Supply chain expectations for tool to calculate sustainability of white fish products at a batch level

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Abstract in Norwegian:

Matindustrien har de siste årene møtt krav om mer miljøvennlige produkter og effektive måter å kommunisere dette på. Behovet er åpenbart i sjømatindustrien hvor hensyn til miljø, etisk produksjon og økonomisk bærekraft er pådrivere for økt kunnskap om hvordan produkter og bedrifter påvirker bærekraft. Hvordan disse bekymringene og behovene omsettes til krav fra industrien er dårlig beskrevet i litteraturen. Denne studien ser nærmere på hvordan ulike "stakeholders" i verdikjeden kan bruke data om bærekraft i markedsføringstiltak, intern benchmarking og forbedring av miljømessige påvirkning. Hovedutfordringen er å designe et måleverktøy som kan brukes ved forskjellige betingelser og fortsatt opprettholde integriteten.

Abstract in English:

The food production industry has in recent years had to answer calls for environmentally friendly strategies and methods of communicating these effectively. This need is seen clearly in the fisheries sector where the concerns regarding the environment, ethical production and economic sustainability are driving forces for greater knowledge about the sustainability impact of a product or company. How these concerns and needs translate into requirements from the industry is poorly described in the literature. This study investigated these requirements within the framework of a theoretical tool which the stakeholders could use in the future. The results of the research carried out here show that stakeholders, through the fisheries supply chain, wish to use sustainability data for marketing purposes, internal benchmarking and improvement of environmental impact. The main challenge reported is to design a measurement tool that can be used in different conditions whilst still maintaining that integrity.

Introduction

Sustainability is the key to being able to provide food for generations to come. Therefore it is crucial to identify areas for improvement. When assessing sustainability it is important to include information from what has been called the triple bottom line or the three pillars of sustainability, Society, Economy and Environment see Figure 1 (Hunkeler & Rebitzer, 2005; Kloepffer, 2008; Remmen *et al.,* 2007).

Life Cycle Assessment (LCA) is a standardized approach to quantify environmental impacts in relation to a product from a supply chain perspective. A weakness is that LCAs are often resource intensive to undertake, which hampers operational day-to-day use and a drawback often pointed out by the industry is that results of different studies are not fully comparable because of different goals and scopes (Parker, 2012; Vázquez-Rowe, Hospido, Moreira, & Feijoo, 2012). Figure 2 demonstrates how an LCA is applied for a consumer product i.e. inputs and outputs from different stages in a product's lifecycle are considered and given a value.

