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# **Social and Economic Contribution of the Fishmeal and Oil Value Chain: Some Considerations**

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### **Key Messages**

- The Nordic fishmeal and oil value chain is highly profitable and sustains employment in remote areas.
- The turnover of the Nordic harvesting and processing of forage fisheries exceed 1.5 billion EUR and employ directly more than 3000 people.
- The forage fisheries harvesting segment has seen profound change over the past decade with the introduction of more economically efficient fisheries management models and more emphasis on sustainable resource management.
- With increasing demand for fishmeal and oil, in particular from aquaculture feed producers, the fishmeal and oil processing segment has turned highly profitable and become a strategic important part of the value chain.
- Aquaculture feed manufacturers are high tech with major investments in R&D, seeking to substitute fishmeal and oil (or lower inclusion rates) for other proteins in feed.
- The combination of increasing prices for fishmeal and continued demand for aquaculture fed species has led to investments in alternative sources for Omega 3 including from algae, genetically modified rape seed and insect meal.
- It is likely that the fishmeal and oil processing sector will face major changes in the coming decade as alternatives to fishmeal and oil are developed and as changes in fish farming practices may reduce the use of fishmeal and oil in feed. Consequently fishmeal processors need to embark on diversifying markets and seek new opportunities for the use of their meal and oil products.

### **The Fishmeal and Oil Value Chain at a Glance**

The fishmeal and oil value chain consists of vessels harvesting forage fish, fishmeal and oil processors turning the forage fish into meal and oil, and feed compound manufacturers using the fishmeal and oil in the production of feed ingredients for aquaculture and terrestrial animals (in particular pigs and chicken).

For Denmark, Norway, Iceland and the Faroe Islands the overall turnover of the sector (not accounting for feed compound manufacturers) is estimated to be well in excess of 1.5 billion EUR. The forage fisheries fleet and fishmeal processors in the Nordic region employ directly in excess of 3000 people. As information and data on the value chain are scarce and scattered it would be a sensible opportunity to invest into a more in-depth evaluation of the overall socio-economic contribution of the sector. This would contribute to getting more policy focus on the sector and help contextualise the overall importance of the value chain.

The forage fishing fleet and the fishmeal processors, in the Nordic context, play a major role in securing jobs in remote areas where alternative jobs may be few and far between. Indirect jobs are also involved in harbours, harbour installations and transport.

The Nordic fishmeal and oil industry is profitable and has been so for quite a while. This has partly been driven by a move towards more economically efficient fisheries management models introduced in recent years (thus making the harvesting segment more profitable), increasing demand for fishmeal and oil from the aquaculture industry (in particular salmon) and a spectacular consolidation among feed compound manufactures.

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The processing of fishmeal and oil is cyclical due to the nature of the forage fish stocks. For its international dimension the availability of fishmeal and oil is cyclical due to the El Nino phenomena which affects in particular production in Peru and Chile i.e. the world's biggest fishmeal and oil producers; this has consequences for fishmeal and oil processors and for feed compound manufacturers. In particular, calibrating production capacity and investments to peak landings and stocks of manufactured goods to periods of low landings of raw material is challenging.

Increasingly, cut-offs and trimmings are used in fishmeal and oil processing and in some cases have reached 30 per cent of the raw material intake. More can be done to better collect and transport trimmings and cut-offs from fish processors to fishmeal processors. Both private industry and fisheries policy makers could do more to ensure that the cut-offs and trimmings can be collected, transported and processed.

It should be noted, however, that cut-offs and fish not sold for direct human consumption may seek other market outlets such as pet food, surimi and further elaborations. These latter markets can pay premium prices for raw material emanating from fish processing. It is therefore questionable how much more trimmings and cut-offs will be available for fishmeal and oil processing. Indeed, as demand for fish for human consumption increases trimmings and cut-offs may increasingly find its way towards this premium market.

It remains to be seen if the EU no-discard policy, as the policy is implemented, provide additional raw material. In addition, fisheries management models based on individual quota systems (e.g., IVQ, ITQ) can help ensure better quality of landed raw material and generally improve the economics of harvesting.

### **Changing Markets, Changing Value Chain**

The Nordic fishmeal and oil value chain consists of three important yet discrete sectors i.e. forage fisheries fishing fleet and companies, fishmeal and oil processors, and the feed compound industry. The analysis undertaken for this study shows that the three sectors are profitable. This has partly to do with increasing demand from end users (e.g., aquaculture) partly to do with the fisheries management models introduced over recent decades i.e., a combination of TAC and quotas, and fisheries management models based on individual vessel quotas.

The introduction of economically efficient fisheries management has led to fleet consolidation and to investment into better vessels and gear technology i.e. modernisation. This has improved the quality of landings with positive consequences for the protein content of fishmeal.

While fishmeal and oil processing is a fairly old technology, marginal investment have been made in modernising plants and equipment. Such investments have focussed on complying with environmental regulations. Nevertheless, some consolidation of the industry has taken place over past decades and very few companies (although they may own several processing plants) are actually involved in fishmeal and oil processing.

The feed ingredient sector is dominated by a few but large companies. These are high tech companies with major R&D budgets and they work closely with the aquaculture and animal farming sector to ensure that their feed compounds are acceptable for animal growth and nutrition. Feed compounds are species and age dependent and the fishmeal and oil content of feed compounds can change considerably through the life cycle of animals.

