

Exploring public perceptions and expectations of the salmon aquaculture industry in Norway: A social license to operate?

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ABSTRACT

The aquaculture industry depends on the support of society to maintain and extend its activities. In Norway and elsewhere, such support cannot be taken for granted. The public has diverse expectations of the industry, and attitudes toward the industry are shaped by experiences with industry production, how the benefits and disadvantages of aquaculture production are distributed in society, and the kind and degree of information about industry issues that is available. This paper investigates public attitudes toward the Norwegian salmon aquaculture industry through a nationwide survey ($N = 1183$). The results reveal that the public is generally positive toward the industry; they tolerate and even accept it. However, respondents had more negative perceptions regarding the environmental consequences of aquaculture production and the fairness of the distribution of economic gains. Although the industry was seen as acceptable, respondents were more reluctant in terms of welcoming production growth, which points to a need for improvement if production increase is to be realized and the industry is to be able to meet society's expectations. Our results reveal differences in attitudes between respondents living in areas with and without aquaculture, which suggest that proximity to industry is, in general, positively related to industry perceptions. However, these differences vary in size, and it can be assumed that there are substantial contextual variances within the group of respondents living in aquaculture municipalities. One potentially important influence on attitudes is related to how industry is perceived to be financially significant in a particular local community. Further research could supply these data to offer a more detailed understanding of contextual variations and thus expand on the present results that explore public perceptions and expectations of the salmon aquaculture industry.

1. Introduction

Since the production of farmed salmon began, it has been a rapidly growing industry and can now be characterized as a great success in economic terms (Garlock et al., 2020). In Norway, salmon aquaculture has evolved from a small-scale business with local ownership in rural coastal areas, to a major export industry dominated by large multinational companies (Asche et al., 2013). Producing 1,5 million tonnes of salmon (Directorate of Fisheries, 2022) and providing seafood to more than a hundred countries (Norwegian Seafood Council, 2021), the salmon industry in Norway is highly competitive compared to other salmon producing nations (Iversen et al., 2020). It also generates significant economic benefits for many coastal communities in terms of job creation, revenues, and increased business activity (Richardson et al., 2019). It is thus easy to find arguments for the importance of this industry on the local, national, and global levels.

However, the salmon aquaculture industry is confronting faced with reputational issues that extend far beyond the popularity of or taste for its product; it has become commonplace to claim that the industry faces criticism and concern from "the public" a broad term covering consumers, other stakeholders, and citizens at large (Flaherty et al., 2019; Grunert, 2005; Hynes et al., 2018; Krøvel et al., 2019; Schlag, 2010, 2011). This criticism covers several topics, including environmental issues, distribution of economic revenues, and competing interests (like fisheries or tourism) related to area use and access. These topics of concern can vary between different groups in the wider public: people in different geographical areas, public versus private actors, and those with more or less knowledge of and/or experience with the industry. Overall, the aquaculture industry has attracted considerable controversy (Condie et al., 2022a; Osmundsen and Olsen, 2017; Young and Matthews, 2010), and the social and environmental challenges have led to limits on industry growth in several salmon producing countries (Young et al.,

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2019).

In Norway, both the salmon aquaculture industry and the government share a vision of a growth in production. However, this ambition has also been met with considerable skepticism, especially due to the potential increase in environmental challenges. The authorities emphasize the environmental dimension of sustainability, as demonstrated in recent changes in the regulatory framework for future growth (Osmundsen et al., 2022). However, in the main strategic documents concerning the industry (Meld. St. 16, 2014-2015), environmental sustainability is often described as something that is bearable by both nature and society; in other words, it is also *acceptable* to society (Olsen, 2022). Public perceptions of the industry are therefore of great importance for industry and public agencies in further improving industry sustainability, particularly in its social and economic dimensions. The latter aspect pertains to the escalating expectations of coastal communities in Norway for a greater share of the economic benefits due to the industry's increased profitability, which has amplified financial returns for owners (Sandersen and Kvalvik, 2015). As suggested by Hersoug et al. (2021), an increased sharing of the benefits from aquaculture production is pivotal to enhancing the industry's legitimacy. The distribution of benefits and potential tax regulations for aquaculture production have been subject to debates over the last decade. These discussions have resulted in the creation of an Aquaculture Fund and the enforcement of a production fee, which together have increased the revenue allocated from the government to municipalities with aquaculture production. As Bailey and Eggeride (2020) showed, perceptions of distributive justice -that is, how costs and benefits are distributed- is an important factor in the socio-economic issues impacting social acceptance.