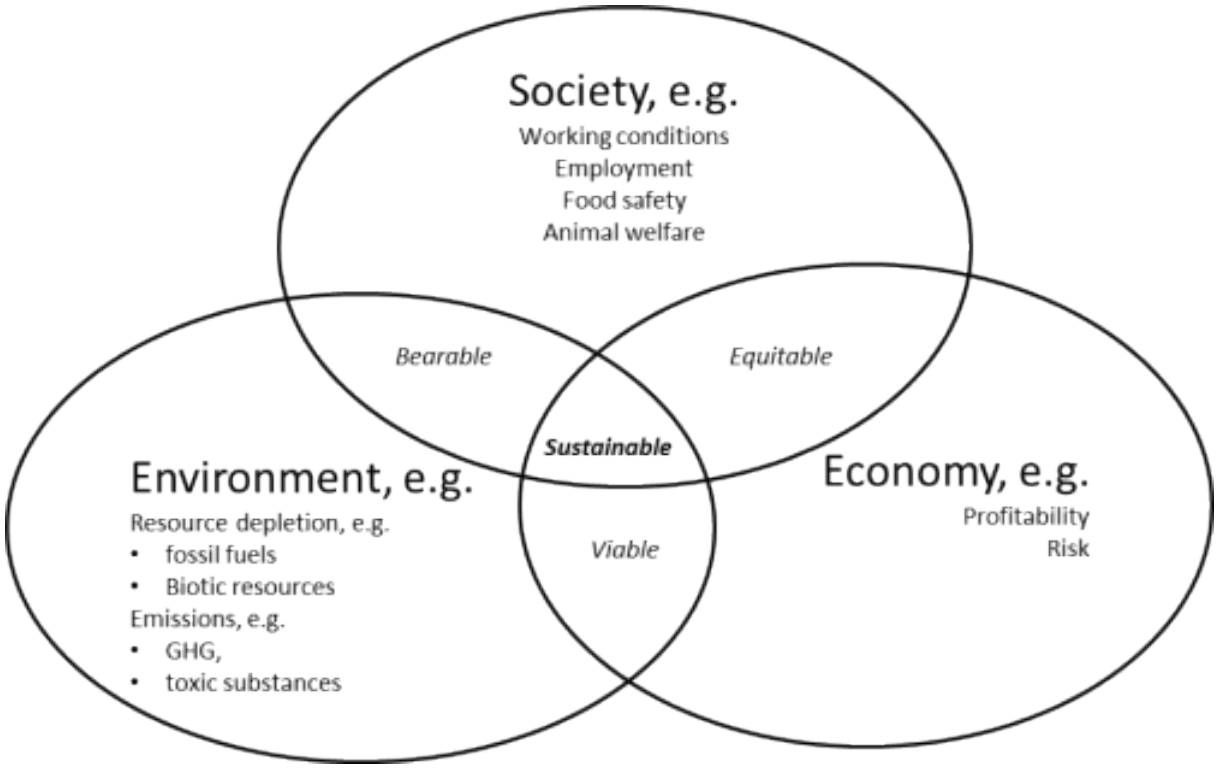

Figure 1 The three pillars of sustainability modified from Hunkeler & Rebitzer (2005), Kloepffer (2008) and Remmen et al.,(2007)

The life cycle of a product implies a chain of successive events. An LCA quantifies the use of resources and emissions to the environment during the life cycle of a product.

