Improving the winter livelihoods of rural population in the cold desert of Western Indian Himalayas

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1. Introduction

The project *"improving the winter livelihoods of rural population in the cold desert of Western Indian Himalayas through dissemination of energy efficient housing"* covers three districts of Leh, Kargil and Lahaul & Spiti of Jammu & Kashmir and Himachal Pradesh states in India.

The environment of these high altitude cold desert areas is very harsh: severe temperatures in winter, a short frost-free period, very low rainfall and scarcity of vegetation. Villages lie between 2800 and 4600m above sea level. The region is isolated not only geographically, with roads remaining closed for six months a year, but also economically with limited access to the markets of mainland India. The 300,000 inhabitants of the target area are also culturally isolated due to its Tibetan heritage. The population is largely rural, living in isolated villages, depending on agriculture as a subsistence activity. Their lives are mainly aimed at surviving the long and harsh winters.

Energy vulnerability is widely recognized as a factor reinforcing poverty. The local populations do not have access to energy facilities and depend on biomass based energy inputs. Shortage of fuel wood and the high price of imported conventional fuels result in a situation of high energy vulnerability. Women and children have to devote around two months per summer to fuel wood gathering. Traditional houses are thermally poorly efficient and room temperatures fall below -10°C in winter, resulting in

unhealthy living conditions. By reducing the energy vulnerability, improving the heating conditions, reducing the unhealthy indoor air conditions, the project supports the progress of the communities towards development.

The project is effective in Leh district (Nubra, Sham, Changthang, Leh area) and Kargil district (Zanskar, Drass, Suru valley, Kargil), in Jammu & Kashmir state; and in Lahaul and Spiti district in Himachal Pradesh state.

2. Objectives of the project

The project aims at disseminating energy efficient housing in these regions, and therefore improving winter livelihoods of rural population in the cold desert areas of Indian Himalayas.

The specific objectives are:

- Integrating energy efficiency techniques in 1,000 private and community buildings
- Organizing sustainable networks for dissemination of energy efficiency measures
- Enabling income generation activities in the newly warm houses
- Reducing the pressure on local and global environment.

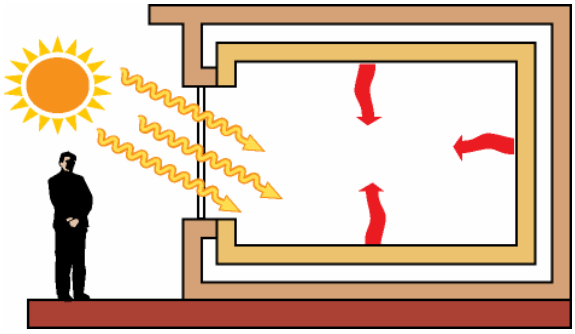
3. Integrating energy efficiency in domestic and community buildings

3.1 What is a passive solar house?

Passive solar house aims at taking advantage of solar radiation during the cold season to heat the inner space of a building. Through south facing walls and large south facing windows the house collects solar radiation during the day and enables the rooms to remain warm both during day and night.

Four factors work together to make a passive solar house efficient:

a) Collection of solar radiation during the day
b) Storage of the heat collected from the solar radiation during the day
c) Release of the heat inside the building during the night
d) Insulation of the whole building to retain the heat inside the building as much as possible

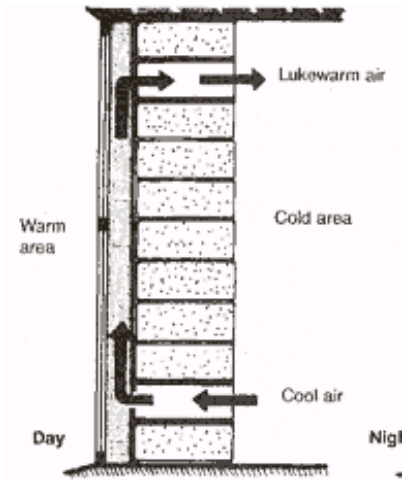


3.2 Passive Solar Gain

The orientation of the house must be south-facing, and it should receive at least six hours of sun in a day, to be very effective. Three different technologies of solar gain are promoted by the project: Trombe wall, Attached Greenhouse and Direct Gain.

3.2.1 Trombe wall

The southern wall is painted black and is covered with double glass to absorb maximum heat during the day. This heat is transferred slowly into the room and is released during the night.



The air in the space between the glass and wall is very hot; this hot air circulates inside the room through the holes that are located at bottom

and top of the wall.

3.2.2 Attached Greenhouse or veranda

A greenhouse is attached to the house on the southern side. Heat is transferred to the adjacent room by convection and radiation through the window, and by conduction through the wall. People can carryout handicraft activities in the greenhouse when it is nicely warm during the daytime.

3.2.3 Direct Gain

A large double glass window is integrated on the southern side of the house to heat the room by radiation. During the night, thick curtains are used to reduce heat loss.