The environmental impact of the farmed salmon industry has proven to be an important element in its social acceptability (Freeman et al., 2012; Kraly et al., 2022; Mazur and Curtis, 2008; Whitmarsh and Palmieri, 2009; Whitmarsh and Wattage, 2006). Along with the growth in production volume, environmental impacts from aquaculture have increased. Furthermore, the public has become more aware of the industry's adverse impacts on the marine environment, possibly through increased media coverage. A negative or skeptical opinion among the public creates obstacles for growth in Norway and other salmon producing countries (Anderson et al., 2019; Sandersen and Kvalvik, 2015), and influences how authorities seek to regulate and control the industry (Osmundsen et al., 2020b). In Norwegian news media, environmental challenges and the consequences of aquaculture production have become a major topic (Olsen and Osmundsen, 2017). The public debate on aquaculture shows that aquaculture activities are often criticized, with disapproval voiced by a mix of different interest groups (Osmundsen and Olsen, 2017). Similar findings from media coverage and debates have been reported in other countries (Amberg and Hall, 2008; Cullen-Knox et al., 2019, 2021; Feucht and Zander, 2017; Kraly et al., 2022; Schlag, 2011).

Public perception of how the industry is regulated by the authorities is likely to have an impact on the approval of the industry. In addition, the perception of the social and environmental impacts of aquaculture is likely to influence its social acceptance, and what is deemed important when regulating the industry. Both these issues are closely related to how news media choose to present and frame aquaculture topics (Olsen and Osmundsen, 2017; Osmundsen et al., 2017; Osmundsen and Olsen, 2017; Young et al., 2019).

Drawing from a national survey conducted in 2020, this paper explores public opinion about the Norwegian salmon aquaculture industry and how perceptions may vary across potential determinants relevant to understanding the social license of salmon aquaculture in Norway. Public opinion is examined on a national level. In addition, we investigate the extent to which perceptions may vary between respondents living close to aquaculture production and those living in areas without aquaculture, with the aim of assessing the degree to which proximity to aquaculture production is an important determinant of attitudes toward

the aquaculture industry. The data for this paper come from a national survey with a total of 1183 respondents.

Understanding the public perception of the industry is useful for both policymakers and for industry actors seeking improved societal support. Insights into the elements that shape and change public attitudes toward an industry are essential for further studies on societal support of the aquaculture sector. In this sense, investigating attitudes is an important step toward achieving a broader understanding of the concept referred to as a *social license to operate* for salmon aquaculture companies, which we elaborate on below.

2. Social support and societal expectations

Societal support refers to a range of concepts dealing with the question of whether a given industry or company has social acceptance, social approval, social legitimacy, or a social license. Many labels are used to describe and investigate such support; they have in common a connection to how the public, as broadly defined, approves of or perceives the presence of an industry in society and their local community. Improving social acceptance for aquaculture is a two-way process in which society's knowledge and understanding of the aquaculture industry need to be strengthened, while the industry also must accept its social responsibility and respond to signals from society (e.g., Kelly et al., 2017; Moffat et al., 2016).

Although there is no consensus definition of a *social license to operate*, Moffat et al. (2016) describe it as an unwritten "social contract" that reflects both the expectations and opinions of the broader community concerning the benefits and impacts of industry and government practices. Thomson and Boutilier (2011, p. 2) describe social license as "a community's perceptions of the acceptability of a company and its local operations." Hence, a social license is understood as the expectations and requirements that apply to a sector and how the public perceives the fulfillment of these expectations. The importance of a social license lies in the need for good collaboration and interaction between industry and society, at multiple geographical levels. As Krause et al. (2020) discuss, a social license is established through a successful interaction between the company and its public, a process that does not require any guidance by formal institutions. Social acceptability, on the other hand, "refers to a collective community-based evaluation that reinforces participatory democracy, aiming at implementing governance processes based on deliberation and public involvement." (Krause et al., 2020, p. 2). However, the discourses of social license and social acceptability both concern factors influencing public perceptions (Krause et al., 2020; Mather and Fanning, 2019; Moffat and Zhang, 2014; Thomson and Boutilier, 2011).

