Solar-powered freezers

Overview

Solar-powered freezers bring cold storage to remote rural communities, which enables preservation of fish catches (and other foods). This can strengthen fisheries livelihoods by allowing fish to be stockpiled until a good time to sell. It can also increase people's resilience by providing opportunity to store fish to consume in times of need. WorldFish and the West 'Are'Are Rokotanikeni Women's Association piloted the installation and use of 12 solar-powered freezers from 2016 to 2020.

- ✓ Solar-powered freezers offer a useful, cost effective alternative to expensive infrastructure construction projects, such as fishery centres.
- ✓ They can lead to a wide range of innovative income-generating ideas, such as freezer space rental or small trading businesses, particularly when introduced in partnership with organised grassroot savings and cooperative groups (including women's groups) who have existing business skills.
- ✓ Small businesses associated with solar freezers have good income-earning potential in areas that have good customer demand from shipping or transport routes, sporting events or households with other sources of cash-income.
- △ The quality and design of solar-powered freezers varies widely. While cheaper models are attractive to buy, they can be severely flawed, so investments in more expensive, higher quality products are strongly recommended
- △ Regular maintenance and upkeep is essential. Providing training for freezer users on proper fish handling, preservation and chilling techniques, as well as nutrition awareness, to accompany installation, could help improve the quality of stored food and avoid food safety issues. Hygiene is crucial when storing fresh foods for a longer time.

WARA freezer committee member storing fish in a solar-powered freezer. Surairo, Solomon Islands.

Background

Rural women in the Solomon Islands carry out key roles in fisheries – as fishers, processors and vendors. To harness these, WorldFish and the West 'Are'Are Rokotanikeni Women's Association (WARA) worked together for five years to pilot the installation and use of solar-powered freezers, with the aim to support rural women to enhance their fish-based livelihoods. WARA is an indigenous, women-led organisation in Malaita Province. It was founded in 1998 and had over 1000 members in 2018. It has a focus on developing business skills and operates as a set of saving clubs in a region that has no access to commercial banks, formal market facilities or trade hubs. The organisation is divided into 13 groups ('WARA Zones'), 12 of which are located in rural areas.

Inputs

A total of 12 solar freezer units, one per rural WARA Zone, were acquired using project funds and installed by a technician from the Honiara-based supplier. Each unit comprised a 170L 24V DC freezer, 2 x 100AH batteries, 2 x 270W solar panels and a regulator (but note challenges

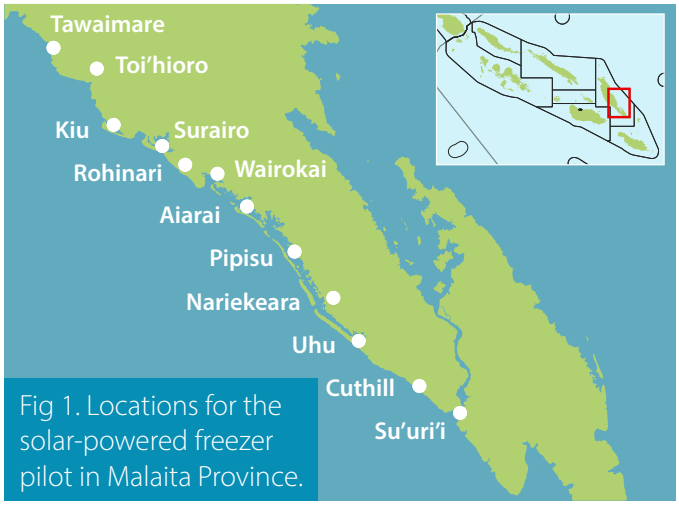

Fig 1. Locations for the solar-powered freezer pilot in Malaita Province.

discussed below). The total cost of each unit was SBD $23,500. Shipping cost from Honiara was SBD $1350 per unit, while installation was around SBD $900. The freezers were installed in batches from 2017 to 2019 to incorporate learning from previous installations. WARA members provided the site and infrastructure to house each freezer. WARA members also had the existing knowledge and skills required to organise and operate small businesses, developed through their years of working together as a collective and savings club.

