

CAGE AQUACULTURE

Observations have shown that there is a decrease in catch from the lagoons in Mauritius and this has probably led to the development of an aquaculture industry for the production of fish by alternate means from fishing. In fact, aquaculture is a viable alternative to fishing and can increase fish production, create jobs and indirectly create additional income for coastal communities. However, many constraints have impeded the success of some aquaculture development projects, mainly because of the lack of monitoring at the technical level, incorrect selection of beneficiaries and insufficient attention to the technical and financial planning of this activity.



FISHERMEN INVESTMENT TRUST

The drafting of this Smart FICHE is a follow up to the project "Support for sustainable aquaculture development through the promotion of small-scale cage culture in the lagoon of Mauritius." This project was developed through a close collaboration between the Fishermen Investment Trust (FIT) and SmartFish Programme. The aim was to promote knowledge of aquaculture and its development, both for the fishers and the investors interested in diversifying their activities.

This document is for those Institutions and members of the Government of Mauritius involved in the planning and governance of the aquaculture sector. It aims to increase their knowledge about the activities carried out so far under the above project and to raise their awareness of the factors underlying the implementation of this activity in a sustainable manner.

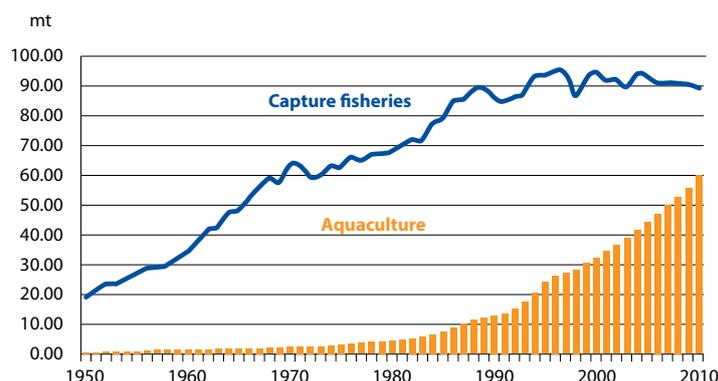
Beneficiaries actively participated in the assembly and installation of six aquaculture cages for fish farming during the first session of the two training courses. Day to day management of these cages were left to the beneficiaries with technical assistance from the Albion Fisheries Research Centre (AFRC). A second practical training course on management practices was held in January 2014 to better arm the beneficiaries who should now be able to conduct farming independently. In the first instance, management of the cages will be complementary to their fishing activities, however, once the business becomes profitable, aquaculture will be carried out as a full-time occupation. It is hoped that following the success of the initial pilot phase of the project and results obtained many more fishers will in the longer term be involved in a profitable and sustainable aquaculture business whilst reducing fishing pressure on the lagoon environment and thereby help preserve the vulnerable lagoon ecosystem.

ORIGINS, DEVELOPMENT AND CURRENT STATE

Aquaculture (the farming of aquatic species, such as fish, molluscs, shellfish and algae) is a long-standing practice. Over the past 25 years, its average annual growth has been of 8 % and now it contributes for 50 % of the fish production in the world.

The ability to use existing water bodies (which means a reduction of investment needed and reducing the need for land surfaces which are widely commended by other economic activities such as industry, agriculture and tourism) explains why a significant proportion (one-third) and growing global aquaculture production (excluding algae) comes from the exploitation of marine farms.

The use of cages to keep and carry fish for short periods is an ancient practice dating back to more than 2,000 years, probably in China. The first



systems were in reality nothing more than modified fish traps. This activity's current design dates back to the mid 1900s in Southeast Asia countries. The cages were made of a simple floating wooden structure, providing support to attach a net containing aquaculture stock. The main inputs came from the capture of wild juveniles stocked in cages and fish with low or zero market value, which then fed the farmed fish. In recent decades, these traditional systems (still used today) have evolved to modern cages, made with other materials (especially plastics and steel), using fingerlings produced in nursery stations (hatcheries) and various types of specially developed feeds. This allowed the establishment of industrial farms and large-scale breeding. It is important to note that the development of small-scale and large-scale aquaculture takes place in two different environmental and socio-economic contexts and both contribute significantly to the total global aquaculture production. These two types of aquaculture therefore require policies, strategies of governance and adequate resources to be able to develop their potential.

THE MAURITIAN CONTEXT

In Mauritius, the average consumption of seafood per capita per year is about 21 kg (50 % of which are imports). Approximately 2,200 small-scale fishers grouped into 32 fishing cooperatives/associations are engaged in artisanal fisheries.