Studies of public opinion and attitudes, industry reputation, and social license have been conducted in several industries and at various focal points (Alexander, 2022; Cullen-Knox et al., 2017; Kelly et al., 2017; Mather and Fanning, 2019; Thomson and Boutilier, 2011). For example, perceptions of the industry have been studied through media analysis (Amberg and Hall, 2008; Olsen and Osmundsen, 2017; Schlag, 2011), studies of public documents (Billing, 2018), and direct questioning of the public through surveys (Bjørkan and Eilertsen, 2020; Flaherty et al., 2019; Hynes et al., 2018; Krøvel et al., 2019) or dialogue and meetings (Lindland et al., 2019). As to salmon aquaculture specifically, the controversies surrounding the industry - in Norway and elsewhere - have been present for some time (Alexander, 2022; Flaherty et al., 2019; Osmundsen and Olsen, 2017; Schlag, 2010; Young and Matthews, 2010). The notion of a social license is, however, relatively new, although reputational issues and questions about perception of the industry within the local community, the broader national public, and global consumers have been important research topics for years.

In the present study, public perceptions of the industry are the focal point, and we draw on a theoretical framework with elements from both social license and social acceptability, while also acknowledging the differences between the two concepts. The concept of social acceptability also entails including perceptions of public regulation, and the

premise that its advancement is reliant on acceptance from the general public (Krause et al., 2020). People's perception and expectations of the aquaculture industry is not easily measurable, as the concept of "the public" includes a diverse group of citizens who may be influenced by geography, personal values, knowledge, and other factors. Nevertheless, investigating perceptions is an important step in advancing our understanding of the industry's social license and social acceptance. A key part of the present study is thus to investigate the multiple factors shaping the perceptions, geographical differences, and implications for further development of the industry.

2.1. Public perceptions and salmon aquaculture

The aquaculture industry depends on being in good standing on the local, national, and global levels. While the Norwegian aquaculture industry is highly regulated, compliance with the authorities' regulatory demands is often insufficient to meet society's expectations of the industry (Gunningham et al., 2004). In Norway, societal support in *local communities* where the industry operates is of particular importance because municipalities govern access to the country's coastal areas. Hence, they decide whether, and where it is desirable to make room for salmon production and, as several studies have emphasized, access to suitable areas for farming is one of the most important factors in the industry's growth (Hersoug et al., 2021; Hersoug and Johnsen, 2012; Osmundsen et al., 2020a; Solås et al., 2015; Young et al., 2019). Societal support is also important on the *national* level, where public perception influences policymakers regulating the industry, and on the *global* level, where it is necessary to respond to consumer requirements and market actors in different countries. Hence, how various publics perceive the social, economic, and environmental dimensions of aquaculture could influence the industry's ability to fulfill society's expectations, its standing in the local community, its access to production sites, the creation of favorable regulatory frameworks, and success in selling their products in the global market (Olsen et al., 2021).