Each WARA Zone established a committee that coordinated the operation of their freezer. All freezers were operated as an income-generating enterprise by charging storage fees to users. Some committees also bought frozen goods in bulk to sell at a small profit.

Organisation

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Benefits

The solar freezers were used by hundreds of community members to store fish and other aquatic foods, chicken and other meat, water and ice lollies for personal consumption or to sell as part of small businesses. Based on logbooks kept by the 12 freezer committees, a total of 711 people (including 440 women) and 60 community groups (such as church and social groups, schools and health clinics) used the solar freezers after operating for 6 months to 3 years. Over the same period, around SBD $50,000 was collected in storage fees. However, income generation varied by freezer, due to differences in storage fees and use, as well as duration of operation (see graph). Around half the freezer committees were on target to earn sufficient income to replace their freezer after its expected life time (5 years). Some committees saved their profits in a bank account, while others put the income towards a revolving fund for financing loans to members.

Challenges and risks

Almost all the piloted freezer enterprises were hindered due to technical flaws in the freezers. While the first batch of freezers initially functioned well, a subsequent design change in the same product resulted in widespread problems. Four freezers broke within the first 12 months and only four lasted more than 2 years. Servicing and repairing the freezers through the Honiara-based supplier was a significant challenge and expensive due to the remoteness of the freezer locations.

Future potential

The solar-powered freezer piloting by the WARA women demonstrates the strong potential to operate small businesses associated with cold storage in remote rural communities. However, resolving the technical flaws associated with some freezer units is essential to enable the ongoing operation of such enterprises.

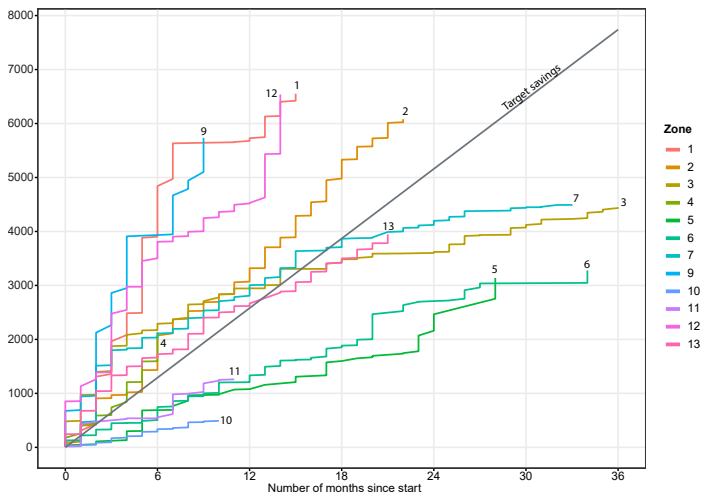
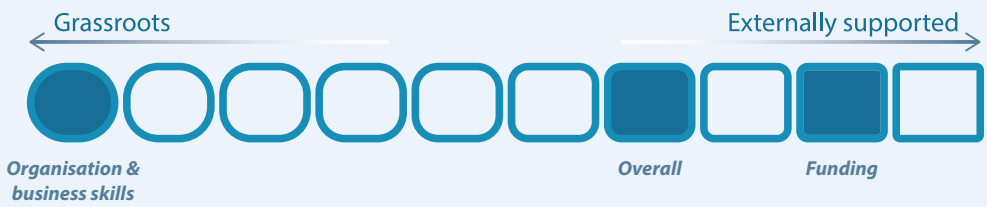


Fig 2. Cumulative fees collected by each freezer Zone committee since installation. Each curve stops at the point when the freezer broke (most) or our data collection ended.



This innovation required a high level of external support as project funds were used to acquire, install and maintain the freezers. However, the idea and success of operating the freezers as viable income-generating enterprises was solely due to the experience, knowledge and skills of WARA members.

Sources:
For more information refer to: Batalofo, M., Aruhe'eta Pollard, A., Ride, A., Hauona, E., van der Ploeg, J., Isihanua, M., Roscher, M., Sukulu, M. and Eriksson, H. (2023). What can the experiences of rural women in Solomon Islands teach us about innovation in aquatic food systems? Asia Pacific Viewpoint. https://doi.org/10.1111/apv.12383

About:
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