

ENERGY ENTERPRISES FOR DEVELOPMENT IN RURAL AREAS: THE CASE OF CLEAN COOKING FUEL

Location:
Chikkana Devara Hatti,
Karnataka, India

Duration:

Partners Involved:
International Energy
Initiative (IEI): Asian
Regional Energy
Initiative, Bangalore

Developing countries like India have millions of rural families who lack basic amenities including clean and efficient cooking fuel. Several barriers to improved energy services exist, especially the families' inability to afford the costs. Therefore, access to improved energy services is often lacking, particularly in the case of domestic cooking that does not yield financial returns.

To overcome this and other barriers, an energy-development approach has been adopted by this project. The International Energy Initiative (IEI) established an „integrated clean energy, rural development enterprise“ in the village of Chikkana Devara Hatti in the state of Karnataka, India. This enterprise consists of a dairy for income generation and associated household biogas supply systems, replacing the existing traditional biomass stoves.

It is the objective of this project to demonstrate the development and sustainable running of such an enterprise and to use this experience for further work in the field.

TECHNICAL ISSUES

The estimated biogas requirement of 0.75 m³ (or 750 litres) per family was doubled, to provide for increases in residents and/or cooking time. To meet the needs of all the village families, the total biogas requirement was divided between several shared biogas digesters, as these were estimated to be the most effective, considering both construction costs and operational efficiency.

Based on this, eight biogas plants, six of 8m³ capacity and two of 10m³ capacity were constructed. The cylindrical pit-floating-drum biogas digester model was chosen, as these plants are proven to be durable with minimal maintenance.

The biogas plants are directly fuelled from the dairy. Dung from the cattle sheds is collected regularly during the day and stored in large covered bins. Daily fuelling consists of 150 kg each of dung and water for the six digesters of 8m³, and 200 kg each of dung and water in the two digesters of 10m³.

To deliver biogas to every household, a min-grid piping system has been created between each digester

and the group of households it serves. Each kitchen is provided with a double-burner stainless steel stove. Based on the suggestions from the users regarding their cooking times, gas is being provided for three hours every morning and one and a half hours every evening.

IMPLEMENTATION STRATEGY

To ensure democratic involvement of all the families (47 families, total population 238), a grama vikas sabha (GVS) or village development assembly (represented by one member of every household) was formed with the guidance of IEI. This was followed by a formal agreement between the GVS of the beneficiary community and IEI regarding the proposed energy enterprise.

An accounting system supports running the dairy. The system consists of daily recording of inflows and outflows by the supervisor at the village enterprise office and weekly verification and electronic recording of the relevant details by IEI. In addition, daily communication between the supervisor and IEI ensures that any problem is dealt with as soon as possible. This way of handling is quite time-consuming, however, it secures a proper operation.

BENEFITS

Social benefits

- Users are very satisfied with the energy service
- Ending of fuelwood collection supports poverty reduction and empowerment of women
- The use of biogas increases the indoor air and improves health
- The project led to income generation

Environmental benefits

- The reduction in use of fuelwood leads to lesser land use
- A switch from fuelwood to kerosene / LPG can be avoided
- The use of biogas leads to a reduction in emissions. If such village enterprises could be replicated to 10% of existing village dairy cooperatives in India, there could be a reduction of 11.3 MtCO₂ and 27.5 thousand tonnes of CH₄.
- Availability of improved natural manure reduces the need for chemical fertilizer

REPLICABILITY

This project was designed as a demonstration project with the clear aim of replicating such a model or variations in other villages in India.

LESSONS LEARNED

No major obstacles occurred through the implementation phase of this project. Most relevant problems have been of financial nature, as prices of raw material for the construction of the dairy and prices of grain and therefore of fodder increased, and lower exchange rates led to a lower grant payment. The financial constraints led to a struggle of the enterprise to become economic independent from financial support. Some amendments had to be taken: As current operating costs are higher than expected, packaged feed was replaced with nutritious but less expensive natural fodder. In future implementations of such a project model, provisions will be made to cultivate own fodder right from the start.

