50,000.

One of the users of solar lanterns is Mrs Pushpa Devi, a member SHG from Kaula village. Her family of four (husband, wife and two small children) rely on farming, with a monthly income of Rs1700-1800. The village is 12 km from the road head and backward in terms of basic infrastructure, including an erratic supply of electricity. Due to this, people use kerosene lamps and candles for lighting. The light from one kerosene lantern is enough for only one child to study, and the emission of smoke also caused health problems. Most of the villagers have cell phones, but have to get them charged outside of the village.

Smt. Pushpa Devi has been regularly participating in meetings of the SHG and federation. One day she got the chance to see the solar lamp at a federation meeting. It looked to be useful and she purchased a lamp from federation.

Not only does the lamp provide light in the house, but it has been used to help with other night-time tasks like cattle management, using the toilet, fetching drinking water and night protection from the wild animals. The children have now started studying at night and, from the savings made in purchase of kerosene, they have brought a mobile phone which is recharged using the lantern.

*Contributed by: UGVs staff of Almora district*

## Improved cooking stoves use less firewood and reduce indoor pollution

The people of Nongsohphan village of Meghalaya's East Khasi Hills district have always used firewood, and it is their only source of fuel for cooking. To collect this wood requires every person (man, woman and child) to go to the forest every day - with women doing most of this work. Burning wood creates a smoky environment in the kitchen causing respiratory diseases.



*Fuel-efficient stove*

The village participated in the Meghalaya Livelihood Improvement Project for the Himalayas (MLIPH), implemented by the Meghalaya Rural Development Society (MRDS) with support from IFAD. Following training on low-cost technologies, some villagers agreed to try out a new design of twin burner cooking stove. This has been developed and patented by the State Council for Science Technology and the

Environment (SCSTE) to use less firewood and produce less smoke.

Using the improved stoves has reduced firewood consumption, which leaves women with much more time to look after their children and for other family activities. Less smoke has reduced respiratory diseases, while the forest environment will benefit from less cutting of firewood.

*Story and photo taken from Prime Movers, by Kit Shangpolang and others, MILPH 2013.*

## Solar energy – from darkness into light

Even after 66 years of independence, thousands of families still rely on kerosene oil lamps to provide light after sunset. Although a large section of rural community in the districts of northeastern India are connected to the electricity grid, they suffer from erratic and unreliable power supplies, and so still need to use kerosene lamps. Each month a family has to spend Rs 250-300 to purchase kerosene. Burning kerosene is polluting (resulting in 18 million tons per year of CO<sub>2</sub> emissions in India) and can cause fires in the home. Moreover kerosene oil is not easily available in remote villages in the hilly terrain of much of the region. Lack of light prevents children from studying after school, as well as hindering the household work and income earning activities of family members.

The North Eastern Region Community Resource Management Project (NERCORMP), a project of the North Eastern Council of the Government of India supported by IFAD, is addressing this problem in a number of villages by providing home solar lighting systems. During 2011-12 NERCORMP provided solar home lighting system to 14 villages, benefitting 585 households. Each unit consisted of a 40 watt solar panel, a 40 ampere battery, controller box, wiring and two CFL bulbs. Solar lighting was installed in the Laisong and Mahur clusters of Dima Hasao district in Assam state. The work was facilitated by two of the project partner NGOs, Beacon Area Upliftment Society (BAUS) and the Backward Area Development Society (BADs).

In 2012-13, the project reached out to another 12 villages in Dima Hasao, benefitting 229 households. The solar system was upgraded with LED rather than CFL lights, which use less power and meant households could have three rather than two bulbs, plus a mobile phone charging point. Each set costs Rs11,500.

Most people prefer solar home lighting systems instead of unreliable grid-based electricity. Solar lighting also saves them the expenditure on kerosene oil, and now most of the family can do productive work in the evenings such as weaving, tailoring and handicrafts to earn additional income. In addition, solar lighting enables their children to continue to study after dark.

In 2013-14, the project plans to scale up solar lighting to cover all three of the states in which it is working, reaching a total of over 1,000 households. These include 440 households in 12 villages in Dima Hasao district of Assam, 280 households in 4 villages of Ukhrul District of Manipur, and 320 households in 16 villages of West Garo Hills District of Meghalaya.

Solar lighting has benefited members of Self Help Groups established by NERCORMP. One of the members, Mrs. Dituilakle Nriame, of Dingam village in Dima Hasao district, is 26 years old and has three children, and said:

*"I am very happy that the project has provided solar light to us which we couldn't dream of buying it or afford to buy it due to financial constraints. Now at night I spend my time in weaving and knitting and I can spend my time in productive work. Now I don't have to buy kerosene and my children can study for longer with no difficulty. I thank the NERCORMP project for giving us solar light".*

The project has also helped members of Natural Resource Management Groups (its village-level organization) to identify a village level technician to look after the maintenance of the systems and to advise on their use. These technicians were trained by a local NGO and help ensure that the solar systems are long lasting. For this work the technician will be paid a nominal service charge of about Rs50 per job (or gets payment in kind). Spare parts are either help by the technicians or available in local markets. So far four technicians are working.

*Contributed by: K. Sani Mao, Chief Technical Officer, NERCORMP; and Mary Hmar, Project Technical Officer, NCHCRMS (North Chachar Hills Community Resource Management Society)*

## Power generation from biomass

### An opportunity for rural people to sell biomass for industrial-scale power generation

Electric power generation from biomass is a recent development in India, but there is considerable interest, and the total installed capacity of biomass power plants (excluding sugar mills) is now around 1,000 MW. A number of these powerplants have been constructed in the Vidarbha region of Maharashtra where the Convergence of Agricultural Interventions in Maharashtra (CAIM) programme is located. Investors in these plants receive incentives from climate change mitigation funds.



