

Evaluation overview

Use of solar-powered cooling to help Senegalese fisheries better adapt to climate change

Countries: **Senegal**

Topic: **Climate change**

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Key FFEM support data

Project name: CryoSolar

Project number: CSN1580

Amount financed by the FFEM: €138,600

Project grant date: 28/09/2019

Duration: 3 years 6 months (2019-2022)

Context

The artisanal fishing industry plays a very important role in Senegal, both economically and socially. However, the abundance and size of small pelagic species are expected to decrease due to climate change and increasing water temperatures. This is likely to have a significant impact on fishing and, by extension, food security for local populations. Solutions to increase the resilience of African artisanal fishing include developing innovations and/or practices to help reduce post-harvest losses. The green energy operator, Valorem, came up with the idea of developing and commissioning a demonstrator – CryoSolar – to meet this challenge. This standalone solar-powered cold room is installed in a container and can be used to store fish at fishing ports.

Participants and operating methods

Supported by the FFEM, this innovation was deployed by Valorem on two landing stages in Senegal (municipalities of Mbour and Fass Boye), having received funding in 2019 through the Private Sector Innovation Facility in the area of climate change (FISP-CLIMAT) financed by the FFEM. The Ministry of Fisheries and Maritime Economy (MPEM) and the National Agency for Renewable Energies (ANER) were the two institutional partners. For the two fishing docks, tripartite agreements were signed between the MPEM, the municipalities and the Interprofessional Economic Interest Group (GIEI), in which the GIEI was made responsible for managing CryoSolar.



Aims

Having been subsidised by FISP-CLIMAT, the aim for Valorem was to produce and test in real conditions an innovative solar-powered cooling device, for a variety of uses in developing countries and based on feasibility studies carried out in the Senegalese fishing sector.

Specific objectives:

At local level, on the Mbour and Fass Boye landing stages in Senegal, the aim was to showcase the merits of the CryoSolar innovation for developing a better cold chain, with a view to:

- better managing resources,
- securing the income of fishers, fish wholesalers and fish vendors.



Performance appraisal

Relevance

The relevance of the project was established insofar as beneficiaries on the fishing docks have cooling needs that were previously barely or poorly addressed by existing facilities. Local authorities have also shown a keen interest in expanding deployment to other cooling needs at fishing docks (e.g. air conditioning at fish wholesalers' premises for better food safety), as well as other sectors such as meat, fresh produce, medicines, etc.

Coherence

There were certain shortcomings in the coherence of project implementation, the main one being persisting with the choice to deploy CryoSolar at the Fass Boye dock, which is not as well developed or established as Mbour to accommodate and use CryoSolar. However, persisting with this site provided interesting lessons to help improve the project in future and avoid pitfalls when installing in other locations.

Effectiveness

While the project's effectiveness was good, areas of improvement have been identified to potentially further refine CryoSolar for the future. The main areas relate to the organisation around CryoSolar to ensure hygiene conditions are optimal, while building a more flexible IT application into the CryoSolar offer to help monitor the system and the operator's management activity.

Efficiency

Efficiency was good and even included efforts to streamline costs. The main obstacle was the extended period of project implementation. However, every initiative encountered this issue and had to endure the difficulties associated with the COVID period, significantly delaying their implementation.

Impact

The pilots tested in the fishing sector in Senegal showed that, aside from a few minor complications, Valorem has successfully produced an innovative solar-powered cooling device for multiple uses in developing countries. However, concern was raised over the 4.5-tonne capacity of CryoSolar, which is not sufficient for this type of activity and flow. Potential users have expressed their wish to use solar technology in existing cold rooms.

Viability/sustainability

In terms of viability, it is essential that the price of CryoSolar and its operating costs are now accessible. The value of the products and the amortisation period are two key elements for generating possible investment. The pilot in Senegal shows there are numerous avenues for developing CryoSolar, both in the fishing sector and others, where the product value is sufficient to tolerate prices linked to the value of the investment. These developments can be easily extended to other sectors, as well as other fields such as air conditioning for birthing suites or food products, etc. in a number of countries around the world, provided they have sufficient sunlight. They may also be of interest to both the private and public sectors, if CryoSolar can remain competitive.

Added value of FFEM support

Surprisingly, the issue of cooling is largely overlooked by sponsors, even though in countries like Senegal it is central to guaranteeing food security and the country's climate commitments. As a result, the FFEM chose to lend its support to the CryoSolar project, which is innovative and full of promise.

Recommendations & learnings

With regard to the recommendations for the two pilot sites at which CryoSolar has been deployed, certain arrangements are still to be finalised (transfer tables and enclosures). It is also recommended that sites are entrusted with receiving and using data linked to using CryoSolar provided by the application, as they are privileged users of such data. For the Mbour site, which is working very well, prices must be reviewed before Valorem exits the project, and the possibility of including all or part of the equipment amortisation in the price should be explored, based on the calculations included in the evaluation report. This should be accompanied by increasing awareness among stakeholders – particularly fish wholesalers using the facility and downstream processors – to determine if they would be prepared to cover part of the costs of using CryoSolar, especially if they advocate its use. For the Fass Boye site, which is less well organised and uses CryoSolar less, work must be undertaken to enhance and professionalise the way in which the equipment is used, through improved technical support and greater commitment from the on-site team.

In terms of learnings on the wider deployment of CryoSolar, the following points should be considered:

- The various possible uses of CryoSolar beyond the container prototype tested in Senegal (cold rooms and other uses such as air conditioning, etc.) and their corresponding prices should be identified as quickly as possible.
- For users requesting it, the CryoSolar usage management application should be improved and built into the CryoSolar product, ensuring the software is user-friendly from the handler stage. This would increase the traceability and security of the equipment's use and avoid double entry errors, as witnessed currently.
- A local communication strategy should be developed to promote the technology and progress of the project among the general public and national and international decision-makers (notify the media, documentation, feedback sessions, capacity building, raising awareness among beneficiaries).