



**“Energy enterprises for development in rural areas:
the case of clean cooking fuel”**
(Chief sponsor: WISIONS
- Project SC 029)

Progress summary – June 2007

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1. Our approach

The main objective of the project is to demonstrate a village-based multi-functional enterprise that combines improved energy services with income generation and employment opportunities, as well as efficient and sustainable resource use. Such a synergistic approach is vital to effectively bringing about rural development.

Specific activities of IEI's project team include:

A: General

1. interacting with regional organisations for local information and drawing up village selection criteria,
2. conducting a survey of villages and, based on this data, selecting the village (with about 50 families¹) for the energy enterprise,

B: In the village

3. establishing the *grama vikas sabha* (village development assembly) in the selected village and signing an agreement for the establishment of the energy enterprise,
4. acquiring land in the village and designing and constructing the dairy structures,
5. planning the location and design and constructing biogas plants at appropriate places,
6. purchasing cattle, and establishing the dairy system (including arrangements for the collection and sale of milk),
7. establishing the gas-distribution system and providing all homes with biogas,
8. establishing and monitoring the management and accounting systems.

This summary report is based on the completion of activities 1 to 3, and on-going activities 4 and 5.

2. Interaction with local organisations and criteria for village selection

A rural development project should target families with lower incomes, preferably those not already getting support from state-sponsored schemes but who are willing to participate in a co-operative venture. However, economic data on rural households is limited. Further, the existence of social or communal problems in village communities could prevent effective co-operation, but such difficulties would not be immediately apparent to visitors. The purpose of our interaction with local organisations was therefore to informally obtain information on the villages.

In addition to information on economic and social issues, on the technical front, information was obtained on the field performance of biogas plants of different designs and also on dairy co-operatives.

¹ The selected village *Chikkanna Devara Hatti* (Section 3.2) has 47 families.

Based on our own experience of rural programmes as well as information collected through our surveys, we have drawn up a list of criteria for selection of a village for establishing an energy-enterprise. These include general criteria (such as the average family income and the proportion of families using clean fuels) and those pertinent to a dairy-cum-biogas-delivery system (such as availability of water, co-operatives already in operation, connectivity, etc).

3. Village selection

3.1 Surveys

In order to select a village at which the energy enterprise would be established, a personal field survey of several villages was conducted. To facilitate travel to and from IEI's office and also for the advantages of construction material and skilled labour, districts near Bangalore were selected. In each case IEI staff, accompanied by one or more persons associated with the village, conducted an informal survey. The data collected were used for assessing the suitability of the village in terms of the criteria drawn up earlier in the project (Section 2).

3.2 The selected village

On the basis of the information collected during the village surveys and the selection criteria already described, the village we have chosen for demonstrating the energy enterprise is *Chikkana Devara*² *Hatti* earlier known as *Gollara Hatti* (inhabited by the “*Kadu Golla*”, a traditional shepherd tribe) in Tumkur *taluk*,³ of Tumkur district in the state of Karnataka (Annexe 1). This village of traditional shepherds has a total population of 238 people. Most of the families appear to lack income and amenities. Only one family has access to clean fuel but even that family does not use it regularly because of the higher cost and difficulty of obtaining supply. Hence, all the families are dependent for stove fuel on biomass -- twigs and dry leaves -- collected from the forest. Unlike in some other villages, easily-available crop residues are not available, so that tedious fuel collection is required. The majority of families (i.e. 38 of the total 47) depend on daily wage labour for their sustenance. There is little scope for improvement in their prospects as most have not had education. Furthermore, most families are landless. Even where available, the landholdings are too small to be economically viable, so that the owners would not be considered credit-worthy for loans from financial institutions. In addition, as they have not been classified as needing assistance in the national Scheduled Caste/Scheduled Tribe categorisation, they have not been receiving much state assistance. Hence, an energy-enterprise such as we are establishing there would be impossible for the people without the assistance of this project. (Very few can afford cattle and free fodder is inadequate, resulting in very limited scope for a dairy). In view of this project's requirements, the village is also suitable because of the availability of unused land and water supply.

