IRRIGATION DRIVEN BY RENEWABLE ENERGY– EFFICIENT TECHNOLOGIES FOR PROMOTING RURAL DEVELOPMENT AND ENTREPRENEURSHIP

Location:
Brazil

Project's Aim:
To support rural development and entrepreneurship by increasing agricultural production through an efficient irrigation system driven by renewable energy

Technical Answer:
Use of photovoltaic and bio diesel water pumps to improve local irrigation systems

Project's Duration:
June 2003 – December 2008

Photo:

The semi arid north-eastern region of Brazil is severely under-served by water irrigation systems. In addition, it is affected by periodic droughts. Therefore, local farmers are confronted with serious problems relating to water availability and effective irrigation. Until now, traditional irrigation techniques such as trenches and inundation have proved inefficient, leaving farmers to survive at subsistence level. Although artificial ponds are present, this water is rarely used due to a lack of high yield pumping systems. By improving irrigation, agricultural production will increase significantly enabling the farmers to sell surplus at local markets.

REDEH, SouthSouthNorth and Ambiente Italia together with CO2nnect aimed to develop a fully replicable model that addressed issues of technical, social, economical and ecological sustainability and replicability. The project consisted of two phases. While strategies concentrating on awareness raising and capacity building were the main focus of the first phase, the second phase was dominated by the implementation of 5 pilot projects.

In total 3 pumps were installed, one PV pump serving 1 family farmer and 1 bio diesel pump serving 4 family farmers. These pumps have been connected directly to small-scale drip irrigation systems of 500 m^2 to 1000 m^2 aiming at increasing local agricultural production. The progress was monitored in relation to social, technical, economical and environmental factors that could influence the project's success and opportunities for replication in the region.

BENEFITS

The project, which is based on the sharing of experiences and mutual learning among farmers, has increased cohesion within the community thereby enhancing agricultural output, raising employment levels and improving technical skills. It is expected to increase job efficiency as working hours under the new system have been halved. As a consequence, these increased benefits of agriculture offer new opportunities to the local youth with the result that

they are less likely to move away to urban areas in search of employment.

SUSTAINABILITY

By using the best technological option in terms of price and quality, the technological sustainability of the project has been assured through the establishment of a commercial partnership with national technology providers. This will also be relevant for the replication phase. The technical partners of the project have provided a user's manual for implementation and maintenance, which will include also lessons learnt, and that enables the farmers to manage the irrigation system themselves. This ensures that the project will continue after the pilot phase. It is predicted that the project will be a success, as the level of interest among the farmers is already high and still on the increase.

TECHNOLOGY

Either a PV or a bio diesel water pump supplies a drip irrigation system. The advantage of the bio diesel water pump is that it can be shared among users and the investment costs are lower compared to a PV water pump, which is difficult to move and, therefore, remains in a fixed place. For these reasons the PV system is used preferably in situations where a single farmer has limited access to agricultural fields (an area of less than 2,000 m^2) and no access to electricity.

Photo:

FINANCIAL ISSUES

The cost of the project and the payback time depends on several factors such as size, type of culture, capacity of the farmer to master the technology and maintenance. For a 500 m^2 drip irrigation system driven by a bio diesel water pump the costs are around Euro 500, while the same system driven by a PV water pump costs between Euro 1,100 to Euro 1,850, leading to payback times of 3 to 7 years. With an estimated income of about Euro 200 to Euro 500 from the sale of beans, and considering that part of the income needs to be used for the farmers themselves, the development of a micro credit scheme over a period of 3 to 7 years seems possible. The use of high value cultures such as spices could decrease the payback time to 2–3 years, always depending on the local social, technical and environmental conditions.

OBSTACLES

During the implementation process several obstacles were evident. The most important challenge was to find a technical solution at a cost of less than Euro 3,000 per integrated system to include the drip irrigation and the water pump driven by renewable energy. This upper limit was necessary in order to take advantage of a micro credit scheme. Furthermore, the identification of appropriate technology partners presented a challenge. Access to a local market and the option to sell products with a certain threshold to limit the pay back time is also mandatory for the project's success if subsidies are not available.

REPLICABILITY

The project can be fully implemented in areas where agriculture is still under development and no irrigation technique is applied. The willingness of the farmers and the community to collaborate concerning micro credits, as well as access to a local market where the surplus can be sold, are also important factors. On a technical level, the farmers should have access to at least 1000 m^3 of water per year for irrigation. This amount includes precipitation. Additionally, it is important that the quality of the water is good enough to avoid clogging in order to keep maintenance costs low.

Photo:

CONTACT

CO2nnect / REDEH
Mr Daniele Cesano; Mrs Thais Corral
e-mail: daniele@co2nnect.com;
thaisc@redeh.org.br
URL: www.redeh.org.br;
www.southsouthnorth.org;
www.ambienteitalia.it;
www.co2nnect.com