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GERES  
is holding a seminar:  
**"Energy and Climate Change in Cold Regions"**  
[21-24 April 2009]



*Photo: Olivier Follmi*

**A basis for regional cooperation in Western Asia**



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French Ministry of Ecology and Energy, Sustainable Development and Spatial Planning

French Global Environment Facility (FGEF)

German Technical Cooperation (GTZ India)

Ensemble Foundation

Renewable Energy & Energy Efficiency Partnerships (REEEP)

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## **Energy and Climate Change in Cold Regions**

**International seminar: 21-24 April 2009**

**A basis for regional cooperation in Western Asia**

Information exchange and endorsement of **best energy technologies** for development projects, designing strategies for a joint climate change adaptation policy—such are the objectives of the seminar to be put on for stakeholders in cold regions of Asia, to be held in **Leh** (Ladakh, Himalaya), from 21 to 24 April 2009.

Representatives and experts from **ten countries** (Nepal, Bhutan, India, Afghanistan, Pakistan, China, Mongolia, Tajikistan, Uzbekistan and Kyrgyzstan) will spend four days conferring around the table in order to set in motion a long-term collaboration process. They will share their successes and good practices regarding social, economic, and environmental impacts in development projects highlighting energy efficiency and adaptation to climate change in Asia's cold regions.

**Put on under the auspices of GERES** (Groupe Énergies Renouvelables, Environnement et Solidarités), **this gathering addresses two major sets of issues:**

- **Development issues:** In this zone where energy needs are greater (in particular for home heating) and where resources are increasingly scarce, it is urgent to manage energy and promote renewable energies. Besides, given the limited land availability, it is also necessary to give added value to local products by facilitating access to modern energy sources.
- **Environmental issues:** Deforestation, local and global pollution, climatic warming and their impacts on the region (dwindling resources, changes in monsoon patterns) all call for action to help human communities to adapt themselves.

Therefore, the seminar puts forward a purposeful international approach to promote information exchange and to design a series of practical recommendations to be used in methodologies and policies adapted to the local contexts of these regions.

The agenda includes expert speeches and workshops on the following themes:

- Impact of energy efficiency projects on development.
- Strategies to assist local communities in adapting to climate change.
- Funding alternatives (role of institutions, carbon finance).

The impetus and influence provided by GERES in the zone have been demonstrated over and over by its presence now spanning over 20 years and the completion of many projects that have improved living conditions for local communities. Among the most remarkable, we should mention the micro economic activity development projects with a strong renewable energy component accessible to the people, along with the dissemination of bioclimatic architecture in dwellings and service buildings (hospitals and schools) to improve living conditions in the Himalayas of Nepal, Afghanistan and China. **(A video presentation of these activities is available on DVD).**

The "Energy and Climate Change in Cold Regions" Seminar will begin with contributions from key players in mountainous region development, under the patronage of Olivier Föllmi, a photographer of international renown for his many pictures and books on the Himalayas as he lived there for over 20 years.

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## A WORD FROM OUR SPONSOR

### OLIVIER FÖLLMI

"Thirty years ago I made my way on foot through the valleys of Zanskar, an isolated place as snow falls eight months of the year. I discovered a completely different world, one living in virtual self-sufficiency from barley crops and animal husbandry.

*The Zanskaris seemed happy as they had learned to accept the cause of their suffering. But the daily living was basically one of drudgery: fetching water from the stream, collecting dung, making hay, ploughing fields, climbing the mountains for sticks and twigs. When the long winter set in, they would spend months waiting in a dark room nestled between the stables where the temperature only reached zero degrees at best.*

*I spent 20 years going in and out of these enchanting valleys and spent four long winters there, six times travelling the only road available in winter, a frozen river winding for over a hundred kilometres through the canyon. Among the Zanskaris, whose compassion and humility rekindled my love for people, I especially appreciated their respect for nature, with which they live in symbiosis. They placed their divinities everywhere: on the mountains, in*

*the streams, under the ground, in houses, along the roads—because the world is sacred.*

*As the years trickled by, a road was built in order to allow truck access to Zanskar, generating business and bringing new consumer goods pandering to the desire of the new communities that settled there. The road had brought modernity to Zanskar, albeit very relative, and had greatly improved the life of the villagers: better hygiene, new schools, clinics, interchange and an openness.*

*But when modernity creeps into these remote valleys, it must bring along with it new alternatives in order to protect the delicate balance and avoid exhausting the local natural resources. It must also come gingerly onto the scene, duly respecting the tradition—which is a treasure of a sacred world. That is fundamental in what GERES is doing. GERES lends a hearing ear, builds bridges with mankind by merging know-how, technology, and experiences, which is essential in building a lasting future. It links the common sense of the men of the plain with the wisdom of the gods of the Himalayas."*

Olivier Föllmi



Photo: Olivier Föllmi

## Biography



**A successful author of more than thirty photographic books translated worldwide, photographer Olivier Föllmi enjoys an international reputation. His incredible knowledge of the Himalaya, along with his humanistic approach to this most isolated peoples, make him a reference point for photographers on their way through the Himalayas. So it was only natural for GERES to ask for his artistic contribution in endorsement of the seminar.**

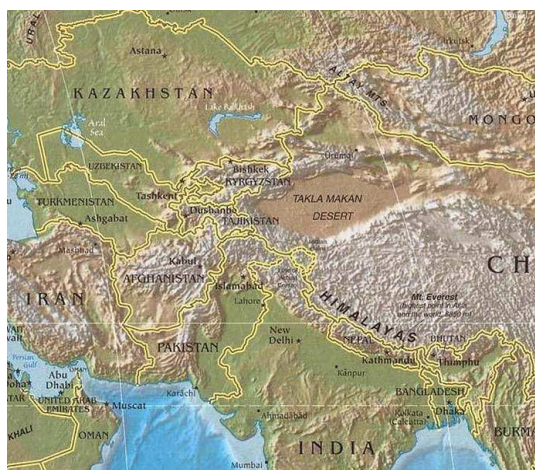
Born in 1958 of a Swiss father and French mother, Olivier Föllmi discovered the Himalayas when he was 17 years old. He has been a trekker of the remote valleys for 25 years, becoming a specialist in Tibetan village culture. Switching jobs like lecturer, photographer, and film maker, he has co-directed two films in the Himalayas for Canal Plus.

Back in 1989, he started on the road to international acclaim for his award-winning photos with Word Press Photo. He has done feature stories the world over for *Géo*, *National Geographic*, *Stern*, *Epoca*, *Aéronne* and *Paris Match*. In September 1999, he was nominated for the **Visa d'or** award at the 11<sup>th</sup> International Festival of Photojournalism in Perpignan. Each year his photos are auctioned off at Hôtel Drouot. He has written 18 books and two adventure stories. With his wife Danièle, they have adopted four Himalayan children and founded HOPE (Humanity Organization for People & Education), a humanitarian association in Leh.



