

This article has been published in:
Regulation and Governance, Published online 28.08.2018
DOI: [10.1111/rego.12213](https://doi.org/10.1111/rego.12213)

This is the post print version of the article.

Business Interests in Salmon Aquaculture Certification: Competition or Collective Action?

By Irja Vormedal and Lars H. Gulbrandsen

Abstract

Research recognizes that strategic business interests can provide an important driver of private regulation, even in the absence of significant societal pressure and NGO-constructed demand. This article examines a range of competition and collective action-related interests that can motivate firms to promote and adopt certification schemes. We pay particular attention to the hitherto underexplored collective action interest to safeguard common-pool resources, upon which an industry may depend to sustain yields. Based on a case study of salmon aquaculture certification, the article argues that while the corporate motives repertoire includes strengthening competitiveness and industry reputation, safeguarding shared waters for culturing salmon is key to explaining industry commitment to and adoption of private regulation in this sector.

Keywords: certification, common-pool resources, private authority, private regulation, salmon aquaculture

1. Introduction

In 2007, a severe crisis hit the booming salmon farming industry in Chile. It was caused by elevated levels of sea lice leading to a major outbreak of infectious salmon anemia (ISA). Salmon farmers were forced to fallow considerably, which resulted in substantial downsizing and financial write-downs in the years to come. This crisis was an example of the “tragedy of the commons”—a theory of a situation within a shared-resource system where individual users acting rationally and independently according to their own self-interest behave contrary to the common good, leading to resource depletion (Hardin 1968). In the Chilean case, the rapid growth of aquaculture led to uncontrolled contamination of shared waters used for salmon farming by parasites, virus and bacteria, and combined with a lack of public regulation and industry preparedness, it allowed ISA to spread rapidly between facilities. In retrospect, the crisis seems to have prompted leading firms to begin pushing for private regulation of the industry, notably through the broad adoption of the Aquaculture Stewardship Council (ASC)—a non-state certification scheme that sets standards and rules for sustainable aquaculture management.

Indeed, private regulation—defined as standards and rules set by non-state actors to regulate the behavior of corporations—has become a prominent mode of addressing governance challenges in a globalized world economy (Mayer and Gereffi 2010; Auld and Gulbrandsen 2013). The proliferation of private regulation is widely understood as a response to economic globalization, and the inability or unwillingness of governments to ameliorate pressing social and environmental problems related to transnational production, distribution and consumption (Auld and Gulbrandsen 2013). Frustrated with the lack of government intervention, global civil society has increasingly targeted corporations directly, using public naming-and-shaming and boycott campaigns to persuade and coerce global businesses to adopt private regulation (Vogel 2005; 2010; Bendell 2004). Certification and eco-labeling schemes—established across sectors such as forestry, agriculture and fisheries—arguably represent the most rigorous effort insofar as they involve mandatory, third-party verification of compliance with performance-based standards (Gulbrandsen 2014). When certification requires companies to implement stricter standards than prescribed by government regulations, it is also expected to raise business costs considerably.

In this article, we examine the extent to which firms subscribe to certification schemes based on strategic business interests—beyond those constructed by civil society pressures and NGO campaigning. We investigate the relative explanatory power of business competition and collective action motives in an in-depth study of the global and burgeoning salmon aquaculture industry—the industrialized culturing of salmon in underwater farms. Salmon aquaculture has become a big global business, representing 60 percent of the world’s salmon consumption and 70 percent of global trade in farmed seafood. Its rapid industrialization has had substantial environmental repercussions (Bunting 2013), and an associated demand for private regulation (Vormedal 2017; Bush et al., 2013), accelerating the uptake of the ASC salmon standard. In our empirical investigation, however, we observe that key producers commit to and adopt ASC certification even when there is little or no demand-side pressure for certification and no price premium to be gained. The puzzle we examine is the following: Why do aquaculture companies commit to and adopt relatively costly ASC certification when there is little demand for certified salmon and no price premium to be harvested? Our study focuses mainly on salmon certification in Norway—the world’s largest production region accounting for 54 percent of global supplies—and home to the world’s leading multinational corporations, with major operations also in Chile and other countries.

Several strategic business motives have been identified in the literature such as a desire to strengthen an industry’s reputation, widen product differentiation, harvest price premiums,

and harmonize an existing sprawl of private standards. To provide analytical clarity, we categorize relevant strategic motives as anchored in either *competition* or *collective action* interests. While competition interests refer to the adoption and promotion of certification to gain competitive advantages through differentiation, thereby increasing profits, market shares, and sales volumes (e.g. Porter 1985; Delmas, Plambeck and Porter 2004), collective action interests refer to the adoption and promotion of certification to address common challenges such as industry reputation (e.g. Klein 1997; Bartley 2007), and the unsustainable management of a common-pool resource upon which an industry depends to sustain yields (Ostrom 1990; 2005).

Analytically, we pay particular attention to a distinct collective action motive that remains underexplored in the literature on private authority: strategic business interest in safeguarding common-pool resources. While strengthening competitiveness and boosting the industry's reputation also encouraged businesses to implement the ASC standard, we emphasize the centrality of a corporate motive to protect shared waters used for salmon production from biological contamination by parasites, viruses and bacteria through the implementation of certification.

2. Business Motives for Adopting Certification

After decades of debate on the role of non-state actors in global politics, it is now widely recognized that states share rule-making authority with non-state actors across economic sectors (e.g. Rosenau and Czempiel 1992; Risse-Kappen 1995; Cutler et. al. 1999; Joselin and Wallace 2001; Haufler 2001; Hall and Biersteker 2002; Vogel 2010; Gulbrandsen 2014). Since the 1990s, non-state governance institutions that regulate global corporations and transnational economic activities have proliferated, to compensate for lack of government regulation or to serve functions that have traditionally been the task of governments (e.g. Falkner 2003; Gulbrandsen 2010; Büthe and Mattli 2012; Auld and Gulbrandsen 2013; Green 2014). Transnational sustainability certification schemes arguably represent the most advanced case of non-state governance efforts, comparable to public regulation in their prescription of mandatory and often costly behavioral changes, and the formal penalization of non-compliance (Cashore 2002; Auld, Gulbrandsen and McDermott 2008; Auld, Renckens and Cashore 2015).

The role of social movements, transnational advocacy networks, and NGOs as initiators of certification schemes and mobilizers of companies, is widely documented. In the era of globalization—as markets and production networks have surpassed national governmental systems—transnational NGOs are increasingly targeting producers and buyers along their value-chains (Mayer and Gereffi 2010; Overdevest 2004), to coerce and entice companies to engage in standard-setting processes for establishing certification schemes (Boström 2006; Bostöm and Hallström 2010). In so doing, they have used a combination of “sticks” – such as naming-and-shaming campaigns targeting big brands, public protests and boycotts – and “carrots” – such as promises of improved industry or firm reputation and access to eco-conscious markets (Bendell 2004; Wapner 2002; Keck and Sikkink 1998; Cashore et. al. 2004; Gulbrandsen 2006; 2010; Stolle and Micheletti 2013). The focal targets of NGO campaigns were retailers and well-known brands near the distribution end of global supply chains (Bartley et al. 2014). A common business response has been to put pressure on producers to adopt sustainability certification schemes that could improve social and environmental conditions at the site of production (Gulbrandsen 2010; Bartley et al. 2014).

