



## Perceptions of aquaculture ecolabels: A multi-stakeholder approach in Nova Scotia, Canada



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### ABSTRACT

Ecolabelling is a tool increasingly used to support sustainable aquaculture management across the world. Proponents argue that ecolabels can offer economic benefits, improve transparency of fish farms, and address some of the ecological and socio-economic concerns of intensive marine finfish aquaculture. Exploring how ecolabelling schemes are valued and perceived can help evaluate their potential acceptance, use, and benefits. However, most perception studies explore consumer opinions and demand; few investigate the perceptions of a range of stakeholders at various points in the supply-chain. In this study, Q-methodology was used to explore the perceptions of six aquaculture-related stakeholder groups (fish farming industry, food industry, scientists, management, wild capture fishing industry, and environmental groups) towards ecolabelling of finfish aquaculture in Nova Scotia, Canada. Twenty-five participants sorted and ranked how much they agreed or disagreed with 49 different statements about the potential uptake, benefits, challenges, and influence of ecolabelling within the aquaculture industry. The analysis revealed four defining factors, or shared ‘perspectives’ which included: the optimist view, the skeptic view, the pragmatist view, and the improver view. Stakeholders agreed on likely market benefits, but also saw confusion and credibility as biggest barriers to successful ecolabelling. Conflicting viewpoints and significant disagreement on the potential for ecolabels to address environmental and socio-economic concerns suggests that labels may not be an effective tool for improving social acceptance. This paper argues that studying perceptions can lead to a better understanding of how ecolabels communicate, identify areas of improvement, and provide insight for their use for sustainable resource management.

### 1. Introduction

Ecolabelling is a voluntary market-based mechanism of environmental certification (eco-certification), which is increasingly used globally to promote sustainable development and improved resource management of seafood industries [1]. Ecolabelling schemes emerged from the sustainable seafood movement, and developed out of grass-roots efforts in response to failures in public policy to protect the ocean from overfishing and detrimental fish farming practices [2]. Ecolabelling for seafood has become popular due to the promise of market benefits, improved sustainability, and reduced environmental impacts [3,4]. By informing consumers of the environmental footprint of seafood production, the primary objective of an ecolabelling scheme is to reduce negative impacts by creating a demand and ‘market-pull’ for sustainably sourced products. The resulting expectation of market premiums for labelled products incentivizes industries to adopt more sustainable practices. Eco-certification processes may also bring wider social and political benefits such as government investment through

financial aid and the provision of infrastructure and amenities to communities involved in certification programs [5]. Sometimes, these wider benefits may outweigh strict economic advantages, especially in circumstances where the evidence of premiums is uncertain.

Many governments, industries, and civil society groups recognized early on that ecolabelling could offer a multitude of benefits. These benefits gained international recognition at the 1992 United Nations Convention on Environment and Development (UNCED) in Rio de Janeiro [4]. Since then, there has been an upsurge of interest in seafood ecolabelling schemes launched by governments, industry organizations and environmental groups [3,6]. Today, certified wild caught and farmed seafood production is rapidly expanding, and 14% of global seafood is certified by the nine key globally-operating voluntary sustainability standards (see Potts et al., 2016) [7].

Ecolabels and certification schemes are becoming commonplace in the market [7,8], and certification bodies have set targets to increase their coverage of fish and seafood production [9]. Yet, some academics question the effectiveness and rigour of seafood labels [10], and

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criticize their ability to foster consumer demand [11] and lead to significant environmental change [12–14]. Others insist that the high volume of available labels with conflicting messages undermines their effectiveness [11]. Thus, in this era of expansion of certified seafood production [7], which is increasingly being challenged by scientists and practitioners, it becomes relevant to understand how individuals perceive ecolabels, and how opinions relate to the effectiveness and potential usefulness of these tools.

To date, most ecolabel perception studies have focused on the opinions and demand of consumers [15–18]. While some argue that consumers are the main drivers of ecolabels, other stakeholders such as retailers, environmental non-governmental organizations (ENGOS), and governments may be more influential in the spread and uptake of eco-certification schemes [19]. And while consumers ultimately pay for labelled products, supply-side actors can influence how consumers access these products, by making important decisions such as which products are available in stores or which fish farms become certified. Other actors can be influential in the success of ecolabelling schemes as well, for example, support by governments can give producers technical and financial assistance to obtain certification [20]. Conversely, greenwashing claims and resistance by ENGOS and communities can undermine public trust in both the ecolabels and the producers that adopt them. Factors that influence industry participation and stakeholder uptake are thus important for understanding the overall ability of ecolabels to support sustainable development. Ultimately, the effectiveness of ecolabelling will depend on the attitudes and subsequent behaviour of several stakeholders. Despite this, few studies have explored the perceptions of a range of supply-side stakeholders.

