Resource use in Norwegian salmon production

T. Ytrestøyl[1], T.S. Aas[1], G.M. Berge[1], M. Sørensen[2], M. Thomassen[2], T. Åsgård[1]

1) Nofima, 6600 Sunndalsøra, Norway
2) Nofima, 1432 Ås, Norway

During the last decade, the production of Atlantic salmon has increased by almost 70% from 900 000 tonnes worldwide to more than 1 500 000 tonnes today. Farmed salmon is the most widely consumed sea product in the industrialised world, and the growth in the salmon industry has raised concerns about the sustainability of salmon farming. The dependence on fish meal and fish oil and the potential effects on wild fish stocks are arguments often used against sustainability. Feed is the main input factor in salmon production, so an understanding of how different feed formulations affect environmental impacts and resource utilisation is vital. To sustain a population of 9-12 billion people on earth within the next 40 years the limited resource pool must be utilised effectively. Thus, understanding how different food production systems utilise the available resources is important.

In a study financed by FHF the efficiency of salmon production was compared with other food productions, and methods that are used for comparing the biological and ecological efficiency of different food production systems were evaluated. The retention of nutrients and energy in the edible part of the animal and in the whole animal was calculated for salmon, pig and poultry production (protein efficiency ratio, PUFA efficiency ratio and energy efficiency ratio). Several methods commonly used for assessing the eco-efficiency and environmental impacts of a production (carbon and ecological footprints, eco-efficiency models) were evaluated in terms of strengths, weaknesses and sensitivity. LCA was used to evaluate resource use and environmental impacts of Norwegian salmon production over time and compare it with industrial pig and poultry production today. Possible resource deficiencies that could limit further growth in the salmon industry are also discussed.