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Eco-labelling of wild-caught seafood products

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ABSTRACT

Several eco-labels for wild-caught seafood have been developed during the last decade. This article describes and analyses the criteria applied by four different eco-labelling schemes for seafood products from capture fisheries, and discusses the criteria in terms of environmental impacts, based on the ISO 14040 standard for life cycle assessment.

It is concluded that the most widespread eco-label, the Marine Stewardship Council (MSC), mainly addresses the fishing stage, in particular the overexploitation of marine resources. LCA studies confirm that the fishing stage represents the most significant environmental burden, but energy consumption and emissions of anti-fouling agents at the fishing or harvesting stage contribute with significant impacts that are not being addressed by international labelling initiatives for wild-caught seafood.

LCA studies show that significant environmental impacts are related to the life cycle stages after landing. This includes fish processing, transport, cooling and packaging (especially for highly processed seafood products). Hence, another challenge would be to include criteria related to the post-landing consumption of energy, certain materials and chemicals, waste handling and wastewater emissions. Minimizing product losses throughout the product chain would also be an important area for future criteria in order to avoid fishing at high environmental costs only to produce something that is later wasted.

The analysis shows that the Swedish KRAV is the only one that currently addresses a range of issues that include energy and chemicals in the whole life cycle of the products. International initiatives such as MSC cover fish products from many parts of the world emphasizing 'overexploitation of fish resources'. It is recommended, however, that international initiatives such as MSC develop criteria related to energy use and chemicals – at least at the fishing stage. Over time, other life cycle stages could be addressed as well to the extent that this is manageable.

1. Introduction

The total global catch of seafood products has increased significantly during the last part of the 19th century but has stabilized on a level slightly above 90,000 tons towards the end of the millennium [1]. Many of the stocks of economic interest are under significant pressure and fishery policies and regulations must be designed to reduce pressure on stocks while meeting the interests of the fishermen and subsequent parts of the product chain from sea to table [2]. Historically, the discussion on sustainability of capture fisheries has mainly been focused on overexploitation and measures such as quota regulation to mitigate overexploitation [3]. This is certainly justified, as fishing is considered to be the most large-scale human alteration of the marine ecosystem [4].

More recently, however, increased attention has been given to effects on multiple species (multi species assessments) and the surrounding ecosystem (ecosystem-based management), by-catch and discard issues, seafloor impacts, lost fishing gear leading to ghost fishing, as well as other types of waste generated from fishing vessels. This is also reflected in the Code of Conduct for Responsible Fisheries (CoC) launched by FAO in 1995. The focus of the Code is on sustainable resource extraction and management, but it also considers ecosystem effects of fishing, food safety as well as social aspects [5]. The publication of the Code has been most important for placing fisheries sustainability on the political agenda. The FAO has since also looked into product certification with or without eco-labelling as a way to promote more sustainable fisheries [6], and in 2005 published a guideline for eco-labelling of seafood products [7].

The expanded view on the notion 'sustainable fisheries' is welcomed, but little attention is given to other important aspects such as energy consumption and the contribution to global warming, which may have a negative effect on the fisheries in the

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long term.[1] Additionally, there are several environmental aspects to consider in the rest of the product chain as well, which are seldom addressed in the discussion of sustainable fish products [8,9].

Eco-labelling schemes have emphasized food products from agriculture and aquaculture but an increasing number of labelling initiatives for wild-caught seafood have emerged over the last decade [6]. These range from 'single attribute' labels, such as the dolphin safe tuna label, to 'multi attribute' labels that address several environmental aspects at 'one' or 'several' stages of the products' life cycle (from sea to table).

The present article analyses the potential and limitations of different eco-labels of wild-caught seafood products and discusses how a holistic approach to eco-labelling may promote more sustainable seafood products from a life cycle perspective.

2. Conceptual framework and methodological approach

When analysing the environmental impacts from seafood products it is important to distinguish between impacts occurring in the fishing stage, and impacts occurring in later, post-landing phases of the products life cycle. It is also important to distinguish between different types of impacts, see Fig. 1.

The figure serves to illustrate the life cycle perspective as well as the impact types, and is further elaborated in the following.

