

**Prakratik Society, India**

**2004**



## **Biogas cooking stoves for villages on the fringes of the tiger reserve in Ranthambhore Park**

### **Summary**

The Ranthambhore National Park in Rajasthan, India, is the home of the endangered Indian tiger, and demand for fuelwood for cooking in surrounding villages puts great pressure on the park's trees. The Prakratik Society has installed 250 biogas digesters in villages on the park's fringes. The digesters use cattle manure to produce biogas for cooking, and thus save fuelwood. Other important benefits are a cleaner and safer fuel for cooking, and a valuable fertiliser from the digester output.

The Ashden judges found many exemplary features in this project. It provides both a sustainable cooking fuel and protects the local environment. Users are actively involved in the construction and upkeep of the digesters.

Unsustainable use of fuelwood adds carbon dioxide to the atmosphere, thus this biogas project also contributes to the reduction of climate change. The Ashden Award to the Prakratik Society has been generously funded by Climate Care, an organisation which helps companies and individuals to counter their impact on climate change by funding new projects to reduce the emission of greenhouse gases.

### **The organisation**

The Prakratik Society was set up in 1994 through the personal commitment of Dr Goverdhan Singh Rathore, a medical doctor who is the son of the first Director of the Ranthambhore Park. He was very aware of the poverty of villagers around the park, and the fact that they derived minimal benefit from the income brought in by tourism. He recognised that the future of both the villagers and the park requires opportunities for more sustainable livelihoods. In addition to biogas and agricultural work, the Society has built a hospital and school to serve low-income people, and works on health care, education and legal issues. It currently employs about 100 people.

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## **Context**

Villagers around Ranthambhore depend on fuelwood for cooking, and there is visible evidence from the deforestation all around the park that the demand far exceeds the sustainable supply. Wood is therefore taken illegally from inside the park's borders. With the local population growing at an alarming rate of 3.2% per year, the pressure on the park's fragile forests is increasing. This conflict of immediate needs for human survival with the preservation of a unique ecosystem has led to many difficulties, including litigation between villagers and the park over allegations of trespass for wood collection and animal grazing.

Meanwhile, the villagers receive little or no benefits from the large numbers of tourists who visit the park, and so have no incentive to refrain from damaging it - nor do they have any reason to identify with the future of the tiger.

## **Technology and use**

The use of cattle dung to generate biogas is well known in the Indian subcontinent. The digesters used at Ranthambhore are of the Deenbandu model, which was developed by AFPRO in Delhi in 1984 as an improvement on the Janta model. The body of the digester is a round tank, with a volume of about three cubic metres. This is built from bricks and mortar and sunk in a pit in the ground. The inlet to the tank has a hand-operated rotator, which is used to mix cow dung and water. The slurry of dung and water ferments in the tank, and the pressure of the biogas produced pushes the slurry out of one end. The gas is piped from the top of the tank to a biogas cooking stove and biogas lights. The slurry can be collected and used as fertiliser.

Reliable technology is an essential part of the project, but this alone will not guarantee the long term use of biogas. There are many examples of programmes elsewhere where biogas digesters have been installed and later abandoned. The Prakratik Society has taken great care to select families for whom biogas technology will be useful, to gain real commitment from the users, and to provide long term follow up through its field workers.

The selection of families is based on the number of cattle that they own, since the digester needs the manure of at least four cattle to operate well. These families are in the middle-income group, which represents about half of the population of about 200,000 people in the 96 villages around Ranthambhore. The project aims to build at least one digester in each village, so that all villagers have the opportunity to see the technology in action. That this is an effective means of promotion is shown by the large number of villagers who have requested biogas after seeing its benefits in action.

Families must provide both money and time for the construction of their digester. This user involvement is a key factor in the success of the programme. The financial contribution has been gradually increased from £6 (500 rupees) to £19 towards the total cost of the plant (which, excluding the family's own labour, amounts to around £75). In addition, the family must provide unskilled labour to assist a trained mason with the construction of the plant.

The Prakratik Society employs two full-time field workers to visit the digesters on a regular basis, make sure that they are working properly and promote their use to other families. The biogas programme started in 1999, and by March 2004 had installed 250 digesters.

## **Benefits of the project**

A major benefit is the reduction in the consumption of fuelwood. It is estimated that the average daily consumption of fuelwood is about 1.1 kg per person, so a digester used by a typical family of six people saves about 2.4 tonnes of fuelwood per year. The 250 digesters installed therefore save together about 600 tonnes of wood per year.

Biogas is a much cleaner cooking fuel than wood, and the reduction in smoke in the kitchens is immediately apparent, as is their general cleanliness. Not so apparent, but also important, is the reduction in the emission of carbon monoxide and other products of incomplete combustion. Smoke inhalation in third world kitchens is a major cause of eye disease, respiratory illness and premature death. Users also speak of their relief at not having to make extensive journeys into the park for wood, which sometimes involved a round trip of 20 km.

By replacing the largely unsustainable use of fuelwood, the digesters also cut carbon emissions. Carbon monoxide and other products of incomplete combustion are also greenhouse gases. It is for this reason that the Award to the Prakratik Society was sponsored by Climate Care, which estimates that the emission savings from each digester are equivalent to about 4.7 tonnes of carbon dioxide per year.

Each digester requires about 14 days of skilled labour from a mason, so the 250 installed to date have provided about 10 person-years of skilled work. The programme also employs two field workers.

Prakratik also supports better husbandry of cattle, through a programme of artificial insemination and the encouragement of tethered feeding for cattle for certain periods. This has increased milk production as well as maintaining an accessible supply of manure to run the digesters. The output slurry from the digesters is an excellent organic fertiliser, which produces good crops and saves money on purchase of fertiliser, as well as increasing income. The sale value of from each digester is about 10,000 rupees (£120) per year.

The Society has also started a tree nursery to provide seedlings to be used in agroforestry in the villages around the park. This will provide a supply of fuelwood for those who do not have access to biogas digesters, timber for furniture and other uses, and fodder for cattle.

## **Management, finance and partnerships**

The Prakratik Society is fully responsible for the management of the biogas project. Prakratik's funding comes from a number of charitable donors and aid organisations, including the David Shepherd Wildlife Foundation; the USA National Fish and Wildlife Foundation; the Jake Eberts Foundation; and Irish Aid.

Prakratik works closely with local NGOs involved with afforestation and development of employment through local handicrafts. It also co-operates with NGOs around other National Parks in India, to encourage the development of similar programmes. One aspect of this is to encourage visits to Ranthambhore and its surrounding villages by school children from other park areas, so that they can learn from local children what has been achieved.

*This report is based on information provided to the Ashden Awards judges by Prakratik, and findings from a visit by one of the judges to see their work.*

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