



# Becoming certified, becoming sustainable? Improvements from aquaculture certification schemes as experienced by those certified

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## ABSTRACT

While the effectiveness of sustainability certification has been studied through many different approaches, an understudied dimension is the behavioral changes made within the companies that become certified. Following neo-institutional and organizational learning theory, the potential of certification as a means of improvement is premised on companies actually internalizing new principles. Based on interviews and fieldwork conducted within the aquaculture industry, we explore if, and how, the responsible practices advocated by certification schemes are incorporated in the day-to-day activities of the companies. Our findings speak to the difficulties of applying standardized measures to regulate a global and complex industry, at times creating a need for compromises and adaptation of the certification principles. An important contribution of this paper is the identification of key facilitators for behavioral change, as the current limited understanding of the behavioral dimension of certification effectiveness gives little guidance on how to realize the full potential of sustainability standards. Based on this, we argue that certification schemes oriented towards continuous improvement and flexibility are better suited for promoting behavioral change.

## 1. Introduction

Sustainability certifications have proliferated within numerous industries due to a growing focus on sustainability among governments, businesses, interest groups, and consumers [1]. These are private regulatory initiatives that come in the form of voluntary certifications, which aquaculture companies can obtain by demonstrating compliance with a set list of criteria, usually assessed by a third-party auditor. In a continuously globalized market, these certifications are intended to facilitate improved resource management, increased traceability, and global commensurability and accountability [2,3].

Aquaculture is an industry that has seen a significant increase in certification schemes [4]. It is a growing industry that is considered vital in addressing global food security, especially in the wake of stagnating fisheries production [5]. It is considered by many a more sustainable food alternative, due to its lower environmental impact relative to other animal proteins [6]. However, the industry has also received much criticism for its unsustainable practices. This relates to issues such as disease, waste and emission, privatization of marine commons,

disregard for local communities, and unsustainable feed production [7–10]. In addition to pressure from environmental groups and civil society, there has also been an increase in consumer and retailer demand for certified products [3,11]. By communicating the attainment of certification, companies can enhance the perception external audiences have of their business [12].

In this paper, we explore this phenomenon as a means towards improving the practices of the aquaculture industry. Although sustainability certification is continuously gaining ground, there is much uncertainty concerning its actual implications. The question of whether sustainability certification is effective has been studied using many different approaches, based on different understandings of what effectiveness constitutes. Many of these studies have considered the standards themselves, and, while this is a valuable source of evidence, it is important to keep in mind that these are studies of certification's *potential* rather than *actual* effectiveness [13]. A dimension of certification effectiveness that has been given little attention, and which speaks more to its actual effectiveness, is the *behavioral changes* made within companies that obtain these standards [14]. This concerns whether

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companies adopt sustainability standards merely as checklists, with the sole intent of complying with the necessary requirements, or if they actually internalize the responsible practices promoted by the certification schemes.

The internalization of responsible practices and principles is here examined from a neo-institutionalist perspective, combined with organizational learning theory, which has proven fruitful in studies on organizations' transition to sustainability [15,16]. It provides a framework for understanding how larger societal forces can instill values and shape interests within organizations through their institutionalization, but also how these forces can encounter resistance in the organizations, in the form of deep structure barriers [17,18].

## 2. Theoretical background

### 2.1. Sustainability certification

Sustainability standards are developed through a variety of collaborative efforts by retailers, NGOs, and the industry, depending on the scheme. As private, market-based regulatory mechanisms, sustainability certification is a voluntary form of governance [19]. Aquaculture companies decide which, if any, certifications to pursue, with different standards addressing different issues and covering different sections of the production process [3,20]. Each certification standard is made up of a list of indicators and corresponding requirements that are meant to ensure responsible practices, thereby serving as a means to operationalize sustainability [21]. Business-to-consumer schemes provide labels on the finished product to differentiate between those certified and non-certified, while business-to-business schemes serve to convey information to wholesale buyers, such as retailers [22].