Many of the reasons why companies adopt certification schemes are clearly constructed and maintained by NGO power. In the absence of NGO pressure along a producer's value chain, the extent to which eco-labelled products would harvest price premiums or increase market access is, in many cases, questionable. However, even in the absence of NGO pressure, producers may use certification as a tool for promoting their own strategic or collective industry

interests—a motive that is recognized in the literature but warrants closer examination. Below, we identify and discuss strategic business motives for adopting certification schemes from two complementary perspectives, namely self-interest related to competition and collective action.

2.1 Competition Interests and Certification

Competition refers to the rivalry between firms or sellers in a market to achieve key business objectives such as increased profits, sales volumes and market shares (Khemani and Shapiro 1993). Individual firms are always looking for competitive advantages that can give them a more profitable and favorable position within their industry (Porter 1980; 1985).

Competitive advantages can be derived from a firm's internal resources, such as human or organizational capabilities, or knowledge and technologies—which determine its operational efficiency and effectiveness. But they may also be rooted in the firm's ability to respond strategically and shape its external environment (Barney 1992; Grant 2001). Low cost and differentiation represent the two main sources of competitive advantage. According to Porter (1985), they give rise to three generic strategies for improving firm performance, namely, cost leadership, differentiation, and focus. Here we examine differentiation and focus. To gain a competitive advantage through differentiation, a firm seeks uniqueness and superior performance along a certain dimension valued by existing or potential buyers. By distinguishing themselves from rivals, firms expect to be rewarded with a price premium, and/or larger sales volumes and market shares. To gain competitive advantage through focus, firms can target a particular segment of the market in a bid to improve sales within it, either by offering lower than average prices (cost leadership) or by providing a particular uniqueness and superiority valued by this market segment (differentiation) (see Porter 1980; 1985; Delmas, Plambeck and Porter 2004).

Drawing on the literature, we argue that business competition can lead firms to adopt certification schemes in at least three key ways. First, firms that move quickly to seek a particular form of differentiation, or target a specific, emerging market segment, can expect to reap first-mover advantages in that market, that is, the initial benefits accruing to those who successfully become the first occupants of a market segment. In Porter's terminology, validating your "good" environmental and social performance through eco-labelling reflects a strategic effort to differentiate and focus, to distinguish your products as "superior" according to environmental and social criteria, and to target a growing eco-conscious market segment with these products. In so doing, some firms seek to reap first-mover advantages by moving quickly to increase their eco-labelled supply, swooping up paramount customers and landing key contracts giving them a profitable market share of the eco-segment. As previous research demonstrates, certification can widen market access and provide price premiums for eco-labelled products, depending on market and product characteristics (see e.g. Auld et al. 2008). Sustainability certification may therefore be seen as a demand-driven competitive strategy for growing a firm's profits and market share (Hoffman 2000; Green 2014).

Second, first movers who are able to shape rules and standards can tailor the provisions to match their technical and operational requirements, leaving late movers with higher switching costs (Mattli and Buthe 2003). This can give the first movers a significant advantage over late movers, who might face technical and financial hurdles that prevent them from upgrading operations and meeting market requirements (Rotherham 2003).

Third, businesses may subscribe to certification to build an individual, firm-specific reputation or brand image (Delmas, Plambeck and Porter 2004; Vogel 2005; Auld 2006). Companies can thus create a public reputation as greener or more responsible than the competition, which may even result in greater sales and market shares (Green 2014).

In sum, certification can give companies at least three competitive advantages: product differentiation, first-mover advantages, and improved reputation. We examine each of these motives in our investigation of commitment to and uptake of ASC certification.

2.2 Collective Action Interests and Certification

The need to resolve common challenges and collective action problems in an industry can serve as an important motivation behind companies’ support for regulation through certification. Drawing on Elinor Ostrom (2005), we distinguish two types of collective goods that can prompt companies to commit to and adopt certification schemes. Ostrom identified two basic attributes of different types of goods: *difficulty of excluding potential beneficiaries* and *subtractability of use*. When those two attributes are dichotomized as shown in Table 1, they can be used as the defining attributes of four basic types of goods: club goods (referred to as toll goods by Ostrom), private goods, public goods, and common-pool resources (Ostrom 2005: 23). Here we examine the two goods that are neither purely public (non-subtractive and non-excludable) nor purely private (subtractive and excludable): club goods and common-pool resources.

Table 1: Four basic types of goods. Source: Adapted from Ostrom (2004).

Difficulty of excluding potential beneficiaries	Subtractability of use		
		Low	High
Low	Club goods	Private goods	
High	Public goods	Common-pool resources	

First, a group of companies may seek to protect and improve their reputation by adopting a certification program (cf. Klein 1997; Spar 1998; Bartley 2007). Drawing on club theory (Buchanan 1965), Prakash and Potoski (2006) argue that certification programs produce *non-subtractive* (non-rival) but potentially *excludable* benefits to their members, such as a positive environmental reputation (see Table 1). According to this approach, certification programs can be conceptualized as clubs that induce members to voluntarily improve environmental performance and exclude free riding (Prakash & Potoski 2006; Potoski & Prakash 2009). Clubs of environmental and social frontrunners that are eager and able to verify claims about their above-average performance, may adopt certification programs to boost their reputation and distinguish themselves from “irresponsible” free-riders (Prakash & Potoski 2006; Potoski & Prakash 2009). Thus, a group of firms can be motivated to promote, join and implement certification schemes to solve a collective reputational problem.

Second, a certification program can potentially serve as a tool to manage common-pool resources (see Table 1). Common-pool resources are typically defined as *non-excludable*, as it is difficult to exclude anyone from the enjoyment of its benefits and services. They are also typically *subtractive*, in that the use of a resource by one actor is likely to subtract units of that resource from a finite amount available for harvesting (Ostrom 2005: 23-14). By contrast, public goods yield non-subtractive benefits that can be enjoyed jointly by many actors. In the absence of private property or adequate regulatory institutions, common-pool resource degradation may result in a “tragedy of the commons” situation in which the natural resource base that enables sustained harvests becomes depreciated to the point of threatening industry survival (cf. Hardin 1968).

If an industry depends on a common-pool resource to sustain production yields in the long-term—and government regulation appears inadequate to protect this resource from degradation—firms may turn to certification as a form of collective regulatory action that can safeguard the resource. In principle, a responsibly managed, common-pool resource can represent a collective good for an industry, to the extent that it enables producers to sustain

yields. The lack of adequate regulatory control, on the other hand, can become a collective action problem (see Olson 1965) insofar as it raises production risks and threatens the profitability of harvests.

While the risk of free-riding and a tragedy of the commons situation typically calls for privatization or government regulation, Ostrom (1990, 2005) has demonstrated how self-organized systems for managing common-pool resources can serve the same purpose. Similarly, we argue, certification schemes may function as a private governance tool for dealing with common-pool resource degradation that affects an industry's operations negatively. Thus, firms may have an economic, self-interest to adopt industry-wide regulation of a common-pool resource through certification, if its degradation raises production risks and challenges the ability to sustain yields. Although the motive to safeguard a common-pool resource has been well-established in the extensive literature on resource management institutions, it remains under-investigated and poorly understood in the context of nonstate certification.

In sum, we argue that collective action-based motives, in particular to protect or improve the reputation of a group of companies (or an entire industry), and/or to safeguard a common-pool resources upon which an industry may depend, represent two potentially important drivers behind company uptake of certification schemes. We examine both motives in our empirical investigation of aquaculture certification but pay particular attention to the motive to manage common-pool resources through certification.

