

## Establishment of the first private tilapia hatchery in Fiji by a woman after Tropical Cyclone Winston – A case study

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### Introduction

The Increasing Agriculture Commodity Trade project (IACT) Phase I started in June 2011. It was funded by the European Union (EU) and implemented by the Pacific Community (SPC). It focused on increasing and strengthening export trade within the agriculture, forestry and aquaculture sectors in 15 Pacific countries belonging to the African, Caribbean and Pacific Group of States. The EU provided a total of EUR 8 million for the project, which ended on 14 March 2017.

On 20 February 2016, the Category 5 tropical cyclone (TC) Winston struck Fiji. It was one of the strongest cyclones ever experienced by Fiji, and caused massive and destructive damage on many Fijian islands, killing 44 people. It also directly affected many beneficiaries of IACT Phase I, who were involved in agriculture, forestry or aquaculture activities.

Following a post-disaster needs assessment, the EU delegation to Fiji decided to reallocate the remaining funds of EUR 2.2 million from IACT Phase I to support emergency assistance to the agriculture and fisheries sectors. The IACT TC Winston Recovery Action Project was then established within IACT to use these funds.

The aquaculture sector was one of the beneficiaries of the IACT TC Winston Recovery Action Project. The project assisted tilapia, pearl, crab and prawn farmers. This case study highlights the support provided to and results obtained by one of the tilapia farmers, Katarina Baleisuva.

A key achievement of the project was the establishment of the first private tilapia hatchery in Fiji by Katarina. After over 40 years of research and tilapia farming by the Ministry of Fisheries, the establishment of a private hatchery by a female tilapia farmer is a highlight for the Fiji aquaculture sector, and for the IACT TC Winston Recovery Action Project.

### Data collection

The case study is based on data collected during an interview (Figure 1), from questionnaires answered by the beneficiary, from project documents, from the project database and also from other sources such as the final narrative report for the IACT TC Winston Recovery Action Project.

Generally, the case study included the collection of information on:

- the beneficiary's situation prior to TC Winston (size of business, type of trade, and benefits to suppliers or harvesters);
- the impact of TC Winston on the business (impact on the supply chain and impact on trade);
- solutions envisaged (how equipment and services provided by the project could assist in solving problems);
- the overall impact of the project;
- the negative and unforeseen impacts of the project; and
- planned investments by the beneficiary.

### Tropical Cyclone Winston – before and after

Prior to TC Winston, the Ministry of Fisheries hatcheries in Navua and Naduruloulou had the capacity to supply tilapia fry and fingerlings to tilapia farmers to meet their demand. This capacity was lost with the destruction of both hatcheries during TC Winston.

Katarina Baleisuva's farm is on a 5-acre lot in Nakasi, just outside of Suva. Prior to TC Winston, Katarina was producing and selling tilapia at local markets. She was also



**Figure 1.** The author (left) interviewing tilapia farmer Katarina Baleisuva inside her hatchery (under construction).

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producing vegetables (beans, cabbage and local spinach) and tropical fruits (watermelon, passionfruit and pineapples) and selling at local markets. The tilapia ponds and the vegetable crops were severely damaged during the cyclone. As there was no fry or fingerlings available to restock ponds after TC Winston, the farm had to stop producing tilapia.

## Solutions

The solutions identified for recovery after TC Winston included addressing the need for hatcheries in the aquaculture sector. Five tilapia farmers whose farms had been damaged by TC Winston were supported by the project to attend a two-week training course at the Asian Institute of Technology Aquaculture Center in Thailand. The course provided training to enable the farmers to establish private tilapia hatcheries in Fiji to complement the work of the Ministry of Fisheries hatchery rehabilitation.

The main objective of the training was to help tilapia farmers acquire the skills to breed and manage tilapia fry and fingerlings in a commercial hatchery. They were also taught how to manipulate the sex of the fry to produce all male fish (which are preferred for culture because they grow faster than females), and good management of a tilapia hatchery operation. Katarina Baleisuva was the only female participant on the course.