# I. WHY HOLD A SEMINAR IN THE COLD REGIONS OF ASIA?

## Context and issues in the cold regions of Western Asia



At least 50 million people live in Asia in cold climates where temperatures can plummet to  $-20^{\circ}\text{C}$  in winter. Of these 50 million inhabitants, one third live under the poverty line of 1 USD/day, most of them in countries of the ex-CIS but including Afghanistan, Mongolia, and certain regions in emerging countries (India, China).

Forestry resources have all but disappeared in most cold regions where only a few substantial stands of trees remain. Many families use dung for cooking and heating or are forced to spend hundreds of hours a year collecting dead wood. Mountain passes are closed for six months of the year, which prolongs the isolation. Vegetation and biomass are becoming scarce. Further, the political context is not conducive to the emergence of comprehensive

solutions to improve the living conditions of these people. In a zone where border conflicts have been going on for half a century, the cold sub-regions of Asia are experiencing huge challenges on their way toward development. **The consequences on man and the environment are tremendous.** Poverty, extreme climate and degraded environment are regular causes of tragedy (nomads from Chang Tang, Afghan refugees in the camps). With no forest cover, soil erosion is exacerbated, with reduces agriculture productivity.

### A new deal: climate change



Photo: Olivier Follmi

There is no uniform pattern of impacts from climate change in the cold regions of Asia, although the following trends are noted:

- Glaciers in the Himalayas are receding faster than anywhere else in the world (70 m per year). There is serious threat to the water resources in the region.
  - Along with the shrinkage of the glaciers, snowfall has become less abundant. The forecast shortage of water is also a threat for traditional agriculture.
  - The rainfall regime has become unsettled: Increasingly violent monsoons are coming up into the Himalayas, damaging crops and habitat alike, and accelerating erosion.
- But the change has brought about some positive things:

Due to the higher temperatures, wheat can now be grown at higher altitudes (100 m higher) and the vegetable growing season out in the open field has become longer.

Another challenge now facing people living in cold regions is to adapt to these new conditions.

### Possible responses:

- Despite cold and rain, the sub-region enjoys an exceptionally high sunlight ratio of which advantage can be taken. GERES' 25 years of experience in these disadvantaged lands has led to a number of observations and technology success stories with the communities. Energy-efficient technologies using renewable energies are now widely subscribed to by the target communities.
- The stakeholders involved and the many other good practices they advocate in all areas of energy and development have been inventoried and will be presented at the seminar.
- Skills allowing adaptation to climate change are far less developed. Pioneers in the field will outline their initiatives (awareness raising or direct intervention). Multilateral exchanges will take place on ways of involving the communities, summoning potential human and financial resources, etc.

Ultimately, GERES hopes that these interchanges will enable the many borders in the region—both natural and political—to be crossed.

## Seminar objectives

### What is on the seminar agenda?

Share experiences, good practices and policies on energy's themes which have been developed over the last 10 years by movers and shakers in the field of development.

The seminar will also provide an opportunity to share analytical thinking that has been done on climate change adaptation strategies.

### Anticipated outcomes

1. Collate good practices and the lessons learned.
2. Review the impacts (economic, social and environmental) of climatic change on the means of subsistence in the communities.
3. Identify information dissemination processes and the prerequisites for project replication.
4. Strengthen knowledge interchange among development stakeholders (development agencies, private sector, local communities, NGO's, bi-/multi-lateral organisations, etc.).

### Working themes

#### I. Impacts of energy projects in development

Decentralised rural electrification.  
Energy and agriculture.  
Energy and productive activities.  
Energy in public buildings.  
Energy and households.

#### II. Strategies to help local communities adapt to climate change

Climate change and natural resources.  
Climate change and livelihoods.  
Resilience to extreme weather events.



Photo: Olivier Follmi

#### III. Financial issues

Role and experiences of financing institutions in the implementation of energy-related development projects.  
Role of the carbon market in catalyzing revenues for clean energy investments.  
Role of civil society in capitalizing on the carbon market.

## Long-term ambitions: A joint strategy



GERES' experience over the last 20 years includes a number of success stories. Technological coaching has made it possible to garner the firm support of communities who quickly saw the advantages and value in it for them both for improving their living conditions (comfort, health) and increasing their incomes (revenue-generating activities). In fact, GERES feels that the time has come to showcase these processes as well as how they can be transferred.

That sums up what the seminar is all about.

80 participants and experts will be invited to present their experiences, to share observations in their work field, exchange technology "that works," and get value from good practices.

**This is the first time that a meeting** of this scope on energy in cold regions is organised at the international level. The ambition is of course to lay the foundation stone of a work to build. It is strongly hoped that the participating countries and stakeholders will keep on with the interchanges and in this way work together to come up with a regional strategy for cold regions that will provide a basis for actual initiatives in the concerned areas.

## II. Technologies developed in cold zone projects

Since the mid-1990's, GERES has developed energy-efficient technologies using renewable energies in a two-pronged approach:

- to limit energy consumption in habitat while improving the comfort level (solutions have been found for domestic housing as well as for public buildings).
- to develop new economic activities which are controllable by the communities. Such activities improve their food security and expand their sources of income. For the activities involved, solar greenhouses for vegetable growing are a major contribution to the fight against poverty. Moreover, this latter component is now of significant assistance to the communities as they adapt to climate change.

### Bioclimatic architecture



Photo: Olivier Follmi

A lack of funding, available materials, or skills often results in a problem of poor quality buildings in developing countries. In cold regions, the thermal insulation of buildings often proves to be far less than adequate. Additionally, in order to heat a building, payment must be made for fuel and/or time spent to go out and gather wood.

Furthermore, the fuel used for heating may have an impact on the environment when the fuel is sourced from the non-renewable biomass. Enhancing building energy efficiency and thus cutting down on the need for fuel is a significant challenge for developing countries. For this reason, bioclimatic architecture is

of particular interest in cold regions. With upstream planning of the building's physical orientation, its design, and insulation, it is possible to reduce the need for heating energy and thus scale down fuel consumption. Bioclimatic architecture can also make a building more comfortable to be in and healthier for its users.