2.3 Method and Material

The findings and analyses in this article draw on multiple sources of data. Primarily, we rely on a set of in-depth, semi-structured interviews with several informants in each of the salmon farming companies that has adopted ASC certification. Company informants include CEOs, heads of sales, and directors of operation, quality and environmental management. We have also interviewed companies we considered eligible—but had yet to adopt the ASC, to gain an understanding of the certification acquisition threshold, and reasons for remaining uncertified. In total, we interviewed 15 informants at ASC-certified companies, and 4 informants at non-ASC companies. Upon their request, and to enable full information disclosure, we granted anonymity to most of our industry interviewees. We have also interviewed three top-level bureaucrats at the Norwegian fisheries ministry, and a key representative at the WWF, central to the development of the ASC standard.

To arrive at our conclusions about underlying company motives and interests, we asked our interviewees to explain why and how they decided to get certified, and account for what they thought were the main drivers of this larger trend. We then asked informants to comment and discuss their company's interests in relation to both competition and collective action motives, to classify and rank interests, and provide examples of why and how they were relevant and important. We also scrutinized the validity of their answers by identifying indicators. For example, an indicator of collective action interests would be efforts to get competitors and the industry at large to certify facilities, whereas stated attempts to be a first mover and stand out through ASC certification indicated the presence of competition interests. Our interviews were taped and transcribed. When analyzed, we used pattern matching to compare our expectations with the respondents' comments and opinions, and to categorize interests across interviews. This process enabled us to identify all motivations, rank their importance, and provide thick descriptions of how they came into play. We used industry reports, sale statistics, export market data, ASC certification data, third-party certification reports, and other sources to triangulate the interview data. We also drew on secondary literature on the aquaculture industry as well as on certification experiences gleaned in other relevant sectors (such as fisheries and forestry) to provide context and relate our findings to broader patterns and trends.

3. Salmon Aquaculture and Sustainability Certification

3.1 *Salmon aquaculture problems and the emergence of private regulation*

Aquaculture is an ancient tradition dating back to carp breeding in 2500 BC China (FDA 2013). During the Medieval and Renaissance eras, fish farming was practiced on a modest scale throughout Europe and the Americas (Bunting 2013), but in the nineteenth and twentieth centuries, as wild capture fisheries underwent rapid industrialization—aquaculture became a supplementary activity accounting for a miniscule percent of global supply (Smith 2012). It was not until commercial overfishing began to raise worries about a depletion of wild fish stocks during the 1970s, that aquaculture re-emerged as a viable option for growing the world's fish-supply. Today, it accounts for over 50 percent of the world's fish that is used for food, and future growth of the fisheries sector is likely to come mainly from aquaculture.¹

Among all cultured species, Atlantic salmon represents the largest and most highly valued of global, farmed-fish markets (Asche 2012). Methods of breeding salmon in open, net cages were developed by local farmers on the Norwegian coast in the 1960s, and spread to other production regions, such as Scotland, Ireland, Canada, and Chile in the 1970s. During the 1990s—fueled by growing market demand and technical innovation in advanced breeding techniques—salmon aquaculture underwent rapid industrialization and consolidation (Naylor 2003; Asche and Khatun 2006; Liu et al. 2013; Olesen et al. 2010; White Paper 2013; Kontali 2016). Today, Norway represents the largest salmon producer with 54 percent of global supplies, and is home to the world's four largest companies.

The growth and industrialization of salmon aquaculture have also had serious environmental repercussions. A major problem has been the increasing biological contamination of shared waters used for farming by sea lice—a parasite that feeds off the salmon's flesh and skin. Because salmon is cultured in open net cages, with facilities and farms being increasingly denser and closely located, parasites—but also viruses and bacteria—tend to spread easily via water currents. In recent years, the proliferation of sea lice has begun to threaten the well-being, and some claim very existence, of surrounding wild salmon populations (IMR 2014). Medicinal treatments and vaccinations have been widely used, but often without significant success, as the fish tends to develop resistance (Bellona 2013; IMR 2014a). Furthermore, the industry has also been unable fully to control and prevent farmed salmon from escaping into the wild, which is said to exacerbate the sea lice sea lice problem, cause hybridization of the wild salmon gene pool, and result in offspring hybrids deprived of characteristics crucial to survival and adaptation to conditions in the wild (Hindar and Disenrud 2007).

Increasing biological contamination of public waters following the growth of salmon farming has raised both reputational and economic challenges for the industry. One the one hand, elevated sea lice-levels infecting and threatening the health and livelihood of wild salmon populations represents an environmental problem of great public concern. The industry is now facing substantial public criticism for failing to control sea lice levels, and for prioritizing industry growth over risks posed to the health and existence of wild salmon stocks. This environmental issue translates into a reputational challenge for salmon farming companies, which in turn provides a motive for adopting a certification program that would improve their public standing and social license to operate.

On the other hand, biological contamination can also raise production risks and threaten industry actors' ability to sustain yields. That is because elevated levels of sea lice, virus and bacteria proliferating within and between farms via currents, can cause widespread fish-disease, high mortality rates and/or force companies to reduce stock or fallow considerably. We conceive of clean water—defined here as water measuring low to adequate levels of parasites,

viruses and bacteria—as a non-excludable, natural resource, as it is difficult to exclude any farmer operating within a relatively clean water area from enjoying its benefits, whether or not they contribute to its provision. We also conceive of clean water in a farming area—such as a Norwegian fjord—as subtractive, even if public water used for aquaculture is neither harvestable nor finite. But the use of water by one industry actor contributes to increasing infection risk, thereby subtracting from its benefits to other farmers. Indeed, the larger the use of the water for farming within an area and the denser the positioning of cages and farms, and the more biomass of fish contained within them, the higher is the risk of parasite and disease transmission between farms and different companies. We therefore define *clean water in a farming area* as a common-pool resource upon which the industry depends to sustain yields, or in other words, reduce the risk of stock reduction, mortality, and in the worst case, fallowing. In this way, clean water can provide utility maximizing economic advantages to companies, and therefore, a motive for supporting industry-wide regulation that force all farmers to keep sea lice and disease levels low within their facilities, to eliminate free-riding and reduce production risks associated with parasite and disease transmission.

However, government regulation in all major production regions, including the EU, Canada, and Chile, has been criticized for addressing these problems too slowly and inadequately (see e.g. Liu et al. 2013; Alvial, 2012; Carter and Cazals, 2015; Carter 2014; Vormedal 2017). Norwegian regulation is considered to be the strictest, in enforcing an absolute sea lice limit of 0.5 per adult fish, and 0.1 during the spring, to protect wild smolt migration. A few, newer “green” farming licenses are also subject to even stricter limits, set at 0.2 and 0.25. The government also requires companies to report and take immediate action to retrieve farmed salmon escapees, but does not enforce an absolute escapee limit. Critics nevertheless argue that the 0.5 sea lice limit and lenient approach to escapees have failed to counter the threats to wild salmon populations (e.g. Fauchald 2017).

