

PROJECT BACKGROUND

The village of Placencia, located on the coast in the Stann Creek District has a population of about 750 permanent residents. Historically, Placencia has depended on the fishing industry as its main sources of economic activity with the formation in June 1962 as the Placencia Producers Cooperative Society Limited (PPCSL). As a Cooperative the PPCSL is a registered and legal entity under the Cooperatives Act. It started with over a hundred members and processed mainly lobster, conch and whole fish for export. These commodities allow the cooperative in its early years to employ over 30 persons – *mainly women* in the processing facilities while maintaining a generating plant that provided electricity to the whole community until the Belize Electricity Limited came in the late 1990s. It is estimated that in the height of its production the PPCSL provided livelihood for over a hundred fishermen who were earning in the region of BZE\$40,000 to BZE\$50,000 per annum each. Today, there are only some (57) active fulltime members and approximately fifty (49) producing non-members who live mainly in Placencia and the neighboring community of Monkey River.

The PPCSL has discontinued its own processing operations mainly due to a reduction in volume of products as well as from the devastating effects of an earthquake in 2009. The PPCSL now buys freshly-caught marine products from its members and transports them overland to a sister cooperative Society in Belize City, National Cooperative Society Limited, for export. In 2011 the Society sold some US\$90,000 in marine products. Lobster remains the most valuable catch, accounting for 50% of total production.

The Cooperative completed a project funded by SGP/COMPACT in 2013 that established ten sea weed farms and train fisher folk in the maintenance, harvesting, production and marketing of seaweed. Under the project the PPCSL established over 10,000 ft. of seaweed farms, and currently have in stock over 400 pounds of dried seaweed. Sales in 2013 were in excess of \$10,000.00 Belize Dollars.

The Purpose of the Project is to expand the economic and livelihood alternatives for fishers through sustainable mariculture in the Southern Belize Barrier Reef Complex. This diversification project is aimed at the southern area of the Central fishing region. It is meant to increase the options for developing new economic opportunities for fishers who are currently dependent on the main commercial species. The target product for this project is the production of seaweed specifically two main species. These are *Euchuma isoforme* and *Gracelaria spp* both of which are commonly available in the wild in the area. There are many uses for seaweed ranging from food to cosmetics. The project aims to profitably farm and market seaweed products in processed form both for the local and export market.

Project Objectives

General Objectives

1. PPCSL seaweed farms expanded in the Gladden Spit and Silk Cayes Marine Reserve.
2. Process and package value-added products developed from seaweed.

3. Business and marketing capacity of PPCSL improved.

Activities

1. Expansion of seaweed farms in Gladden Spit and Silk Cayes marine reserve.
 - a. Obtaining building materials and establishing 60 farms
 - b. Monitor and maintain farms
 - c. Harvest and dry sea weed
 - d. Rehabilitate fish trawler boat
 - e. Recruit and train 25 new fishers from Placencia
 - f. Prepare a seaweed production manual
2. Package and Process value-added products developed from seaweed.
 - a. Process seaweed into gel and powder form
 - b. Recruit and train require personnel for processing
 - c. Develop locally made soap from seaweed
3. Improve business and marketing capacity of PPCSL
 - a. Revise existing business plan
 - b. Develop and implement radio and television advertisement
 - c. Participate in local trade fairs and expos
 - d. Establish formal distribution channels for seaweed products locally and internationally

Expected Results

The project is intended to bring economic, social and environmental benefits. The project aims to provide current membership of the PPCSL and their households an alternative that brings equal economic benefit as capturing lobster or conch. It aims to recruit twenty five (25) additional member fisher folk from the PPCSL, and employ ten (10) women and youth to engage in the processing and packaging of seaweed in dried, gel and powder form and in soap making. At the same time the wider environmental benefit to be gained is by further reducing the fishing pressures within the Belize Barrier Reef Reserve System – World Heritage Site. This project will benefit each participant in providing them additional income from sales of seaweed locally and internationally and provide additional jobs for women of the community who have always been an integral part of the development of the Placencia Producers Cooperative Society Limited.