(1) Fishing activities have a direct impact on the stock of the target species. In a wider perspective the exploitation of target species may influence the non-target species and the surrounding marine ecosystem, as illustrated by the concentric circles.
(2) Apart from the direct impact on target species, fishing activities lead to impacts on non-target species such as other fish, invertebrates, marine mammals, and birds. The direct impact on non-target species may also have indirect effects on the surrounding marine ecosystem, including feedback effects on the target species.
(3) A direct impact on other parts of the marine ecosystem (e.g. the benthic ecosystem) can also be observed. One example is the use of demersal fishing gear that inflicts damage to the seafloor. Another example is the loss of fishing gear (or other types of wastes), and the release of biocides from anti-fouling[2] paint, which can have effects anywhere in the marine ecosystem [3]. This may have feedback effects on non-target and target species as well.
(4) Fishing activities also have negative impacts on parts of the external environment that do not belong to the marine ecosystem. This is mainly related to the combustion of fossil fuels and emissions of gases such as carbon dioxide (contributing to global warming), sulphur and nitrous oxides, contributing to effects such as nutrient enrichment and acidification.
(5) Impacts also occur during the post-landing product chain. This involves the processing industry, wholesale and transport processes. The environmental impacts are related to consumption of energy (with related emissions), chemicals, water and other resources as well as generation of waste and various types of emissions to air and water.
(6) Finally, the products reach the consumer. The environmental aspects related to shopping, storing, cooling, food preparation as well as disposal of packaging and leftovers involve a number of inputs and emissions.

The grey arrow emphasizes the feedback from the external environment. For instance, the greenhouse effect may change the production conditions in the marine ecosystem, which in turn may change the abundance and composition of species in a given area [10].

2.1. Different categories of eco-labels

Inspired by Chaffee et al. [11] the present article approaches the analysis of eco-labelling by distinguishing between two types of eco-labels for seafood products, namely 'single attribute' and 'multiple attribute' eco-labels. An example of a single attribute eco-label is the 'Dolphin Safe Tuna' label aimed at minimising/avoiding by-catch of dolphins. An example of a multiple attribute label is the 'MSC' eco-label (Marine Stewardship Council) that focuses on the protection of fish stocks and marine ecosystems in broader terms. It can be argued, however, that it is possible to distinguish between two subcategories of multiple attribute labels; one that mainly focuses on the fishing stage, arrows 1–3 in Fig. 1 (e.g. MSC) and another that addresses the 'environmental' impacts in the whole life cycle of the products, arrows 1–5 in Fig. 1. An example of the latter is the KRAV eco-label that will be elaborated on later in this article. Hence, there remain single attribute and multiple attribute labels of which the 'MSC approach' and the 'life cycle approach' are two subcategories. This article will therefore, discuss on the following three types of eco-labelling schemes for wild-caught seafood, namely:

- Single attribute labels such as the 'Dolphin Safe Tuna' label, which typically focus on the protection of one single species [12];
- Resource oriented multiple attribute labels that focus on sustaining the reproductive capacity of fish stocks by limiting over-fishing and adverse effects on marine ecosystem. One example is the MSC label [13];
- Multiple attribute eco-labels that focus on environmental aspects in a broader sense (not only a marine ecosystem focus) and which address environmental aspects in the whole life cycle of the product. The Swedish 'KRAV' eco-label represents an eco-label in this category [14].

The following section includes a description and analysis of eco-labels within these three categories.

3. Analysis of four different eco-labels for seafood

Based on the conceptual framework presented in the previous sections, the following contains an analysis of four different eco-labels: 1) the 'Dolphin Safe Tuna', 2) the MSC label, 3) the Swedish KRAV label for wild-caught seafood, and 4) a Danish label suggested by the Danish NGO – the Danish Society for a Living Sea (DSLS). The first two are the examples of well-known international eco-labels, while the latter two are national labelling initiatives of a much smaller scale. The KRAV eco-label has only certified four fisheries (primo 2008) and that the suggested Danish eco-label (from DSLS) hasn't been used for several years. The latter is still of interest, because it includes an approach targeted at minimizing energy consumption.

The analysis describes the labels' comprehensiveness in terms of environmental aspects and life cycle stages that are being addressed, and discusses the criteria vis-à-vis findings in LCA

[1] It should be acknowledged that the Code explicitly mentions energy consumption. It is stated that "States should promote the development of appropriate standards and guidelines which would lead to the more efficient use of energy in harvesting and post-harvest activities within the fisheries sector" [5].

[2] Anti-fouling agents are used to inhibit the growth of barnacles and other marine organisms on the hull of the fishing vessels. Anti-fouling agents typically contain tin or copper compounds [3].