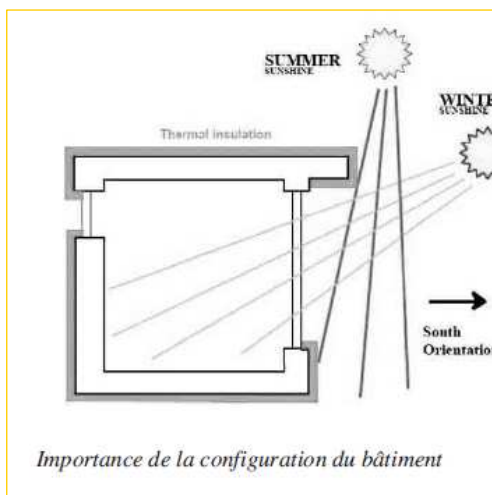
For public (or general service) buildings and rural dwellings, two types of architecture exist. The challenges differ and require an appropriate approach but the overviews are the same.

Bioclimatic architecture is a way of designing buildings and improving the environment within them. This is accomplished by balancing the design and construction of habitat with the climate and environment, as well as the life pattern of their inhabitants. It can be used for many types of buildings, those in the construction stage as well as older buildings for which renovation is contemplated. It frequently involves a revival of ancestral concepts.

#### Operation

Bioclimatic architecture in cold climates makes it possible to achieve a saving in energy use by maximizing heat that can be harnessed from the sun and minimising heat loss. A number of technologies are available, but **the general principles** remain the same: **capturing and using energy from the sun, and conserving heat.**

Sun energy capture is optimised if buildings are designed asymmetrically to capitalise on their southern exposure and having large windows put in on that side, while limiting the northern exposure. The layout provides for larger rooms to be located to the south and secondary rooms to the north. Putting an "attached greenhouse" on the south side of a building can contribute to its passive heating with energy from the sun (see Case Study). Another arrangement is the "Trombe wall," a dark-



coloured wall covered externally with a double-glazed panel. Solar radiation passes through the glass and is absorbed by the wall. The wall picks up heat during the day and releases the warmth to the interior during the evening and night hours.



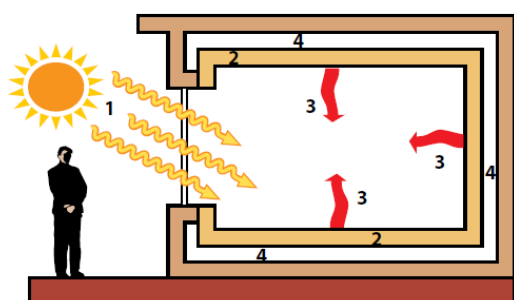
## Many applications in buildings, for agriculture and handicraft

GERES has worked to multiply the applications of the architecture and energy efficiency. Among the most relevant and most widely disseminated by GERES in cold regions are the following:

- Domestic buildings.
- Service buildings: schools, health care centres, hospitals, government buildings, training centres, etc.
- Buildings used for productive work: workshops for processing wool, solar sheep sheds, etc.
- Solar greenhouses for family-scale agriculture.
- Solar greenhouses for micro-entrepreneurs.
- Solar poultry houses (family-scale); solar poultry houses (micro-entrepreneurs).
- Solar drying facilities for micro-entrepreneurs.

### For domestic buildings

**The passive solar house** is a house built to take advantage of sunlight during the cold season to heat the interior space.



The principles of bioclimatic architecture are such that the passive house collects heat from the sun's rays during the day and releases it during the evening and night hours.

**Plans for houses** in Ladakh meet a number of criteria: technical (thermal efficiency), social (is in keeping with local architecture and the aesthetic tastes of the owners), and financial (commensurate with the investment capacity of the target group).

**The materials used** are virtually all local, commonly available at low cost. Thus, depending on the region,

walls are made of stone, mud brick or rammed earth. The roof is of local wood (rafters and joints of poplar or willow), the floor of packed earth.

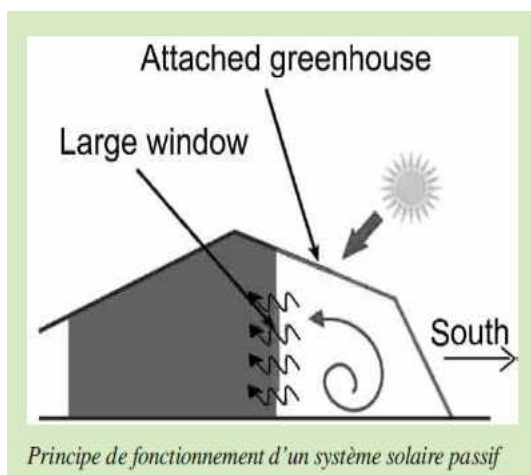
**Insulating materials** differ according to what is available: straw, brush, dung, sod, sawdust or wood shavings.

**Where renovation work is involved**, the southerly exposed wall is rebuilt using the passive solar technology chosen (enlarging the windows, double-glaze glass, "Trombe" wall or addition of an attached greenhouse). The roof, floor, walls, and any other windows are insulated.

**If a new room is to be added** (new house or additional room put on), the southerly exposed wall includes passive solar technology; the roof, floor, and other walls are insulated.

Insulation is done in such a way as to obtain the maximum thermal mass enabling heat to be stored and subsequently released. Fuel consumption is cut by 60 percent; the warm interior environment is conducive to handicraft making during the long winters.

### Attached greenhouses



A solar greenhouse is not freeze, despite an outside temperature of -20°C.

Three sides with a double brick wall in addition to roof insulation.

Plastic UV-resistant roofing to increase heat gains.

Fans to preclude need for heating.

Compost used to maintain soil fertility.

Passive greenhouses can be used for 4 to 6 crops per winter.

Over 300 kg / year of vegetables produced.

Money back on investment over 2 years.

1 hour a day to operate, 1 hour a month for marketing.

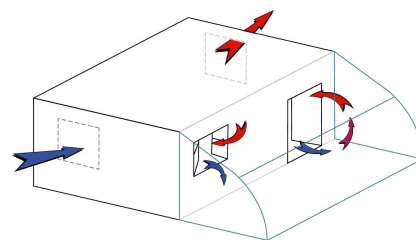
For the most vulnerable groups, a solar greenhouse enables a 50-percent hike in income.



## Poultry housing and sheep sheds



Poultry can be raised in this building even in winter time. Roof insulation and the double brick wall keep heat inside. The attached plastic sheeting increases heat, thus creating an environment in which chicks can thrive both day and night. A storage room is necessary for feed storage.



