



A method to assess social sustainability of capture fisheries: An application to a Norwegian trawler



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ABSTRACT

Social sustainability assessment of capture fisheries is, both in terms of method development and measurement, not well developed. The objective of this study, therefore, was to develop a method consisting of indicators and rubrics (i.e. categories that articulate levels of performance) to assess social sustainability of capture fisheries. This method was applied to a Norwegian trawler that targets cod and haddock in the northeast Atlantic. Based on previous research, 13 social sustainability issues were selected. To measure the state of these issues, 17 process and outcome indicators were determined. To interpret indicator values, rubrics were developed for each indicator, using standards set by international conventions or data retrieved from national statistics, industry agreements or scientific publications that explore rubric scales. The indicators and rubrics were subsequently used in a social sustainability assessment of a Norwegian trawler. This assessment indicated that overall, social sustainability of this trawler is relatively high, with high rubric scores, for example, for worker safety, provisions aboard for the crew and companies' salary levels. The assessment also indicated that the trawler could improve on healthy working environment, product freshness and fish welfare during capture. This application demonstrated that our method provides insight into social sustainability at the level of the vessel and can be used to identify potential room for improvement. This method is also promising for social sustainability assessment of other capture fisheries.

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1. Introduction

Northeast Atlantic fisheries produced 8.3 million t of fish in 2011, accounting for approximately 10% of the global production of fish from capture fisheries (Statistics Office Iceland, 2013b). In the northeast Atlantic, demersal fisheries, targeting species living close to the ocean floor, comprise the majority of fisheries and nearly a third of these demersal fisheries targeted cod and haddock in 2011 (Statistics Office Iceland, 2013a). Recently, fishing companies that target cod and haddock in the northeast Atlantic have expressed interest in assessing and improving sustainability of their products at the level of the fishing vessel. These Norwegian and Icelandic fishing companies, therefore, initiated the WhiteFish project on sustainability of cod and haddock fisheries in the northeast Atlantic, which was funded under the EU 7th Framework Programme for Research.

Sustainability is generally composed of environmental, economic, and social sustainability (Jeswani et al., 2010; Kloeffer, 2008). Assessment of environmental performance is well developed (e.g. life cycle assessment ISO, 2006a,b). Economic sustainability or viability (e.g. profitability) is a prerequisite for companies to stay in business,

so this is generally well monitored by companies themselves. Assessment of social sustainability is, however, both in terms of method development and measurement, not well developed.

Increasing interest of companies in social sustainability can be viewed in light of wider changes in welfare economics from a traditional focus on profitability and income to a more inclusive view on welfare based on Sen's (1984, 1993) capabilities approach. This approach considers welfare not only in terms of utility as quantified by profitability and income, but also in terms of, for example, individual freedom, non-material values and equal opportunities. At the company level, this capabilities approach has given rise to a focus on corporate social responsibility (CSR) to consider environmental and social sustainability in addition to profitability. The standard on CSR of the international organization for standardization (ISO, 2010), however, does not provide methodological assistance on social sustainability assessment. One method that is often proposed for social sustainability assessment is social life cycle assessment (S-LCA) (Benoît-Norris et al., 2011; UNEP/SETAC, 2009). S-LCA however, focuses on the value chain rather than on the single company or vessel.

Thus far, social sustainability of capture fisheries has been studied using qualitative methods (e.g. Glaser and Diele, 2004; Glass et al., 2015; Reed et al., 2013) and quantitative methods (e.g. Ceriola et al., 2008; Guyader et al., 2013; Utne, 2007). Qualitative methods such as

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semi-structured interviews and field observations have been used in sustainability assessments of a Brazilian mangrove crab fishery (Glaser and Diele, 2004), the Alaskan weathervane scallop fishery (Glass et al., 2015) and inshore fisheries in the UK (Reed et al., 2013). Quantitative methods have been used in sustainability assessments of the Southern Adriatic trawl fishery (Ceriola et al., 2008), European small scale fisheries (Guyader et al., 2013) and Norwegian cod fisheries (Utne, 2007). These social sustainability assessments performed thus far concerned fisheries as a whole and hence do not inform individual companies about their social sustainability. When companies would know about their social sustainability, they can improve their social sustainability and communicate outcomes from their assessment to consumers.

Sustainability assessment starts with a description of the (problem) situation (Mollenhorst and De Boer, 2004; Van Calker et al., 2005). The situation considered in this study concerns cod and haddock fishing companies that participate in the WhiteFish project and that employ trawlers, longliners, auto-liners, and Danish seiners in coastal and offshore fisheries to produce fresh and frozen fillets. The second step in sustainability assessment is the identification of social sustainability issues (Mollenhorst and De Boer, 2004; Van Calker et al., 2005), i.e. aspects of social sustainability that are important to consider in an assessment. This step was performed for cod and haddock fisheries in the northeast Atlantic by Veldhuizen et al. (2015) who identified social sustainability issues based on stakeholder input. The third step in sustainability assessment consists of determining suitable indicators for the issues identified (Mollenhorst et al., 2006; Van Calker et al., 2004, 2007) and quantifying these indicators to measure the state of the social sustainability issues (Bell and Morse, 1999). Application of this third step to cod and haddock fisheries in the northeast Atlantic is the subject of the present paper.