As this summary indicates, it is important to gain further knowledge about peoples' attitudes toward the industry at both the local community and national level (Alexander, 2022; Gunningham et al., 2004; Moffat and Zhang, 2014; Thomson and Boutilier, 2011). While most consumers live far from the production sites where salmon is farmed, they still play a powerful role in pressuring the industry to become more environmentally sustainable (Hynes et al., 2018; Verbeke et al., 2007). People in different salmon producing countries have expressed divided opinions of the industry's impact on the marine environment (Hynes et al., 2018). People living close to aquaculture production areas might be expected to voice a more negative attitude toward the industry, as these communities can directly experience its negative impacts. However, Krøvel et al. (2019) found that people living in a community with aquaculture production expressed a more positive attitude toward aquaculture than the views found among the general public. One reason may be that although the industry's environmental consequences may be most directly experienced in the communities neighboring aquaculture production sites, they are also the localities that enjoy the industry's benefits and contributions, thus leading to positive attitudes. In Scotland, Whitmarsh and Palmieri (2009) found that local and regional context affect how people evaluate the trade-offs between the environmental and socio-economic effects of aquaculture. In other words, awareness of negative impacts from the industry may influence public perception, but people living close to a production facility that provides benefits to the local community may perceive the gains and disadvantages differently than people living elsewhere or if the industry is not deemed to be of enough significance to the respondents' local communities because of a wider range of other employment options (Hynes et al., 2018; Whitmarsh and Palmieri, 2009). Thus, attitudes may also be influenced by a community's economic and social status and the presence or absence of other job opportunities.

As with the disadvantages and negative impacts of aquaculture, the

industry's benefits and positive contributions are perceived differently by different parts of the public. In addition, as shown by Lindland et al. (2019), attitudes may not even be as simple as being for or against salmon aquaculture; rather, they can be a matter of various stakeholders' assessments and interpretation of sustainability, and different expectations can appear in the same local community. However, the public and its perceptions of the industry are important as they can affect people's positions on actively supporting (or opposing) aquaculture expansion (Chu et al., 2010).

3. Materials and methods

The empirical material in this article is based on data from a nationwide survey conducted between April and September 2020 in Norway, Iceland, and the Australian state of Tasmania. The present study analyzes only the survey data from Norway, with a focus on obtaining in-depth knowledge of perceptions of the industry presence on a national level and identifying differences at the local level. Respondents were recruited by a Norwegian survey company specializing in panel data (Norfakta). The research group determined the minimum number of total respondents and also decided on a minimum number of respondents from each county to ensure representation from all 11 counties in Norway. Recruitment of respondents was carried out by Norfakta using its own processes and algorithms, although it sought a representative selection of respondents in terms of gender and age distribution. The survey was conducted online, with respondents from age 18 to 85; a minimum of 800 total respondents was required. All respondents received an email with a link to the survey, in which they were asked a series of questions about the aquaculture industry, in addition to demographic questions about gender, age, education, household income, and municipality and area of residence. Respondents were also asked about their trust in the Norwegian governance system, concerns for the environment in general, and knowledge of the Norwegian salmon aquaculture industry. Questions were asked using a five-point Likert scale (all moving from [1] negative to [5] positive¹) with the additional option of answering "I don't know" (omitted in figures below but discussed when observed high numbers of "I don't know" answers). The ends of each scale were labeled ("1 - Not a lot", "5 - A lot") but [2], [3] and [4] had no labels. The purpose of the survey was to gain knowledge about the population's attitudes toward and impressions of the aquaculture industry. The results provided by the survey company included only completed survey responses for a total of 1183 respondents; however, the total response rate is unknown.

The survey questions were developed by the Norwegian project group members in collaboration with international research partners from Tasmania and Iceland. Questions were designed to be equally appropriate in all three countries, with the intention of conducting comparative analyses.² Topics and questions were based on previous research on social license and public opinion of aquaculture, and from extensive experience in research projects concerning a variety of topics related to the aquaculture industry. The first part of the survey asked about socio-economic and geographical information, in addition to respondents' knowledge of the aquaculture industry, trust in the governance system, and concern for the environment in general, because these are underlying factors important for assessing industry specific issues and illustrate how familiar they are with the industry. The second part consisted of questions concerning respondents' opinions about the aquaculture industry in their own country, while the last part asked specific questions about the industry in their local communities; in Norway, this part was only completed by respondents in two counties.

¹ While we interpret both [1] and [2] as negative positions and [4] and [5] as positive positions, the middle category [3] signals a more moderate position.

² We use English translations in this paper, however, all questions were asked in the primary language in each country (Norwegian, Icelandic, and English).