In response to inadequate government intervention, calls for private regulation emerged already at the turn of the century. In contrast to NGOs protesting the sector’s very existence—framing fish farming as something inherently unnatural with slogans like ‘Wild Salmon Don’t Do Drugs’ and ‘Farmed and Dangerous’ (Young and Matthews, 2010)—actors such as the World Wildlife Fund (WWF) began to promote certification as a private governance solution to the sector’s problems. Inspired by the success of the Marine Stewardship Council (MSC), a certification program for wild-capture fisheries certification (Gulbrandsen 2009), they organized naming-and-shaming campaigns and consumer boycotts to persuade producers and buyers to commit to selling sustainably farmed fish. Some retailers and supermarket chains in Europe and North America adopted their own sustainability standards that suppliers must comply with (Bush et al., 2013). Whole Foods, for example, requires suppliers to address problems like unsustainable feed, chemical use, and predator control (DesMarais, 2013).² In 2004, the WWF instigated the global aquaculture dialogues, which drew over 2,000 participants including farmers, seafood processors, retailers, and foodservice operators, and resulted in the establishment of the Aquaculture Stewardship Council (ASC) in 2009. The ASC—an independent, non-profit certification organization—aspire to become the world’s leading eco-labelling scheme for sustainably farmed seafood.

The ASC salmon standard, which became operational in 2013, sets out seven overarching principles for the environmental and social management of farming sites, each of which contains a range of specific criteria and requirements¹. In many respects, they are much stricter than the standards set by the Norwegian government.³ Both Norway and the ASC regulate the use and release of chemicals, nutrients, and medicines to protect local biodiversity, seabed and water quality, and set formal sea lice limits. Yet the ASC goes further in setting a

¹ To view the ASC salmon production standard, go to: https://www.asc-aqua.org/wp-content/uploads/2017/07/ASC-Salmon-Standard_v1.1.pdf

maximum level of 300 escapees, which effectively prevents actors with significant escapee rates from becoming certified, and requires all farms to implement a stricter sea lice limit of 0.1 and engage in monitoring and data-collection on the health of the surrounding wild-salmon population. Moreover, the ASC set maximum levels for fish disease and medicinal treatments, ‘fines’ (dust and fragments) and marine ingredients in salmon feeds require certification of marine and soya-derived ingredients, and smolt production in open net cages is prohibited—none of which are focus areas that are not covered by Norwegian regulations.

More generally, to attain ASC certification of a salmon farming site, member companies must verify compliance with ASC standards by engaging ASC-licensed, third-party certification organizations. Once a farm is certified, fish produced at the site is eligible to use the ASC eco-label on its packaging, providing access to markets and retailers with certification requirements, and to communicate directly with consumers that their products are sustainably produced. Gaining ASC certification may therefore require behavioral and management changes that are more costly and difficult to implement than simply complying with the Norwegian government’s regulations.

3.2 Globalization, Exports and ASC-Certification

Market demand for certified and eco-labelled seafood originates in major salmon-consuming countries, such as the United States (US), United Kingdom (UK), France, Germany, and Sweden (Nøstvold et al. 2010; Honkanen and Nilssen 2013).⁴ Thus far, demand for eco-labeled salmon has occurred mostly in Europe and North America, but there are differences between markets in terms of focus on and definition of sustainability. For example, UK and German retailers appear to be the most rigorous in requiring suppliers to adhere to environmental standards for fish sourcing and production, while French buyers are perceived to be less rigid, and equally focused on social standards such as workers’ conditions and protection of local communities (Nøstvold et al. 2010; Honkanen and Nilssen 2013).

The market for farmed salmon is global, and Norwegian production is predominantly for export. In 2015, nearly 97 percent of the Norwegian harvest was exported (see Figure 1). To date, there has been little demand for certified salmon in Norway, and all the available ASC-labelled salmon is sold abroad. This may be related to the fact that US and EU consumers distrust in their respective governments’ ability to protect them from unsustainably produced and unhealthy food, whereas Norwegian consumers generally believe the Food Safety Authority’s regulation of food production is sufficient (Nøstvold et al. 2010). The uptake of ASC certification therefore appears to be a clear response to global market characteristics, trends, and demand, rather than domestic conditions.

Figure 1. Export Sales (Kontali 2016b)[insert about here]

We now account for the uptake and development of salmon aquaculture certification through the ASC and discuss salmon producer interests and motives in committing to, promoting and implementing the ASC standard.

3.3 Commitment to and Adoption of ASC Certification

In Norway, eight companies have implemented the ASC standard. They include three multinational companies based in Norway: Marine Harvest, Mitsubishi/Cermaq and Grieg Seafood; two big national companies, Lerøy Seafood Group and Salmar (see Figure 1); one medium-sized national company, Norway Royal Salmon (NRS); and two small, locally owned companies, Edelfarm and Wenberg. Degrees and levels of commitment to ASC certification vary,⁵ but to date, ASC-certified salmon produced in Norway amounts to about 200 000 tonnes—or 10 percent of the total harvest (Company interviews 2017).

In 2012, when the ASC salmon standard became operational, 15 of the world's leading aquaculture companies were also in negotiations to establish the Global Salmon Initiative (GSI)—a new interest organization intended to work toward realizing the sector's global growth potential through increased sustainability. These included all the large and medium-sized companies in our sample. During negotiations, Marine Harvest—the world's by far largest aquaculture company—made their participation in the GSI conditional upon all members making a joint commitment to certify all farms with the ASC by 2020. In fact, Marine Harvest had already committed to certifying all of its production facilities back in 2008, when they entered into a working partnership with the WWF, who had challenged them to take leadership and assume an active role in the ASC standard's negotiations (Vormedal 2017).

Figure 2. Top 15 Salmon Farming Companies 2015 (Kontali 2016a) [insert about here]

The main motives for pushing other GSI members to commit to full ASC certification coincide with those of the other multinationals, who decided to back Marine Harvest's demand. First, the multinationals had been subject to significant NGO pressure to get certified and felt a need to meet public expectations to lead by example. A broad uptake of the ASC standard, they argued, would likely strengthen the industry's global reputation by demonstrating the sector's commitment to operate sustainably and thus social license to operate. 'It's not enough to just say that we are sustainable—if the world thinks otherwise. We have to document it,' one head of sales explained. This motive to improve industry reputation through certification was shared by several follower companies: 'Certification makes it easier for us,' a chief financial officer (CFO) argued. 'We have an independent, third-party that can verify that our production is sustainable, to build a good reputation for our industry.' Some informants also linked industry reputation to brand building: 'There is marketing potential in being sustainable,' one chief executive officer (CEO) emphasized. 'If we appear ... if we become sustainable as an industry—we can make a profit. "Sustainably farmed salmon" is a brand, and certification can help us strengthen it.'

Second, the multinationals, and above all Marine Harvest, stressed the importance of a motive to improve "biological control", which refers to the industry's ability to prevent elevated levels of parasites, viruses and bacteria from spreading within and between farms. According to the multinationals, the need to improve biological control has been particularly prominent in non-Norwegian production regions such as Chile, where they consider public regulations inadequate for dealing effectively with sea lice and fish disease. 'With elevated sea lice levels in the water', a vice president explained, 'the stock grows slower, which raises our costs'. But more importantly, he argued, 'we operate in a commons; we share the waters for production with other companies... so what your neighbor [company] does is almost as important as what you do yourself. Look at what happened in Chile⁶. Stricter regulation is necessary to prevent the industry from crossing the line of what is sustainable.' 'In Chile,' another corporate affairs director explained, 'we have other challenges than in Norway—the most central being inappropriate government regulation and lack of trust and cooperation within the industry, and between industry and the government. We believe these challenges can be solved through regulation and cooperation, and to this end, we have promoted far-reaching implementation of ASC-certification.' 'We [aquaculture companies] bathe in the same bathwater', a chief operating officer (COO) argued. 'So improving how we operate through the ASC is more important than building our reputation'.