## Advantages and limits of renewable energies in cold regions

| Pros   | Cons   |
|--|--|
| <p><b>Energy available everywhere:</b> Most cold regions enjoy a high, continuous sunlight ratio.</p> <p><b>The technology is simple and easy to adapt:</b> People do not have to import costly precision equipment or call on outside technicians.</p> <p><b>Low investment:</b> Systems put up on site use materials available locally at low cost.</p> <p><b>Do it yourself:</b> The simple technology and low investment mean that the future user can build his own house.</p> <p><b>Minimal upkeep and monitoring:</b> The basic principle is stand-alone operation. Easily adapted to existing buildings.</p> <p><b>A response to air pollution problems:</b> Reduction of greenhouse gas emissions.</p> <p><b>Vector of new economic activities:</b> Solar greenhouses and poultry buildings enable new activities to be undertaken, including greenhouse vegetable growing, something heretofore unheard of in rural communities.</p> | <p><b>Mandatory add-ons:</b> For the impact to be significant, the introduction of renewable energies must go along with energy efficiency measures ("clean" fuel, thermal insulation, etc.).</p> <p><b>Energy efficiency impact is greater for new buildings,</b> whereas the greater need is to enhance the energy efficiency of already existing structures, an area in which the overall energy challenges are greatest.</p> |

## Electricity applications

Electricity is a major contributor to development: expansion of handicraft making and improvement of basic living; diversification of solutions available allowing people to enjoy a better standard of living and develop traditional production activities in rural communities. Since 2000, GERES has been leading operations with a focus on:



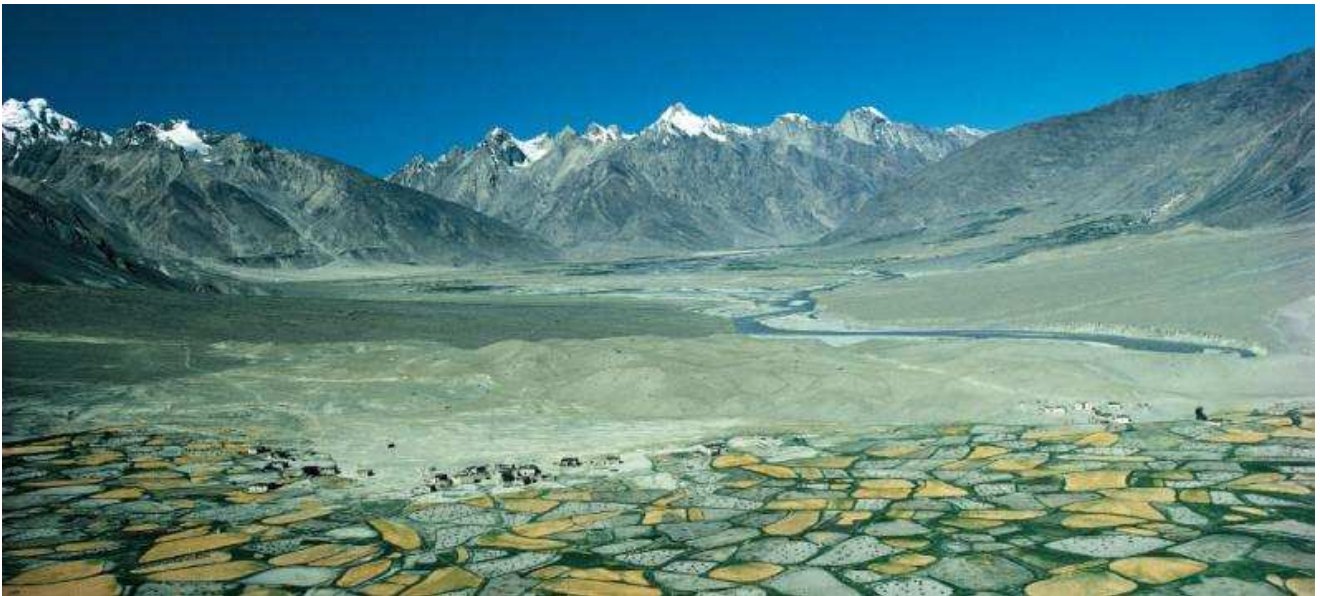
**Mechanising traditional jobs** to improve product quality: solar drying facilities with fan, mechanical wool plucker (a job traditionally assigned to children), motorized spinning wheels, oil presses, woodworking equipment, etc.).

**Mechanising laborious household tasks**, such as churning butter.

**Providing adequate lighting** in homes and places where handicraft production is carried out.

**Village electrification** through micro-hydroelectricity plants (up to 20 kW) promote handicraft activities and meeting basic household needs. (In Ladakh, implementation is being cared for in cooperation with BORDA, a German NGO working on local management of small power plants.)

## Anticipated impact on the environment:



A sunlight ratio that tops 300 days of sun a year makes it possible to design and disseminate passive solar technology. A number of **pilot projects** conducted by GERES since 2000 prove that a 60-percent energy savings can be realised by bringing basic, reliable passive solar technology into buildings, supplemented by thermal insulation of living spaces. The heat thus captured and gradually released appreciably increases comfort and allows working time to be extended.

Reassured by this success, GERES is planning to continue its programme onward to 2012, in close cooperation with local associations, in order to effect a broad penetration of passive solar technology with adaptation to at least 1,000 buildings in the Himalayas that are under construction or being remodelled.

## Globally, the impacts are affecting:



*Photo: Olivier Follmi*

- Preservation of the climate: Reduction of greenhouse gas emissions, notably through a decrease in habitat heating needs: 1,900 tonnes of CO<sub>2</sub> are not emitted each year (reduction of 5,000 TeqCO<sub>2</sub> over 10 years).
- Prevention of desertification: Reduction of pressure on local resources: 2,500 tonnes of biomass are saved (2 tonnes of biomass saved per building per year).

- Awareness of climate change: 300,000 persons (including 30,000 through direct interaction) have become aware of climate change. Some 100 teachers have been trained to inform their o their students.



