THE PLACE OF SUSTAINABLE AQUACULTURE IN "BLUE GROWTH" STRATEGY FOR BALTIC SEA

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"Lack of available maritime space for aquaculture activities, competition in the global market and administrative constraints in particular concerning licensing procedures are amongst the challenges to growth." (p.8)

"… As part of the Common Fisheries Policy reform, the Commission proposes to promote aquaculture through an 'open method of coordination' based on nonbinding strategic guidelines, multiannual national strategic plans and the exchange of best practice. There is a wide scope for improving administrative practices, especially in licensing. Member States need to be aware of ways of increasing production that are sustainable and that meet the concerns of other users of coastal or sea space – for example, by building cages along with offshore windfarms or by integrated multi-trophic aquaculture. Such measures will be supported financially by the proposed European Maritime and Fisheries Fund. The future Horizon 2020 programme for research and innovation should also play an important role in unlocking the growth potential of European aquaculture for instance through the farming of new species or moving further offshore." (p.9)

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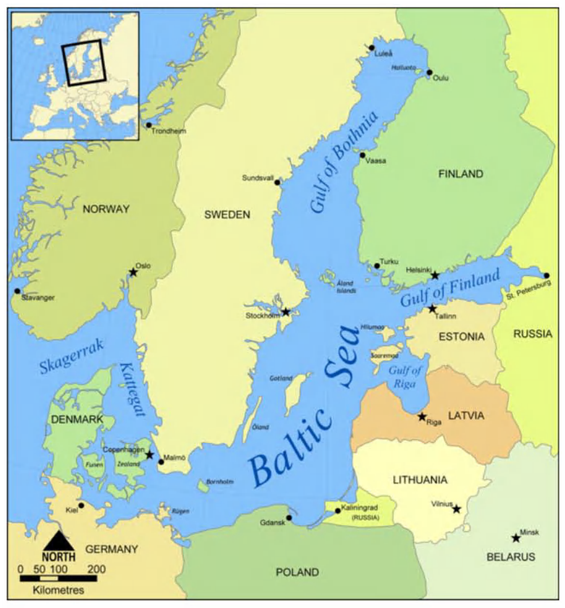
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Blue Growth

opportunities for marine and maritime sustainable growth

Among the Baltic Sea countries only Finland has essential fish farming production based on marine aquaculture.

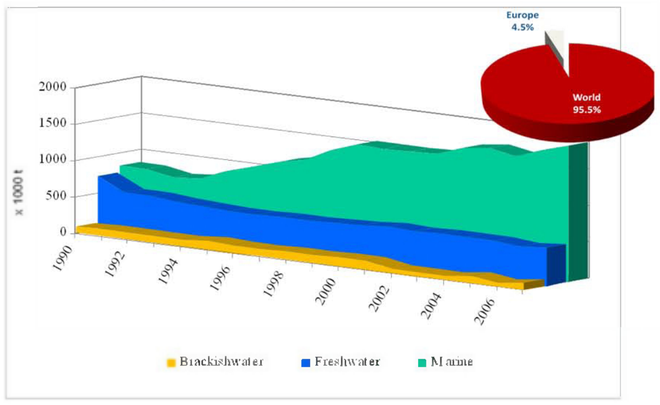
- The amount of food fish cultivated in Finland in 2010 was about 11.8 million kilograms.
- Value of food fish production was 44.0 million €
- The food fish supply consisted of
  - **11.0** million kilograms of **rainbow trout**
  - about **0.7** million kilograms of **whitefish** (***Coregonus lavaretus***) and
  - just under **0.1** million kilograms of **other** food fish species.
  - 80% of farmed fish are from the sea waters



However the potential capacity of Baltic Sea is about 300 million kilograms for annual aquaculture total harvest. Just three of Baltic countries like Finland, Estonia, and Russia are able to produce up to 70 million kilograms in the Gulf of Finland waters.

The stake of European aquaculture is only 4,5% from the World production and fish farming in brackish water in Europe has the minor part. Baltic Sea is a reserve for brackish water aquaculture growth in Europe.

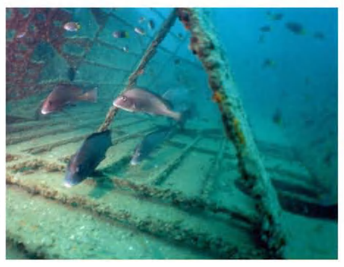
Unfortunately Baltic Sea Region faces enormous challenges including fishery declines, eutrophication due to excessive nutrient input as well as the effects of climate change. But innovative technologies provide opportunities for new uses of marine ecosystems, which can be both commercially appealing and environmentally friendly.