Thus, to the multinationals, the collective action interests to (1) strengthen industry reputation and (2) reduce the risk of biological contamination in shared waters used for salmon production provided important motives for adopting ASC certification, and pushing other industry leaders to do the same.

However, within the space of a few years, all of the non-multinational, Norwegian companies withdrew from the GSI, and thus reversed their initial commitment to certify all production facilities by 2020. ‘The GSI became an organization for using the ASC standard to improve Chilean production practices,’ one director of societal relations explained. ‘We were supposed to lift them [the Chileans] up to our level,’ a director of quality and environment also contended, ‘so we ended up giving more than we got back.’

Nevertheless, these companies decided to implement the ASC standard in a selection of Norwegian production facilities. Their main underlying motives—which were also declared as relevant motives for implementing the ASC standard in Norway by the multinationals—can be seen as nested in demand-side, competition interests to satisfy buyers or capture new markets. For some companies, certifying a share of their production was partly a response to emerging demand. ‘We had customers that wanted all of their salmon to be ASC labeled,’ one director of quality and environment explained, while a director of societal relations stressed that ‘the GSI was a reason for joining the ASC, but in practice ... we implemented it in response to market demand.’

Yet while buyer demand can explain initial implementation, it cannot account for its growth. This is due to the fact that by 2017, the Norwegian supply of ASC-labelled salmon had long surpassed market demand. Some companies were able to sell close to 50 percent of their supply as certified salmon—others as little as 15 percent. ‘There aren’t enough customers who want certified fish,’ a head of quality and environment explained. ‘If demand would increase, we would, of course, consider certifying more facilities.’ Therefore, growth in ASC implementation and supply is not a function of parallel growth in demand.

The low demand for ASC-certified salmon is likely related to high salmon prices. ‘Many hard-discount retailers aren’t willing to pay a premium for ASC-certified salmon, with such high spot-market prices,’ a head of sales argued. But some companies also linked retailer demand to inadequate ASC marketing and consumer demand: ‘We’ve tried selling ASC-fish to more retailers, such as Tesco,’ another head of sales recalled. ‘But they said selling our ASC-salmon required too much from them, in terms of getting the consumer to want it.’ A CEO of a multinational, moreover, expressed frustration with the lack of NGO commitment. ‘It is us producers that have to market the ASC,’ he remarked. ‘We’ve said to the WWF and others that *you* had a role in making this standard, and *we’ve* committed to implementing it—so you have to work harder on the retailers, otherwise the standard is worth nothing.... Money talks. They have to convince the market this is important.’

Growth in ASC implementation as such was partly motivated by a desire to increase competitiveness by capturing new markets (eco-conscious buyers), harvesting price premiums, and boosting sales, even if low demand has resulted in smaller-than-expected benefits. ‘It was important for us to be an early mover,’ one head of sales argued. ‘We’ve captured 50 percent of this market segment, and right now, we can exploit our lead as a competitive advantage.’ According to another head of sales, ‘we haven’t actively tried to differentiate ourselves ... but it happens automatically, when relatively few companies are ASC-certified. In a temporary phase, we have an advantage over those who aren’t certified—especially if more retailers jump on the standard.’ Some companies also recounted how the ASC had helped increase their competitiveness through general brand building vis-à-vis investors. ‘We’ve used the ASC to build a green brand, not just to attract customers, but also investors, who attribute it more and more weight,’ a CFO argued.

For the small and locally based companies in our sample, strengthening their competitive advantage through differentiation constituted the main motive to implement ASC. ‘We expected to differentiate ourselves, stand out, get more customers and sell more salmon for a better price. We have a brand for smoked ASC salmon, for example, which we sell to Bama—which they claim they can’t get elsewhere’ one CEO and owner argued. In addition,

they also use ASC certification to strengthen their reputation locally, not least by holding stakeholder meetings to explain the sustainability benefits of implementing the standard.

All companies were convinced that first-mover advantages were likely to be temporary. ‘We’re not going to be unique forever,’ one CEO observed. ‘Our competitive advantage will have a temporary effect, because in the long term, the rest of the industry will probably move toward our level,’ a head of sales argued. Some non-certified companies also doubted the permanence of ASC benefits. ‘Today, first movers can make a profit and reap advantages by differentiating themselves,’ an owner argued. ‘But that’s not going to last—soon there’ll be some new letters. If you wait too long, there is no point joining.’

In addition to documenting key motives, our company interviews demonstrated a noteworthy relationship between expected benefits and the actual costs of ASC implementation. While all the companies considered the ASC standard to be stricter than government regulation, many also argued that the cost of implementation was relatively low. Two companies said they were “close to zero.” ‘We’re lucky,’ one CFO explained. ‘The ASC standard is strict ... but our location in the north of Norway gives us a competitive advantage. We don’t have a big sea lice problem due to low temperatures in the water, and greater distances between farming facilities, than in the south.’ ‘We don’t have sea lice, and we don’t have fish disease, so we haven’t had to change much in our production to comply with the ASC,’ another owner said.

Unlike the three multinational aquaculture companies, most of the national companies based in Norway benefit from geographically favorable conditions, because they have farming facilities localized in the north of the country or in other areas with fewer or no biological problems. For those companies, ASC implementation did not seem to require significant behavioral change. Costs relate mainly to reporting and third-party verification, or unintended side effects, such as having to slaughter salmon earlier than predicted to avoid an additional delousing treatment. ‘That’s why the big [multinational] companies only certify parts of their production, in areas where it’s easy for them [to comply],’ a COO of a non-certified company contended. ‘I call that window dressing.’

Conversely, ASC implementation outside of geographically favorable areas would require significant and costly behavioral change. ‘The ASC standard is so strict that it is incompatible with conducting normal farming operations in many areas of Norway,’ one CEO explained. ‘The Norwegian industry, on a whole, cannot implement the ASC standard,’ another CEO emphasized, ‘primarily due to sea lice-levels.’ Some water areas are also particularly challenged with fish disease. ‘In [the county of] Rogaland,’ a COO stressed, ‘no company has managed to implement the ASC due to a problem with Pancreas Disease (PD). We just can’t get below the maximum 10 percent mortality rate.’

The three multinationals, then, who remain committed to certifying all their production facilities by 2020—and in the case of Marine Harvest, which has also begun to implement the ASC in non-favorable geographical areas—the costs of implementation are significant, if not great. ‘It will be very demanding to achieve full certification by 2020,’ a VP admits. ‘It’s going to require a lot of research and development.’

4. Business Interests in Certification: Competition and Collective Action

Our interview data demonstrates that collective action interests have motivated multinational companies based in Norway to promote and commit to broad implementation of ASC certification.

The multinational companies stressed the importance of their self-interest to achieve “biological control”, and thus the motive to scale up the regulation and governance of biological contamination. Because the industry operates in a common—sharing public waters for culturing salmon—elevated levels of parasites, virus and bacteria in one farm can spread fast via currents

and contaminate the larger water area, causing widespread fish disease, high mortality rates, stock reduction, and in the extreme, fallowing. Therefore, the Norwegian multinationals have become advocates of stricter production standards, and particularly in regions such as Chile, where public regulations are considered inadequate for dealing with biological risks. Through broad implementation of the ASC certification program, the multinationals believe industry actors can improve their control over parasite and fish disease transmission, and therefore also ability to sustain farmed salmon yields. For Marine Harvest—a giant which manages 233 of the 1,051 Norwegian licenses⁷ and operates in nearly all Norwegian production regions—the motive to enhance biological control in shared waters also applies to Norway, probably due to their high exposure to neighboring companies. This supports our hypothesis that certification, as a particularly rigorous form of private regulation, can be utilized strategically by business actors to deal effectively with common-pool resource challenges that pose a risk to their business operations.