² This is the name of the local deity.

³ A *taluk* is an administrative unit of a district, in turn a unit of a state; it usually consists of about 100 contiguous villages with a combined area of about 1,000 km².

In contrast, most of the other villages in the region did not seem as much in need of economic/financial assistance (in terms of their occupations, landholdings and other possessions) or clean fuel (as more families per village already had LPG or biogas).

However, it is important to note that most villages have some proportion of very poor families who would benefit from such projects, and varied sources of raw biomass can be obtained, so that replicating this rural energy-enterprise model will be feasible in many other villages.

4. Activities carried out in the selected village

4.1 Discussions with the people's representatives

Meetings were held with groups of people in the village, so as to ensure that the planned activities of the enterprise and their costs/benefits were understood and accepted by all the people. Queries regarding costs and responsibilities were answered. Benefits, as perceived by the people, were chiefly employment and easy-to-obtain/use cooking fuel.

4.2 Formation of and agreement with the *grama vikas sabha* (GVS)

A *grama vikas sabha* (GVS) or village development assembly represented by one member of every household, was formed with the guidance of IEI. This ensured a democratic involvement of all the families. (It will be followed by the formation of the village energy enterprise (co-operative) committee represented by five people -- President, Secretary, and three members, who are elected/nominated by the GVS).

A formal agreement regarding the proposed energy enterprise was drawn up between the GVS of the beneficiary community -- the people of the village of *Chikkanna Devara Hatti*, and the implementing organisation -- the regional branch, in Bangalore, of the International Energy Initiative (IEI).

5. Activities in progress

As indicated in the project implementation (timeline) chart at the beginning of the project, the main construction work is now taking place. This includes the construction of the dairy and the biogas plants.

5.1 Construction of the dairy

The dairy will comprise four cattle sheds, fodder storage area, water facility, and an office. A detailed civil engineering plan of the layout of the proposed dairy has been prepared.

Cattle sheds and fodder storage: To accommodate an estimated 120 cows, we have designed a dairy consisting of four cattle sheds. Each shed, measuring 65 ft x 35 ft, is intended for 30 cows. A fodder (hay and cattle-feed) storage unit will be built inside each shed so that there is adequate food for the cows even if an unforeseen delay in fodder supply occurs. Each shed will be provided with long troughs (gutters) for feed and water. A separate calving shed of 10 ft x 65 ft will be constructed for keeping those cows expected to give birth and those who have recently given birth.

Water facility: An overhead tank of 10,000 litres capacity will be constructed at the dairy. Water from the village tank will be connected to this dairy tank. This water will then be fed to all the cattle sheds by gravity through appropriately designed pipelines.

Office: A small office has been constructed adjacent to the dairy under construction.

5.2 Construction of biogas plants

A civil engineering survey was conducted, citing the location of each house (some housing more than one family). The number of people residing in each cluster of houses was ascertained.

Simultaneously, information on the food customs and the consequent cooking requirements was obtained. These details were then used to estimate the hours of biogas fuel requirement and thereby, the size and number of biogas digesters.

Based on the village housing layout, and the daily requirement of biogas for cooking obtained during the village survey, we have identified the location of eight biogas plants, six of 8m³ capacity and two of 10m³ capacity, serving the cluster of families (the capacity is determined based on the number of people and the number of families being served in a particular cluster).

IEI's past experience with biogas technology at rural centres as well as reports of other experiences of biogas use for cooking have led to the selection of the floating-drum biogas digester model. The gas-holders for these plants are now under construction, according to the engineering drawings prepared. Adequate precautions are being taken with respect to the design and fabrication of the gas-holder, to prevent future problems (such as corrosion and mis-alignment).

Annexe: The selected village *Chikkanna Devara Hatti*, ($77^{\circ} 2' E$ longitude, $13^{\circ} 7' N$ latitude), *Tumkur taluk*, *Karnataka state*, *India*