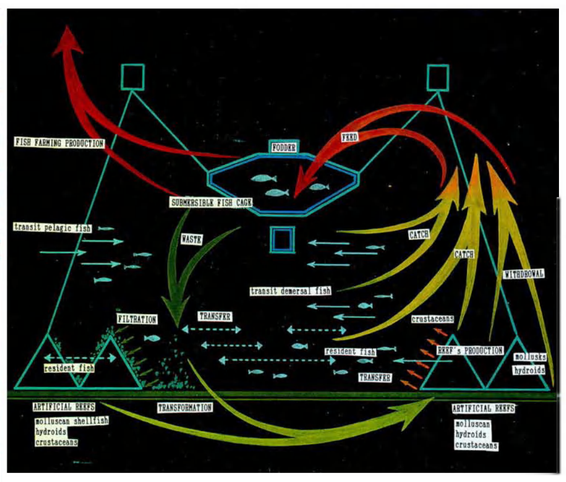


Comparison of European aquaculture production in marine, brackish and fresh waters (FAO, 2010)

What we need for sustainable aquaculture development in the Baltic Sea

Nowadays typical aquaculture is intensive monoculture. This concept has several disadvantages both from an environmental point of view. The environmental pollution is a very important problem in the intensive fish farming. It is well known that salmon rearing causes the drift of 5-25% feed mass from the net cages. In the other hand polyculture production systems could represent ways of increasing production volume and utilizing the biodiversity of marine ecosystems. Combining cage system with an artificial reef could solve the problem of the waste conversion.

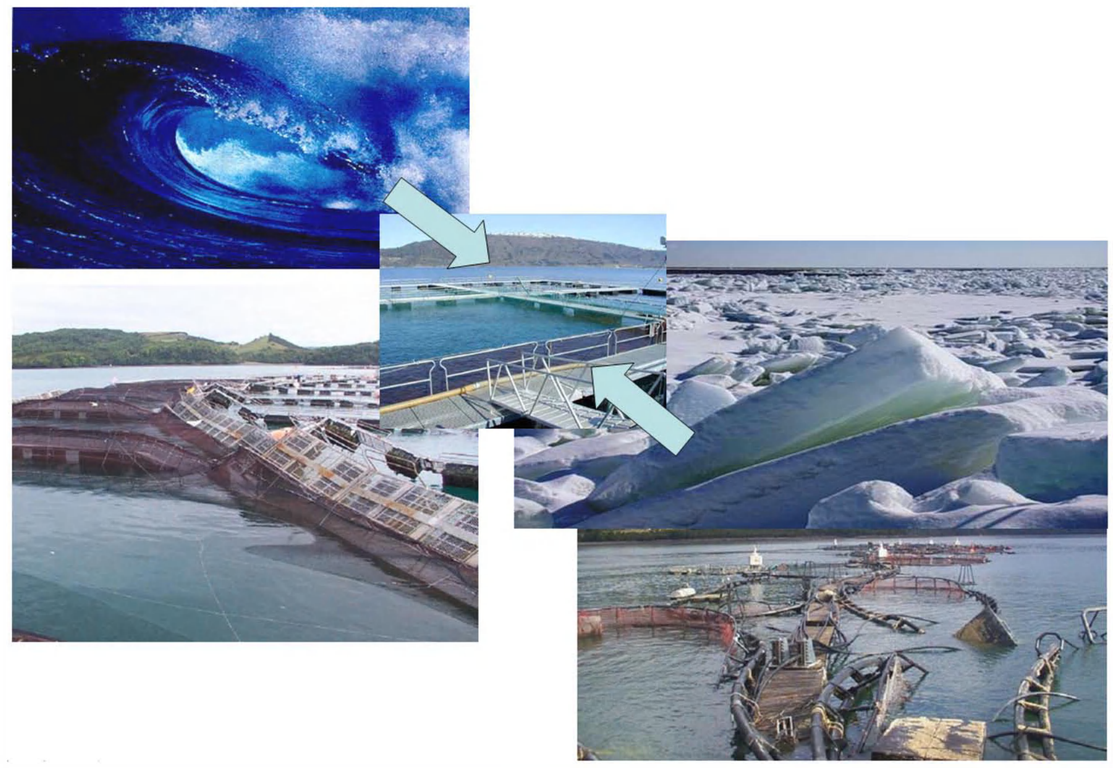




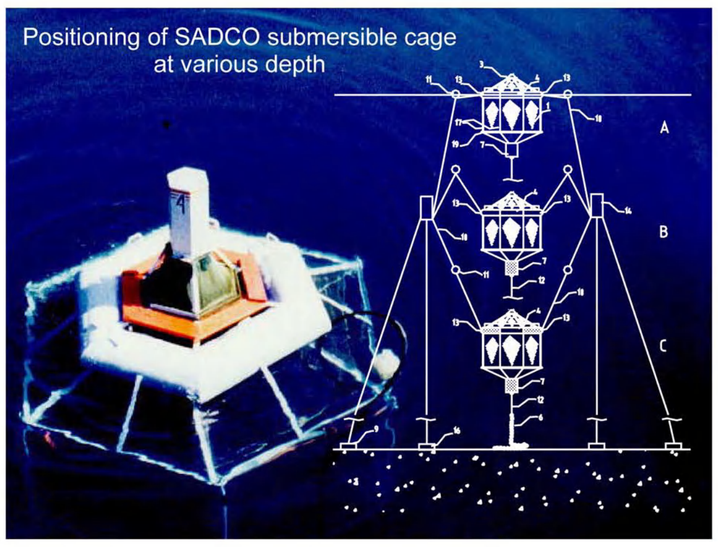
(from Bugrov, 1991)