Currently, the sector is facing a major crisis. The excessive fishing pressure and the use of illicit means, such as small mesh size nets and unauthorized spear fishing etc., have led to a dramatic depletion of lagoon fishes and shellfish. This decline in landings from the artisanal fisheries sector is a major cause of concern at the economic, environmental and socio-economic levels. Consequently, sustainable fish production in an alternative way from fishing and would greatly enhance the conservation of the lagoon ecosystem, which is a natural heritage and an important economic resource due to tourism activities. Furthermore, It would also create new jobs and yield better income to coastal communities. Both being priorities for the Government of Mauritius.

ACTIVITIES CARRIED OUT WITHIN THE PROJECT'S FRAMEWORK

The main objectives of the project were the training of two groups of beneficiaries of about fifteen persons each (fishers grouped in associations/cooperatives) and also included academics and AFRC technicians, on the construction of small farming cages and their settling at sea, as well as technical and financial management of a small aquaculture farm.



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Developing a sustainable small-scale Aquaculture in Mauritian lagoons

The training included theoretical and practical sessions on two different sites on topics such as:

- prior assessments of the chosen site, of the cage design and the species to breed;
- assembly and offshore installation of two different models of floating cages;
- main parameters of zoo technology involved in farming (volume and farming density, biomass, conversion ratio, growth rate, etc.);
- technical management of a farm (stocking a cage, food strategy, food administration, periodic sampling, nets change, structural maintenance, collection and recording of farm data); and
- planning and financial management of the activity (setting up of a business plan, a market analysis, marketing strategies).

This training has been designed this way to allow beneficiaries to undertake and conduct the breeding in a self-sufficient manner. Extension of the experience gained and the results achieved, whilst facilitating the dissemination of similar initiatives, from part of the project objectives. Also in this context, an illustrated manual covering all these topics is in preparation.



Breeding cages in Quatre-Soeurs © Florence WALLEMACQ/FAO

OUTCOMES

Six breeding cages were assembled and installed at sea (within the lagoon). They have already been stocked with fingerlings of the Rabbit fish better known as the "cordonnier" (*Siganus sutor*) in Mauritius, and culture trials are underway.

The beneficiaries have acquired knowledge and tools needed to manage a fish farm cage. Moreover, emphasis has been lengthily and repeatedly placed on the extreme importance of communication and collaboration among farmers since it is one of the key factors to achieve a sustainable development of this activity in the island.



Preparing the fish to go in the cages © Florence WALLEMACQ/FAO



Lady feeding the fish in the culture cage (daily) © Florence WALLEMACQ/FAO

It also appeared that the assessment of the mentality, aptitudes and socio-economic conditions are crucial for the selection of beneficiaries. Indeed, this activity – even on a small scale – requires an entrepreneurial approach. For this, a minimum of financial autonomy and good leadership represent assets with which to face the constraints and contingencies inherent in this sector.



Fishermen community of Quatre-Soeurs © Florence WALLEMACQ/FAO

CONCLUSIONS AND STRATEGIC VIEWS

Based on direct field observations, information obtained, and bibliographic research, we can conclude that the environmental characteristics and quite favourable logistics provide for a good potential for the development of sustainable aquaculture in Mauritius.

To ensure the success of similar initiatives, both here and elsewhere, the following are prerequisites:

- A legal framework governing the sector should be developed. It should especially:
 - Regulate the granting of concessions and licenses, while defining the use of the maritime public domain. This will ensure the integration of aquaculture among other spaces' users (tourism, shipping and fisheries) and avoid areas subject to possible sources of pollution (urban untreated sewage, fertilizers and pesticides from agriculture and industrial discharges);
 - Establish appropriate incentives to support neophyte farmers until they reach the technical and financial self-sufficiency. It is important to bear in mind that grants-in-aid have never led to the development of the sector. We must therefore intervene at other levels such as tax exemptions, loans, partnerships, etc.
- Availability of key inputs (fingerlings and feed for fish to grow) in sufficient quantity towards the targeted production objectives and at an affordable price with regard to the financial capacity of the farmers and the viability of the farming industry (taking into account the technical feasibility studies).
- Technical assistance must be provided through qualified technicians from public institutions or from abroad.
- A communication strategy should be implemented. Within society, aquaculture faces many rather unfavourable a priori comments. Thus, a national communication and educational activities strategy is desirable, in order to promote the image of aquaculture to the public.
- Meetings between fish farmers from different farms and regions should be organized from time to time in order to promote the sharing of experiences and information, and increase knowledge and awareness of the potential of culture. Moreover, these initiatives help to maintain enthusiasm and motivation of farmers.

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