### **Where Does The Nordic Fishmeal and Oil Sectors Stand Internationally?**

Compared to fishmeal and oil from other sources e.g. Peru and Chile, the North East Atlantic fishmeal has a higher protein content and is generally considered to be of better quality. This is in part due to the efforts in the harvesting sector where care is given to freshness, and to the processing of fishmeal itself which uses

state of the art technology. This is in part also linked to the fisheries management models. Nevertheless, because of their dominant role in forage fisheries, Peru and Chile are key players in the fishmeal and oil market and to a large degree determine the world market prices. An important developing market will be East Asia as demand for high protein feed compounds increase with developments in aquaculture production.

Of the 5 million tons of fishmeal produced on a globally some 3 to 3.5 million tons are used for aquaculture and this has been fairly constant over the last decade. Against a fast growing aquaculture production of carnivorous fish species the inclusion rates of fishmeal in feed compounds have fallen considerably. Demand for fishmeal and oil has shifted from pigs and hogs to fish as prices have risen. With increasing populations and incomes in East Asia demand for high protein feed compounds is likely to increase considerably in this region over the coming decade.

As prices for fishmeal and oil have increased, the feed ingredient and aquaculture sectors have been working closely on feed formulations which minimises the fishmeal and oil content. One way to reduce the fishmeal and oil content is to use these ingredients only at the early stages of fish farming when fingerlings and fry need such inputs. For example, FAO suggests that fishmeal inclusion rates in salmon feeds which stood at 45 per cent in 1995 might fall to 12 per cent by 2020. And trials have shown that it is possible to grow salmon without fishmeal. This however raises questions about fish health, survival and quality of aquaculture products.

With an increasing world population (plus 2 billion by 2025) and increasing disposable income, the demand for fish based products will increase. As for seafood products this demand will have to be met by aquaculture as capture fisheries is largely fully exploited or overexploited (FAO).

### **Some Strategic Considerations**

The increase in aquaculture production will sustain the demand for fishmeal and oil. Concurrently it will induce feed companies to search for alternatives to fish protein (Omega 3) and further reduce the inclusion rate of fishmeal and oil. Meanwhile the lower limits for inclusion of fishmeal and oil are yet to be determined and depends on species and factors such as availability of substitutes high in Omega 3 lipids (GMO rape seed, micro and macro algae, etc.). However, for the foreseeable future (five years) fishmeal and oil will continue to be strategic ingredients.

For feed manufacturers, securing fishmeal and oil supplies is crucial. Control over these supplies may therefore be a strategy to be pursued and could involve mergers and acquisitions downwards in the value chain.

The fishmeal and oil sector has been criticised for using fish which could, alternatively, be used for human consumption. However, most of the forage fish used e.g. Norway pout, Sandeel, Blue whiting, Menhaden, Anchoveta have no or only marginal human consumption markets. This is also reflected in the price of fish; fish landed for human consumption reaches far higher prices than fish landed for reduction to meal and oil.

Overall, the fishmeal and oil value chain plays an important role for society and contributes considerably to the aquaculture economy. Presently, the aquaculture sector in the Nordic context exists in part because the same region is heavily involved in fishmeal and oil processing. A future without fishmeal and oil would imply turning to herbivorous aquaculture species for which, in the Nordic context, there is a marginal demand.

## **Challenges and Opportunities**

The uncertainties for the fishmeal and oil value chain include:

- A limited and cyclical resource base;
- Climate change and its impact on the resource;
- The development of alternative feed compounds for aquaculture and animal feed which reduce or eliminates the need for fishmeal and oil; and
- The increasing demand for fish oil from pharma and food businesses affecting the whole value chain.

A future strategy is (further) consolidation among fishmeal and oil processors while also entering the feed ingredients market. This would, however, require major investments in R&D. Assuming that the aquaculture sector remains heavily dependent on fishmeal and oil in feed compounds, a relatively high risk is that feed ingredient manufacturers buy up the remaining fishmeal and oil processors to safeguard and ensure supplies. If, on the other hand, the aquaculture sector with the help of feed ingredient processors can overcome the dependence on fishmeal and oil, the fishmeal and oil processors need to develop new markets. The relative strong concentration in the Nordic feed ingredients markets dominated by three key processors is an important challenge. That concentration has taken place because feed ingredient manufacturers are high tech and capital intensive R&D companies. Fishmeal and oil processors may also increase their presence in markets with high growth rates e.g., East Asia.

Meanwhile, national and EU legal and regulatory legal frameworks may impede consolidation in the Nordic context. For example, only Iceland permits companies not registered in the fish harvesting sector to own fishing quotas. Likewise, competition authorities may get involved (see e.g., EU Case COMP/M. 7035) considering that the concentration at the feed ingredients processing level is so that a competitive market does not exist. As such, the regulatory framework ring-fences the strategic possibilities and orientation of fishmeal and oil processors.

Companies in traditional but profitable businesses tend not to innovate and seek new ventures for sustainable profits. Over time the danger for such companies is irrelevance. Fishmeal and oil processors are in this group with the feed ingredients companies being the high tech area where there is more strategic thinking about the future of their products and markets. A central question for all companies, including for fishmeal and oil processors, is to identify new forward looking business opportunities to replace existing activities as they become outdated.

The fishmeal and oil value chain is an important contribution to the blue economy as long as forage fisheries are well managed and TACs set at sustainable levels which allow stocks to recover. Over the past decade, fisheries operators and policy makers have made strides to ensure that fish stocks – including forage fisheries – are fished within MSY levels. Moreover, rendering forage fish not used for direct human consumption and trimmings and cut-offs to fishmeal and oil, and to use this for aquaculture can be seen as a “green” economic opportunity.