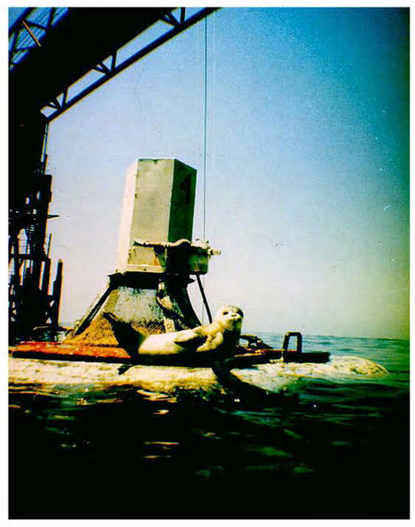
The reefs installed around the cage become inhabited with various filtering organisms. Waste products from the cage might be used as food and contribute to the strengthening of bio-filtration belt, thus increasing the self-cleaning capability of the sea area. The most advanced systems are termed Integrated Multi-Trophic Aquaculture (IMTA) and combine the cultivation of fed species (e.g. finfish) with extractive species, which utilize the inorganic (e.g. seaweeds) and organic (e.g. suspension and deposit feeders) excess nutrients from the fed aquaculture.

There are engineering and biological aspects that we need to consider as risk factors proper estimation for sustainable aquaculture development in the Baltic Sea. Among engineering aspects the main is risk of damage of floating cages because conventional floating cages at water surface cannot withstand against storm waves and ice fields. Key biological aspects are wave impact to fish and overheating in the summer season.



Cage damages by storm waves and ice fields





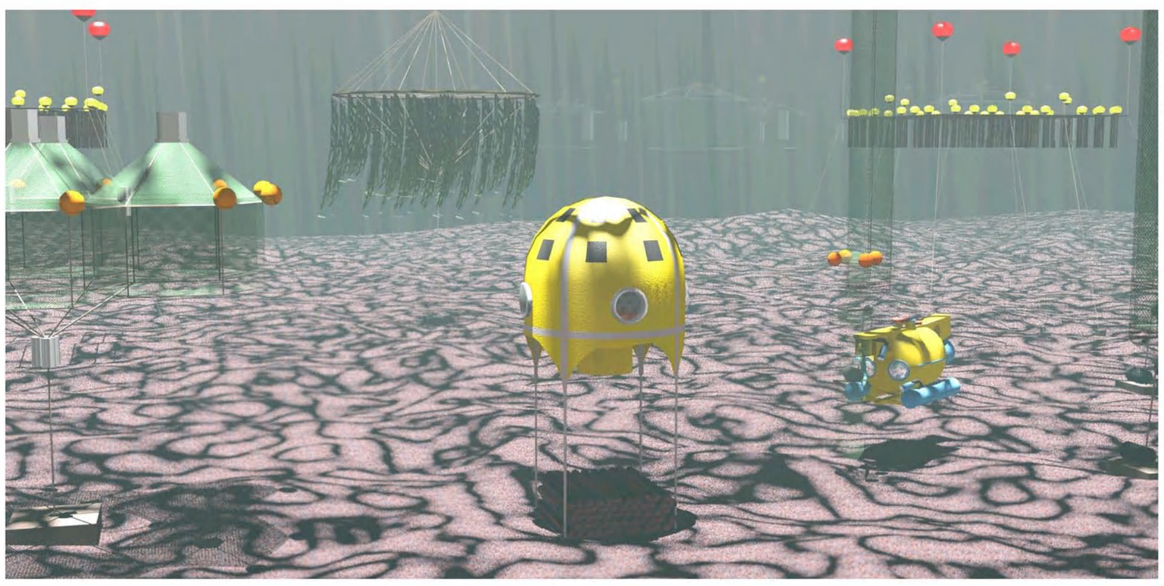
Submersible cage system is the solution for offshore aquaculture. This is the way to avoid conflicts between users, reduces risk of fish overheating, cage damage by storms, drifting rubbish or ice and enables successful fish farming in open sea areas.

Modern offshore cage systems

Different versions of submersible SADCO cages

At ice-infested waters submersible cages could be used for all-year round and seasonal fish farming. Before winter time cages will sink into safety depth to prevent the ice hazard.

IMTA sea farms based on submersible concept are able to produce different fin fish species, macro algae (Furcellaria lumbricalis) and blue mussels (Mytilus edulis) as row material for new pharmaceutical and cosmetics products, as well as may be a way to remove nutrients from the Baltic Sea.



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