Expected Impacts

The impact of aquaculture on the environment and effects of environment on aquaculture production have become important issues in recent years. While there is evidence from many countries that environmental deterioration is a major threat to aquaculture production and product quality, the reverse is true in the case of seaweed aquaculture. There have been several recent reviews of impacts associated with finfish (Beveridge, 1984; NCC, 1989), mollusc (ICES,

1989; NCC, 1989) and crustacean (Phillips et al, 1990) culture but there is little information on seaweed culture. Seaweed culture is practiced using a very diverse range of culture methods and each of these methods will interact with the environment in different ways. The nature of this interaction and environmental impact will depend on the method of culture, the surface area (and three dimensional volume) of the farm, and the site where the farm is located. In general, several physical impacts can be recognized, which may have both positive and negative effects on the environment. Positive effects include increased shelter for sensitive species, improved production and management, and more wildlife that thrive off of seaweed. Some of the negative impacts include the potential loss of native species and habitat diversity, increased sedimentation, and ecosystem changes that can not be foreseen.

Alteration of the seabed and adjacent areas – Installation of anchors and similar containment structures could result in some damage to coastal ecosystems, primarily the seabed, and in some instances the loss of some species of conservation interest, such as seagrasses (Pullin, 1989). The routine management of seaweed farms in shallow waters, such as *Gracilaria* or *Eucheuma* farms, can result in additional damage through trampling and accidental damage. The physical shading of an area by seaweed farms may also occur, resulting in changes in benthic communities and primary production in the water column (later section) although these effects have not been well studied.

Additionally, intensive, large-scale seaweed farming could have impacts on the physical environment, such as changes in patterns of sedimentation, changes in water movement, erosion, depletion of nutrients, competition with native primary producers for nutrients, alteration of habitat prior to farming, shading of the benthos (especially corals), and addition of detritus from decaying seaweed (De Silva 1999, as cited in Crawford 2002; Tang and Fang 2002).

Navigation Hazard - The main physical impact of sea-based systems probably stems from the large surface area required for viable seaweed culture in many areas but there may be others caused by site preparation, routine management and the culture system. In areas where floating lines cover large areas they become a hazard to safe navigation.

Settlement site and attracting juveniles - Introduction of seaweed culture rafts, ropes, anchors and other structures can increase the surface area of substrate, which particularly in open waters may enhance production of other marine organisms, particularly in otherwise barren areas, much in the same way that artificial reefs have been shown to do (see below). Seaweed culture may also be used very effectively to rehabilitate degraded coastal areas and enhance production from otherwise unproductive and barren environments. Seaweeds are known to be habitat-creators, forming refuges and feeding grounds for a variety of fishes and invertebrates (Limbaugh 1955). For example, *Eucheuma* spp. farming has been shown to increase fish and shellfish populations in surrounding areas (Crawford 2002).

MITIGATION MEASURES

As with any aquaculture operation, mitigation measures are an integral part of management best practices. There is a direct relationship between the quality of the management and the level of production. It is therefore of economic importance to ensure that the seaweed beds are properly managed.

Alteration of the seabed and adjacent areas

The operation will be sited in areas of low biodiversity. The current location at Little Water Caye will be maintained primarily to obtain seed material but will not be expanded. The site at Gladden Spit will be expanded only to the areas where there is no grass or coral cover on the bottom. All new areas will follow the guidelines used for site selection at Gladden Spit.

To reduce the direct impact of anchors and containment structures they will be designed to occupy as small a footprint as possible and will be placed in areas where they do not contact benthic flora or fauna.

As part of the operations procedure, spacing of plants on the line will be close enough to optimize the available resources but far enough apart to allow light to penetrate. There is five feet of spacing between lines, which is more than adequate to allow light to reach the bottom, even on heavily seeded strings. Strings will be suspended mid-water to reduce contact with the bottom since studies have shown that the species being cultivated perform better when suspended.

Navigation Hazard

Sites will be selected that are away from the regular navigation channels. In addition, sites will be clearly marked with the required navigation aids, primarily marker buoys.

MONITORING PROGRAM

There is no need for a separate monitoring program as the information collected as part of the daily operations will be sufficient.

LINES OF RESPONSIBILITY

The operations manager will be responsible for all onsite activities and will report back to the Managing Committee of the Cooperative.

COST ESTIMATES AND SOURCES OF FUNDS

The cost of providing the necessary mitigation measures is already built into the operational costs.

ADDITIONAL INFORMATION