*Photo: Olivier Follmi*

### III. FEATURES OF DEVELOPING PROJECTS

#### PSH Project: Construction of 1,000 passive solar buildings / 2008-2012

|                                    |   |
|------------------------------------|---|
| <b>Objectives</b>                  | <p>The project aims at disseminating energy-efficient housing and therefore improving winter livelihoods of rural communities in the cold desert areas of the Indian Himalayas. The specific objectives are:</p> <ul style="list-style-type: none"> <li>• Set up 1,000 domestic and community buildings in about a hundred villages with energy-efficient technology.</li> <li>• Organise civil society in sustainable networks for the promotion of energy-efficient measures.</li> <li>• Facilitate the development of handicraft activities in the wintertime.</li> <li>• Set up a network of stakeholders to share experiences regarding adaptation to climate change in mountain regions.</li> <li>• Reduce pressure on local resources and climate by reducing energy consumption by 60 percent.</li> </ul>   |
| <b>Beneficiaries</b>               | <ul style="list-style-type: none"> <li>• 300,000 people living in Ladakh, Zaskar, Kargil, Lahaul and Spiti in the states of Jammu &amp; Kashmir and Himachal Pradesh</li> <li>• Local handicraft workers (masons, woodworkers, carpenters and traders).</li> <li>• Partner NGOs.</li> <li>• Representatives of local communities as well as local and regional authorities.</li> </ul>  |
| <b>Social impacts</b>              | <ul style="list-style-type: none"> <li>• Better living conditions: Improved inside air quality (temperature increased to 15°C, reduced noxious fumes).</li> <li>• Significantly improved health conditions (child illness reduced by a third, better hygiene).</li> <li>• Increased time for schooling and less time spent collecting dung and biomass residues.</li> </ul>   |
| <b>Economic impacts</b>            | <ul style="list-style-type: none"> <li>• Reduction of energy consumption in domestic and community housing.</li> <li>• Growth of the handicraft industry: 400 women organised in 30 groups can increase their production tenfold thanks to improved working conditions and training by NGOs.</li> </ul>   |
| <b>Environmental impacts</b>       | <ul style="list-style-type: none"> <li>• Energy efficiency brought into 1,000 domestic and community buildings.</li> <li>• Reduced pressure on local resources (2 tonnes of biomass saved per building per year).</li> <li>• Climate preservation (reduction of CO<sub>2</sub> emissions, thus mitigating global climate warming).</li> </ul>   |
| <b>Institutional strengthening</b> | <ul style="list-style-type: none"> <li>• Capacity building for the NGO partner consortium to become a reference throughout the Himalayan region (technology transfer).</li> <li>• Development of sustainable information networks on energy efficiency and adaptation to climate change. Creation of a local network of qualified tradesmen in passive solar buildings (mason, carpenters, etc.).</li> </ul>  |
| <b>Action programme</b>            | <p><b>Local partnership</b></p> <p>The project is based on a partnership with five local NGOs that combine their specific fields of expertise. This proximity approach is conducive to building relationships with and winning the confidence of local communities. It also facilitates the implementation of shadowing and awareness-raising activities.</p> <p><b>Organisation of sustainable networks</b></p> <p>These advocacy and information networks involve local and regional authorities, NGOs, government, selected community representatives and the private sector. These groups come together to harmonise field activities and develop local policies. They work along with the government in an effort to gradually switch from a policy of subsidised wood to a policy of investment in energy efficiency.</p> <p><b>Support for income-generating activities</b></p> <p>The NGOs build capacity in the communities for local economic development, particularly in the handicraft sector (weaving, spinning).</p> |
| <b>Partners</b>                    | <p><b>5 Indian NGO technical partners:</b> LEDEG: Ladakh Ecological Development Group, LEHO: Ladakh and Health Organisation, LNP: Leh Nutrition Project, SECMOL: Student and Cultural Movement, STAG: Spiti Trans Himalaya Action Group.</p> <p><b>Financing partners:</b> European Union, Government of India, Fondation Ensemble Gaz et Electricité de Grenoble (GEG), Lord Michelham of Hellingly Foundation, private donors.</p>  |



## LIGHT project: Income-generating activities for rural communities in the cold desert of the Western Indian Himalayas - 2005-2009

|  |  |
|--|--|
| <b>Objectives</b>                                | Set up additional income-generating activities.<br>Empower rural women.<br>Improve the villagers' health.<br>Build the capacities of local NGOs.   |
| <b>Beneficiaries</b>                             | Rural communities in Ladakh, Spiti and Lahaul living on less than 0.7 €/pers/day.  |
| <b>Vegetable growing in improved greenhouses</b> | Due to the harsh winter conditions of Ladakh, vegetables can be grown in open fields only from May to September. For the next six months, the roads are closed. A few fresh vegetables are flown in at high cost, but are only available in Leh. The improved greenhouse technology based on local materials, allows farmers to grow vegetables even during the peak of winter, when it is too cold to operate simple greenhouses. The project is assisting 500 farmers in the construction of improved greenhouses throughout the four years of the project   |
| <b>Solar lambing sheds</b>                       | In Chang Tang, the population, often nomad, depends fully on cattle breeding. On these high altitude plateaux (4,000 to 5,000 m), the livestock stays outside day and night, even when the temperature reaches -30°C, resulting in a high mortality rate among kids, lambs, and pregnant females. The experience shows that the utilisation of low-cost passive solar heated lambing sheds in Chang Tang can reduce the lamb and dam mortality by 50 percent. The project is supporting the building of 80 individual and community lambing sheds, and is training local masons and carpenters in the construction.  |
| <b>Solar poultry farms</b>                       | In summer, when the roads are open, eggs and chickens are imported from the plains at low cost. In winter, these products are supplied by air and the prices increase by as much as three times the summer rate. Local production is a profitable business, particularly during the winter months. However, in such cold areas, a poultry farm requires heat from September to May. As fossil fuel is expensive and causes pollution, a passive solar heating system, based on local materials, is a cost-effective and eco-friendly way to provide the heat needed on a poultry farm. The project is assisting 15 local developers in the construction and operation of poultry farms of 300 to 500 birds fed with local products such as apricot almond residue. |
| <b>Food processing units</b>                     | Apricots and apples are the main resources of the Kargil, Sham and Nubra valley areas, where more than 3,000 tonnes of fresh fruit are produced yearly. The fruit is traditionally dried on rooftops or on large rocks, but the lack of hygiene makes it difficult to penetrate the tourist market and market outside Ladakh. Sea buckthorn berry juice ( <i>tsestalulu</i> ) has recently been discovered as very rich in vitamins, and its market demand is now high in Ladakh, Himachal Pradesh and Delhi. The project aims to assist 10 developers or self-help groups to set up their units and organize marketing channels for the production of apricot jam, osmotic dried apricots and sea buckthorn juice.  |
| <b>Transformation of the wool</b>                | The Himalayan range is a major production area for sheep, goat and yak wool. Traditionally women process wool for home use during the long winter. The project aims to build the capacities of 25 women groups in the production and marketing of wool products. This is being achieved through field visits and training in spinning, natural dyeing, knitting and weaving, according to the women's interests and needs. Improved tools are available. Besides, local NGOs and microfinance systems are being made available to the women to facilitate investment and constitution of a revolving fund. Capacity building in accounting and administrative management is also an important component of the training provided.                                  |
| <b>Micro Hydro Power Units</b>                   | Remote regions cannot be connected to central electrification. But energy services are an important support to develop economic activities, such as carpentry, wool spinning or oil extrusion (see picture below). Domestic lighting makes for a considerable improvement in villager livelihoods. The project aims to equip 20 villages with micro-hydro turbines, generating power between 5 and 10 kW. Each village will set up a committee in charge of managing the power unit, including fee collection. Selected community members will be trained for the maintenance and operation of the power units.  |
| <b>Implementation methodology</b>                | A network of five Ladakhi and two European NGOs is implementing the project. The local NGOs are organized into resource NGOs and proximity NGOs: a resource NGO, experienced and skilled in a given activity, develops a methodology and advises other NGOs.   |



## IV. GERES: 20 YEARS OF ACTIVITY IN THE INDIAN HIMALAYAS

### 1982: Early days in Ladakh

In 1982, an architecture student on a mission to study traditional architecture in Ladakh noted that despite the variety of building materials used, he found himself freezing indoors in winter. There was no firewood available for heating and heat from cooking food was never enough to achieve even a minimum level of comfort. And the communities were unable to produce enough from agriculture to meet their own needs. When the student got back to France, he contacted GERES in order to find solutions suited to the climatic context of these high-altitude regions.

