



INSTITUTE OF MARINE RESEARCH



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Experience with Norwegian aquaculture technology in Phuket, **Thailand**

Key challenge; lack of skilled technicians and operational know-how.

Oslo 15 juni 2015

Meeting arranged by **Veiledningskontoret for næringsutvikling i utviklingsland**

Thailand Project objectives

- Mastering of operation of modern marine farms; big cages and intensive marine hatcheries
- Improved innovation in marine aquaculture and spread of new (modern) technologies
- Elaboration of general regulations incl. fish health and environmental areas
- Strengthening of Government competence and governance, improved public governance regarding aquaculture development

Transfer of know-how from Norway

Marine Finfish Hatchery

- Knowledge of bio security, use of quarantine, fish health monitoring program
- Biological knowledge about nutrition demands to secure fish egg quality
- Knowledge how to manipulate for a year round production.
- Knowledge and protocols for a predictable mass live feed production
- Knowledge and protocols to secure high quality live feed incl. bacterial control and enrichment
- Technical know how regarding water quality / water treatment
- Operational know how on all farming stages

Transfer of know-how from Norway cage farming

- site selection
- species selection
- cage assembly
- cage installation
- net change
- net cleaning
- stocking with fingerlings
- data registration and regular farm reports
(growth, morts, temp., oxygen, predators etc.)
- dead fish removal
- feed and feeding
- predator handling
- parasite treatment
- disease handling & prevention
- crowding
- grading
- harvesting
- slaughtering
- processing
- (sales and export)



Use of ball line crowding fish



Production of rotifers



Larval production





Nursery section



Cobia on ice slaughtered for testing



Cobia Processing



Fillets of cobia



Portion cut of cobia



Sushi of Cobia from Pilot Farm



MARINE FIN FISH AQUACULTURE (TROPICAL CANDIDATES)



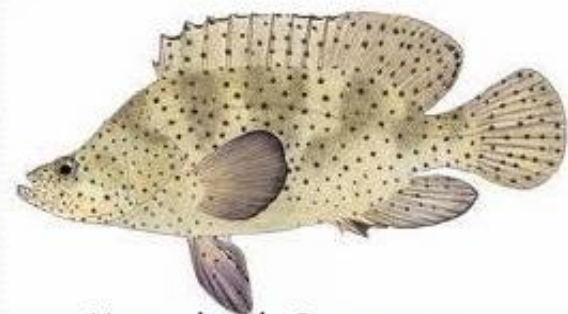
Orange spotted grouper
(*Epinephelus coioides*)



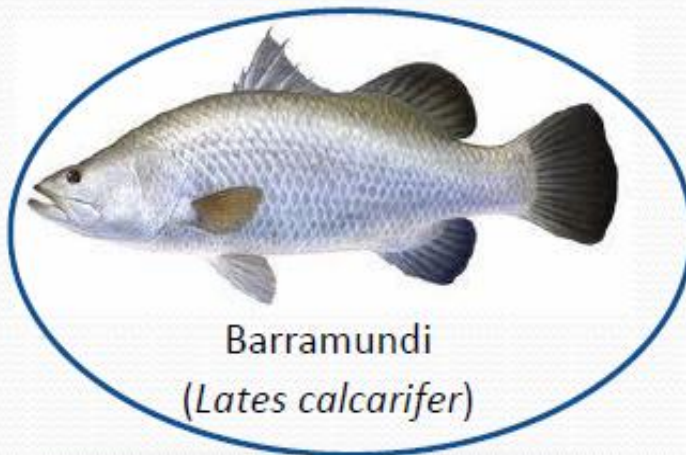
Coral Trout
(*Plectropomus leopardus*)



Tiger Grouper
(*Epinephelus fuscoguttatus*)



Humpback Grouper
(*Cromileptes altivelis*)



Barramundi
(*Lates calcarifer*)



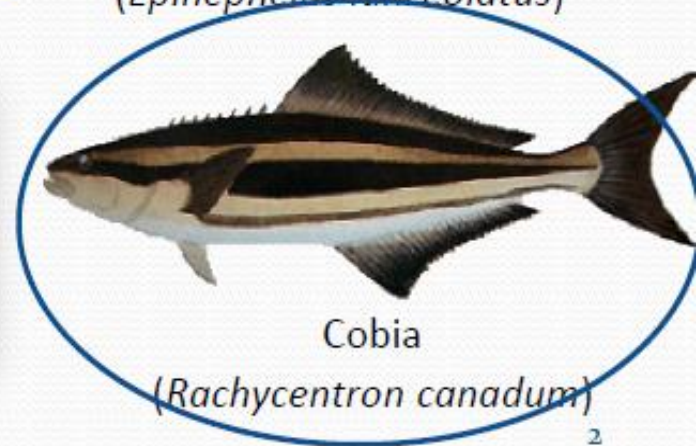
Giant Grouper
(*Epinephelus lanceolatus*)



Golden travelly
(*Grathanodon sp.*)



Pompano
(*Trachinotus blochii*)



Cobia
(*Rachycentron canadum*)

Tunas; Albacore, Atlantic Bluefin, Skipjack, Yellowfin and Bigeye



Results

- Thai management capable of operating both the pilot cage farm and the demo hatchery
- The new technology introduced is functioning
- High quality fish is produced in the cages (cobia and now Asian Sea Bass)
- High quality fingerlings is produced in the hatchery
- Regulations are revised
- The level of understanding modern aquaculture is dramatically improved

Review by Norad 27/8 2009

- *Furthermore, because of the success of this Project and the activities at the Phuket Center, one should consider the possibility of establishing regional cooperation in training and innovation, i.e. use the Phuket Center as a regional training and development center.*

CDCF advice and proposal: Phuket Competence & Training Center for Southeast Asia/Asean

- Practical training in modern marine fish farms (Norwegian style)
- Goal; Technical certificates?
- Research and development work regarding key species
- Exchange of researchers Norway – Thailand/Southeast Asia
- Post Doc/Phd grants?

Skilled technicians (røktere) - the backbone of the Norwegian fish farming industry

The skilled workers have fagbrev (technical certificate)

- I. Passing an exam (theoretical and practical issues) after 5 years of experience as a farm technician or
- II. 2 years in High School (VG1 + VG2 (aquaculture) and then 2 years apprenticeship in a fish farming company (VG3)

The industry is run on the farm level by practical people –
The technology is "no good" if you don't have the operational skills

FAO: Training and extension in aquaculture

- Aquaculture is a practical science and hands-on training through demonstrations, pilot projects and training courses with a strong applied component are likely to be the most successful way of effecting this transfer.
- Traditional teaching methods, with one expert lecturing to an assembly of farmers in a classroom, have their role to play, but this component of a training programme should be limited.

The Thailand CDCF Model

- Emphazising a practical starting base
- Demonstrating high quality cage and hatchery practical operations in the real local environment
- Relevance and potential can be discussed based upon this base
- Biosecurity and fish health management is elaborated on the same basis
- Training can be based upon real functioning farms₂₃

An aerial photograph of a dense mangrove forest. The image shows a complex network of dark, winding water channels and narrow paths that separate the thick stands of mangrove trees. The vegetation appears as dark, textured patches, while the water channels are lighter, creating a honeycomb-like pattern across the landscape. The overall scene is a vast, intricate natural ecosystem.

Thank you

Koop khun krub