

Photo: Elle Hughes, Unsplash



Today, large-scale industrial fishing is harvesting huge amounts of herring from the Baltic Sea, but only a fraction becomes food for humans. Of the 47,000 tonnes of herring and Baltic herring landed in 2021, only 10 per cent went to human consumption, with the rest used for animal feed for salmon, chickens and mink.<sup>[1]</sup> Meanwhile, small-scale coastal fishermen get considerably fewer fish in their nets, and therefor salting plants have not been able to get enough of large herring to ferment.<sup>[2]</sup> From a strictly business administration perspective, the situation is profitable for the individual large-scale industrial fishermen. But if we consider fishery from the national economy perspective, today's fishery management is not profitable for Sweden. Utilising fish resources in a different way would benefit individual citizens as well as the national economy.

## Herring populations in the Baltic Sea

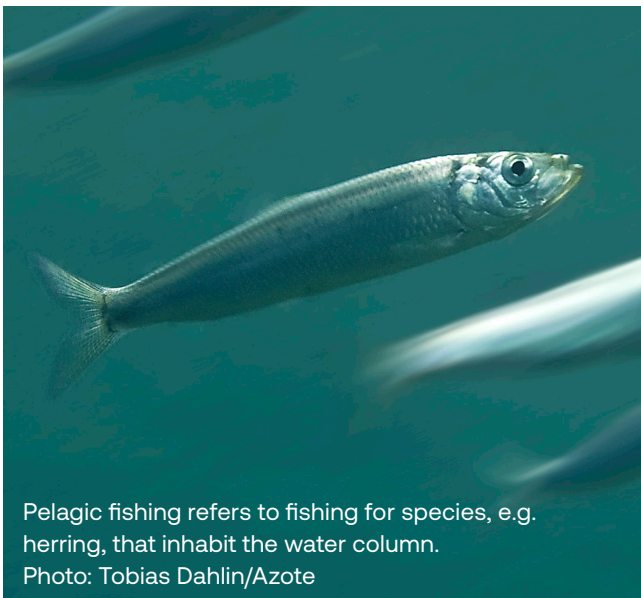
The Baltic herring is under increasing threat. The amount of spawning herring in the central Baltic has decreased more than 80 per cent since the 1970s.<sup>[3]</sup> And today's herring are smaller in size and reach sexual maturity at an earlier age,<sup>[4]</sup> which are classic warning signs for species under stress.<sup>[5]</sup> The most essential measure for Baltic Sea herring recovery in the foreseeable future is to limit fishing,<sup>[6]</sup> and researchers argue that reducing fishing pressure on herring is necessary for the fish to recover.<sup>[7]</sup>

In 2021, 452 boats fished in the Baltic Sea under the Swedish flag. The 20 largest boats accounted for 95 per cent of the

## Conclusions

- One kilo of herring processed into fermented herring has a 36 times higher value than the same amount of herring processed into feed.
- In 2020, the fermented herring industry contributed nearly SEK 7 million to the national economy, while the feed industry (calculated on the same amount of herring) contributed SEK 225,000.
- Using 30% of the fished herring for human consumption (rather than the current 10%) would increase revenues for the Swedish economy.
- Today's heavy fishing pressure has a negative effect on herring populations, and everyone loses if the fish disappear. Promoting viable populations and maintaining a healthy Baltic Sea is therefore not only the most sustainable course of action for the environment, but is also best for the Swedish economy.

total catch, with the most commonly fished species being herring and sprat.<sup>[8]</sup> As an example, one of Sweden's largest pelagic\* trawlers landed 175 times more herring over a three-month period than all of the professional fishermen in Stockholm County combined.<sup>[9]</sup> Large-scale fishery landings cannot be used for human consumption and are processed into animal feed. Selling fish from industrial trawlers as food for human consumption is not an option, as the fish are crushed and damaged in handling and the boats are at sea for so long that the fish can go bad.<sup>[10]</sup> The Swedish Agency for Marine and Water Management (SwAM) characterises industrial fishing as profitable and effective because it contributes to food supply, as the fish are used as feed for chicken and pork production.<sup>[11]</sup> But SwAM only defines profitability in relation to the amount each fishing company earns from its activities, and does not include direct or indirect costs or revenues for the state and society.<sup>[12]</sup>



Pelagic fishing refers to fishing for species, e.g. herring, that inhabit the water column.  
Photo: Tobias Dahlin/Azote

Broadening the analysis of fishery profitability to include perspectives beyond purely business administration can provide a more complete picture of its value for individual fishermen as well as the national economy.

The aim of this policy paper is to examine the values associated with herring processed into fermented herring versus

herring that becomes animal feed. Using a mathematical example, we also demonstrate the effects on the national economy if a larger proportion of today's herring catches were to be processed into food rather than feed.

