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Case studies illustrating the benefit of using feasibility assessments including technical, economic, and social factors, in aquaculture

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Case studies

1. Working paper 1 explains how feasibility assessments can assist in identifying and reducing risks that may impede the success of aquaculture projects. To illustrate this multi-disciplinary approach, three case studies were mentioned. This information paper describes them in further detail.

Summary of Case study 1: Economic modelling for the establishment of an oyster farm in New Caledonia.

2. Rock oyster farming offers an opportunity for development of a sustainable livelihood that can be a source of income for local communities. New Caledonia (NC) has been working for several years on the development of local rock oyster production. In this frame, SPC worked with NC fisheries authorities and a project owner to assess the technical and economic feasibility for a rock oyster farm development in a remote area, and the context of a market dominated by imported oysters from France and New Zealand. This feasibility assessment, which included technical considerations and economic modelling, allowed sizing/scaling of the farm to decide on the most appropriate option of production method, according to the context of the farm location, the investment and operating costs that each option represents, and the market potential.
3. For each option considered, required equipment were listed and quoted, and investment needs were estimated. A six-year economic forecast including projected income and operational expenses was presented, and economic indicators (net present value and intern rate of return which assess the return on investment of each investment option) were calculated. The model enabled changes to the characteristics of each tested option (quantity of oysters produced, selling price, ratio collection – purchase of spats, price of spats) to find the most viable farming and marketing conditions.
4. Benefit of this assessment: the technical analysis allowed selection of the equipment most adapted to the local specificities (remote place, no electricity, high freight cost etc). The economic modelling turned out to be a useful tool which facilitated discussions between the project owner and the authorities. They could agree on a project which was not oversized, coherent with financial capacities, and with a marketing plan in line with the current and future potential demand. This work also provided evidence-based documentation to the authorities and to the bank (required to grant administrative authorisations and financial supports).

Summary of Case study 2: best candidate for finfish sea cage farming in Fiji.

5. With increasing pressure on coastal resources, the development of marine finfish aquaculture in the Pacific region, given the availability of advantageous marine farm sites in PICTs, seems a suitable strategy to pursue both for food security and economic development. This is of great interest in Fiji, where there are many sites suitable for marine finfish sea cage aquaculture. The main constraints are isolation from inputs, cyclones, and the availability and cost of feed, which is the most significant economic and logistical challenge to be managed.

6. Most promising species were identified (milkfish, rabbitfish, yellowtail kingfish, Pacific threadfin, grouper, grey mullet), SPC worked on the comparison of farming conditions of these species to identify the best candidates for sea cage farming in Fiji, that is the species which would be the most profitable for a small-scale production, according to the identified constraints. This consisted of a technical analysis to identify, list, and quote the equipment required for sea cage farming and the most suitable to cyclone risks. Then, capital costs, revenues and operating costs generated by the farming of each species were estimated and compared, according to their production cycles and their feed needs.
7. Benefit of this assessment: This work, combining technical and economic factors, gives a picture of the fish farming reality and helps to choose the farming conditions ensuring a sustainable and profitable activity. The assessment of the cost of inputs and the income can also help for fish pricing and marketing strategy. A socio-economic survey would complement this analysis and give additional information on the market demand, the consumption habits, or the cultural use of the fish, which could, in combination with the other factors, influence the choice of species to be farmed in a sustainable manner.

Summary of Case study 3: Socioeconomic assessment to inform the development of mangrove oyster aquaculture in Fiji.

8. Women from Muanaira village in the Rewa Province in Fiji had been harvesting mangrove oysters for many years. Scientists from the Fisheries Research at Fiji's Ministry of Fisheries, the Pacific Community and Vutia community members teamed up to test the development of an oyster aquaculture programme¹. A study to better understand the social and economic context was conducted in 2019, including gender-specific issues and opportunities². This study also included an analysis of current and potential markets, providing guidance on optimisation pathways of the value chain³. The socio-economic and value chain analysis complemented the technical studies to assess the feasibility of this initiative.
9. The socio-economic assessment identified the main species targeted (*Crassostrea* sp., introduced in the 1970s), processing and distribution strategies (mostly cooked and shelled, and sold in plastic buckets to friends and relatives, and in specific markets). It also helped to map the areas mostly used, characterise the people involved and their roles (women did most of the harvesting, but some of their partners sometimes accompanied them to help carry the oysters), the importance for income (mostly secondary) and the main constraints (transport limitations and costs, and biological/bacterial/viral contamination).
10. The aquaculture trial showed that spat collected in their harvesting grounds and grown in nursery bags grew quickly and could represent easier access to the resource and higher productivity, both factors

¹ Jimmy R. 2019. Fiji's Muanaira Women's Group sees promise in pilot mangrove oyster farm. SPC Fisheries Newsletter 159:12. <https://purl.org/spc/digilib/doc/jvvw8>

² Kinch J., Vitukawalu B., Nalasi U., Waqainabete P., Bermudes M. 2019. Socioeconomic aspects of oyster harvesting in the Rewa River delta area, Fiji. SPC Fisheries Newsletter 159:45–54. <https://purl.org/spc/digilib/doc/wemnn>

³ Kinch J., Yabakiva M., Waqainabete P., Nalasi U., Pickering T., Ravunamoce P., Romeo A. 2020. Exploring the market potential for Fiji's Rewa River oysters. SPC Fisheries Newsletter 160. Noumea, New Caledonia: Pacific Community. 48–54. <https://purl.org/spc/digilib/doc/3inzd>

increasing the likelihood of this activity becoming a more important food and income source. Since then, more communities are involved in oyster farming.

11. The value-chain analysis showed that selling price could improve and processing costs could be reduced if oysters were to be sold to higher-end clients, like hotels and restaurants. Some of these were interested, and in fact some raw oysters are sold today. These go through a depuration process before consumption. No health issues have been signalled, but a closer monitoring of identified food safety issues should be in place.
12. Remote sensing data for coastal productivity shows several areas in Fiji could possibly support the culture of rock oysters. Integration of spat collection with on growing in different communities and areas may reduce food safety risks and result in a more widespread benefit for a developing industry.