Aquaculture, or the farming of fish, shellfish, or algae, is one of the fastest-growing marine and animal food-producing sectors. According to FAO statistics, farmed fish and seafood contributes more than half of the fish consumed globally [21].<sup>1</sup> Given expanding global populations and declining wild fish stocks, aquaculture production is expected to experience continued rapid growth [22]. While the leading seafood eco-certification schemes have been in existence since the late 1990s, certification schemes for aquaculture are still a relatively new phenomenon, and have only experienced substantial growth globally in the past five years. Certified wild catch accounted for 20% of the total global catch in 2015 [7]. Comparatively, 6% of the total aquaculture production is certified by six major international schemes (Aquaculture Stewardship Council (ASC), Global Aquaculture Alliance Best Aquaculture Practices (GAA BAP), Friend of the Sea (FOS), GlobalGAP, Naturland, and Organic), with certified salmon encompassing 56% of that total.

Canada's overall contribution to global aquaculture production is relatively small [23], but Canada is the fourth largest producer of Atlantic salmon (*Salmo salar*) in the world behind Chile, the United States, and Norway [24]. In Atlantic Canada, aquaculture plays an important role supporting local economies; for example, aquaculture accounted for 26% of employment income in Charlotte County, New Brunswick [24]. Despite its potential to revitalize rural communities, the production of seafood by finfish aquaculture in Canada has remained relatively constant over the last 10 years [25].

Nova Scotia is a small Atlantic Province, but has an important aquaculture industry. High government support, unique access to global markets, and stretches of suitable coastline presents the unique opportunity for development [26]. Nova Scotia's finfish sector is highly valued, and contributed 93% of aquaculture's total \$60 M GDP in 2014 [27]. However, the development of finfish aquaculture around the world has been accompanied by growing environmental, health, and socio-economic concerns [28]. In Nova Scotia, public mistrust and negative perceptions of aquaculture have been an enduring problem, and

have engulfed the industry in controversy. Developing industries that reduce negative environmental impacts and address socio-economic concerns is a priority for sustainable aquaculture management [29], and an ongoing challenge within Nova Scotia [24].

Since finfish farmers only recently became involved in ecolabelling schemes in Nova Scotia, this study aims to better understand how stakeholder perceptions influence potential future acceptance and uptake. At this point, fish farmers in Canada are certified with predominantly ASC, GAA BAP and organic certification [30]. Behavioural insights can help strengthen ecolabelling schemes, and help them reach various policy objectives by paying attention to what individuals *actually* think, rather than relying on what they *should* think [31]. Given the conflicting push for development and existing negative public perceptions over finfish aquaculture, Nova Scotia presents an interesting case study for exploring how the wider socio-political context influences perceptions about management solutions such as ecolabels. Ultimately, this research can inform policy, decision-makers, and potentially certification schemes to better understand how voluntary ecolabelling is used, promoted, developed, and understood.

This study investigates how a range of key stakeholders within a controversial aquaculture industry perceive the benefits and challenges to voluntary ecolabelling in a growing market. To gain a better understanding of stakeholder perceptions and identify groups that share similar viewpoints, a Q-methodology approach was applied. This systematic method explores the subjectivity of human behaviours and opinions by exploring patterns in the responses of individuals on a comprehensive set of statements about a topic. Statements were categorized across several topic areas to reveal differences in perceptions regarding the benefits and challenges of ecolabels, and the potential uptake, use and influence in Nova Scotia's aquaculture industry. Ultimately, exploring a range of stakeholders' experiences, knowledge, and perceptions can offer insight into the potential challenges and opportunities for aquaculture ecolabels.

## 2. Materials and methods

While aquaculture perception studies often use survey-based methods [32,33], some recent studies have used Q-methodology [34,35], which is a systematic research approach that identifies major themes in opinions shared by a range of stakeholders [36]. This method does not require a large number of respondents to produce statistically significant results [37] by providing an in-depth understanding of the diversity of perceptions within a group rather than attempting to be a sample representation of a larger population. This approach has been used to research perceptions in various environmental issues ranging from wind farm proposals [38], forest management [39], and climate change [40], among others. These studies praise the ability of Q-methodology to identify groups responding to similar issues, to describe competing viewpoints, and to determine criteria important to participants [39]. Consequently, Q-methodology could help inform sustainable environmental policy development and revision [41,42].

### 2.1. Selecting statements

A Q-study is undertaken in five broad steps. First, the 'concourse', or a comprehensive set of statements covering a multitude of topics surrounding ecolabelling in aquaculture was developed. A total of 281 statements were initially gathered from a range of research materials including newspaper articles, journal articles, government and private documents, reports, websites, and informal interviews. This approach to aggregating statements is typical of Q-studies, and taken so that research is focused on issues of relevance to participants rather than the researchers [41]. All potential statements (negative, positive, neutral) relating to topics relevant to the adoption, and subsequent acceptance of ecolabelled aquaculture were aggregated at this time. Statements were chosen as representative of any

<sup>1</sup> If catch reconstructions are taken into account, which consider unregulated and unreported catches, aquaculture contributes approximately one third of all fish produced.

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