## The fermented herring industry

Herring has long been a mainstay of the Swedish diet and a central component of 'our cultural identity.'<sup>[13]</sup> Today, professional fishermen and fish processors are warning that herring catches along the entire Baltic coast are declining to such an extent that there are not enough large fish to process, for instance, into fermented herring.<sup>[14]</sup> Researchers,<sup>[15]</sup> on the other hand, argue that there are still plenty of herring in the Baltic but that the fish are small and of too poor quality to be used for human consumption, as confirmed by professional fisherman and fermented herring manufacturers. As an example, renowned fermented herring manufacturer Oskars, which has been operating in Tynderö since 1955, received only 10 tonnes of herring in 2022, as compared with 100 tonnes two years ago. To stay in business, the company is now relying on herring fillets imported from Finland.<sup>[16]</sup>

## Incremental value in the fermented herring and feed industries

A fisherman who sells herring to a fermented herring manufacturer for human consumption receives SEK 11.25 per kilo, as compared with just over SEK 2.41 if the fisherman sells to a feed manufacturer (diagram 1) – i.e., the fisherman is paid over 4 times more when the fish are sold for human consumption. Following the supply chains through to the market prices of fermented herring and animal feed (diagram 1), we see that the value of fish for human consumption is over 36 times greater than that for feed (retail price for human consumption = SEK 104.00; sales price for feed manufacturer = SEK 2.88). See the [Appendix \(only in Swedish\)](#) for a more detailed description of the calculations.

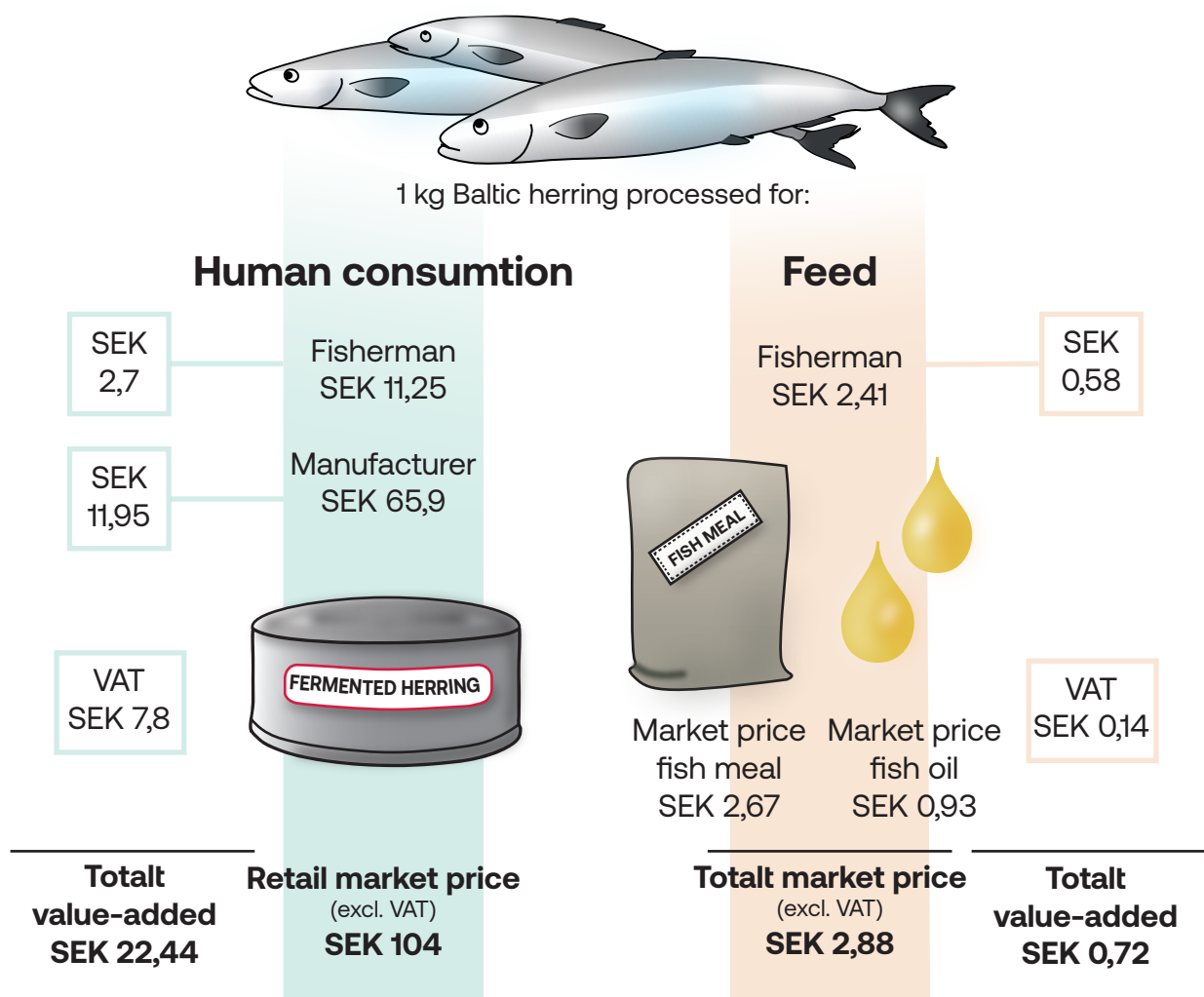


Diagram 1. The coloured bars show the supply chains for 1 kilo of herring processed either into fermented herring for human consumption (green) or into fish meal and fish oil for animal feed (orange). In addition to sale of the actual product (fermented herring or feed), additional values are added as explained below. Source: Diagram figures are based on interviews with fermented herring manufacturers, fishermen, animal feed operators, researchers and experts, as well as figures available from research and trade associations. Figures are from 2020. Illustration: Madeleine Kullenbo, BalticWaters2030.

