

Recent Activities in the Tsunami Affected Zone of Aceh Province, Indonesia

Indonesia is one of the major seaweed producers in the world. Seaweed farming is widely recognized as one of the most sustainable forms of aquaculture and an opportunity for small-scale producers to grow locally edible crops and to produce commodities, agar and alginates, which are in demand for international trade. *Gracilaria* is a genus of red algae notable for its economic importance as an agarophyte, as well as its use as a food for humans and various species of shellfish. Agarophytes produce the hydrocolloid agar as part of the makeup of their cell wall. This agar can be harvested commercially for use in biological experiments and culturing.

The people of Aceh had not been involved with seaweed farming before the tsunami in 2004 and Aquaculture without Frontiers (AwF) volunteers felt this was an opportunity to assist those impacted to develop a more sustainable aquaculture industry as they rebuild.

AwF, founded in 2004, was established for the specific purpose of promoting and supporting responsible and sustainable aquaculture to assist in poverty alleviation through improving rural livelihoods in developing and transition countries.

Polyculture of seaweeds in shrimp ponds or in the effluent ponds was one of the Best Management Practices suggested by Food & Agriculture (FAO) recovery experts, and the Indonesian Aquaculture Directorate. A hatchery and farming manual for *Gracilaria*, a red seaweed with several commercially attractive aspects, was distributed to 150 farmers at a series of workshops. The goal of the training was to explain the concepts of nutrient cycling and pond dynamics so that the farmers could see for themselves the benefits of incorporating seaweeds or other plants to absorb the wastes from shrimp. In creating a valuable secondary crop, the farmers also reduce water pollution and increase the sustainability of their shrimp farming practices.



A red seaweed, Gracilaria, being harvested for food production in Indonesia.

Volunteers also met with hatchery owners and described the potential for providing initial seaweed stocks for farmers to place into their ponds.

AwF supervised the transfer and expenditure of funds originally provided by the YSI Foundation for a project in which two tons of an endemic species of *Gracilaria* was transported from hatcheries on Java to Sumatra to start seaweed culture. The primary market for the *Gracilaria* is expected to be for agar; however, its use has also been promoted as a nutritious sea vegetable for human consumption. Edible seaweeds are an important part of the diet in other regions of Indonesia as well as most East Asian cultures.

A series of trials in four different villages growing *Gracilaria* in shrimp ponds has demonstrated rapid seaweed growth and improved water quality. At harvest time, we

anticipate significantly improved shrimp growth and survival. A commercial agar producer has agreed to visit Aceh to negotiate purchases of the seaweed now growing in the ponds.

In an on-going partnership, United States Agency for International Development (USAID) has provided support for two scientists from Southeast Asian Fisheries Development Center (SEAFDEC) in the Philippines to travel to Aceh to conduct workshops in the villages growing *Gracilaria* and to demonstrate back yard agar production and its use as an ingredient for candies, desserts, and other foods.

Another aspect of the seaweed culture project was to develop raft culture of *Gracilaria* in the ocean. Assistance was provided to two fishing cooperatives with instruction and materials for raft construction and placement in protected ocean locations. *(continued)*

These rafts initially were quite successful, but one location was later plagued with storm damage and excessive grazing from wild fish and turtles. Economic analyses showed that sales of the seaweed from the rafts could generate income well in excess of what farmers had been generating from shrimp production alone.

The YSI-AwF-World Aquaculture Society (WAS) effort also supported the restoration of three small shrimp hatcheries. In addition to financial and technical support for repairs, the hatcheries were encouraged and trained to consider alternative species for culture in their facilities (tilapia, milkfish, seaweeds, and groupers). Training was also provided in biosecurity and with a focus on the endemic species rather than imports of exotic species. Equipment for sustainable collection of wild breeders was provided along with training to improve efficiency and survival of post-larvae (PL). Provision of high health PLs will be critical to the long-term sustainability of shrimp farming in Aceh and to the development of local and international markets for the shrimp produced.

Mangrove restoration has been a goal of both the aquaculture community and the environmental (Non-Governmental Organization) NGOs, in the tsunami zone specifically and globally in general. Many tsunami damaged ponds have been replanted with mangroves in order to restore natural functions as well as to serve a role as a biofilter for shrimp effluents. Some farms have also planted mangroves along the pond shallows and on the dikes to support the pond ecosystem and to treat wastes. Provision of substrates for bacterial and algal colonization and shrimp grazing has been promoted by many biologists as contributing to a more sustainable production system. SEAFDEC has published a text on Mangrove Friendly Shrimp Aquaculture which provided several worthwhile examples and technical descriptions. AwF volunteers have used these documents in their workshops to train the shrimp farmers in the techniques and explain the benefits.



Farmers inspecting crops attached to ropes in the shallows.

The long-term restoration of the industry will depend most directly on sustainability and the ability to market products meeting sustainable criteria. Several large seafood customers have offered to purchase aquaculture products from the tsunami impacted area as soon as sustainable certifications can be obtained. They are considering both the humanitarian issues of supporting the people and their livelihoods but, just as importantly, they would like to ensure a continuous supply of high quality products for international markets. This would surely be the most encouraging and worthwhile outcome from one of the worst humanitarian and natural disasters in history. Organizations such as

Aquaculture without Frontiers and World Aquaculture Society, in cooperation with YSI, Inc., are helping ensure healthy, productive livelihoods for the people in Aceh Province.

For additional information about Aquaculture without Frontiers, please visit:

www.aquaculturewithoutfrontiers.org

For additional information about the World Aquaculture Society, please visit:

www.was.org

For additional aquaculture information including specifications on the YSI instruments, please visit:

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