

# Fish or Meat? Is this a relevant question from an environmental point of view?



## Introduction

Nutrition accounts for 28 % of environmental impacts caused due to the final consumption of Swiss households [1]. It is thus the most important consumption sector from an environmental point of view. Out of this meat is the most important product group accounting for about 27% of impacts of food consumption [2]. Therefore, it is necessary to investigate and understand the environmental impacts of food consumption and possibilities for the reduction of environmental impacts. One option discussed for this is a reduction of meat consumption. Depending on the cultural background, fish might be considered as a possible replacement by consumers. Within a recent study we assessed the environmental impacts of different fish products sold in Swiss supermarkets [3].

## Goal of the Study

The goal of this study is to quantify the environmental impacts of high-sea fishing and salmon aquaculture, fish processing, transport and distribution to supermarkets across Switzerland.

## Life Cycle Inventory

The life cycle inventory for different types of fish is based on published work by different authors. These data have been harmonized and implemented in the EcoSpold format. The functional unit is one kg of frozen cod, canned mackerel, canned herring or smoked salmon. The former three are caught and processed in Denmark; the latter is farmed and processed in Norway. Data for the production of different meat products in Switzerland were available from earlier studies [4, 5]. To evaluate environmental impacts, the Ecological Scarcity Method 2006 and Global Warming Potential 2007 are used.

## Results

Depending on the type of fish, greenhouse emission per kg of filet range between 4.2 and 6.4 kg CO<sub>2</sub>-eq (see Fig. 1). Lamb, beef, and veal have a significantly higher impact on climate change compared to the assessed fish due to their methane emissions. However, the greenhouse gas emissions of fish are not lower than those of poultry and pork.

Fig. 2 shows that the environmental impacts of canned mackerel filets assessed with the Ecological Scarcity Method 2006 are dominated by the virgin olive oil in which the fish is conserved. Furthermore, the packaging material, the fish processing and the fish catching are of importance. Canned herring gives a similar result, however with much lower environmental impacts from the oil, since refined rape oil is assumed instead of virgin olive oil. The environmental impacts of deep frozen codfish are dominated by the carbon dioxide and nitrogen oxide emissions from the fuel use of the fishing boat. Feed production and the nutrient emissions into the sea are quite important for the total environmental impacts of smoked farmed salmon.

Comparing fish with different types of meat reveals that the environmental impacts are in the same order of magnitude (Fig. 2). Canned mackerel and smoked farmed salmon are at the higher end, due to the high impacts of aquaculture and olive oil, whereas canned herring and deep frozen codfish are at the lower end.

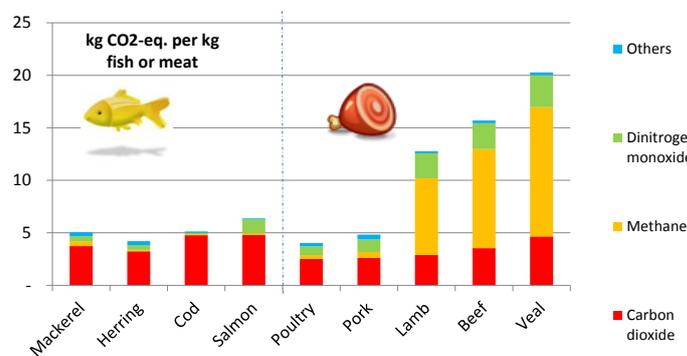


Fig. 1 Comparison of fish and meat – Global Warming Potential (IPCC 2007)

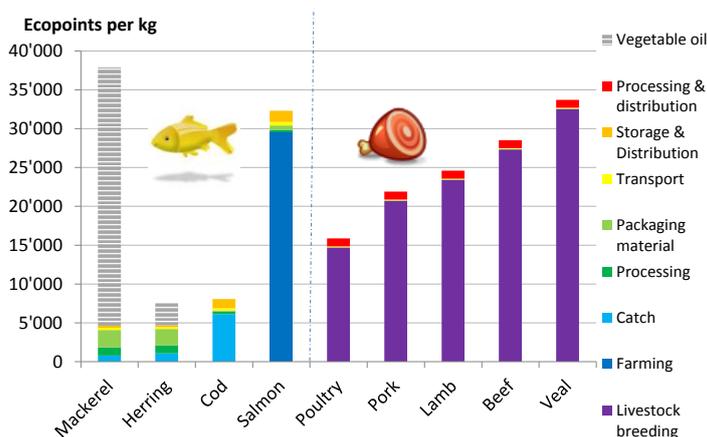


Fig. 2 Comparison of fish and meat – Ecological Scarcity Method 2006

Fish cannot be regarded generally as a more environmentally friendly food item than meat, because environmental impacts of different fish products might be quite variable and be even higher than those of meat. Furthermore, specific environmental impacts of fishery such as disturbance of natural habitats on sea ground or overuse of natural stocks are so far not covered by common LCIA methods.

The environmental impacts of food consumption can be reduced considerably by replacing both fish and meat dishes with vegetarian alternatives [6, 7].

## Conclusion

Despite having some environmental benefits with regard to climate change, high-sea fish and farmed salmon cannot be considered as an environmentally friendly alternative to meat due to large environmental impacts of the fishing industry such as waste water from aquaculture and overfishing.

## Literature

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