### 1984-1989: Initial research work in India

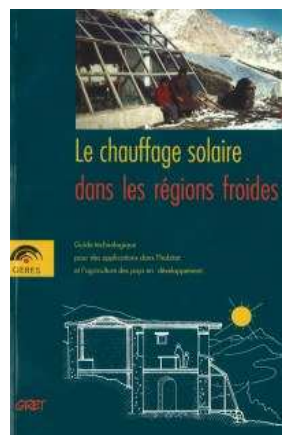
In 1984, GERES received assistance from the European Commission to undertake an initial study project to find solutions suited to the Ladakh area based on **Trombe walls, direct gains, attached greenhouses and insulation (roof, wall and floor)**. The totally passive heating system was technologically very simple, fully adapted to the local context, efficient and low cost. It can be put into existing houses or introduced in new construction projects.

### 1989-2002: Research over, on to work

In 1989, the local authorities launched a major programme with the distribution of solar greenhouses in Ladakh, where nearly 9,500 greenhouses were put up in rural communities on the plateau. A lack of follow-up measures (training in greenhouse growing, maintenance) unfortunately hindered any real impact on the communities.

With limited resources, GERES took a chance on a further limited contribution, but this time involving the communities and providing them with the keys to managing the activities. Numerous training manuals in construction and use of greenhouses, poultry houses, and solar dryers were published, and training sessions in marketing and micro-enterprise management were given.

Since 1998, GERES has been working in India with the support of a number of NGOs in Ladakh and Himachal Pradesh: LEHO LEDEG, LNP, CRO, STAG, MUSE, etc.



After 10 years of study, GERES published a guidebook for technicians on solar heating in cold regions.

The guidebook is a compilation of various solar heating technologies suited to cold regions in developing countries, broken down into nine models for habitat and agriculture.

### 2002-2009: Building up activities and developing regional initiatives

Since 2000, GERES has elected to have permanent workers in the field to extend its initiatives. Today, eight expatriates share in various development projects in Ladakh and Afghanistan, along with regular support missions to Tibet and Tajikistan. Two branches have been set up in western central Asia, one in Dehli and the other in Kabul.

#### Saying it with figures

**500 houses** have been built or renovated with highly energy-efficient technology (bioclimatic architecture, thermal insulation, etc.).

**2000 families** have better incomes thanks to solar greenhouses, sheep sheds, and poultry houses in Ladakh, Afghanistan, and China.

**300 service buildings** (180,000 m<sup>2</sup>) have been renovated or built using technologies that allow an energy saving of 50 percent.

In addition to these quantitative results, GERES' long-term goal is to turn these operations into a foundation for local development policies under the leadership of public institutions.

By pooling skills from NGOs, living conditions for human communities are improved. The next challenge is to assist the communities as they adapt to the local impacts of climate change.

## Highlights of GERES in India:

**1998-2002:** GERES was at work with LEHO, developing and test-distributing new models of agricultural greenhouses, bioclimatic poultry houses and introducing insulation.

**June 2000:** GERES attended the World Mountain Forum (June 5 to 9, 2000) in Chambéry where it was moderator of a workshop on local renewable energies in cold regions.

**2001:** GERES was coordinator for the construction of 50 bioclimatic houses in a Tibetan refugee camp in Spituck village, and another 30 houses in Igoo Valley in Ladakh.

**2001:** GERES developed a new model of solar dryer in Kargil district.

**2005-2009:** GERES and five local NGOs assisted village communities to put up 500 solar greenhouses, 80 solar sheep sheds, 15 solar poultry houses, 10 dryer units, 300 wool processing machines, and 10 micro electrical power plants with income-generating activities in the districts of Leh, Kargil, Lahaul and Spiti.



**2008-2012:** GERES has teamed up with five local NGOs to develop a platform linking the private and institutional sectors to bring bioclimatic architecture technology into 1,000 houses and provide training for tradesmen.

**2009:** GERES was selected by Ashden Awards for its work on vegetable growing in greenhouses.

## V. SEMINAR PARTNERS

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### European Commission



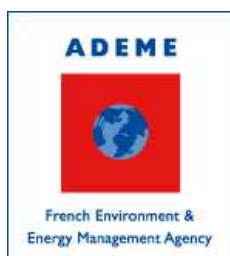
Established by the 1957 Treaty of Rome, the Commission is made up of 27 European Commissioners, including Bulgaria and Romania who joined on January 1, 2007. Its current president is Jose Manuel Barroso of Portugal, as of November 22, 2004.

Its main function is to propose and implement policies. As "Guardian of the Treaties," it ensures their implementation. Having the sole right of initiative on the first pillar of the European Union, it plays a central role as guarantor of the general interest.

The Commission allocates funding in the form of grants in order to implement projects or activities in relation to European Union policies. These grants may be awarded within fields as diverse as research, education, health, consumer protection, environment protection, humanitarian aid, etc.

Web site: [www.ec.europa.eu](http://www.ec.europa.eu)

### French Environment and Energy Management Agency (ADEME)



ADEME is an industrial and commercial public agency under the joint supervision of the French Ministry of Ecology, Sustainable Development and Spatial Planning and Ministry of Higher Education and Research. ADEME promotes, supervises, coordinates, facilitates, and initiates operations with the aim of protecting the environment and managing energy. Its priority thrust areas are energy, air, noise, transportation, waste, polluted soil and sites, and environmental management. It employs 820 persons (including 359 engineers).

