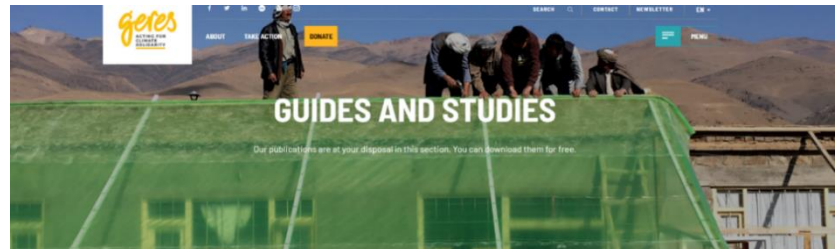


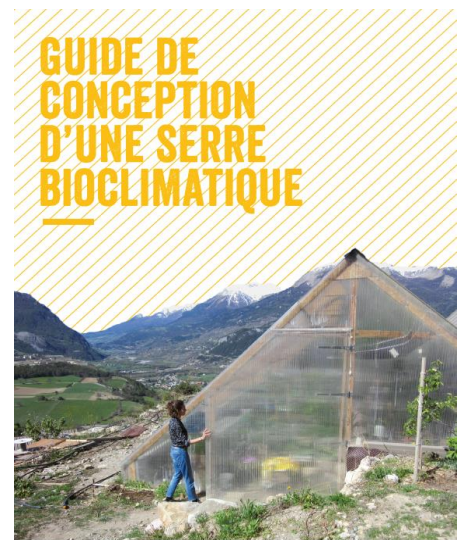
DESIGN AND CONSTRUCTION OF BIOCLIMATIC GREENHOUSES

TECHNICAL GUIDES PRODUCED BY GERES - FRANCE

In 2020, the *Renewable Energy and Environment Group* Geres, development NGO based in Marseilles (France), published the [Passive solar greenhouses construction guide](#), a useful tool to help farmers in the conception and construction of their greenhouse.



[The Guide, published in French](#), is based on feedback from the seven different bioclimatic greenhouses built as part of a pilot project conducted in the Provence-Alpes-Côte d'Azur region (France) from 2016 to 2020 by Geres, Agrithermic and GRAB. The Guide has been produced by Geres to answer farmers' questions, helping them both in the conception of their greenhouse and in its construction.



Different models of greenhouses have been chosen and developed by the project, taking into account the regional context and the need of promoting the establishment or maintenance of agricultural activities in high altitude and isolated territories, allowing farmers to diversify production with regard to supply in seedlings and to length the growing season for better farm profitability.

The main advantages of a bioclimatic greenhouse and its operating principle are presented in the Guide. The bioclimatic greenhouse stores solar energy during the day and releases it at night. It ensures night temperatures significantly higher than those allowed by a conventional greenhouse, which guarantees secure production during periods of frost, with little or no energy. This production mainly concerns plants that are particularly heat-demanding. Solar energy is captured during the day through the south face (direct ray of the sun on the thermal mass and capture of heat from the air); it is stored by the thermal mass made up of heavy materials: solids (stones, bricks, concrete blocks, etc.) or water contained in drums or cans; it is restored at night or during the day during cloudy sequences. The whole is insulated to reduce heat loss.



The feasibility study of the project is explained in the Guide with a decision support table comparing different types of bioclimatic greenhouse. The project sets up seven bioclimatic greenhouses according to different models: three-wall type greenhouses, light tunnel greenhouses with wall, light tunnel greenhouses and multi-span greenhouses.



The Guide provides information on the different technical characteristics of each type of greenhouse and the materials used and the essential elements for the design of the greenhouse are presented, as well as indications and advice for the construction. Finally, the seven pilot bioclimatic greenhouses, established under different climatic conditions, are described in the form of fact sheets. These fact sheets prepared by the farmers for each of the seven bioclimatic greenhouses built and in operation in Provence-Alpes-Côte d'Azur [are also available on the Geres website](#).



