

Integrated Multi Trophic Aquaculture in Norway

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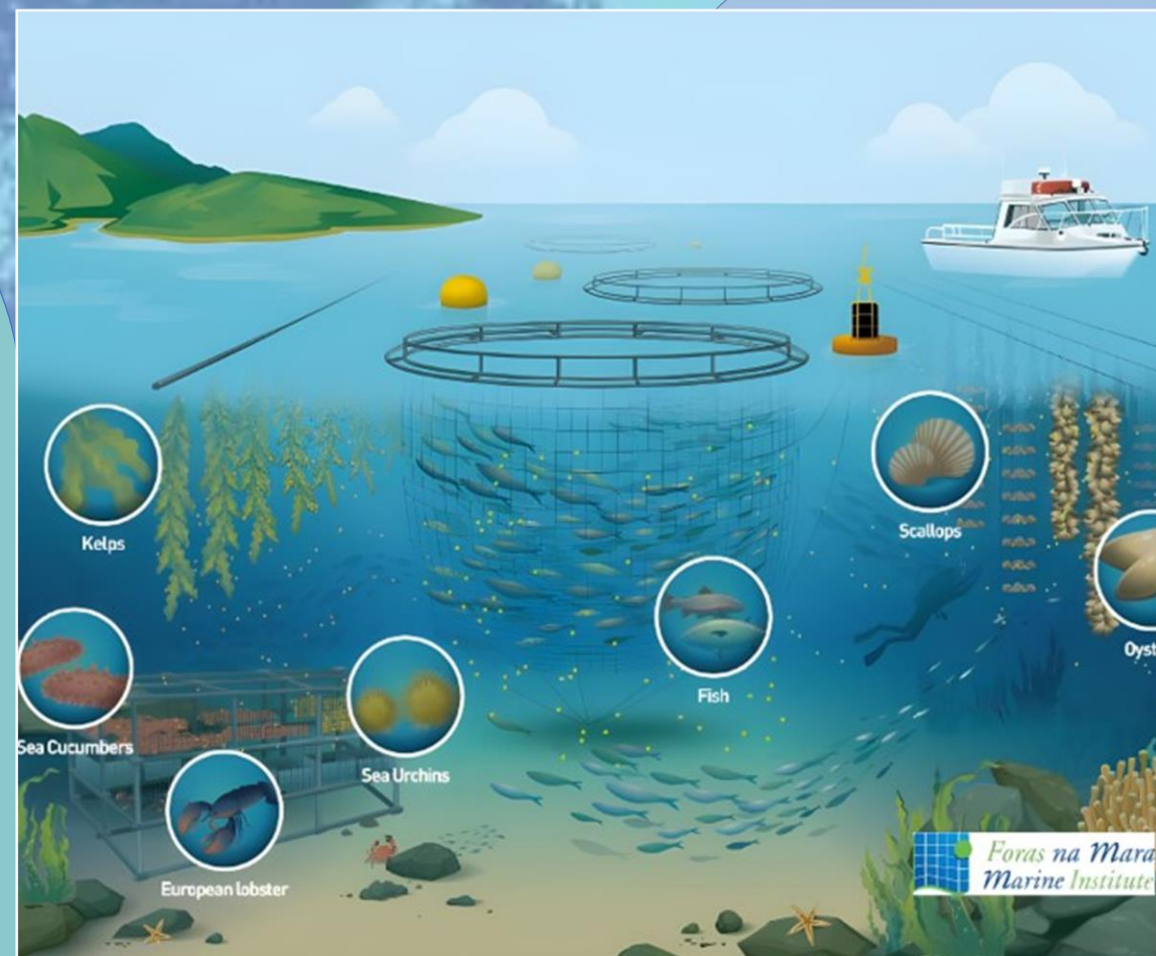
BACKGROUND

In Integrated multi-trophic aquaculture, or IMTA, multiple aquatic species from different trophic levels are farmed in an integrated fashion to improve efficiency, reduce waste, and provide ecosystem services, such as bio-remediation. This means that the different species can benefit from each others waste products, as it is often nutritious, and thus reduce overall waste from biproducts of the present aquaculture.

APPROACH

Although coastline and open fjords with a strong enough water current can disperse sediment and fish feces, there is a lack of available areas that meet the requirements for low environmental impact fish farming.

Norwegian government have made their policies for allocating farm-licences more strict due environmental concerns. A healthy marine environment and suitable locations are essential for the development of salmon aquaculture, and available space is a critical issue for the industry and the government. In response to the lack of suitable locations and environment concerns, the industry is looking at IMTA farming as a solution.



What is IMTA?

Integrated - various parts or aspect

Multi - more than one

Trophic - relating to feeding and nutrition.

Aquaculture - rearing/cultivation of aquatic animals/plants for food

OPPORTUNITIES

- IMTA can improve perceptions of the industry, create skilled jobs in coastal communities, and provide the industry with new sustainable sources of marine ingredients for feed.
- IMTA could be implemented in Marine Protected Areas under their regulations
- It could help with SDG14s goals of reduction of nutrient waste and ocean acidification.