*Kalyani biomass power station*

In Akola district Kalyani Renewable Energy India Ltd. has constructed a 15 MW electric powerplant with a daily fuel requirement of 440 tons, of which 400 tons is biomass and the rest is coal. The plan is to source biomass within a 50 km radius, including cotton stalks, soybean and pigeon pea residue, together with invasive shrubs such as Proposis Juliflora. It plans to link up with CAIM groups to procure biomass and a survey of CAIM villages shows that only around half of the potential fuel biomass is now used, and much crop residue is burnt as waste in the field. This will provide an opportunity for Self-Help Groups (SHG) being supported by

CAIM to collect and sell biomass. The plan is for CAIM SHG to collect biomass at the village level, shred it to reduce bulk for transport, and sell this chopped material to the plant at a price of Rs1400 per ton.

The economics of biomass energy look good – about 4 to 5 kg of biomass produces the same thermal energy as 1 litre of furnace oil. Even assuming the cost of biomass is Rs4 per kg, it would cost Rs20 to replace 1 litre of furnace oil costing Rs40 or more. This saving has made it attractive for industries such as soya oil extraction to convert their boilers to run on agricultural waste.

In the neighbouring Washim district the soya oil extraction plant of Narmada Solvex Pvt Ltd has converted its boilers to burn biomass, and is burning 60 tons of biomass per day to generate steam used in processing soybeans. The saving in fuel cost meant the cost of conversion (Rs3 million) was recovered in only 18 months. Solvex is now installing 0.6 MW steam turbine to provide 60% of its electric power requirement.



*Boilers using biomass at Narmada Solvex*

The biomass used is largely soybean crop residue, which is delivered to the plant by farmers who are paid Rs2000/ton. Farmers say that this residue was earlier mostly burnt in the field, with around 30% kept as cattle feed. This crop residue can be separated on feed quality as the threshing machine chops the crop residue and the lighter leaf material (better as cattle feed) gets blown further away, leaving heavier stalks to be collected for burning.



*Farmers delivering soybeans and biomass (soybean crop residue) to the plant*

Cotton and tur (pigeon pea) stalks can also be sold as biomass fuel and are chopped in the field by a tractor-powered machine. Solvex has provided two of these for farmers to use.

In the last three years this company has started contracting farmers to for direct procurement of soybeans. In CAIM clusters over 300 farmers have been contract growing 1100 ha of soybeans. The company will pay farmers an extra Rs100 to Rs200 per ton over the market price, but contracted farmers are free to sell elsewhere if they wish. Solvex say they get better quality soya if they buy direct from farmers. As part of the contract they provide links to Bayer Crop Science for pest control and other services, including the free opening of bank accounts with HFDC to receive payments. The company is also making efforts to form clusters of farmers for group buying of seed and fertilisers.

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## Solar power for a domestic water supply system

People living in the Bundelkhand area of Madhya Pradesh face great problems in getting sufficient water for drinking and other domestic purposes as well for agricultural use. This problem was highlighted during the Participatory Rural Appraisal (PRA), carried out in Niwari and Taricharkalan village of Niwari block of Tikamgarh district in 2008 at the start of the Tejaswini Rural Women's Empowerment Project, which is supported by IFAD.

At Niwari the project's NGO for the area, Society for Development Alternatives (SDA), organised a large village meeting to discuss how to solve this problem. A number of ideas were put forward and it was eventually agreed to install a piped water system to distribute water through the village with taps for each hamlet (mohalla). SDA then did a survey to plan the layout of the distribution system and used resistivity tests to identify a location for a well that would be able to supply sufficient water. This resulted in a plan for 1,900 metres of pipeline, 19 stand posts with taps, and a well with a 2 HP electric submersible pump.



Water supply tap stand

The total cost was estimated at Rs250,000 to Rs300,000, and it was agreed that 30% of the cost will be paid by the community

in form of labour and local materials and the other 70% would be paid by the project.

Once construction started it became apparent that the more influential and powerful villagers wanted taps located in front of their houses. This created problems in laying out the pipe network, but was solved by negotiations through the women's self help groups established by the project in the village. It was decided by the community that least 20 houses should take water from each tap stand. To operate the system a community organisation, Samagra Jal Vikas Samiti (SJVS) was formed. This organisation collects a monthly charge from each household and pays for the cost of operation and maintenance.



Solar panels supplying power for pumping

The whole village was pleased with the operation of the system, especially women who had previously faced the problem of finding water for their families. Solving this problem gained the project credibility with the villagers and other project activities really took off. However the system could not be fully operated due to the unreliable supply of electricity. The high demand for power for irrigation pumps meant that the overall supply was inadequate. Moreover, as some farmers did not pay their bills for the power they had used, the whole village would get cut off by the electricity supply company.

The possibility of using solar power to supply electricity for the pump was suggested, and SDA approached the Arghyam Trust who agreed to fund a solar system. Solar panels were installed in 2010, and since then the water supply system has been running reliably and supplying 22 tap stands. SJVS, as well as managing the water supply system has constructed a cattle drinking trough at the edge of the village. To improve sanitation SJVS has promoted the construction of 170 toilets, 17 soak pits and 600 metres of drains in the village, and has also organized an awareness programme with school children on sanitation issues.

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