

Title: **Norwegian Salmonid Farming and Global Warming: Spatial Distribution and Value Adding**

Authors: Knut Heen, Norwegian College of Fisheries Science (Norway)
Øystein Hermansen, Nofima Market (Norway)

Abstract: The spatial distribution of Norwegian salmon farming depends on license allocation and physical conditions, with politicians defining the former. Currently, relocalization of these is not permitted. With an expected temperature increase in Norwegian waters, this study analyzes increased temperatures impact on the spatial distribution of production and employment. Four scenarios are investigated over a 30 year timespan: - No relocalization and stable temperature - No relocalization and increased temperature - Free relocalization and stable temperature - Free relocalization and increased temperature

Temperature has a major effect on fish growth. The production model predicts annual salmon production per year and county, utilizing a simplified approach to model a complex relationship. Total production is based on linear market growth, serving as a restriction in the subsequent model. Productivity per county is determined in a temperature-driven model, and another model predicts the relocalization of licenses.

Measurements of industrial statistics like value added and employment are important for policymakers. An input-output model captures the direct and indirect effects of aquaculture production in each county, comparing these to the base scenario. Preliminary findings indicate substantially differing effects on the spatial distribution of production and hence value adding and employment. In the baseline scenario, production growth is relatively equal among the northern, middle and southern parts of Norway. Increased temperature yield shifts production considerably north, both in case of stable and liberalized management.