The aquaculture industry, like other resource-intensive sectors, has seen a substantial increase in demand for sustainability certification [23]. The value of getting certified lies in the authoritative endorsement of the company made by a third party [24]. Such endorsements serve as signals of quality and provide assurance that the company has implemented practices that meet the requirements outlined by the certifying agency. By obtaining various certifications, aquaculture producers seek to reduce risk related to consumer and general public concerns, increase trust, and secure themselves against the supposed lacking capacity of national regulatory frameworks to govern the industry [2,22,25]. Adopting certain certifications can also provide companies with competitive advantages such as permanence, access to markets, and price premiums [26,27]. Due to the increased pressure to become certified, certification schemes are, in certain cases, becoming *de facto* mandatory [20]. This underlines the significance of sustainability certification's role in regulating the aquaculture industry, making it an important unit of analysis.

Sustainability certification has been criticized for having limited potential for improving the aquaculture industry, thereby creating a false sense of security through labeling products as 'sustainable' [28]. This is based on claims of inadequate stringency and the employment of a too narrow take on sustainability [3,21,29]. Furthermore, their ability to capture broader scale externalities has been questioned by many, as compliance, to a large degree, is assessed on site-level and rarely includes externalities of distribution, feed production, or transportation [3,4]. Although attempts to achieve a broader reaching impact with site-level certification are being made, sustainability certification does have its limitations in this regard [30]. These certifications have also been criticized for being technocentric, applying the same requirements across a global industry with little consideration for local differences, thereby not addressing the actual issues at hand [29]. Also, the nature of the standard requirements has been called into question, as it has been shown that utilizing set metrics for compliance discourages continuous improvement [31,32].

### 2.2. Certification effectiveness

When discussing sustainability and how to work towards it, it is important to acknowledge that this is an ambiguous concept, as there are differing opinions as to what it constitutes. This is especially true in the case of sustainability in aquaculture, where there are numerous issues to be dealt with, many with conflicting solutions [21,33,34]. The aquaculture industry is characterized by complexity, as it involves biological production activity based in an open environment with direct interaction with local habitat and wildlife [7,35]. This complexity is source to the 'wicked problem' of governing aquaculture, referring to the uncertainty, lack of comprehensive knowledge, and disagreement among researchers concerning how to improve the industry [36]. Precisely because of this complexity, the effectiveness of initiatives such as sustainability certification is difficult to ascertain.

In their comprehensive review of research on voluntary sustainability certification schemes, Tröster and Hiete [14] identify four success dimensions, inspired by Young [37], and Tikina and Innes [38]: *problem-solving* (mitigation of issues addressed), *behavioral effectiveness* (behavioral changes in the company), *process effectiveness* (market diffusion), and *constitutive effectiveness* (stakeholder acceptance). While acknowledging the significance of all four dimensions, we find that they speak to very different understandings of effectiveness. We argue that it is necessary to distinguish between effectiveness in regard to the schemes' impact on making an industry more sustainable, and in regard to the success of a specific scheme. With emphasis on the former, the problem-solving dimension is of vital importance, as it refers to whether a certification scheme is capable of solving the problem it was developed to address [14]. As is argued in this paper, the success of this dimension is very much related to the dimension of behavioral effectiveness, which we also consider of great importance. In the studies reviewed by Tröster and Hiete, the behavioral effectiveness dimension is given limited consideration, something that is reflected in the inadequate descriptions found in the literature on what it actually involves. While Tröster and Hiete assume that this dimension is considered indirectly in studies concerned with the problem-solving of certification, we do not find this association a given, thereby warranting a more explicit study of behavioral changes in organizations.

### 2.3. Behavioral changes through internalization

Importantly, while this dimension is referred to as behavioral *effectiveness* by Tröster and Hiete, and others, we choose to utilize behavioral *change*. This is because we find that the former gives a misconstrued impression of what improving the industry involves, as it carries connotations of a specific goal to be attained. As has been argued, making the aquaculture industry more sustainable is a complicated endeavor, with very few certainties. Necessary behavioral changes made in companies to fully incorporate more responsible principles and practices are, consequently, difficult to determine. For that reason, an important intent of this study is providing content to the concept of behavioral change in organizations, and exploring how these manifest in day-to-day practices.

