

This is a category III project according to IIC's environmental and labor review procedure because specific impacts may result, which can be avoided or mitigated by adhering to generally recognized performance standards, guidelines or design criteria. The review of this project consisted of appraising technical and environmental information submitted by the project sponsor, as well as site visits. The following potential environmental, social, health and safety impacts of the project were analyzed:

- Mangrove vegetation
- Water use and wastewater management from production and processing activities
- Solid waste management
- Food hygiene
- Occupational health and safety issues and labor practices.

Aquamar plans to obtain ISO 14001 certification in Environmental Management Systems for both its production farm and processing plant as well as ISO 9001 certification in Quality Control, thus demonstrating the company's commitment to environmental and food safety issues. The US\$10 million project is designed to help Aquamar build a new tilapia processing plant to replace the current plant, which it shares with two other tilapia producers. The US\$5 million loan will permit the Company to build the new plant with three production lines: fillet processing; a whole fish line; and a value added product line, consisting of shaped and breaded portions. The company will also build a dehydration plant to produce animal feed from fish scraps from the processing plant, as well as a plant that will prepare fish skins from the processing plant for export. The technology to be used at the new processing plant will allow processes to be more efficient, resulting in product quality upgrades and in environmental improvements. The principal environmental improvements will include better management of solid and liquid waste and an improvement in working conditions.

The new processing plant will be located 30 km from the airport of Guayaquil, Ecuador, near the town of Milagro. The production site consists of production ponds and hatchery facilities, which are located on the coast of the Gulf of Guayaquil in the Churute area (approximately 1.5 hours from the City of Guayaquil).

**Mangrove vegetation and local fauna:** The earth-based grow-out ponds were built considering the natural contour of the surrounding mangrove vegetation, as is evident in the irregular shape of the ponds. Prior to the property being converted to production ponds it had scarce vegetation and was used as pasture for cattle. The company has made an important investment in the early growth ponds by providing bird netting over the ponds to prevent predation by birds such as ducks, egrets, herons and seagulls. Not only does this protect the fish when they are most vulnerable due to their small size, but it also protects the local avifauna from being harmed by other attempts to limit their predation.

**Introduction of non-native species:** Aquamar has screens at production pond discharge points in order to avoid the risk of tilapia escaping into the surrounding area. Also, the fact that the ponds are earth-based and do not involve cages in open waterbodies further reduces the likelihood of releases of tilapia into local waterbodies.

**Water Use:** The new processing plant will use water from a groundwater well (30,000 cubic meters on a monthly basis). The aquifer resources in the area are reported to be abundant, so the project is not expected to affect the local water supply. Water used for the production ponds will be obtained from the Soledad estuary, which is part of the Gulf of Guayaquil.

**Liquid and Gaseous Effluents:** The liquid effluent from the processing plant and the skin preparing

plant will receive aerobic biological treatment, followed by secondary clarification before being discharged. The solids retained in the treatment process will be pressed and sent to the feed plant, where wet exhaust will be biofiltered prior to discharge. Human sewage will be treated in an on-site septic system.

The liquid effluent from the farms will not contain inorganic fertilizers or antibiotics since neither is used there, thereby avoiding algal blooms, and the creation of nutrient-rich water that could upset the ecological balance of the receiving estuaries. Feeding regimes are carefully monitored to control the increase of organic discharges. After each cycle, ponds are sun-dried for at least four weeks to allow organic remains to oxidize.

*Solid Waste Disposal:* Organic waste, such as fish scraps (i.e. fish heads, entrails, etc.) will be sent to the dehydration plant that will produce balanced feed for poultry, pigs, dogs, cats and shrimp. Other waste, such as leftover food from the cafeteria on site will be sold to local swine farmers for feed. Other domestic waste generated will be collected and disposed in a municipal landfill.

*Cold Storage:* The Company will utilize an ammonia based cold storage system. No chlorofluorocarbons will be used in the refrigeration units at the new processing plant.

*Quality Control/Food Safety:* The company is preparing to adopt international food sanitary standards and the food quality control system called HACCP (Hazard Analysis of Critical Control Points) that are mandatory for exports to the USA and the European Union. In addition, a private consulting company has been hired to undertake voluntary certification in ISO 9000 for quality control. The facilities will be equipped with foot-activated iodine-based hand washes at the entrance of the packaging plant and with lactic acid baths as a disinfectant for the fish.

*Emergency Response:* The Company will have an emergency response plan for its new processing plant and fish farms. The processing plant will be equipped with protective gear for persons that may be exposed in the event of an accidental ammonia leak from the cooling system. The plant will be equipped with alarms to notify workers of any leaks. The new plant will also be equipped with fire extinguishers, fire hoses that will be connected to the water supply, signage indicating evacuation routes, and an alarm system. Periodically, fire drills and simulations of evacuations will be conducted.

*General Health and Safety:* Workers at the processing plant will be provided with the appropriate protective equipment, health insurance, and first aid, as are the workers at the farms. Workers involved in filleting the fish at the processing plant will be provided with protective steel mesh gloves. All work related accidents will be recorded and analyzed continuously. Working conditions at the new processing plant are anticipated to be better since the work areas and bathroom facilities will be more spacious. Aquamar will also offer its employees occupational health and safety training, which will be described in the Environmental Management Plan. One component of the training will focus on prevention measures to avoid accidents, such as drownings in the fishponds and associated canals.

*Labor issues:* The Company respects the minimum work age of 18 years old. Workers at the existing plant and at the fish farms have not joined any unions, but are free to do so if they wish. The workers' accommodations and eating facilities provided for both permanent and temporary employees are in excellent condition with respect to hygiene and appearance. The dormitories are equipped with comfortable beds and lockers. The eating facilities are clean and spacious, and the bathroom and shower facilities are well maintained.

*Monitoring:* The sponsor will develop an Environmental Management Plan (EMP) based on the ISO 14000 guidelines, which will include a schedule for the implementation of environmental projects and a monitoring and reporting program to ensure that the plant facilities are complying with national laws and IIC's environmental guidelines. The EMP will describe who will be responsible for monitoring the implementation of environmental activities. The sponsors will submit an annual report summarizing the monitoring data related to occupational health and safety, accident reports, wastewater discharge, solid waste disposal, hygiene and quality control, food safety, and labor related issues.