This natural resource-based, collective action motive also seems closely related to the sector's globalization. The global expansion of production by Norwegian multinationals into regions with less stringent public regulation, appears to have constituted a driver for private regulation through certification, and thus resulted in a strengthening of the sector's governance of production in both Norway and abroad. This dynamic demonstrates how strategic business motives, here anchored in a common-pool resource challenge, could trigger upwards regulatory change, in which leading industry actor's push for stricter rules than government regulation provides for. This is in sharp contrast to assumptions often made in the economic globalization literature that the relocation of production is likely to cause a regulatory race to the bottom. However, in this case, the expansion and growth of more sustainable aquaculture governance in aquaculture does not appear to be anchored in environmental concerns, but in industry self-interests in safeguarding clean water to reduce risks and sustain yields—a to level the regulatory playing field.

Both the Norwegian multinationals and the Norway-based companies also stressed their interest in improving the industry's reputation, and how this provided a partial motive for adopting the ASC. With consumers and the general public becoming more concerned with the sustainability of fish farming, and the potentially devastating consequences of sea lice proliferation for wild salmon populations, the industry believes ASC certification can provide a sustainability guarantee with positive reputational effects in the market. While ASC implementation started out as a GSI club commitment, there is no indication of a club aim to separate leaders from laggards. Rather, as companies all claim to be affected by the reputation of "farmed salmon" as a product category and believe the effect of industry-wide certification would have been beneficial, their motive should be seen as truly collective and non-exclusive.

Furthermore, our interview data demonstrate that competition interests have also provided a partial motive to implement the ASC standard. First, some companies emphasized buyer demand as their initial reason to supply ASC-certified salmon. Second, and more importantly, many companies were motivated by the prospect of strengthening their competitive advantage. In other words, ASC certification constituted a strategy for differentiation and focus by which to validate the company's "superior" environmental performance, with a view to gaining price premiums and capturing a larger portion of the eco-market segment. For the smallest companies, competitiveness through differentiation was their main reason for committing to ASC. All of the companies stressed the importance of being an early mover to reap market benefits.

Nevertheless, the importance companies attribute to competition motives appears to be linked to demand-side conditions, particularly high spot-market prices and insignificant retailer demand for ASC-certified salmon. Lower-than-expected demand and high salmon prices have made it harder to harvest price premiums and obtain first-mover advantages. The importance

of competition as a motive promoting the further growth of ASC certification thus hinges on market and price developments as well as the standing of the ASC brand—including the extent to which more retailers and consumers will demand ASC salmon.

The fact that the supply of ASC salmon has exceeded buyer demand, and that producers have been pushing price-weary retailers to become more interested in ASC-labelled salmon, provides support to scholars who are skeptical of the impact of ‘political’ or ‘conscious’ consumers in promoting certification (e.g. Bartley et al. 2015; Vogel 2010). Indeed, some of our informants expressed outright skepticism regarding the preferences of individual consumers leaning towards premium-priced, eco-labelled salmon, referring to market research that demonstrate high demand for non-certified, low-cost products.

Based on previous research, we would expect NGO power and pressure on buyers along the producer’s value chain to perform as a major driver pushing up business-to-business demand for certification (Cashore et al. 2004; Gulbrandsen 2006, 2010; Auld et al. 2008; Bartley et al. 2015). However, our data demonstrate that while NGO power can help explain the establishment of the ASC and Marine Harvest’s initial commitment to full ASC certification, it cannot explain adoption and implementation by follower companies. To recap, the WWF played a huge role as the main initiator of the salmon aquaculture dialogues, and its partnership with Marine Harvest influenced the company’s early ASC commitment. Yet it was Marine Harvest’s enticement of other GSI members that ensured the broad, initial uptake of ASC certification by the world’s leading salmon producers. In the next phase, after the withdrawal of non-multinationals from their GSI commitment, there is little indication of NGO pressure on buyers spurring growth in supply and implementation. While some companies cite satisfying buyers as a motive for implementation—all stress how quickly supply exceeded demand—together with the lack of retailer interest in ASC salmon. Ultimately, then, the growth of the ASC must be explained by strategic business motives beyond NGO-constructed retailer demand for eco-labelled products.

The notable differences in degree of ASC adoption among aquaculture companies also raise an important issue of whether the strategic interests of the Norwegian multinationals—having promoted and indeed pushed for a broad, industry-wide uptake of the standard, while committing to full-scale implementation in all farming facilities—carry more weight than the interests of the national companies in our sample that have cherry-picked localities requiring insignificant behavioral changes. For the Norwegian multinationals, full-scale implementation will require substantial costs and investments in research and development, which indicates that they also perceive the risks and costs related to a regulatory status quo as high. Thus, raising the regulatory bar for the industry as a whole—and especially in production countries with inadequate governance such as Chile—seems to represent one of the most important drivers behind the growth in ASC adoption.

5. Conclusions

This article has explored several business interests that can motivate firms to promote and implement private regulation and certification schemes—arguably the most rigorous and costly form of industry self-regulation. Two key conclusions can be drawn. First, we should distinguish between declared commitment to ASC and actual adoption of the scheme in attempting to explain drivers of salmon farming certification. Regarding declared commitment to ASC certification, NGO power played a role by influencing the initial commitment of Marine Harvests—the world’s largest salmon farming company by far—to implement the standard. Yet strategic business motives are more suited to explain actual adoption of the ASC standard and further growth of the program. Most important to Norwegian multinationals seem to be collection action interests, in particular to safeguard clean, shared waters for production—a common-pool resource upon which salmon yields and industry profitability may depend. The

drive to strengthen the global industry's reputation as providing a sustainable source of edible protein was also a strong collective action motive. Second, the Norwegian multinationals' interest in ratcheting up public regulations in countries with weak governance and severe common-pool resource challenges such as Chile, served to increase commitment to ASC certification.

More generally, our study confirms the importance of many strategic business motives identified in the literature on non-state sustainability certification, such as the aim to strengthen firm competitiveness and reap first-mover advantages through differentiation and focus on eco-market segments (competition) and improving the industry's reputation (collective action). But our study also demonstrates the importance of the understudied collective action interest to manage common-pool resources, to enable long-term industry survival and future growth. The centrality of this interest in explaining why key business actors have committed to and adopted aquaculture certification provides support for a functionalist understanding of the emergence and growth of private authority, grounded in the literature on liberal institutionalism. Indeed, just as public authorities, private actors may design institutions to regulate behavior when individual action may produce collective irrationality, such as common-pool resource depletion and tragedies of the commons. While it is widely appreciated that private certification schemes in many cases were formed to address environmental problems in a sector or industry, business interest in addressing common-pool resource challenges is generally not recognized as an important motive for business adoption of certification schemes. More often, studies highlight other collective benefits, such as improved industry reputation and reduced transaction costs.

Our study indicates that collective action interests in safeguarding a common-pool resource is likely to motivate firms to scale up private regulation through certification programs when government rules have dealt inadequately with its degradation, and when such degradation raises significant production risks that—when unmanaged—can threaten companies' ability to sustain yields and thus profits. There is need for more research on the role of this particular collective action motive as a driver of private regulation in other natural resource-based sectors, such as forestry and wild-capture fisheries, to further investigate the conditions under which safeguarding common-pool resources provides a key explanation for the emergence and growth of nonstate certification programs.