Set up in 1976, the Renewable Energy and Environment Group - Geres is a development NGO working in Europe, Africa and Asia to improve community living conditions and fighting against climate change and its impacts. The energy transition is a major lever in their activities and the operations include the development of value chains, which create jobs and are key to the sustainability of the solutions implemented. By carrying out field projects both in the Provence-Alpes-Côte d'Azur Region where is based and in many other countries, Geres adopts an approach that values the active participation of the actors involved to design and build innovative and sustainable solutions in the framework of ongoing local development processes.

With this approach Geres develops an important activity for the production of guides and manuals that allow to replicate the innovative solutions adopted, multiplying their impact with the collaboration of governments, institutions, communities and local organizations involved. Furthermore, as is the case of methodological guides produced for the construction and use of passive solar greenhouses, these may also be of great interest for other contexts.

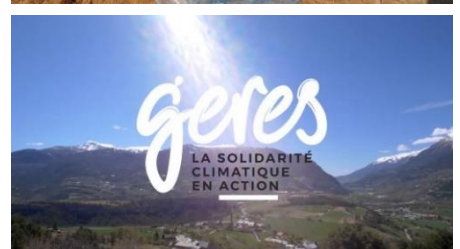
In 2014, [in partnership with the ASDP Nau organization of Tajikistan](#), Geres published the technical guide [Vegetable production in a solar greenhouses. Advice for producers](#). The guide presents the methodologies adopted in a project that has supported 87 farmers in building greenhouses and training them for off-season production of vegetables in the Ayni and Asht District.

In 2012, Geres published the [Solar greenhouses for Mongolia. Construction Guidelines](#). The Guide presents the methodologies adopted in the [project implemented by the NGO Caritas Mongolia](#) with the technical support of Geres and in collaboration with Ministry of Food and Light Industry and Gobi-Altai province government. The project was based on local knowledge and has brought innovation for the construction of 16 greenhouses and the technological improvement of the territory's traditional bioclimatic cellars dug into the ground to capture the coolness in summer and the heat in winter, which have been insulated and ventilated for better preservation of foodstuffs. Currently the territory is equipped with more than 180 bioclimatic greenhouses, 75 nurseries and 100 cellars built and managed by local communities who grow vegetables and generate new income for their families.

In 2009, in partnership with the *Ladakh Environment and Health Organisation* (LEHO), Geres published the Guide [Passive Solar Greenhouse in Ladakh: A Path to Income Generation and Livelihood Improvement](#). The Guide presents the methodologies adopted by the [project in Ladakh \(India\) for the innovative design of greenhouse](#) allowing farmers to grow vegetables in peak winter. Thanks to the sustainability, reliance on local human and natural resources and its positive environmental impact in the longer term through the reduction of vegetables imports, [this project was awarded at the 2009 Ashden Awards](#).

[The work done by Geres has been recognized with many international awards](#). In 1919, for example, Geres received the Energy Globe Award - Air category (Geres Afganistan), the Distinction in the *Energy* category for the Sahel Terra Awards (Geres Mali), the Green Solution Award in the *Low Carbon* category (Geres Mali) and the Honorable Medallion from the National Women's Association (Geres Mongolia).

The [Guides et études](#) section of the Geres web page presents the various publications available to all interested actors, free and downloadable in PDF version.



To know more

[Guide de construction d'une serre bioclimatique](#)

[News in Geres website](#)

[Guide - Report in grab website](#)

[Geres website](#)

[Solar greenhouses in Tajikistan](#)

[Vegetable production in a solar greenhouse in Tajikistan - Geres advice-greenhouse-taj-en.pdf](#)

[Solar-greenhouse-construction-manual-mongolia-2012.pdf](#)

[Construction guide for greenhouses in Mongolia – Geres website](#)

[Solar Greenhouse running manual – Ladakh India](#)

[Geres awarded by Ashden](#)

[Guides et études - Geres](#)

[Le Manifeste-Geres](#)

[Serres bioclimatiques in Grag website](#)

[Efficacité énergétique des serres agricoles in Agrithermic website](#)