Web site: [www.ademe.fr](http://www.ademe.fr)

## French Ministry of Ecology and Energy, Sustainable Development and Spatial Planning



The Ministry of Ecology, Energy, Sustainable Development and Spatial Planning was established on June 1, 2007. The president has made the distinguished appointment of a Minister of State. The Ministry of Sustainable Development is a facilitator, a guide for change. Its purpose is to demonstrate concretely that environmental protection does not in fact cost more and often results in improved well-being and purchasing power. It has also laid the foundations for the economy of tomorrow: firms and territories that make a fast-track shift to sustainable development will have a genuine advantage over their competitors.

Web site: [www.developpement-durable.gouv.fr](http://www.developpement-durable.gouv.fr)

## French Global Environment Facility (FGEF)



The FGEF is a bilateral fund which was set up in 1994 by the French government following the Rio Summit. Its aim is to promote protection of the global environment in developing and transitional countries. The FGEF is used to support concrete undertakings in beneficiary countries, promote the learning of principles and test innovative or exemplary approaches, on request from and under the responsibility of one of its five institutional partners in France, as a minority co-financing mechanism or as an add-on mechanism within the French public aid system, under Official Development Assistance accounts.

Web site: [www.ffem.fr](http://www.ffem.fr)

## German Technical Cooperation (GTZ INDIA)



GTZ is an international cooperation agency for sustainable development with worldwide operations. GTZ promotes complex reforms and change processes, often working under difficult conditions. Its corporate objective is to improve people's living conditions on a sustainable basis. India has been a priority partner country of German Development Cooperation for more than 40 years.

GTZ has been active in India on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) for almost all of this period. In 2008, India and Germany celebrated 50 years of successful development cooperation.

Web site: [www.gtz.de](http://www.gtz.de)

## Fondation Ensemble



Fondation Ensemble is a private foundation recognized by the government as serving the public interest. Fondation Ensemble is involved in programmes conducted by organisations in four fields—water and sanitation, sustainable development, animal biodiversity and solidarity/environment—which reflect the wish of the founders to tackle poverty alleviation issues, while working towards long-term environmental protection. Capacity building, involvement of both communities and partners in the projects, and training initiatives are

essential components of the integrated projects we support.

Web site: [www.fondationensemble.org](http://www.fondationensemble.org)

## Renewable Energy and Energy Efficiency Partnership (REEEP)



REEEP is an active, global partnership that works to reduce the barriers within policy, regulatory and financial structures that bar or limit the uptake of renewable energy and energy-efficient technologies and projects. With a network of eight regional secretariats and several thousand friends, REEEP is positioned to affect change worldwide. The partnership

has funded more than 80 high-quality projects in 40 countries that are removing market barriers to clean energy in the developing world and economies in transition. These projects are beginning to deliver new business models, policy recommendations, risk mitigation instruments and regulatory measures.

Web site: [www.reeep.org](http://www.reeep.org)

# ANNEX I. SEMINAR INFORMATION

## Agenda

| Day      | Morning 9:30 am - 12:30 pm   | Lunch Break | Afternoon 2:00 pm - 5:00 pm   | Evening events                |
|----------|--|-------------|---|-------------------------------|
| April 21 | <b>Conference Hall</b><br>Welcome & Registration (starts at 8:30 am)<br>General Introduction<br><br>Introduction of thematic: <ol style="list-style-type: none"> <li>1. Challenges and opportunities for Sustainable Energy Solutions in the Hindukush Himalayas</li> <li>2. Financing Renewable Energies</li> <li>3. Facing Climate Change in the cold regions of Asia</li> <li>4. Setting up Carbon Finance</li> </ol> |             | <b>Conf. room 1</b><br>Working session 1<br><b>DECENTRALIZED RURAL ELECTRIFICATION</b><br><br><b>Conf. room 2</b><br>Working session 2<br><b>CLIMATE CHANGE IMPACTS</b><br><br><b>Conf. room 3</b><br>Working session 3<br><b>ROLE AND EXPERIENCE OF FINANCING INSTITUTIONS</b> | Common Dinner                 |
| April 22 | <b>Conf. room 1</b><br>Working session 4<br><b>ENERGY AND HOUSEHOLD</b><br><br><b>Conf. room 3</b><br>Working session 5<br><b>ROLE OF CARBON MARKET IN CATALYZING REVENUES FOR CLEAN ENERGY INVESTMENT</b>   |             | <b>Conf. room 1</b><br>Working session 6<br><b>ENERGY AND HOUSEHOLD</b><br><br><b>Conf. room 2</b><br>Working session 7<br><b>ENERGY AND AGRICULTURE</b><br><br><b>Conf. room 3</b><br>Working session 8<br><b>ROLE OF CIVIL SOCIETY ON CAPITALIZING CARBON MARKET</b>          | Common Dinner + Cultural Show |
| April 23 | <b>Conf. room 1</b><br>Working session 9<br><b>ENERGY AND PRODUCTIVE ACTIVITIES</b><br><br><b>Conf. room 2</b><br>Working session 10<br><b>CLIMATE CHANGE ADAPTATION</b><br><br><b>Conf. room 3</b><br>Working session 11<br><b>ENERGY IN PUBLIC BUILDING</b>  |             | <b>Conference Hall</b><br>Plenary Session<br>Working Group sessions summary<br>Seminar Closing Remarks  | Common Dinner                 |
| April 24 | One day FIELD VISIT (Transportation + lunch arrangement) to: • Pangong Lake OR • Lamayuru - Alchi OR • Igloo village<br>OR<br>One day WORKSHOP on Energy efficient Building and Carbon Finance in cold regions of Asia   |             |   | Common Dinner                 |

## List of participants

A number of organisations have confirmed their attendance at the seminar: ADEME, European Commission, ICIMOD, GTZ, India, REEEP, Team Leader for Access to Infrastructure Services Programme, INTEGRATION Environment & Energy, IUCN, Nepal, CAMP Alattoo, Head of Business Unit Methodology Development, Perspective, Habitat Foundation, Kyrgyzstan, Atmosfair/WEFC, Germany.

## Eco-designing and seminar carbon compensation

In order to limit the seminar's environmental impact, the organisers have arranged for group travel, to give special consideration to conservative vehicles and billet participants in a so-called "eco-friendly" hotel. Unavoidable CO<sub>2</sub> emissions generated by travel and logistics will be compensated through the purchase of carbon credits from the GERES Himalayas programme.



## ANNEX II. OVERVIEW OF GERES

**GERES** - Groupe Énergies Renouvelables, Environnement et Solidarités (Renewable Energies, Environment and Solidarities Group) is a not-for-profit association established in 1976 in the wake of the first oil shock. Today, close to a hundred staff members are working on innovative development projects in France and eight countries of Africa and Asia.

**Preserving the environment**, mitigating climate changes and their impacts, reducing energy vulnerability and improving the living conditions of the poorest of the poor, such are the challenges of our times. The GERES team is out there contributing with state-of-the-art development engineering practices and expertise.