Despite being understudied, behavioral changes within organizations is still considered to be critical for the effectiveness of certification schemes, as the changing of existing practices has been shown pivotal for actual improvements to take place [14,39]. However, organizations cannot be assumed to be passive adopters of new practices that are introduced from external parties [39,40]. Aquaculture companies, similar to companies in other resource-intensive industries, have been accused of adopting improvement measures such as sustainability certifications, only to serve as window-dressing [41]. This entails a lack of internalization of new principles, in an act of adoption rather than adaptation. To better understand this response to external ideas and practices, we employ insight from neo-institutional theory.

According to this perspective, organizations are influenced by the

prevailing norms and beliefs of their environment, which constrain, shape, and channel behavior [16,42]. Organizations conform to these dominant notions of their environment as they depend on social approval from relevant audiences, to obtain the support and resources they need to survive and prosper [39]. What this means is that while organizational environments are subject to change through the influence of larger societal shifts, such as the current 'transition to sustainability', the institutionalization of new rules or norms is not a given, as it may fail and even reinforce prevailing rules [16,43]. New practices and technologies must challenge established and experience-based practices, changes that can also reduce the organization's efficiency [44].

According to Meyer & Rowan [45], 'decoupling' the formal structures and the actual day-to-day activities is a common strategy to avoid completely conforming to external forces, thus creating a potential disparity between policies and practice. Similarly, Nyberg & Wright [46] find that the development of new roles, e.g. sustainability manager, is more likely a form of compromise that the organization creates as a response to external criticism, as a way of incorporating 'sustainability' on their own terms. In other words, changes made in the organization do not necessarily imply fundamental behavioral changes taking place. Moving from 'identity management' to genuine 'identity development', therefore, entails that the new rules, norms, and values become part of the organizational culture, leading not just to new responsibilities and roles, but altered awareness as well [16,39].

What this tells us in regard to certification is that becoming certified does not necessarily result in more sustainable behavior. According to Tlusty and Tausig [32], companies risk 'backsliding' to noncompliance after having passed the initial audit, by not fully internalizing the principles of the certification. Kumar et al. [47] similarly find that the implementation of new technologies in aquaculture occurs as a dynamic process, with numerous factors influencing both the intensity and extent of adoption. In accordance with this, it is argued within organizational learning theory that the implementation of new principles must be understood as a process, as well as a result of the process [48]. In their seminal work on learning theory, Argyris and Schön [49] explain that it is not sufficient that individual employees learn new skills for organizational learning and change to occur, as the diffusion of this knowledge is in no way a given. For actual changes to occur, the acquisition of new knowledge must further be embedded in routines, practices, plans, and actions, thereby becoming organizational knowledge. According to Elkjaer [48], this occurs both through the acquisition of knowledge and skills, *and* participation in the community of practice, the former referring to the individual's obtainment of explicit expertise and the latter to the reciprocal learning occurring in interaction with others. Elkjaer [48] explains that the individual and the organization cannot be seen separately, "as both are products and producers of human beings and knowledge. The content of the learning process is the development of experience, which may lead to relevant organizational knowledge." In this lies the significance of actual behavioral changes taking place for new principles to be maintained over time, underlining the necessity of exploring whether responsible practices from certification are in fact internalized in the companies becoming certified.

### 3. Methods and materials

This study looks at the application of standardized measures as a means towards making the aquaculture industry more sustainable. Responding to the existing gap in the literature, we focus on behavioral changes made in organizations adopting sustainability standards. Former research has asserted that there is much pressure on the industry from buyers demanding certified product and production, but there are limited studies that have explored the perspective of the industry itself. The originality of the study presented here is, therefore, the investigation into the experiences of those certified and their reports on what certification signifies for their organization and work practices.

We conducted in-depth interviews with managing directors, quality

directors, operational managers, environmental coordinators, and certification managers in selected salmon aquaculture companies in Norway, Chile, and Scotland; 22 in total. We spoke with representatives in ten different companies in Norway, six in Chile, while only one in Scotland due to difficulties gaining access. Our choice of companies was limited to those with familiarity with certification, as our research interests lie primarily in the industry's experience with these schemes. The interviews focused on the producers' perceptions of different schemes and their reflections on the process from deciding to work towards becoming certified through to the implementation and implications of the standards. We also interviewed two auditors from Norway and Chile, concerning their experience with the certification schemes and the audit process. Each interview lasted approximately 1–1.5 h, and was recorded, transcribed, and translated by the authors and other project members. The interviewees were anonymized using unique identification codes (e.g. N1–C1), where the first part denotes country (e.g. N1–\*\*, N for Norway, C for Chile, and S for Scotland), and the second denotes company (e.g. \*\*–C1). The transcribed interviews were subsequently coded in N-VIVO according to theme.