For this paper, the main question of interest was how the aquaculture industry is perceived by people in Norway. Previous research has shown that attitudes are closely linked to several factors, suggesting that attitudes are a function of the weight given to perceived benefits and negative effects of aquaculture. Survey questions were therefore related to general impression, and subsequently topics related to among others; industry contribution, distribution of benefits, expectations, acceptance, information and transparency, sustainability, importance, and authorities' regulation of industry.

While many studies of social license and social acceptance have investigated perceptions in communities that are directly affected by an industry or company, the present study looks at society more broadly to unearth opinions across geographical locations on a national level. We deliberately chose a non-representative geographical distribution of respondents (by ordering a survey with a minimum number of respondents in each county), given that a large part of Norway's population resides in and around Oslo, the capital, in areas with no aquaculture production nearby. While the lack of representative geographical distribution of respondents cannot enable a generalization of findings to the wider population, the deliberately skewed distribution does enable adequate sample sizes for statistical comparison of perceptions from areas with and without aquaculture. Of the 1183 total respondents in the Norwegian survey, almost 48% of respondents lived in a municipality with aquaculture production.³

The geographical distribution of respondents is presented in Table 1 (appendix) and ranged from 61 to 211 per county. There are two reasons for the variations between counties: 1) in 2020, several counties were merged, and 2) an additional set of questions (about the industry's contribution, communication, and contact with local community) was given to respondents living in two counties in the eastern and northern part of Norway (Vestland and Troms og Finnmark), and we wanted a higher response rate for these groups. Analysis from these additional questions is not included in this article, but is used in a different part of the project, in combination with supplementary data on ripple effects to further investigate perceptions in local communities.

Table 2 (appendix) summarizes the demographic composition of the respondents living in aquaculture municipalities and non-aquaculture municipalities for the variables gender, education, and area of residency. There is a higher number of men in the respondent group living in an aquaculture municipality. Also, the share of respondents with higher education is lower in this group, while a higher share of respondents in aquaculture municipalities lives in more rural areas compared to respondents from non-aquaculture municipalities. Nevertheless, a large share of the respondents from aquaculture municipalities lives in a small (36,5%) or large city (21,6%), demonstrating the large variety of communities hosting aquaculture in Norway.

The data were examined through univariate analysis, which showcases results on the national level and for respondents from aquaculture municipalities and non-aquaculture municipalities to highlight disparities between these two groups. The results are presented in figures displaying frequency distribution in percentages, along with the total number (N) included for each question and respondent group. Additionally, an overview of all survey questions and descriptive statistics regarding responses is included in the appendix (Table 3).

³ This includes all municipalities registered with production sites, in line with the overview from The Aquaculture Fund and its, 2020 disbursements (Directorate of Fisheries, 2020). In addition, we have chosen to include Bergen as an aquaculture municipality, due to the industry presence there (the headquarters of Mowi, the world's largest salmon aquaculture company, is in Bergen).

4. Results

4.1. Industry knowledge, environmental concern, and confidence in governance system

As shown in Fig. 1, the respondents were to a very large degree concerned about environmental issues in general, as more than 70% reported high environmental engagement. We also found that respondents as a whole self-reported a high level of confidence in the Norwegian governance system. Comparing responses of individuals residing in proximity to aquaculture and those in municipalities without aquaculture revealed only minimal variations in attitudes regarding both these questions.

When asked about their knowledge of the industry, the distribution between 'not a lot' and 'a lot' was more balanced, with 40% of respondents placing themselves in the middle category, indicating moderate knowledge of the industry. Respondents living in aquaculture municipalities reported being more knowledgeable about the industry than did respondents living in a municipality without aquaculture. It is important to point out that this refers to the self-reported extent of knowledge. Perceiving oneself as knowledgeable about the industry can be a result of knowledge due to experience (e.g. from being close to a production facility or living in a municipality with aquaculture) but can also be knowledge obtained through informational sources like media. When asked "How easy is it to find information about the industry?" (Fig. 2), we found that fewer than 25% of respondents reported information about the industry to be easily available (scale options [4] and [5]). Notably, respondents residing in aquaculture municipalities indicated that industry information was more accessible. It is also worth highlighting that a greater proportion of respondents (approximately 20% of those surveyed) opted for the answer "I don't know" when asked about information availability.

