

FISKERI-INSPEKTORATET
HOVEDBIBLIOTEKET

Institute of Marine Research
Department of Aquaculture

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Department of Aquaculture

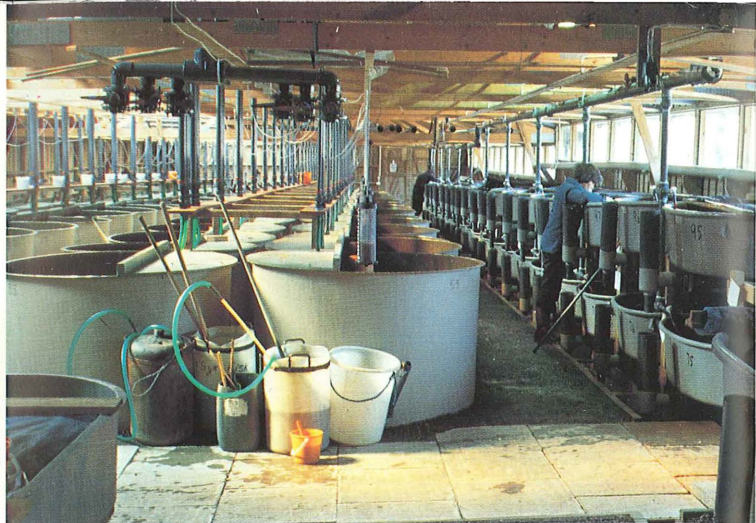
In 1972 the Institute of Marine Research established a research group for aquaculture. By now this group has grown into a department in the institute in Bergen and two affiliate aquaculture stations.

The Department is involved in investigations in the fields of genetics, pathology, nutrition, physiology, behavior, general culture of marine organisms as well as farming techniques. There is extensive cooperation with other institutions, such as the universities of Bergen and Tromsø. As a part of the Institute of Marine Research the Department of Aquaculture also functions in an advisory role in the Directorate of Fisheries.

Among the products of the research, the development of methods to combat salmon lice and vaccines against vibriosis are noteworthy, along with successful attempts to hatch and raise cod larvae and improved salmonid hatching rates through the use of hatching substrates. Methods of water recirculation and treatment in the hatchery and farm ponds are also upgraded.

The most important projects presently undertaken by the department are: genetic variation in the production characteristics of farmed fish; nutrition investigations in salmonids; cultivation of fingerlings of marine fish and the development of appropriate feeds; release of salmonids and cod; discovery and exploitation of suitable

Bergen, laboratory for fish pathology



Matre, parr and smolt tanks

areas for farming oysters, mussels and other bivalves; behavioral investigations with smolt in the wild and in cultivation; development of methods for pond-rearing smolt in freshwater; improvement of water quality and water treatment i.e. for hatching salmonids; testing and developing new farming equipment; examining the pollution and environmental impact of a fishfarm; intensive rearing of cod and, finally, investigations into the pathology of fish in farms, particularly the development and testing of vaccines. Research is also conducted in population genetics and diseases of natural fish stocks.

The necessary laboratory work of the projects takes place either in Bergen or at one of the stations. Field work is conducted at the stations, in the small fjords adjacent to Austevoll Aquaculture Station, at some commercial installations and in Kvernvatnet, a coastal lake in Austevoll.

The department's activities are financed partially by a budget from the Ministry of Fisheries and partially by foundations and councils (the Norwegian Council of Fisheries Research, the Oil and Fish Fund, Norwegian Fisheries Research Fund). Some of the activities are supported by special grants from the Ministry of Fisheries, the Ministry of the Environment and the Ministry of Municipal and Labor. Companies and organisations, such as ELF Aquitaine Norway A/S, Norsk Hydro, the fishfarmers organizations etc., also contribute significant amounts.

Matre Aquaculture Station

The purpose of Matre Aquaculture Station was to contribute to the development of Norwegian aquaculture, particularly the raising of salmonids. Construction of the station has been more or less continuous since 1971 and led to the timely inclusion of an experimental station for fisheries research.

The station has access to five different water types: from the Matre River, cooling water from the Matre Power Station, recirculated water, brackish water at the river mouth and seawater.

The station's hatchery has a capacity for 2.4–3 million salmonid eggs, while fry and older fish can be maintained in the approximately 200 fibreglass tanks and the floating cages of various shapes and sizes. At the disposition of the station are a lab for water and general food analyses, a small feed kitchen, a freezer and cooler room, a classroom for up to 60 people and facilities including sleeping rooms and kitchen.

Stripping of female brood fish



Recording of fish larvae behavior

Austevoll Aquaculture Station

This station meets the requirements of experimental investigations in marine aquaculture. The first stage of construction was complete in 1978 and the station now consists of a small analysing laboratory, a wet lab, a feed kitchen and freezer, a feeding hall with 60 tanks and a large sea installation with netpens of various sizes as well as floats for research in mussel culture. The wet lab has containers for growing rotatoria and for the hatching and start feeding of marine animals and bivalves.