Furthermore, we attended audits for three different certification schemes in two different companies in Norway. The first audit was for the certification Aquaculture Stewardship Council (ASC), with four sites being subject to review, which lasted five days. The second audit was a combined review for International Featured Standards (IFS) and BRC Global Standards (BRC<sup>1</sup>), which both concern food safety at processing facilities. We attended two of the four days. In addition to observing the audit procedures and following the auditors on site visits, we conducted informal interviews with auditors and employees. Recording devices were not used, as per the companies' request. Notes from the fieldwork were transcribed, anonymized, and coded according to theme in N-VIVO.

This study was initially intended to include a comparative analysis of national contexts, which our data material reflects. However, due to unequal access to informants in the three countries, the available data is not sufficient for a full comparative study. There are, however, several insightful comparisons that can be made, as highlighted in the Results section.

While the study includes all the standards that the companies interviewed have adopted, we focused particularly on the following eight schemes: Aquaculture Stewardship Council, GLOBALG.A.P., Global Aquaculture Alliance - Best Aquaculture Practices, BRC Global Standards, International Featured Standards, Scottish Salmon Producers' Organisation, Royal Society for the Prevention of Cruelty to Animals, and Friend of the Sea. These are eight of the most prevalent certification schemes for salmon aquaculture in Norway, Chile, and Scotland. While not all refer to themselves as sustainability standards, we have deliberately included schemes covering a wide range of issues as we advocate a broad definition of sustainability (for discussion, see Ref. [21]). Importantly, while this study does focus on eight specific schemes, this is not a comparative analysis of these standards, as they do not address the same challenges or the same segments of the production chain, making a leveled comparison neither feasible nor desirable.

The interviews conducted in this study were based on in-depth knowledge of the above-mentioned schemes, as the authors have examined these schemes and their standards used by the salmon aquaculture industry. We have categorized the 1916 indicators in these standards according to 28 different topics, in order to gain insight into the type of criteria that accompany these certifications. The 2830 categorizations from this work are available in a searchable database. See Ref. [50] for details.

<sup>1</sup> BRC Global Standards became BRCGS after the research was conducted and is, therefore, referred to as BRC throughout this paper.

## 4. Results

### 4.1. Improvements from certification

Certification is described by both producers and auditors as something that keeps the companies on their toes, as it provides both management and employees with an incentive to do things properly. Respondents in both Norway and Chile, furthermore, describe the schemes as more stringent than their respective national regulations. As a Norwegian producer explains,

*I usually say that it's like ascending stairs. First, you comply with the [national] regulatory requirements. That's a minimum, a definite minimum. Then come the ISO standards that to some degree are based on the regulatory requirements. They expect you to comply with those, or you have to comply with those, but then you have to do that little extra bit that takes you up to the next step. And then come the specific standards such as GlobalG.A.P. and ASC and BRC. [...] They have more specific requirements, more explicit demands that are not in the ISO standards. When you have achieved those, then come the buyers' demands. Then if we have any internal requirements, they come on top of that. You just keep going (Producer N5–C2).*

Several respondents describe certification as having expanded the focus areas of the industry, meaning that new issues and concerns related to aquaculture are given needed attention. Some of the issues mentioned include employee welfare, specific environmental impacts, waste and chemical management, fish welfare, and the local community and society at large. Several Chilean producers speak of an increased focus on social issues, with better overtime pay for employees and general increased social responsibility for the local community. In Norway, respondents point to how the health and safety of employees has improved as a result of increased awareness through certification. Also, the ASC's requirements concerning engagement with community stakeholders are said to have made the companies more mindful of local actors, proving especially valuable in areas where the aquaculture industry faces resistance. Several hold that while they have always been concerned with maintaining good relationships with their local community, the requirements demand regularity in their interaction and a system in place to answer grievances.