Further training was delivered by the Asian Institute of Technology Aquaculture Centre in Fiji, on the management of tilapia broodstock. The IACT TC Winston Recovery Action Project funded this training, for Ministry of Fisheries hatchery staff and the future private hatchery operators. The participants also learned how to maintain the genetic

quality of the broodstock. Tilapia eggs were sourced from the Ministry of Fisheries to ensure the highest possible genetic quality.

## Equipment provided and additional investment

The project supplied aquaculture equipment and building materials to Katarina's farm so she could establish a private tilapia hatchery. Katarina provided the labour to build the hatchery (Figure 2). The equipment was imported from Thailand and the building materials were sourced locally in Fiji. The project also provided fish feed, and 'hapa' nets (Figure 3) to contain the juvenile tilapia fish and reduce feed waste.

Katarina borrowed money to dig additional ponds and build raceways for the raising of tilapia fry and fingerlings. With the additional ponds, Katarina's production of tilapia doubled. Katarina also borrowed money to improve the drainage and quality of the ponds to prevent future flooding damage.

Additional water tanks were bought by the project and were installed by Katarina to improve water management on the farm, including during drought periods. The new raceways will be built when the hatchery is completed, and the additional tilapia fry and fingerlings will be used by Katarina's farm, and will also be sold to other farmers to provide additional income for the farm.

## Impacts of the project

Without assistance and funding from the project, the hatchery would not have been established. The training provided improved farmer knowledge on tilapia farming management techniques, especially tilapia breeding techniques. The farm has been greatly improved, and this should have an impact on the business and the tilapia aquaculture sector in general. Tilapia production has doubled at Katarina's farm as a result of the new ponds and the improved quality of the ponds.

Recovery from TC Winston would have been extremely difficult without assistance from the project. Without support, Katarina would have had to replant vegetables and fruit trees and then wait for them to mature before she could sell them in order to have money to repair the tilapia ponds. This would have taken many months. The assistance provided by the project enabled quick recovery after the cyclone. Investments in training and the establishment of the hatchery have also benefitted Katarina and other tilapia farmers in the supply chain. The private hatchery establishment will lessen the reliance of tilapia farmers on government-run hatcheries.



Figure 2. Tilapia hatchery under construction at Katarina's farm.



**Figure 3.** Hapa net installed in a tilapia pond in Katarina's farm.

## Recommendations

One recommendation would be to continue establishing private hatcheries in different parts of Fiji as an extra source of income for farmers. This would also mean that the increasing number of tilapia farmers would not have to totally depend on government hatcheries for supplies after a major disaster.

Improving the quality of ponds to prevent damage from flooding is critical for tilapia farmers. This generally involves making sure that proper drainage is planned and developed for the farm. Flooding is common in Fiji because of heavy rainfall during the wet season and cyclones, and usually causes an extensive loss of tilapia.

Another key factor in tilapia farming is ensuring that the farm is able to survive with additional income from alternative sources. Some tilapia farmers in Fiji undertake mixed farming and produce tilapia, vegetables and/or fruits at the same time.

Tilapia males are preferred for culture because they grow faster than females, according to Katarina Baleisuva. Females use more energy in reproduction and do not eat when incubating eggs so their growth is slower than that of males.

Therefore, by increasing the proportion of male fingerlings in their production, tilapia farms will become more productive, according to Katarina.

A good source of water is important for tilapia farms, and for Katarina's farm the additional water tanks will provide extra water during drought. A further recommendation is to help tilapia farmers dig boreholes to supply additional water, and to mitigate against flooding and natural disasters. The water can also be used for irrigation systems for crops within a mixed farming system, to increase production and provide other sources of income for the farm.

The strategic partnership between the SPC Aquaculture Section, the SPC IACT TC Winston Recovery Action Project, the Asian Institute of Technology Aquaculture Centre, the Fiji Ministry of Fisheries and the tilapia farmers was very important to the recovery effort.

It would be beneficial for tilapia farmers to set up a Tilapia Farming Association to strengthen the sector and to facilitate training, exchange of information, technology transfer and delivery of assistance during major disasters.