The seawater supply comes from 50 meters depth where the salinity and temperature are fairly constant year round. The seawater used for hatching and for larvae experiments is filtered and disinfected by ultraviolet irradiation.

Field experiments on the massproduction of larvae of marine organisms, particularly cod and oysters, take place in a small fjord adjacent to the station. A brood stock of halibut will form the basis of an attempt to farm this commercially interesting species.

Aquaculture

Norway has a marvellous coastline replete with fjords, bays, sounds and straits. For those who approach from the sea this can appear barely navigable but once shoreward of the skerries and islands there is shelter from bad weather and storms. The topography of this coast is also special by international standards.

A northbound coastal current originating in the Baltic Sea mixes with the freshwater of a number of rivers and with the enormous watermass of the Transatlantic Current. A rich bloom of algal species and phytoplankton occurs particularly in spring. The areal transfer of biological energy can be compared with production on cultivated land.

We Norwegians have generally taken these resources for granted, rejoicing in the beauty of the fjords and the pleasure of the richness of the fisheries. But we have neglected to exploit this richness through cultivation.

Norwegian fishfarming has nonetheless directed attention to the exploitation of our coastal areas, where the farming of salmon and trout has shown that the location can be used for more than just recreation, transportation and small catches. Industry in particular has become interested in the potential of our coastal waters. Although the pioneers of fishfarming toiled with primitive techniques and insufficient know how, and despite large losses, they possessed great optimism and laid the foundation for a new and hitherto unparalleled primary industry. There still remains a number of problem areas in salmon farming, such as disease prevention and treatment, appropriate utilization of the foodstuffs and the environmental impact of the fishfarms. In addition to these problems, interest has been focussed in new areas, the most important of which is the exploitation of other species by cultivation, such as cod, plaice, turbot and halibut. This requires the development of economical methods of stockfish production. Such techniques combined with cheaper and better smolt production in salmonids could form the basis for a new type of fishery. The fishery of released fish or sea-ranching can mean better use of the coast's grazing areas. Examples from other countries

show that such resource management can lead to a steady increase in yield if balance is achieved between the home environment and the area of release.

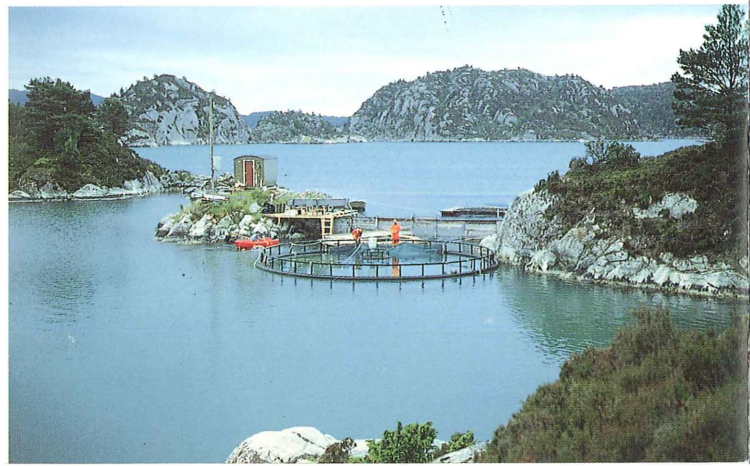
An additional use of the sea's production can be found in the farming of bivalves and the raising of kelp and seaweed. These organisms take their nutrients directly from the sea and are an inexpensive natural product. Although oyster farming has a long tradition in Norway this industry has not yet reached its potential level of output. Meanwhile, interest has been growing in the cultivation of mussels which, despite criticism and instances of poisoning is hoped to expand into an industry for coastal Norway.

In the Far East algae farming is a booming business. Many of our local species are well-suited for cultivation so that with proper management this resource could yield significant amounts of protein to supplement both animal and human diets.

Innumerable problems await a solution. The Department of Aquaculture of the Institute of Marine Research has taken on some of these problems and many have been solved with positive results.

We are hoping for a deeper understanding of the coast's potential and a greater interest in the sea's natural products. The larders of the sea hold many delicacies.

Rearing of cod fry in an enclosed small fjord





Reared blue mussels

**Institute of Marine Research
Department of Aquaculture**

C. Sundtsgt. 37, N-5000 Bergen - Teleph.: + 47 5 31 85 00

RESEARCH STATIONS:

Matre Aquaculture Station

N-5198 Matredal - Teleph.: + 47 5 36 60 40

Austevoll Aquaculture Station

N-5392 Storebø - Teleph.: + 47 5 38 03 42