3.3 Thermal mass and insulation

During the day heat is stored in the properly insulated roof, walls and floor, which is released during the nighttime. The walls, roof and floor are properly insulated. The insulation material could be straw, sawdust or any other local material.

4. Implementation methodology

4.1 A dynamic NGO network

A network of five Ladakhi NGOs and one European NGO, work together in implementing this project. The local NGOs are organized into as resource NGOs and proximity NGOs. A resource NGO, experienced and skilled for an activity, elaborates a methodology and advises other NGOs. Proximity NGO, technically less experienced but with a trustful relationship with the communities in its working area, takes advantage of resource NGO's expertise to implement the project. A resource NGO can also implement the project as proximity NGO in

its own area. GERES, a European NGO, coordinates the network and elaborates the implementation methodology with the resource NGOs.

4.2 Two phases – demonstration and diffusion

The project is divided in two phases; a demonstration phase and diffusion phase. Two different selection methodologies have been set up for the two phases.

The demonstration phase targeted key persons of the community who were able to demonstrate the interest of the innovation: one demonstration house has been installed in each village, making 100 demonstration sites.

In the diffusion phase, the household selection was based on technical, social (0,5 €/day/capita) and motivational criteria such as: future or existing house had to be south facing, with enough sunny hours and no shade, the owner's agreement to invest by participating to the construction cost, one adult family member has basic handicraft skills, the motivation to incorporate energy efficiency measures in building and to assure maintenance.

4.3 Organising sustainable networks for energy efficiency measures

A main objective of the project is to set up all required conditions to insure a large and sustainable dissemination of energy efficient housing techniques after the project period. In this view, the project aims at organizing and strengthening two types of sustainable networks at different levels to allow a large diffusion of energy efficient housing measures.

4.3.1 Training and organising artisans as service provider

100 masons, carpenters and 15 rural engineers are trained and certified as service providers for renovation and construction, based on energy

efficiency techniques.

4.3.2 Setting up 15 grassroots level networks

These networks, set up at the level of village clusters, play a very important role in ensuring grassroots' participation in the project as well as acting as a pressure group to advocate policy with the district authorities.

5. Impacts

5.1 Environmental and energy impacts

The fuel consumption of households for space heating has decreased in winter by 70% or 2 tonnes of biomass is saved. 95% of the PSH owners stopped collecting bushes which are otherwise uprooted, hence no regeneration. The indoor atmosphere of the building is improved; people live in comfortable temperature without much heating. The temperature inside the room is 20°C more than the outside temperature and is always above 5°C.

5.2 Social impacts: Increased household and community centre activities

The warmer atmosphere in winter invariably increases the duration of activity, which up to now is limited to the sunniest hours (2 hours per day). As a consequence, the inner atmosphere becomes much more comfortable from morning to evening (6 pm). The supplementary time is used to practice winter activity i.e. handicraft production. At the household level, social relations have increased as families have more comfortable space to receive family relatives, neighbours and friends. In addition, it was observed that children spend more time to read or to study when the house is warmer. The time for the religious prayers has increased as well. The community centres are more open to receive

members who can conduct meetings or other social affairs.

5.3 Financial impact

As the fuel consumption is reduced, the amount devoted to fuel wood collection has also decreased. In the areas where fuel is bought (due to scarcity of natural resources, no subsidy) the money saved is 50 euros per winter.

5.4 Health and hygiene impact

The less frequent use of heating stoves reduces the toxic gas emissions and improves the indoor air, reducing the chances for cases of respiratory infection and associated diseases. Children and expecting/feeding mothers are the most significant beneficiaries of this improvement. Adults suffering from arthritis are relieved with the warmth in the room. As the room temperature is controlled, women no longer have to use heating/cooking stoves and have shifted to more efficient means of cooking, like gas stoves. Thus the indoor air is improved even more.

5.5 Gender impact

The improvement of indoor atmosphere has a clear direct impact on women's living conditions. Since women are the one's performing much of the household activities, the usual rigidity of domestic tasks (clothes washing, cleaning, cooking and looking after children) is relieved to a great extent. In addition, the arduous task of collecting fuel wood for women and children are immensely relieving: in some areas the time of collection of fuel wood required for cooking purposes are reduced from two months to few weeks.

6. Project Funding

The project, lasting from 2008 to 2012, is funded by the European

Commission with co-funding from the French Fondation Ensemble, Gaz and Electricity of Grenoble (GEG), the Lord Michelham of Hellingly foundation and other private donors. It involves a staff of more than 60 persons and benefits directly to 1.500 families or 10.000 persons.

7. Project Partners and contacts

1. Groupe Énergies Renouvelables, Environnement et Solidarités (info@geres.eu)
2. Ladakh Ecological Development Group (info@ledeg.org)
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5. Students' Educational and Cultural Movement of Ladakh (publication.info@secmol.org)
6. ECOSPHERE (ishita@spitiecosphere.com)