### 4.2. Standardizing practices

A vital part of understanding how sustainability standards are implemented is exploring how the aquaculture companies work to achieve compliance and, with that, what kinds of changes the standards are promoting. A key feature of most of the certifications discussed here is that they comprise globally standardized criteria, meaning that the same requirements are applied across different companies and countries. This entails using specific metrics, often with detailed descriptions on how to be in compliance with each criterion. Many producers are positive to the specific metrics in the standards, saying that they reduce uncertainty concerning how to comply with the criteria, thereby providing the producers with more predictability. However, the metrics for certain criteria are perceived as random, a source of much frustration for both producers and auditors. For instance, the ASC standard has set the maximum lethal incidents involving predators at nine over the prior two years. According to both Norwegian and Chilean auditors, the number of lethal incidents will depend on the amount of birds or other predators in the area. They claim that having such a specific requirement, rather than letting the companies demonstrate improvement, encourages underreporting. Another example is having both lower and upper parameter boundaries, when the intent of the criteria is to keep the levels below a certain amount, as described by a Norwegian producer:

*For smolt, the standard says we have to score between 130 and 150 on a chloride test, and there is no explanation for why they have the lower limit. 'Isn't it better with 128?', the site workers ask. No one has been able to explain why not. But that's what it says, which means that 128 will get you a noncompliance (Producer N1–C3).*

The application of specific criteria metrics is also criticized for discouraging continuous improvement, as it can give rise to a checklist mentality. This is also reflected in how many of the producers speak about sustainability as an end-goal, rather than in terms of steady progress. A Norwegian producer advocates for more emphasis on improvement in the certification schemes, contrasting them to customer standards, which are standards that are created and often also assessed by specific buyers:

*That's one of the good things with [this customer standard], you get requirements like 'after a certain amount of time, you need to get here'. They keep pushing you to keep things moving. And that's the thing with sustainability, you can't just make a manual that's valid for ten years' (Producer N2–C8).*

### 4.3. Changing practices

In regards to necessary changes in practice, a few of the producers interviewed argue that changes made as a result of certification are more of an 'initial grief', meaning that there is limited improvement necessary after the required adjustments are made. However, the majority state that they need to make significant changes in the organization, at least within the departments working with certification. According to both producers and auditors, it is not sufficient to prepare for audits just prior to them. Certification is described as a constant process, which must be incorporated in the day-to-day activities. This entails changing internal procedures to comply with the standard criteria, as well as introducing new routines for continual reporting, often required by the schemes. Several of the companies interviewed, particularly larger companies, have established new positions and departments for certification within the organization.

An example of a major change many companies have made as a result of certification is the implementation of new internal systems and processes, to accommodate the many traceability and transparency requirements in the standards. These requirements concern issues such as improved food safety, traceability of input such as feed, documentation of suppliers and their practices, public records of disease management, and collaboration with neighboring sites. Changes mentioned include improved routines and procedures through the consolidation of documentation processes, standardization and structuring of documentation management, and in general the creation of better and more efficient systems. A Norwegian producer describes the importance of this,

*You have to have a quality system that lets people know about the improvements. And not to mention structuring things so that if they don't follow the procedures, there is a process to identify measures to get the job done correctly. So that lays the foundation for very good systems and routines (Producer N7–C2).*

Respondents also stress that the documentation requirements not only allow them to demonstrate responsible practices that are a result of the certification process, but also document good practices and procedures that were already present in the company. This is, however, considered futile by some, as this entails spending time and resources on practices that are already in place. For instance, Norwegian producers see the indicators related to workers' rights in standards such as GLOBALG.A.P. and ASC as, to a large extent, unnecessary in the Norwegian context. As mentioned, the criteria in the standards are standardized, with the same requirements being applied globally. According to several Norwegian producers, the strict labor laws in the country make these social indicators redundant in Norway:



*There is a lot more focus [in the standards] on things that we in Norway consider a given, relative to the regulations we follow. While this is of course not a given in other countries. So for us, GLOBALG.A.P. is more of a documentation issue, which it always has been, rather than something we need to strive to achieve (Producer N2–C8).*

Several respondents question the value of such extensive reporting in general, and whether this actually does contribute to making the industry more sustainable. Some claim that the increased demand for documentation has led to less focus on the fish: *“There is a lot of additional work [with certification], but not the wrong kind of additional work. At the same time, at one point you will reach the limit. Soon I’ll have to document which boot I put on first” (Producer N8–C2).* There is also some skepticism as to what is done with all the submitted documentation, whether all of it is actually read and processed by the standard owners. While many respondents speak of the numerous documentation requirements with some resignation, others do, however, argue that this is not too difficult as long as there are good reporting systems in place.