Who loves inorganic waste?

Around two thirds of the nitrogen waste from salmon farming is inorganic ammonia, which is taken up by primary producers such as phytoplankton and macroalgae.

Co-producing salmon and kelp reduces the ecological influence of dissolved nitrogen released into the environment and at the same time produce valuable kelp biomass.

ENVIRONMENTAL IMPACTS OF SALMON FARMING

- Change/destruction of habitats
- Eutrophication/ hyper nutrification
- Changes in community structure
- Benthic impact
- Changes in sediment chemistry and biology

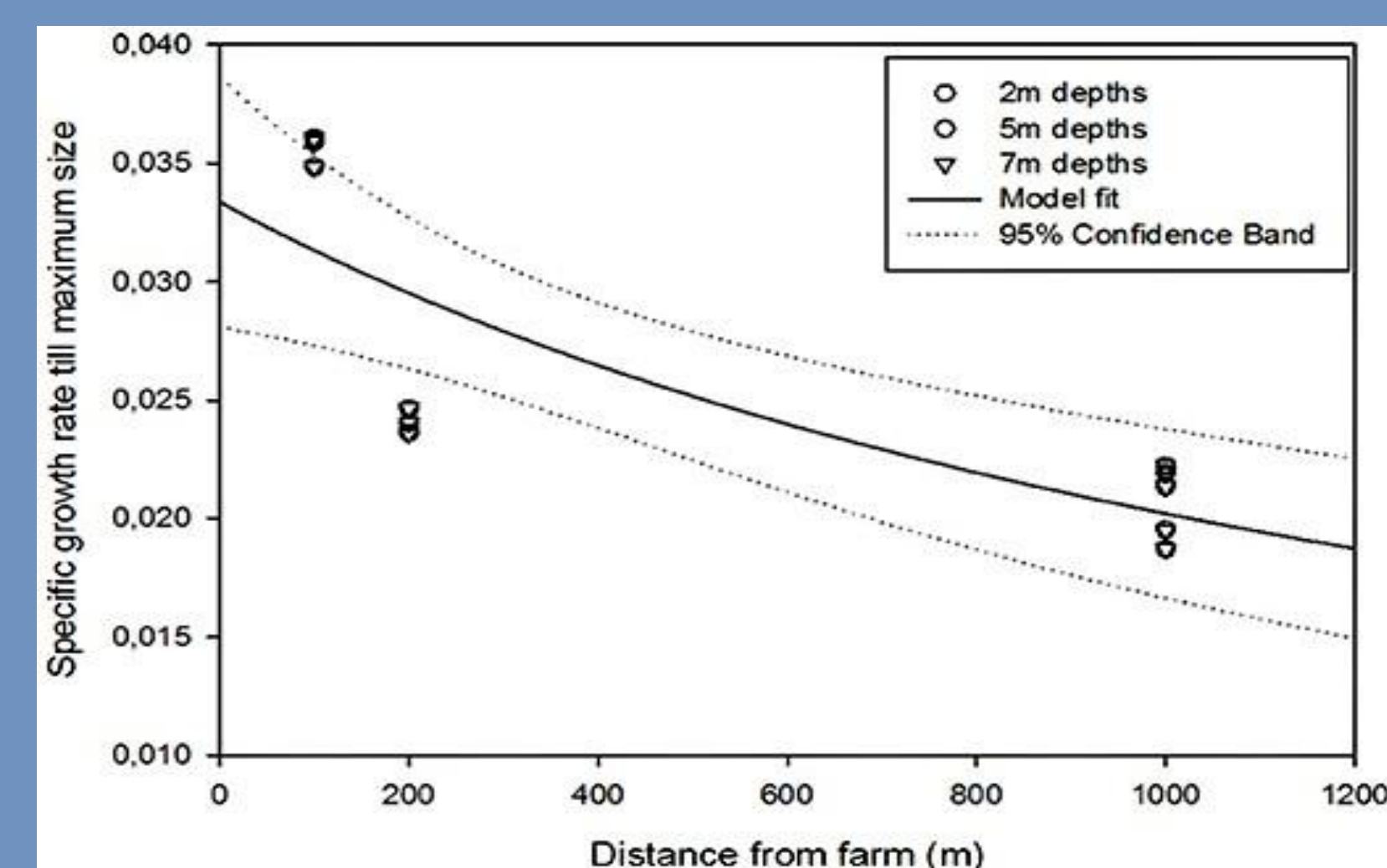


Figure 1. Kelp growth rate vs. Distance from farm (Fossberg, et al. 2018).



SCAN ME

See additional paper for full reference list

(Hersoug, Mikkelsen, and Karlsen. 2019), (Sandersen, and Kvalvik. 2015), (Grassle. 2013), (Abdallah. 2017), (Fossberg et al. 2018).