Acknowledgements

We thank Simon Bush, Mads Greker, Kristin Rosendal, Jon Birger Skjærseth, and the anonymous reviewers for helpful comments on earlier versions of this article. We are grateful to the many people we interviewed in Norway for taking time out of their busy schedules to discuss salmon aquaculture certification with us. Finally, we thank the Research Council of Norway for funding this research (grant number 244407).

References

- Asche F. 2012. *Green Growth in Fisheries and Aquaculture Production and Trade*. Contribution to OECD Synthesis Report on Green Growth.
- Asche F, Khatun F. 2006. *Aquaculture: Issues and Opportunities for Sustainable Production and Trade*. Issue Paper No. 5. Geneva: International Centre for Trade and Sustainable Development
- Auld, G. 2006. Choosing How to be Green: an Examination of Domtar Inc.'s Approach to Forest Certification. *Journal of Strategic Management Education* 3:37-92

- Auld, G. and Gulbrandsen, L.H. 2013. Private Regulation in Global Environmental Governance. In Falkner, R. (ed) 2013. *The Handbook of Global Climate and Environment Policy*, First Edition. London: Wiley & Sons, Ltd.
- Auld, G., Gulbrandsen, L.H., and McDermott, C.L. 2008. Certification Schemes and the Impacts on Forests and Forestry. *Annual Review of Environment and Resources*, 33:187-211
- Auld, G. Renckens, S. and Cashore, B. 2015. Transnational private governance between logics of empowerment and control. *Regulation and Governance*, 9, pp 108-124
- Alvial A, Kibenge F, Forster J, Burgos JM, Ibarra R, St-Hilaire S. 2012. *The Recovery of the Chilean Salmon Industry: The ISA Crisis and its Consequences and Lessons*. Puerto Mont, Chile: World Bank
- Barney, J. 1991. Firm Resources and Sustained Competitive Advantage. *Journal of Management*. 17: 99, pp. 99-120
- Bartley, T. How foundations shape social movements: the construction of an organizational field and the rise of forest certification. *Social Problems*, 54 (3), pp. 229-55
- Bartley, T., Koos, S., Samel, H., Setrini, G. and Summers, N. 2015. *Looking Behind the Label: Global Industries and the Conscientious Consumer*. Bloomington: Indiana University Press.
- Bellona 2013. *Traditional and Integrated Aquaculture: Current Environmental Challenges and Future Solutions*. (Translated from Norwegian). Oslo: Bellona Foundation
- Bendell, Jem. 2004. *Barricades and Boardrooms: A Contemporary History of the Corporate Accountability Movement*. Geneva: United Nations Research Institute for Social Development
- Boström, M. 2006. Establishing credibility: practicing standard-setting ideals in a Swedish seafood-labelling case. *Journal of Environmental Policy and Planning*, 8 (2), 135-58
- Boström, M. and Hallström, K.T. 2010. NGO Power in Global Social and Environmental Standard-Setting. *Global Environmental Politics*, 10:4, pp. 36-60
- Buchanan JM (1965) An Economic Theory of Clubs. *Economica* 32(125), 1-14.
- Bunting, S.W. 2013 *Principles of Sustainable Aquaculture. Promoting social, economic and environmental resilience*. New York: Earthscan, Routledge
- Bush S, Belton B, Hall D, Vandergeest P et al. 2013. Certify sustainable aquaculture? *Science*, 341: 1067–1068
- Büthe, T. and Mattli, W. 2011. *The New Global Rulers. The Privatization of Regulation in the World Economy*. Princeton, NJ: Princeton University Press
- Carter C. 2015. Who governs Europe? Public versus private regulation of sustainability of fish feeds. *Journal of European Integration* 3 (3): 335–352
- Carter C, Cazals C. 2015. The EU's government of aquaculture. Completeness unwanted. In *The EU's Government of Industries: Markets, Institutions and Politics*, Jullien B, Smith A (eds). London: Routledge
- Cashore, B. 2002. Legitimacy and the privatization of environmental governance: how non-state market-driven (NSMD) governance systems gain rule-making authority. *Governance: An International Journal of Policy, Administration and Institutions*, 15, (4), pp. 503-29

- Cashore, B., Auld, G. and Newsom, D. 2004. *Governing through Markets: Forest Certification and the Emergence of Non-State Authority*. New Haven, CT: Yale University Press
- Cutler, A.C., Haufler, V. and Porter, T. (eds) 1999. *Private Authority and International Affairs*. Albany, NY: SUNY Press
- Delmas M, Plambeck E, Porter M. 2004. *Environmental Product Differentiation by the Hayward Lumber Company*. Case Study, Stanford Grad. Sch. Bus., Stanford, CA.
- DesMarais C. 2013. *How Whole Foods is changing aquaculture*. Greenbiz, 16 Oct. 2013. URL: <https://www.greenbiz.com/blog/2013/10/16/how-whole-foods-changing-aquaculture-better>
- Falkner, R. 2003. Private Environmental Governance and International Relations: Exploring the Links. *Global Environmental Politics*, 3:2, 2003
- Fauchald, O.K. 2016. The application of Article 112 of the Norwegian Constitution to salmon farming. The relationship between aquaculture and wild salmon. FNI Report, 6/2016, URL: <https://www.fni.no/getfile.php/133912/Filer/Publikasjoner/FNI-R0616.pdf>
- FDA 2013. *An Overview of Atlantic Salmon, its Natural History, Aquaculture and Genetic Engineering*. US Food and Drug Administration.
- Grant, R.M. 1991. The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation. *California Management Review*. Vol 33, No 3, pp. 114-134
- Green, J. 2014. *Rethinking Private Authority: Agents and Entrepreneurs in Global Environmental Governance*. Princeton, NJ: Princeton University Press.
- Gulbrandsen, L.H. 2006. Creating markets for eco-labelling: are consumers insignificant? *International Journal of Consumer Studies*, 30, 5: pp. 477-489
- Gulbrandsen, L.H. 2009. The Emergence and Effectiveness of the Marine Stewardship Council. *Marine Policy* 33 (4), 654-660.
- Gulbrandsen, L.H. 2010. *Transnational Environmental Governance: The Emergence and Effects of the Certification of Forests and Fisheries*. Cheltenham, UK: Edward Elgar
- Gulbrandsen, L. H. 2014. Dynamic Governance Interactions: Evolutionary Effects of State Responses to Non-State Certification Programs. *Regulation and Governance* 8 (1), 74-92.
- Haufler, V. 2001. *A Public Role for the Private Sector*. Washington, DC. Carnegie Endowment for International Peace.
- Hall, R.B., and Biersteker, T.J. 2002. *The Emergence of Private Authority in Global Governance*, Cambridge: Cambridge University Press
- Hardin, G. 1969. *Managing the Commons*. San Francisco: W.H. Freeman
- Hindar, K. and Diserud, O.H. 2007. *Vulnerability analysis of wild salmon population towards escaped farmed salmon*. NINA Report 244: 45 pp. URL: <http://www.nina.no/archive/nina/PppBasePdf/rapport/2007/244.pdf>
- Hoffman, A.J. 2000. *Competitive Environmental Strategy: A Guide to the Changing Business Landscape*. Washington, DC: Island Press