Fishing companies that want to assess and improve their social sustainability need to be able to interpret indicator values, for example, by using performance reference points that provide target or threshold values based on conventions or best practice (UNEP/SETAC, 2009). A scoring system that can include performance reference points and that can be used to interpret indicator values is a rubric assessment, which is an overall assessment of performance based on a series of rubrics. Rubrics are categories that articulate levels of performance, from poor to excellent (Goodrich, 1997; Hafner and Hafner, 2003). The advantage of applying a rubric assessment is that it explicates desired directions, and desirable and undesirable values (Jonsson and Svingby, 2007). As a result, social sustainability assessment based on rubrics informs companies about their performance and about potential room for improvement. In addition, the use of rubrics ensures that the social sustainability assessment is transparent (Jonsson and Svingby, 2007). Rubric assessment is traditionally applied in education (Hafner and Hafner, 2003), but it has also been applied in other areas, e.g. sustainability assessment (e.g. FAO, 2014; Häni et al., 2003; Zahm et al., 2008), certification of buildings (e.g. BREEAM, LEED and CEEQUAL Sev, 2011) and fisheries management (Pitcher and Preikshot, 2001; Pitcher et al., 1998, 2013).

The objective of this study was to develop a method consisting of indicators and rubrics to assess social sustainability of capture fisheries. To demonstrate this method, the indicators and the accompanying rubrics were used to determine social sustainability of a Norwegian fishing company from Tromsø that operates a trawler to target cod and haddock in the northeast Atlantic.

2. Methods

2.1. Selection of issues

Social sustainability issues for cod and haddock fisheries in the northeast Atlantic were previously identified through two consecutive stakeholder surveys (Veldhuizen et al., 2015). In these two surveys (n = 41 and n = 51), stakeholders from seven stakeholder groups

were consulted, i.e. fishing companies, fishing company employees, suppliers and processors, sales organizations, consumer organizations, policy-makers (at the national and at the local level), and fish welfare organizations. The first stakeholder survey resulted in the identification of 27 relevant issues. These issues were subsequently grouped into issue categories entitled working conditions, employees' job fulfilment, terms of employment, food safety and product quality, fish welfare, and companies' contribution to the local community. Since it is not practical nor desirable to consider all issues identified as relevant in a social sustainability assessment (Mitchell et al., 1995), a second survey was used to determine the importance of each issue (Veldhuizen et al., 2015). For the present study, issues were selected that were considered important by at least a two-thirds weighted majority of respondents. Table 1 shows the resulting 13 issues and the issue categories these selected issues belong to.

2.2. Determining indicators

Outcome and process indicators (Evans et al., 2011; Good et al., 1999) were determined for the 13 important social sustainability issues of cod and haddock fisheries in the northeast Atlantic. An outcome indicator measures the state of a sustainability issue, whereas a process indicator measures factors that influence the state of a sustainability issue. Outcome and process indicators can be both quantitative (e.g. number of workplace accidents) and qualitative (e.g. severity of workplace accidents).

To warrant quality and practicability, according to Mitchell et al. (1995), indicators should be: 1) valid, i.e. provide accurate and precise information, 2) measurable, i.e. easily measured given time and budget constraints, 3) sensitive, i.e. show changes in the state of the issue, 4) simple, i.e. easily understood by users, and 5) accompanied by performance reference points that assist in the interpretation of indicator values. Outcome indicators provide direct information on the state of an issue, whereas process indicators provide only indirect information on the state of an issue. Therefore, outcome indicators were the preferred indicator type. In case an outcome indicator for an issue failed to meet the indicator criteria, process indicators were determined.

2.3. Rubric development

Rubrics with scores ranging from 1 to 5 (integers only) were developed for all indicators to interpret indicator values. In all cases, a rubric score of 1 represents the least desirable value for an indicator and a rubric score of 5 represents the most desirable value for an indicator. Note that these rubric scores indicate relative levels of social

Table 1

Social sustainability issues selected based on the proportion of stakeholders that consider each issue important, ordered per issue category (based on Veldhuizen et al., 2015).

Issues per issue category	Proportion
Working conditions	
Healthy working environment	0.99
Worker safety	0.96
Provisions aboard for the crew	0.73
Employees' job fulfilment	
Employees' job satisfaction	0.86
Employees' professional pride	0.85
Companies' salary levels	0.69
Terms of employment	
On-the-job training	0.80
Companies' timely payment of salaries	0.72
Food safety and product quality	
Physical food contamination	0.87
Chemical food contamination	0.86
Product freshness	0.80
Microbiological food contamination	0.72
Fish welfare	
Fish welfare during capture	0.71

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