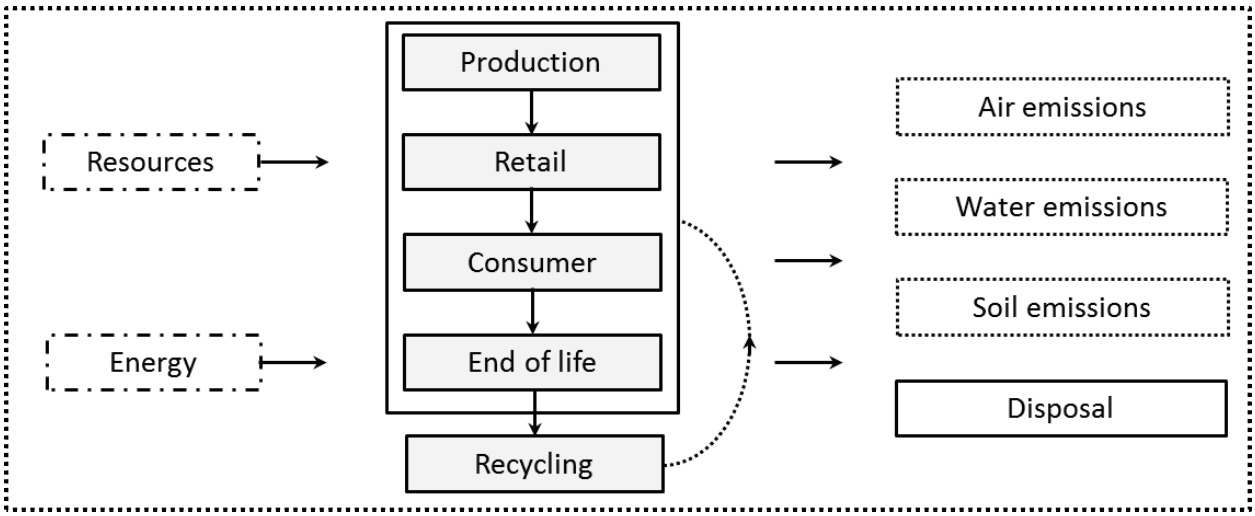

Figure 2 Example of an LCA for a consumer product

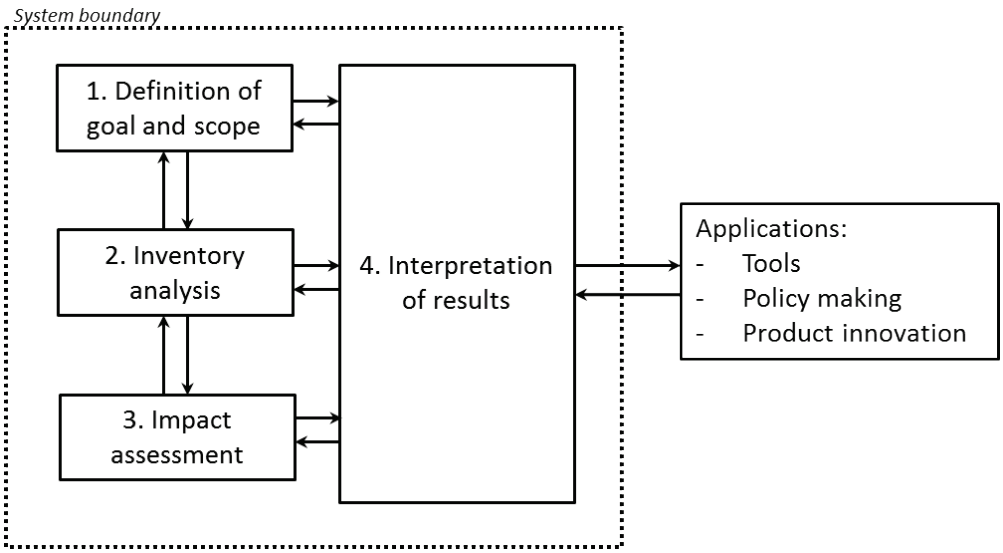

Figure 3 LCA Framework

Currently the LCA framework (fig.3) does not extensively include the social and economic aspects of sustainability. A complete Sustainability Impact (SI) tool should include these factors and aim to give consumers and other supply chain actors a more complete and simple manner in which to judge sustainability.

Calculating SI is of particular interest in the whitefish sector because conditions change through the season and the market is increasingly being influenced by the increasing presence of farmed fish. This incentive means that the sector is motivated and interested in new ways of assessing sustainability impact.

Currently a number of companies have operated with lifecycle analyses (LCA) or studies of the environmental impact of a product or production in general. What is missing is the ability to differentiate between two examples of the same product which may have a varying sustainability impact due to for example different fuel efficiencies during the catch operation. With regards to dish it will vary according to the gear employed and seasonal changes in the availability of the fish.

Currently there exists no simple tool for carrying out sustainability impact on products at a scale smaller than a year nor is there any tool which can be used by multiple entities in the supply chain. Before creating such a tool it is appropriate to find out what those initially using the tool (i.e. stakeholder) are interested and what they expect from it. There is little research, mapping what stakeholders would want in order to be able to assess their own internal sustainability and their attitudes towards this. For example the LCA's described above are often carried out based on data from one or more years and require a great deal of new data for each calculation.

This research aim to outline what the stakeholders in the wild caught fisheries supply chains involved in the case studies expect from measurements of sustainability and how best they could exploit the latest research as part of their business. Stakeholders in the case of this study are small and medium sized enterprises as well trade associations. The stakeholders are expected to consider an SI tool which could be used independently by one company. The tool could of course cover a whole supply chain if all partners in the chain used the tool.

In order to achieve relevant stakeholder orientated solutions for calculating sustainability the stakeholders need to be motivated to use it and it needs to be appropriate

for their needs. Therefore we need to carry out research in this area.

Method/Design

In order to correctly identify what sustainability information is important to stakeholders and how they would expect to use a tool for calculating their sustainability impact in a typical whitefish supply chain, interviews and workshops were carried out. The stakeholders include representatives from all sections of the wild caught fisheries supply chains in northern Europe. The stakeholders were from Iceland, Norway, Sweden and the United Kingdom. These areas were chosen because of their importance and relevance to the fisheries industry across the EU. In addition the stakeholders have connections with processors in countries outside Europe such as China. The types of stakeholder were fishing boats and associations of fishing boat owners, fish processors and environmental certification associations.