Other values are created in addition to the actual fish product (the fermented herring or feed) – so-called Swedish Unique Added Values (SUAV). Added values are the values a product generates for society in the form of wages and profits, as well as VAT. Swedish added values must be produced in Sweden and included in Swedish GNP. Values are unique for the fermented herring or feed industry if the values could not have been created without herring fishing. A unique added value, in other words, signifies that fermented herring or animal feed operators would be unable to recreate their product using a substitute product in place of a fermented herring or animal feed product (for value added calculation and SUAV analysis, see [Appendix \(only in Swedish\)](#)).

Of the operators involved in the fermented herring and animal feed supply chains, SUAV is created only by feed fishermen, human consumption fishermen and fermented herring manufacturers. Animal feed manufacturers and wholesalers do not create SUAV because the feed is processed

outside of Sweden. This, along with the higher per-kilo value of herring used for fermented herring versus herring used for feed, means that the unique contribution to the Swedish national economy\* is significantly higher for fermented herring than for animal feed.

A kilo of herring processed into feed creates a value-added of SEK 0.72, while the same amount of herring processed into fermented herring creates a value-added of SEK 22.44 (diagram 1). The unique contribution to the Swedish national economy is 31 per cent higher for fermented herring than for animal feed. An estimated 620,833 tins of fermented herring were produced in Sweden in 2020, signifying that the fermented herring industry added nearly SEK 7 million to the Swedish economy. The corresponding figure for the animal feed industry, calculated on the same amount of herring, is just under SEK 225,000.

## Profitability of the herring industry for Sweden

Herring fished in the Baltic Sea for human consumption is used in products other than fermented herring, such as fried herring and smoked herring. The added values for these products differ somewhat from those for fermented herring. We therefore use a range\*\* to estimate the fermented herring manufacturers' unique contribution to the national economy. With a catch of 47,000 tonnes of herring in 2021,<sup>[17]</sup> the herring industry added a value of SEK 84–137 million to the Swedish economy, with SEK 53–106 million generated through human consumption and SEK 30 million through the feed industry. This estimate is based on 10 per cent of the year's herring catch going to human consumption and the rest to the feed industry.<sup>[18]</sup>



### Can we eat fatty fish from the Baltic Sea?

If a larger share of herring is to be used for human consumption, there also needs to be demand for herring as a food. The National Food Administration advises certain groups against eating fatty fish, such as Baltic Sea herring, citing the higher levels of environmental toxins often found in these fish.<sup>[20]</sup> Meanwhile, research shows<sup>[21]</sup> that these levels vary between catch sites and have decreased over time in some areas of the Baltic Sea.<sup>[22]</sup> An updated summary of the state of knowledge about environmental toxins in Baltic Sea herring could form the basis for revised food recommendations and promote increased domestic consumption of Baltic Sea fish.

\* Unique contribution to the national economy refers to the Swedish Unique Added Values (SUAV) that would be lost if the product stopped being sold. Estimates from other industries show that 30% of the values an industry generates can be lost if the industry ceases to exist.<sup>[23]</sup> In other words, the products' unique contribution to the economy can be assumed to be 30% of the SUAV. For a more detailed description, see the [Appendix \(only in Swedish\)](#)

\*\* The range is 50–100% of the fermented herring product's SUAV. For a more detailed description, see the [Appendix \(only in Swedish\)](#).



If 30 per cent, rather than 10 per cent, of the landed herring had been used for human consumption, the total value-added would have been SEK 184–343 million, with SEK 160–319 million coming from herring processed for human consumption and SEK 24 million from herring sold for feed (see [Appendix \(only in Swedish\)](#) for redistribution analysis).

## **Is it profitable for Sweden to fish for animal feed?**

The mathematical example above demonstrates that it is more profitable for Sweden to fish for human consumption than for animal feed. Using a larger proportion of the herring catch for human consumption would therefore increase revenues for the

national economy. Large-scale fishing has also been shown to cost Swedish taxpayers over SEK 600 million annually.<sup>[19]</sup>

But the continuation of large-scale fishing for animal feed in the Baltic may cause even greater losses. The disappearance of herring from the Baltic would drive both large- and small-scale fishermen out of business. Sweden would then lose revenues for its economy, as well as one of the Baltic Sea's most important food fish. Current herring fishing patterns are not sustainable for any of the industry's operators under this scenario. Taking steps to ensure viable herring populations and maintain a healthy Baltic Sea is therefore not only the most sustainable environmental choice but is also the most beneficial for Sweden's national economy.

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