#### 4.4. Embracing sustainability

While respondents from all three countries acknowledge the importance of sustainable production and conduct, and several describe the ambitions of their company to be the most sustainable producer in the market, many still speak of sustainability and what it entails in a superficial manner, e.g. referring to the importance of ‘the social stuff’. Still, many producers stress the importance of internalizing the responsible practices from the standards. Some point to how this must apply to the entire organization, not just those working with certification. As explained by a Chilean producer,

*The approach to certification should be based on the fact that the company believes in it. Certification cannot be an aspect that depends on a department, because when it is like that, like a checklist, it does not work properly. It must be like a culture. Everyone has to know it, find it useful, work as a team, not just do it to comply [with the standard]. When done correctly, when it is internalized, when you’re working as a team and learning from it, continuous improvement is made in all areas (Producer C1–C6).*

Particularly the Chilean producers emphasize the importance of making certification and the work towards more sustainable practices part of the culture of the organization. Norwegian respondents also express the necessity of improving attitudes throughout the company, emphasizing the need to include all employees in not just understanding *how* but *why* they work towards different certifications. They do, however, also speak of the difficulty of conveying the importance of certification and the changes it brings forth to the production workers. This is attributed to the fact that these employees do not work directly with the standards and that the audits mainly take place at the office and not on-site.

#### 4.5. Mitigating certification pressure

Many producers express frustration with the substantial resources associated with obtaining and maintaining different certifications. Financial costs can include necessary improvements to comply with requirements, the certification and label fee, the auditor’s fee and travel/accommodation, and personnel. In terms of manpower, many companies have deemed it necessary having employees working fulltime with certification, especially larger companies. This work includes aiding site managers with the standard requirements, creating new procedures and systems, preparing for and carrying out audits, collecting and submitting documentation, and communicating with auditors and standard owners. With auditors visiting on behalf of certification schemes, as well as national regulatory authorities and buyers, many producers speak of an overload of audits. Furthermore, many describe

the substantial pressure that follows the adoption of *numerous* certifications. While many standards are described as being very similar in the issues they address, companies still find it necessary to obtain multiple certifications. Different markets and individual buyers request different certifications, and since a large quantity of the fish produced in Norway, Chile, and Scotland is exported, market access is highlighted by most respondents as a key driver for adopting additional schemes.

For those working directly with certification, many express a need to be strategic when implementing new standards, to alleviate the pressure. For instance, for schemes that certify on site-level, companies may choose to prioritize sites that are closest to being in compliance with the standard criteria. An approach to limit spending and other resources on certification is combining audits for similar standards, which is possible for certain standards. This also depends on the auditor, most importantly that they are accredited for all relevant standards. Some producers voice a need for better alignment between certification schemes and national regulations, in order to limit the amount of reporting and number of audits. Others prefer that public and private governance remain separate, to ensure exhaustive scrutiny of the industry.

Another strategy for mitigating the pressure of certification is communicating and negotiating the terms of compliance. While the standards’ criteria, to a large degree, have specific requirements that must be fulfilled to achieve compliance, there is some room for interpretation. Several producers stress the importance of negotiating with the auditor or standard owners if they disagree with any of the requirements or the auditor’s decisions. Particularly respondents from larger companies describe strategies they sometimes employ, such as explaining how their current practices are necessary due to local conditions or providing scientific evidence that their practices accomplish the criterion’s aim even though they may not be in direct compliance with the specified requirement. For more in-depth findings on negotiations in certification audits from this data material, see Ref. [51].