Stakeholder workshops were held where the methodologies and possible information that could form the basis of a tool for assessing sustainability impact (SI) were presented. The data collection was carried out using a questionnaire which was completed by a representative of each of the stakeholders and then discussed verbally in order to clarify any uncertainties.

A selection of the questions is found in Table 1 below.

Table 1 The questions used as part of the stakeholder analysis

Q nr.	
1	What do you expect to achieve through the development of the sustainability impact (SI) tool?
2	What do you hope to achieve through the development of the SI tool?
3	What elements to you expect to be important in the SI tool?
4	How should the SI tool be made available?
5	How detailed should the SI tool be? Should it include every possible contributing sustainability factors Should it only include main contributing sustainability factors Should it only include issues where data is easily available Should it be as easy to use as possible
6	Do you have any concerns regarding the SI tool, its development or this project?
7	What type of input are you expecting to give to the SI tool
8	How will be expecting to use the SI tool? (what questions should the SI tool answer for you?)
9	Following on from this – what are your motivations for participating in this project?
10	How important is profiling the environmental impact of your members/company?
11	How important is profiling the economic impact of your members/company?
12	How important is profiling the social impact of your members/company?
13	What internal impacts do you expect greater awareness of?
14	How important would the SI tool be to your members/company?
15	Do you think you will use the results of the SI tool in marketing your products?
16	How do you hope to be able to use the SI tool?

In addition to answer the questions each of the stakeholders were encouraged to discuss opinions expressed.

Findings

The stakeholder responses showed that despite the fact that they were gathered from very varied backgrounds, for example certifying organizations and fishing boats, they had many similar opinions about what should be included in a tool to assess SI, what they would expect to be included and the possible limitations.

The findings presented here are not those shared by all stakeholders but rather an overview of the broad spectrum of responses. Where an opinion was held by the majority of the stakeholders this is clearly stated in the findings.

The stakeholders expected to achieve several related goals through the use of a tool for calculating SI. These revolved around documenting the environmental aspects of their products both with regards to provision of information for customers and that of documentation internally within a supply chain. They also expressed the desire to be able to use this as a marketing tool and as a tool for "enhancing (improving) the environmental load of their products" and improving the environmental impact of individual companies.

Through the development of a SI tool the stakeholders hope to gain a better understanding of factors contributing to the environmental impacts of their products. The stakeholders also expressed the desire to understand how actors in the supply chain can affect the environmental burden of their products. In addition the stakeholders would like to be able to quantify the environmental impact.

When the stakeholders were questioned as to what answers the SI tool should supply, one of the dominant responses was that of analysis and calculation of the environmental impact of their current practices. Stakeholders wanted to be able to supply answers to questions regarding sustainability both within supply chains and to end consumers, for example in decision making processes when choosing raw materials. This is in agreement with previous findings about the expected uses of sustainability certification (Gulbrandsen, 2005). Some of the stakeholders would like the tool's specifications to be applicable in certification settings and other formalized uses. Certain stakeholders expressed the idea that the tool should also clarify the social and economic impacts of sustainability as well as the environmental impacts.

It was clear from the answers to all the questions that an SI tool would be important in a marketing context. Some of the stakeholders believe that the different parts of the supply chain or for example different sizes of boats will use the SI calculation differently. The SI tool could be used to establish industry benchmarks and could be offered as a service within the trade associations as internal web services in addition to external web services. The stakeholders also highlighted the possibility of using the tool to encourage suppliers to improve their environmental performance.

The interviewes repsonses with regards to which elements should be included in the tool where varying and not extensive the collective response is listed below:

- Fuel usage
- Emissions
- Type of gear
- Kg fuel usage/kg fish
- Packaging material
- Different types of transport, e.g. sea or land

The stakeholders also expressed the desire for the calculation method to be universal. The Sustainability Impact (SI) calculations must be seen as fair and comparable by the potential buyers. These expectations of the relevant elements to be included are realistic and in line with current LCA practice, however they are only a small number of the total number of elements currently included in an LCA (Vázquez-

Rowe *et al.,* 2012). This illustrates the stakeholders' desire for a way of calculating SI impact in a simple fashion. The stakeholders had different perspectives with regards to how the tool should be made available dependent upon their position in the supply chain. There was an expectation that the tool should be easily implemented, easily used and automated. There was an expectation that it could be used as an online tool and as an extension of existing services. The tool should be based on a methodology that provides confidence in the validity of the data created.

