



Figure 1: Tilapia farming, Inrapit in Malaysia.

Demand for Norwegian Aquaculture Competence in Southeast Asia

The Institute of Marine Research (IMR) plays a central role within aquaculture research in Norway, as well as internationally. This is one of the reasons that an increasing number of Southeast Asian countries requests aquaculture cooperation projects with Norway.

BY ROLF ENGELSEN

The last decade, Center for Development Cooperation in Fisheries (see fact box), have received numerous requests from Southeast Asia. The cooperation with Thailand is the most developed of the Aquaculture projects in the region, but IMR have, or have had, cooperation projects in Vietnam, Indonesia and Malaysia.

PILOT FARM AND TRANSFER OF OPERATIONAL KNOW-HOW

After the Tsunami in December 2004, the Thailand governments' fishery administration requested assistance to rebuild the aquaculture business in the Phuket region. The request included a Norwegian pilot cage farm, testing of the farm in tropic climate and transfer of know-how to the Thai personnel, to enable them to take over the day-to-day operation of the farm. The competence building was done throughout the value chain, from production of broodfish/fry to the market. The species chosen for the project has so far been cobia (*Rachycentron canadum*) and Asian sea bass (*Lates calcarifer*). The production is a success and Norwegian cages and operational knowledge passed the test in the tropical climate. The farm is connected to the Phuket Coastal Fisheries Research and Development Center (PCFRDC) north on the Phuket island which is one of the Department of Fisheries' central research facilities. The crew handles farming in what the Thai call "Norwegian big cages". The project also involves dealing with fish health issues and public management of "big cage" aquaculture. Hands-on training in aquaculture, in parallel with increased knowledge and acknowledgement of the importance of regulation and management within the sector, has proven to be a successful approach as compared to more theoretical cooperation models.

FRY PRODUCTION AND NEW SPECIES

The cooperation with Thailand went into a new phase in 2010. At that stage, the Thai Government prioritized a demonstration farm unit on land; a hatchery with live feed production, use of algae paste, a larvae production section

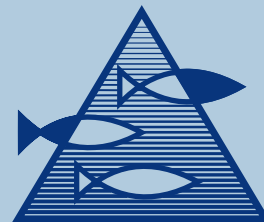
and a nursery. The technology applied in Phuket can to some degree be compared with IMRs research station at Austevoll. The modern fry production introduced has shown good results. The overall aim is here again to transfer know-how to enable the Thai personnel mastering the hatchery operations. The pilot demonstration farm is relatively small compared to a commercial farm, however, it is complete, and of the same type as modern European hatcheries. It has a potential for producing numerous new tropical species, some of whom to be tested in 2013. An important question is if one can be able to identify a "tropical salmon"; a species that is ideal both concerning the production and the market. Pompano (*Trachinotus blochil*), Yellowfin tuna (*Thunnus albacores*), Asian sea bass and some Grouper species are considered, in addition to Cobia. The latter has not been given up, despite challenges related to the market for this fish.

BIG POTENTIAL IN INDONESIA

Considering the geography and climate, Indonesia is considered the country with the largest potential for expansion in Aquaculture. A large part of Southeast Asia lies within the tropical zone with calm winds outside the typhoon area. Indonesia now wants to evaluate the actual aquaculture sites based upon data on winds, waves, currents and depths. Most likely, existing Norwegian cage

Figure 2: The nursery section of the aquaculture station in Phuket, Thailand.





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technology can be used, even in open ocean areas. Traditional Asian cages can, however, only be used in protected areas, as in Norway in the 1980's.

SUSTAINABLE AND MODERN

The above mentioned countries in the Southeast Asian region want to utilize more of their ocean area, by making use of new (Norwegian) technology and knowledge, that is, "offshore big cage farming". This is conditioned on replacing the traditional small scale fry production by massproduction in modern land-based hatcheries. Dry feed is the central input in modern fish farming, and should replace other types of feed and so called "trash fish". Local feed production based on local raw material is of importance. Vaccine development is in focus in all countries. Generally speaking, it is challenging to develop complete value chains to ensure modern and sustainable marine fish farming. In Southeast Asia, the shrimp-, tilapia- and pangasius industries have been able to achieve such goals, but not so when speaking about marine fish farming. The governments in the region look to Norway who has knowledge and experience with industrial farming of salmon. Some elements of this industry, for example breeding programs, can also contribute positively to Asian small scale aquaculture.

THE GOVERNANCE OF AQUACULTURE

The use of antibiotics, high death rates, food safety issues, lack of export licenses to important markets and low levels of foreign investments are among problems countries faces when managing their aquaculture industry. The use of existing laws and regulations with respect to control, surveillance, enforcements and sanctions also is also challenging. Vietnam has in a previous cooperation with Norway developed laws and regulations within the fisheries

and aquaculture sectors. In the cooperation with Malaysia, we are now in the process of developing a regulation scheme for fresh water aquaculture. Malaysia, as Thailand, has also asked for assistance related to regulation of the marine areas.

DEMANDING REGULATIONS

The traditional Southeast Asian aquaculture is dominated by many small players. This is apparent within fresh-water aquaculture, parts of the shrimp industry and the limited marine aquaculture. It is also often connected with high risk. It is difficult to implement regulations for fish health management, hereunder such as simple principles for minimum distance between farms, controlling fry inputs, fallowing, site rotation, year-class separation, reports on the use of chemicals and antibiotics, handling of dead fish, surveillance of environmental effects and zoning of areas. The fishery government bodies in many Southeast Asian countries are interested in such principles and methods. In Malaysia, they want insight in the Norwegian management system. Not necessarily to copy the system, but to see how it works, and how it's built up. In the next stage, one needs to consider which principles in the Norwegian management system that indeed is universal.



Figure 3: Section for live feed production at the aquaculture station in Phuket, Thailand.

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The Centre for Development Cooperation in Fisheries (CDCF)

- Coordination unit for development cooperation within fisheries and aquaculture.
- Organized as a department within IMR, but also represents The Directorate of Fisheries, The Norwegian food Safety Authority, The Veterinary Institute and the National Institute for Nutrition and Seafood Research.
- The financing from Norad (the Norwegian agency for development cooperation), is central to the activity. CDCF currently has a framework agreement with Norad and the other cooperation institutions.
- Today, projects are also financed through the Ministry of Foreign Affairs, The Norwegian Embassies and the Ministry of Fisheries and Coastal affairs.