In dealing with the pressures of certification, the size of the adopting company is said to be influential. Producers in smaller certified companies point to flexibility as their major advantage, claiming that it is easier for smaller organizations to make company-wide changes. Respondents in larger certified companies say that their major advantage is having a separate quality department, with employees working fulltime with certification. As described above, audits and audit preparations are portrayed as extremely time-consuming, especially when there are numerous sites that seek to obtain and maintain certification from numerous schemes. Another advantage mentioned by respondents in larger companies is more power and influence when negotiating with the certification schemes or auditors, in cases where the producers disagree with the standard requirements or the auditor’s assessments. This is also confirmed by respondents in smaller companies, who state they have limited resources to engage with the certification bodies.

## 5. Discussion

The findings of this study confirm the pressure to become certified, and provide evidence of the experiences of those adopting these certifications. Resonating with former research on how norms and ideas travel [e.g. 43], the findings demonstrate that these companies experience a demand to become certified from their environment. Certification has, in many circumstances, obtained the status of ‘obligatory passage points’ [52] for an industry heavily dependent on international markets, and predictable contracts for high volumes of fresh produce. Becoming increasingly *de facto* mandatory, certification can function as a barrier to trade for those sites and companies that struggle to obtain these certifications. This relates to the challenges of applying a standardized governance regime in the attempt to improve a global industry. According to the producers in this study, factors such as size and capacity of the organization can leave some at a major disadvantage, though our respondents disagree as to whether it is advantageous to be small or large. Due to the substantial resources needed to obtain and maintain a

certification, producers will often select to certify those sites that are more likely to be in compliance with the criteria. *Who* becomes certified is therefore of central significance, despite the proclaimed neutrality of certification.

As for those that do become certified, the majority of the companies we spoke with reported significant changes made due to certification, such as improved waste management, risk assessments, and mitigation plans and measures. Many of the changes made can be attributed to the inclusion of new and strengthening of existing focus areas, such as the welfare of the fish, the importance of responsible chemical storage, and the industry's potential effects, both positive and negative, on local communities. Also, better systems for documentation and reporting suggest major improvements in the areas of traceability and transparency. For many companies, making these changes involves going beyond the establishment of new roles and areas of responsibility for employees, to include new job categories and in certain cases new departments. While this does suggest increased focus on sustainability issues, it does not necessarily indicate the presence of organizational changes, as changes may be confined to those given these responsibilities. Furthermore, similarly to what Meyer and Rowan [45] and Nyberg and Wright [46] describe, the organizations we spoke with juggle and navigate external expectations by employing various strategies to mitigate the pressure from certification. Compromises can, for instance, be formed through the decoupling of formal structures and day-to-day activities, hindering certification principles and practices from becoming internalized as organizational knowledge.

Despite hesitation and ambiguity in the producers' reflections on what sustainable production involves, the findings do indicate a growing awareness of the externalities of aquaculture and the effects of their production practices. A crucial element to this is producers recognizing the inadequacy of simply window-dressing their behavior. While the possibility to communicate sustainability is central to their motivation to adapt to the certification regime, this is also seen as futile without fully embracing the changes within and across the organization. However, the respondents reveal the difficulty of justifying the importance of certification to the organization at the sharp end, as there is a gap between the focus of production workers and those in the administration/marketing departments. To what extent there is a gap in the perception of the certification criteria's pertinence and applicability has not been sufficiently revealed by our findings, but the mere existence of such a gap represents a challenge for sustainability certifications as their fundamental claim is improvement of production practices. This relates back to the discussion of whether the existence of behavioral change in the organization can be inferred from studies of the problem-solving capacity of certification. Our findings suggest that this cannot be assumed. However, this does not mean that initial results from specific changes such as waste management and mitigation plans, cannot have implications for an organization's ability or willingness to undertake behavioral changes. As described above, 'problem-solving' and 'behavioral change' as two dimensions of certification effectiveness are very much interrelated. More importantly, our focus on the latter does not suggest that we undervalue the significance of the former.

The crucial role of documentation and reporting warrants further reflection, as it concerns one of the major changes that has come as a result of the certification pressure. The value of improved documentation lies in creating procedures that are scrutinized, and which become systematic and explicit, as opposed to taken-for-granted behavior and actions that may be haphazard and arbitrary. As such, increased focus on documentation may represent improvements in production practices. The downside may be found, as confirmed by the respondents, in much time and resources being spent on writing down and reporting on the 'real' job. Furthermore, extensively reporting the status quo may also leave less time devoted to improvements. Also, frustrations with demanding documentation requirements suggest that the increased documentation pressure does, to some extent, affect the degree of perceived relevance of certification scheme criteria. The emphasis on

reporting begs the question as to whether this actually is a step towards a more sustainable industry, or merely a resource-draining activity that suits the audit format of regulation. While the data material does not offer an unequivocal answer, the documentation and audit overload reported by the majority of the respondents, both producers and auditors, does point to an unfortunate trend.