With regards to the level of detail expected in the calculations and the tool the stakeholders thought that it should be focused on being at a batch level, which is a smaller division for data acquisition then is currently seen in LCA's. Beyond this the stakeholders expected the tool to focus on the major contributory factors to their environmental impact. The stakeholders emphasized ease of use as being important. The desire to input only the minimal amount of new data for each new batch was also important. Other values that maybe constant from batch to batch should be able to be pre-implemented and "remembered" by the tool. The level of detail should be sufficient to provide credibility but not so complex that mistakes could occur when inputting data into the tool.

The stakeholders expressed a number of concerns regarding both the calculation and publication of the results of such an SI assessment, one of the major concerns being the possibility that it could be used for propaganda by competitors or advocacy groups. Another concern was that of data security, i.e. where data input into the tool may be used and by whom. Concerns were also raised about the acceptability of the outputs from the tool in a wider context, ease of implementation and suitability for a wide variety of companies. There is a fear that the tool will only be able to be used internally within a company when it is most interesting for external purposes. Finally concerns were raised with regards to the "usability" of the tool and the possible need for a further project in order to create a tool which can be used in marketing and not just for internal bench marking.

When questioned about the motivations for taking part in this research (the same motivations as found in uses were identified with the additions of the ability to limit costs related to achieving a desirable environmental impact and the ability to illustrate this for the market.

The stakeholders generally responded that with regards to the three areas of sustainability they were most interested in profiling the environmental sustainability followed by the economic sustainability with social impact being least important. They felt that a tool for assessing sustainability at a batch level would only be widely accepted if it is widely used and its potential to create value will be based on its user friendliness and general supply chain perspective.

Conclusions

The results of the investigation into the important aspects from a stakeholder's point of view with regards to creating assessment of SI impact can be summarized as follows;

- Calculating and reporting environmental impact
- Marketing (internally and externally)
- Communication both within supply chain and to final customers

The stakeholders expect the development of a tool for calculating SI will assist them in assessing their internal supply chains and also comparing their products (with other companies) with regards to environmental impact. The stakeholders expressed the greatest interest in environmental sustainability followed by economic and social sustainability. It is unclear whether this is related to their current perception of what is included in "sustainability" or a real desire

to focus only upon the environmental aspects. Further work should examine more clearly what is relevant in which context.

With regards to a classical LCA and environmental impact with regards to CO2 emissions fuel usage is the largest contributory factor (Avadí & Fréon, 2013; Tyedmers, 2001; Tyedmers *et al.*, 2005) suggesting that this impact has been clearly identified by all stakeholders (additionally many of the other elements in the list created as part of this work will contribute towards fuel usage). This points to the fact that an adaptation of classical LCA will be an important contribution from a stakeholder perspective. A tool for calculating sustainability impact at a batch level should be,

- Easy to use in terms of input of data,
- Easy to interpret
- Available through web applications
- Offer customization options.
- Detailed enough to be reliable
- General scientific acceptance is desirable.

In futures studies a greater number of stakeholders could be included and end consumers` opinions could be included to give a more complete picture of the most relevant information to be presented.

The stakeholder response indicates an eagerness to not only obtain but also analyse and use information about sustainability impact. Stakeholders highlight the desire not only to use this information as a marketing tool highlighting current practices, but also for internal and supply chain benchmarking. Improvement of internal practices is also a priority. Creating a tool that can fulfill all these needs will be challenging but this research provides a baseline for the creation of a requirement specification for the first generation of such a tool.

This study provides the knowledge of what a tool for internal and supply chain measurements of SI should provide what limitations it may have and who stakeholders from different parts of the white fish supply chain expect to interact with it. The tool should be developed so that it can stand alone in an individual company or be used as part of a supply chain approach. This research has been carried out as part of the WhiteFish project which is a Seventh Framework EU project that will develop a simplified tool for assessing the broad sustainability of North East Atlantic cod and haddock fisheries, based on LCA methodology.

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