- Honkanen, P. and Nilssen, F. 2013. Etterspørselsforhold knyttet til bærekraft og miljø: Sluttrapport. NOFIMA Report, 9. URL: <https://brage.bibsys.no/xmlui/handle/11250/284041>
- Institute for Marine Research (IMR) [Norway] 2014. *Marine Research Report 2014. Fish and the Sea*. (Translated from Norwegian). NO 1-2014. Bergen: IMR
- Josselin, D. and Wallace, W. 2001. *Non-state Actors in World Politics*. Basingstoke: Palgrave Publishing
- Keck, M. E. and K. Sikkink. 1998. *Activists Beyond Borders: Advocacy Networks in International Politics*. Ithaca, New York Cornell University Press.
- Klein, D.B. 1997. Knowledge, reputation and trust by voluntary means. In Klein, D.B. (ed.). *Reputation: Studies in the Voluntary Elicitation of Good Conduct*, Ann Arbor, MI: University of Michigan Press, pp- 1-14
- Khemani, R.S. and Shapiro, D.M. 1993. *Glossary of Industrial Organisation Economics and Competition Law*. Directorate for Financial, Fiscal and Enterprise Affairs, OECD
- Kontali Analyse, 2016. *The Salmon Farming Industry in Norway 2016*. Kristiansund: Kontali Analyse AS
- Liu Y, Chuenpagdee R, Sumaila UR. 2013. Salmon aquaculture in Canada and Norway – appraising governability. In *Governability of Fisheries and Aquaculture: Theory and Applications*, Bavinck M, Chuenpagdee R, Jentoft S, Kooiman J. (eds). Dordrecht: Springer.
- Mayer, F. and Gereffi, G. 2010. Regulation and Economic Globalization: Prospects and Limits of Private Governance. *Business and Politics*. Vol. 12, Issue 3, pp. 1-25
- Mattli, W, and Buthe T. (2003) Setting international standards: technological rationality or primacy of power? *World Politics* 56: 1-42.
- Micheletti, M., Føllesdal, A. and Stolle, D. (eds). 2004. *Politics, Products and Markets: Exploring Political Consumerism Past and Present*. New Brunswick, NJ: Transaction Publishers
- Naylor R, Eagle J, Smith W. 2003. Salmon aquaculture in the Pacific Northwest: a global industry. *Environment* 45 (8): 18–39
- Nøstvold, B., Alm S., Pley, I. & Honkanen, P. 2010. *Hva er drivkraften bak bærekraftig sjømat og hvordan er norsk sjømatnæring posisjonert?* Rapport 27/2010 Nofima. URL: http://www.fhf.no/media/28672/fagrappport_2_og_3-01102010.pdf
- Olesen I, Myhr AI, Rosendal K. 2010. Sustainable aquaculture: are we getting there? Ethical perspectives on salmon farming. *Journal of Agricultural and Environmental Ethics* 24:381–408
- Olson, M. 1965. *The Logic of Collective Action and the Theory of Groups*. Cambridge, Massachusetts: Harvard University Press
- Overdevest, C. 2004. Codes of Conduct and Standard Setting in the Forest Sector: Constructing Markets for Democracy? *Industrial Relations*, Vol. 59, no. 1, pp. 172-197
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions of Collective Action*. Cambridge: Cambridge University Press

- Ostrom, E. 2005. *Understanding Institutional Diversity*. Princeton: Princeton University Press
- Porter, M. 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free Press
- Porter, M. 1985. *Competitive Advantage: Creating and Maintaining Superior Performance*. New York: Free Press
- Potoski, M. and Prakash, A. (eds) 2009. *Voluntary Programs. A Club Theory Perspective*. Cambridge, Massachusetts: MIT Press
- Prakash, A. and Potoski, M. 2006. *The Voluntary Environmentalists. Green Clubs, ISO 14001, and Voluntary Environmental Regulations*. Cambridge: Cambridge University Press
- Rotherham T. 2003. *Implementing Environmental, Health and Safety (EH&S) Standards, and Technical Regulations: The Developing Country Experience*. Winnipeg, Manit., Canada: International Institute for Sustainable Development (IISD).
- Risse-Kappen, Thomas. ed. (1995). *Bringing Transnational Relations Back In: Non-State Actors, Domestic Structures and International Institutions*. Cambridge: Cambridge University Press
- Rosenau, J. N. and Czempiel, E.O. (eds.) 1992. *Governance Without Government: Order and Change in World Politics*. Cambridge, MA: Cambridge University Press
- Smith T. 2012. Greening the blue revolution: How history can inform a sustainable aquaculture movement. Harvard Law School, 19 April.
<http://nrs.harvard.edu/urn-3:HUL.InstRepos:11938741>
- Spar, D.L. 1998. The spotlight and the bottom line: how multinationals export human rights, *Foreign Affairs*, 77, pp. 7-12
- Stolle, D., and Micheletti, M. (2013). *Political Consumerism: Global Responsibility in Action*. Cambridge: Cambridge University Press.
- Vogel, D. 2005. *The Market for Virtue: The Potential and Limits of Corporate Social Responsibility*. Washington, DC: Brooking Institution Press
- Vogel, D. 2010. The Private Regulation of Global Corporate Conduct. Achievements and Limitations. *Business and Society*, Vol 49, No. 1, pp. 68-86
- Vormedal, I. 2017. Corporate Strategies in Environmental Governance: Marine Harvest and Regulatory Change for Sustainable Aquaculture. *Environmental Policy and Governance*, Vol. 27, No 1, pp. 45-58
- Wapner, P. 2002. Horizontal Politics: Transnational Environmental Activism and Global Cultural Change. *Global Environmental Politics*, 2:2, pp. 37-62
- White Paper 22, 2013 [Norway]. *The World's Leading Seafood Nation*. Oslo: Norwegian Ministry of Fisheries and Coastal Areas.
- Young N, Matthews R. 2010. *The Aquaculture Controversy in Canada: Activism, Policy and Contested Science*. Vancouver: UBC Press.

¹ <http://www.fao.org/aquaculture/en/>

² See also Whole Foods "Farm Raised Seafood" <http://www.wholefoodsmarket.com/farm-raised-seafood>

³ In addition to desk research comparison of Norwegian regulations and the ASC standards, all of our informants confirm that the ASC represents the world's by far strictest environmental and social regulation of production.

⁴ The Nofima research project 'Demand related to sustainability and the environment' (Etterspørselsforhold knyttet til bærekraft og miljø) in the Norwegian seafood industry, collected extensive data at consumer and industrial buyer levels. At the industrial level, buyers from supermarket chains, processing and food service sectors were interviewed in the UK, France and Germany. At the consumer level, focus groups and surveys were conducted in the UK and France. The markets were chosen together with the reference groups consisting of industry representatives. Thus, fish producers were also been widely consulted in the research process.

⁵ To date, Marine Harvest has certified 41 farms, Mitsubishi/Cermaq 5 farms, and Grieg none, but the three multinationals have committed to full certification of all farms by 2020. Lerøy has certified 19 farms, Salmar 15 farms, and NRS 7 farms. Edelfarm and Wenberg has certified all of their 3 facilities.

⁶ The major outbreak of infectious salmon anemia (ISA) in 2007, highlighted in the introduction of this article.

⁷ The 2nd largest company measured by Norwegian licenses is Lerøy, which runs 120, followed by Salmar with 111 and Cermaq with 52 licenses.