In terms of impact, respondents confirm that the control they are subjected to through certification transcends that of national regulatory authorities. This appears to be the case even in Norway, where aquaculture regulation has been hailed as the most stringent and 'complete'. However, we find reason to question whether certification can push companies to *continuously* improve, corresponding with much of the certification literature. The use of set metrics in standards can lead to the specific demands being treated as the required minimum in a race to the bottom, thereby limiting improvement. While some respondents call for more improvement-based requirements, others claim that certification does provide an incentive to find more responsible methods of production. This indicates at least a potential for utilizing certification as a learning mechanism and not just an end-goal, though with room for refinement. Furthermore, the continual update of standards does suggest at least a potential for regular progress. However, as argued by several respondents, a checklist mentality serves little purpose in dealing with the 'wickedness' of governing the aquaculture industry. With all its complexity, sustainability is not a static process and goals must, therefore, be continually adjusted.

Limited flexibility of standards may not only hinder continuous improvement, but also the occurrence of behavioral changes within the organization. As asserted in neo-institutionalist theory, company employees cannot be considered passive adopters of external principles and practices, illustrating both the need for and potential benefits of compromise and adaptation of certification principles. A way to form compromises in the implementation of a new sustainability standard is to redefine the terms, adapting certain elements of the standard to fit the local setting, through negotiation with auditors and standard owners. As this interactional character of the audit process has been shown to also facilitate important reciprocal knowledge production, it is argued to be necessary when applying standards as a means towards improving the industry [51].

While compromises and adaptations of external principles and practices are to be expected, and may also serve a role in facilitating behavioral changes within the organization, this warrants a discussion about whether this impedes improvements towards sustainability. This is an empirical question, which underlines the importance of exploring and understanding the behavioral dimension of certification effectiveness. As discussed above, this dimension is understudied, and there is limited knowledge as to how it manifests in organizations. Furthermore, as behavioral changes often occur as incremental changes embedded in routines and practices, as argued by organizational learning theory, they are difficult to capture. However, in this study, we have identified several key facilitators for behavioral change in the organization. These include incorporating responsible practices as routines in the day-to-day, embracing new focus areas, implementing structures that promote continuous improvement, raising awareness of the importance of sustainability, and making changes in the entire organization and not just for those responsible for certification. While this study's findings do not speak to whether specific certification schemes provide or support these facilitators, they do suggest that standards oriented towards continuous improvement, as well as flexibility in terms of both criteria and assessment, are better suited for promoting behavioral change.

## 6. Conclusion

Saying anything decisively about whether sustainability certification for aquaculture adequately promotes the necessary behavioral changes in the adopting companies, i.e. whether it can function as a means towards improving the industry as a whole, would necessitate more data.

However, this paper serves as an important contribution to understanding potential implications of certification and the experiences of those certified. Furthermore, it provides much needed content to the behavioral dimension of certification effectiveness, which, in turn, can inform future studies on the topic. Taking these findings further, an interesting issue to explore for future research is the question of whether the internalization of responsible practices is, or should be, a doing of the schemes in what they demand, or of the companies becoming certified. Preferably, this is supported by both parties. For the schemes, this is a matter of both promoting *and* not impeding favorable behavioral changes in the companies, for instance by providing specific solutions with room for local discretion. For the companies, this rather concerns having good incentives for making significant changes, so as to compensate for the transaction costs of such changes. In any case, these are important issues that warrant further exploration.

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## Declaration of competing interest

The authors declare no conflict of interest.

We declare that we have no significant competing financial, professional or personal interests that might have influenced the performance or presentation of the work described in this manuscript.

## CRediT authorship contribution statement

**Vilde Steiro Amundsen:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing - original draft. **Tonje Cecilie Osmundsen:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing - review & editing.

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