Better processing and marketing of healthy fish products in Malawi

The challenge

In Malawi, fish provide 70% of the animal protein in people's diets: small fish, in particular, are a vital source of calcium, vitamin A, iron and zinc. Once caught, most fish are sun-dried, smoked, parboiled or pan-roasted. However, peak fish catches in Malawi coincide with seasonal rains and high humidity, which interfere with drying and smoking. Open-air drying of fish results in insect infestation, dust accumulation, and contamination by animals. The smoking of fish over open fires leads to high levels of smoke deposits. As a result, over 40% of the fish catch in Malawi is lost during processing, with a major impact on fish consumption in the country. The high losses are also contributing to a decline in the fishing sector, whether as a source of nutrition, income, or employment.

Objectives

To test and promote fish solar tent dryers to reduce post-harvest losses, while increasing economic gains and reducing the use of forest resources.

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Esnart Mhone drying fish in a solar tent dryer at Msaka

The solution

- Existing fish solar drying technology has been adapted and redesigned in order to reduce post-harvest losses, improve the quality of fish products and increase economic gains.
- The fish solar tent dryers are made up of a UV-treated polythene 200 micrometre sheet fixed over a wooden frame. The solar dryers have inlet air vents at the bottom and outlet air vents at the top of both sides, to provide natural air circulation and to speed up the convection current process. Fish are spread on drying racks within the tents.
- The project tested the effectiveness of the solar fish drying tents for three Lake Malawi small fish species – Usipa (*Engraulicypris sardella*), Utaka (*Copadichromis spp.*) and Ndunduma (*Diplotaxodon spp.*).
- The performance of the technology was assessed by comparing the fish quality and drying rates of fish dried in solar drying tents and in the open sun.
- The project worked with fish processing groups to: provide support in fish processing and marketing; train local artisans in the construction of dryers; and provide finance linkages to the cooperatives.
- Packaging has been introduced by the project as a value-adding activity, and the sale of packed solar-dried fish has been tested in supermarkets and local markets to assess consumer preferences.

Key results

Increasing production and reducing post-harvest loss

- Examination of fish post-harvest losses in May 2017 showed that, after using the solar tent dryer, the total estimated loss along the value chain in Malawi is 22.25% compared to 30-40% using traditional methods.
- At the fish processing node of the value chain, only 0.8% of fish is lost when using solar tent dryers compared to 11.3% when open-air sun drying.
- The solar tent dryers have an 80% probability of being profitable.
- Compared with traditional open sun drying, the study findings show that the drying time for fish in the solar tents was similar during the dry season, and shorter during the rainy season.
- Solar-dried fish and open sun-dried fish have similar crude protein and fat content but solar-dried fish have significantly lower moisture, ash content, and microbial load than open sun-dried fish. The low moisture content and microbial load leads to a longer shelf life (seven weeks compared to three weeks for sun-dried fish).
- The output from solar tent dryers is estimated at 86,685.50 kg, which has a monetary value of over US$540,000. The dryers have supplied fish to over 17,000 consumers.
- The reduction in quantitative and qualitative losses ensures that the tents increase fish supply without increasing fishing effort.
- Of the consumers supplied with healthy fish, about 900 are secondary school pupils who are now having fish in their diets twice a week.

Increasing access to resources, markets and incomes

- Consumers have shown higher levels of acceptability for solar-dried fish than open sun-dried fish in terms of smell, color and taste.

- More women (78) than men (45) are using the solar tent dryers, and more women (23) than men (12) have started accessing formal lucrative markets where they receive double the price for their products compared with traditional markets.
- Over 10 formal lucrative markets have been accessed by fish processors. Solar tent dried fish is also sold at local markets in central and southern regions of Malawi and in Chipata in Zambia.
- There are 188 individuals (123 women) using solar tent dryers, compared to none at the start of the project.

Gender equity and empowerment of women

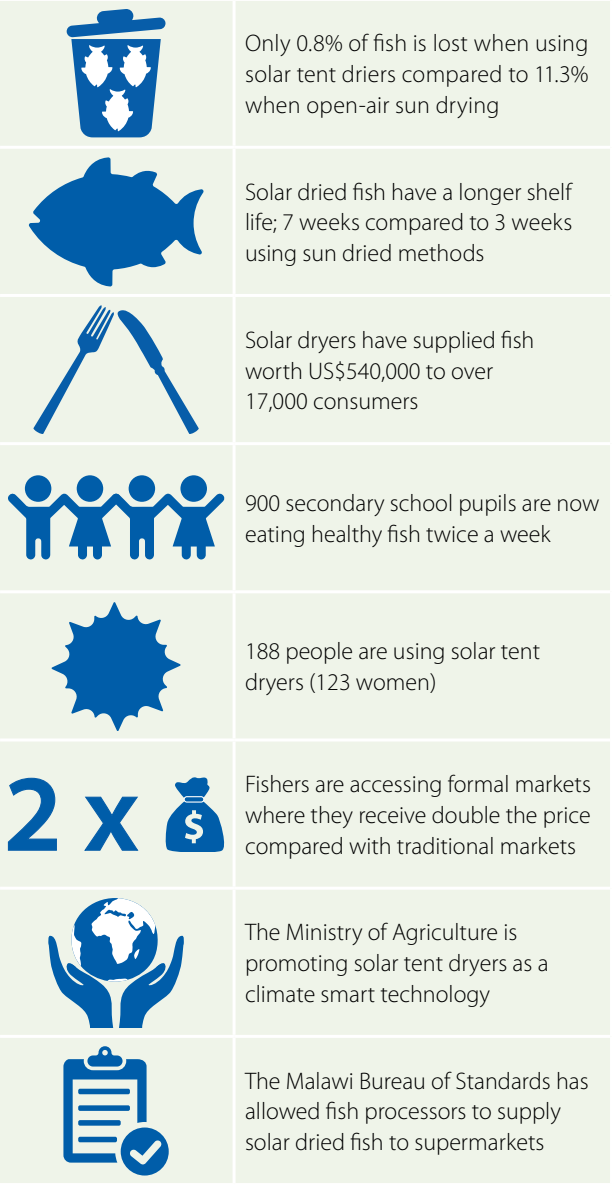
- Men have more input than women in decisions regarding the use of income from fish-related activities.
- The attitudes of men and women on women's leadership and involvement in fish-related activities are statistically similar. This implies that gender transformative activities need to involve both sexes.
- Through gender transformative approaches in the project's sensitization training sessions, more men are now encouraging women's full participation in using improved fish-processing technologies and accessing markets.

Capacity and policy influence

- The Malawi Bureau of Standards certified solar tent drying and solar tent dried fish as safe for human consumption in July 2016. This certification has allowed fish processors to supply fish to supermarkets.
- Supermarkets and other formal markets are attracted to solar tent dried fish because of the longer shelf life.
- The Ministry of Agriculture has chosen to promote the solar tent dryers as a climate smart technology. They have given the technology a local name '*Samva Nyengo*' which emphasizes that solar tent dryers are effective in all weather conditions.

Conclusions and recommendations

- The Fisheries Department recommends the out-scaling of fish solar tents to all water bodies in Malawi to expand on the project's results.
- The duration of the project was not long enough to observe tangible changes for some project outcomes.



- We recommend that future projects conduct capacity building training on gender and communication from the outset to optimize fisherfolk engagement.

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