**The activities** that it carries out in partnership with communities and local stakeholders involve implementation of energy efficiency programmes, extension of energy services that promote local economic development, development projects for renewable energy supply chains and promotion of initiatives to get value from waste. This has led GERES to focus on pooling skills:

**Improving conditions for agricultural production and product processing** to get more value from family-scale farming and contribute to food sovereignty in developing countries. GERES is working in the mountainous areas of Afghanistan and India to promote greenhouse vegetable growing and the storing/conserving of agricultural produce.

**Optimising energy gleaned from forest resources** in a move to preserve natural resources: *In Cambodia, nearly 250,000 families are now using energy-efficient cooking appliances.*

**Coaching the development of renewable energies** to intensify forms of local energy production that are clean and environmentally friendly: *In the Provence-Alpes-Côte d'Azur (PACA) region, GERES is leading the small hydroelectricity power plant chain in partnership with people working for the protection of the aquatic environment.*

**Promoting initiatives to get value from waste** in order to reduce its impact on the environment: *awareness-raising campaigns to promote composting in the PACA region.*

**Putting energy efficiency and solar energy into play** to support sustainable development in mountainous zones: *passive solar building construction programme (dwellings, schools and hospitals) in the Indian Himalayas and Afghanistan.*

**Developing a local supply of agro-fuels** to respond to the energy needs of rural communities: *In Western Africa (Benin, Mali, Niger), GERES is coaching a number of pilot*

*short-circuit projects for agro-fuel production and use.*

**Promoting energy savings** to manage energy consumption, reduce vulnerability, and mitigate climate change: *consultative and educational missions in communities to limit energy vulnerability and promote renewable energies in the PACA region (energy information spaces) and Morocco.*

**Developing new energy and engineering services** to improve living conditions for rural communities: *programme in Benin to set up multi-utility platforms and related services.*

**Coaching local and international NGOs** to assist them to factor climate change into their develop projects: *Training for NGOs in Southeast Asia for access to carbon finance mechanisms, publication of the good practices guidebook "Climate, Energy, Development."*

**CO<sub>2</sub> Solidaire:** In 2004, this association initiated the first francophone voluntary compensation programme in support of its climate solidarity projects.

([www.co2solidaire.org](http://www.co2solidaire.org))

**GERES networks:** GERES is a member of various networks such as CLER (Comité de Liaison des Énergies Renouvelables), CFSI (Comité Français de Solidarité Internationale), Comité 21, Global Compact, NFORSE (International Network for Sustainable Energy), ARECOOP, MEDCOOP (a group for cooperation in the Mediterranean), and still others.

## ANNEX III. COPING WITH CLIMATE CHANGE

### CLIMATE SOLIDARITY: A PRIORITY COMMITMENT IN PROJECTS CARRIED OUT BY GERES.

GERES has been conducting action programmes for over 30 years now on energy efficiency and renewable energy with the focus on mitigating climate change. GERES is active in France and nine developing countries.

#### OBJECTIVES

As it works for climate change mitigation, GERES is leading development actions for:

- Preservation of natural resources.
- Limiting CO<sub>2</sub> emissions through energy efficiency.
- Coaching the development of renewable energies.
- Reducing inequalities and vulnerability.
- Awareness raising, training stakeholders, and building capacity within its partners (target communities, institutions, public at large, and businesses).

#### OVERVIEW



By ratifying the Kyoto Protocol in 1997, the most advanced countries recognised their historic responsibility in climate change. They committed to reduce their greenhouse gas emissions (GHG) through the implementation of impact mitigating measures.

Although such alleviating measures have been undertaken in developed lands (major change of industrial processes, citizen awareness raising, etc.), it must be borne in mind that certain regions are more vulnerable to climate changes. This is generally true of developing countries that have to cope with challenges in adapting. A shortfall in financial and technical resources, the extreme fragility of natural balances and availability of energy resources are major roadblocks.

On top of this situation of climatic vulnerability is superposed an extreme economic and social fragility due to the skyrocketing prices of petroleum products and raw materials.

**Climate solidarity** therefore means creating close links with the developing world. This is fleshed out by coaching these societies as they adapt to the impacts of climate change and seek to mitigate its effects.

For climate solidarity to achieve concrete results, actions undertaken in developing countries have to merge efforts to mitigate climate change with efforts to alleviate poverty. That is the commitment now championed by GERES.

## PROJECT IMPLEMENTATION

Every initiative undertaken by GERES is designed to enable significant impacts on climate change mitigation: energy efficiency in people's homes, energy use and economic activities in rural communities, capturing value from waste, institutional capacity building, energy savings for households, support for sustainable development policies, etc.

GERES is currently active on some thirty different projects in as many as ten different countries. It has set up operational branches in nine countries: Afghanistan, Benin, Burkina Faso, Cambodia, Philippines, France (PACA), India, Mali, Morocco and Niger. These projects are improving the economic and social circumstances of hundreds of thousands of families and SMEs.



*Thirty projects—ten countries*

## AWARENESS RAISING

The year 2004 saw GERES launch the first voluntary compensation operation: **CO<sub>2</sub>Solidaire**.

This programme is tailored for the individual, businesses and local or regional authorities. It encourages them to measure their GHG emissions in order to effect a reduction at the source. They are furthermore invited to compensate for their unavoidable emissions by providing financial support to development projects that are both people and environmentally friendly.

In France's PACA region, GERES is piloting two **Energy Information Spaces** in partnership with ADEME along with local and regional authorities. The first outreach of such spaces is to provide advice and raise individual awareness.



*Energy information space at an event*

## TRAINING AND CAPACITY BUILDING

### Shadowing programmes

Encouraged by successful initiatives conducted in Cambodia, GERES is moving into the Southeast Asia region to lead an ambitious shadowing and capacity-building programme for local project leaders.

Some ten different local NGOs have been brought together under the umbrella "Carbone Solidarité Asie" (CSA – Asia Carbon Solidarity) that operates as a platform of skills and experience exchange and sharing. **Its purpose:** raise awareness among development stakeholders regarding climate solidarity, pass on skills and technology to implement projects that combine GHG reduction and poverty alleviation.

**Currently,** the ambition of CSA is even broader. It wants to speed up clean development through the use of such things as carbon finance as tools to drive up the impact.

### Publications



The **Good Practices Guidebook "Energy – Climate Development"** was released by GERES in January 2009. It provides a comprehensive look at exemplary technologies and approaches that link development with climate change mitigation.

These practices concern the areas of energy efficiency, management of the energy demand, renewable energies, getting value from waste, resilient agricultural practices, and combating deforestation.

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