4.2. General impression of the industry

Overall, the respondents' general impression of the Norwegian salmon aquaculture industry was more positive than negative, with approximately 40% reporting a positive impression ([4] or [5]), and fewer than 25% reporting a negative impression ([1] or [2]) (Fig. 3). Separating respondents living in a municipality with aquaculture production from those who did not, we found that people with proximity to aquaculture reported a more positive general impression of the industry ([4] or [5]). Conversely, people living without nearby aquaculture production reported a more negative general impression ([1] or [2]).

Compared to the respondents' general impression of the industry, we found that they were more reluctant about the industry in terms of transparency and trustworthiness (Fig. 4). While 35% of respondents did report finding the industry trustworthy, only 24% viewed it as transparent. In terms of both transparency and trustworthiness, the respondents residing in municipalities where aquaculture is present exhibited a more positive disposition toward the industry than those residing in municipalities without aquaculture.

When asked more specific questions about Norwegian salmon and whether it is produced in a sustainable manner when considering social, economic, and environmental aspects, the respondents had more negative perceptions than the general impression presented above. Almost 40% of the respondents placed themselves in a negative category ([1] or [2]), and fewer than 30% were on the positive end of the scale ([4] or [5]) (Fig. 5). As for whether the industry was perceived as environmentally sustainable the results show that almost 50% of respondents reported a negative ([1] or [2]) perception, with only 20% expressing a positive ([4] or [5]) perception.

While the general perception of the salmon aquaculture industry regarding questions of sustainability tended to be negative, respondents residing in aquaculture municipalities demonstrated a more favorable attitude and exhibited a less negative impression when asked about the

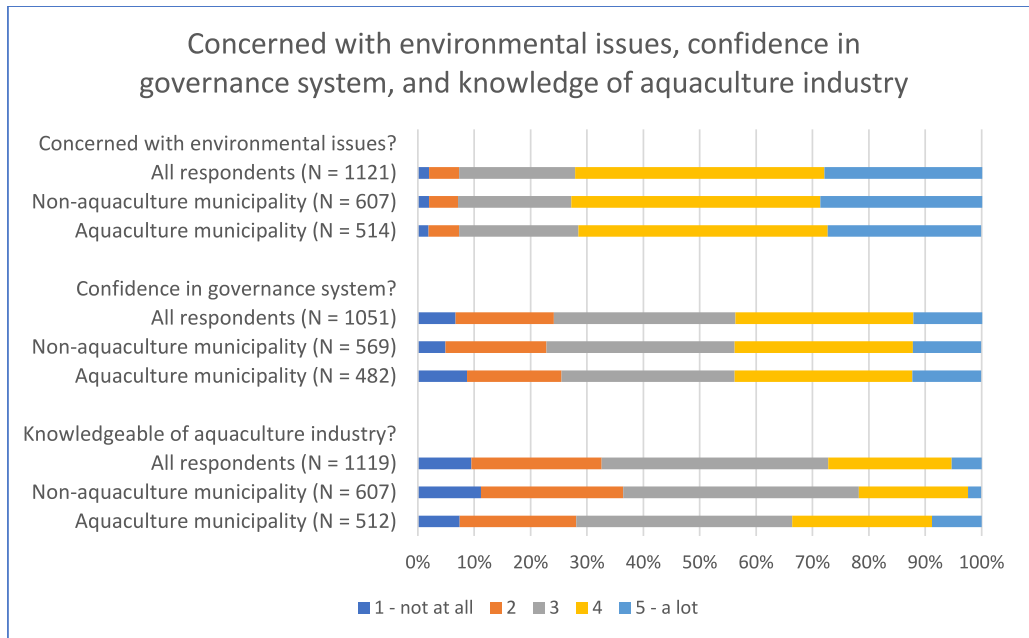


Fig. 1. Respondents’ self-reported knowledge about the industry, concern with environmental issues (in general), and confidence in the Norwegian governance system (“How concerned are you with environmental issues?”, “How much confidence do you have in the Norwegian governance system?”, “How knowledgeable are you about the Norwegian salmon aquaculture industry?”).

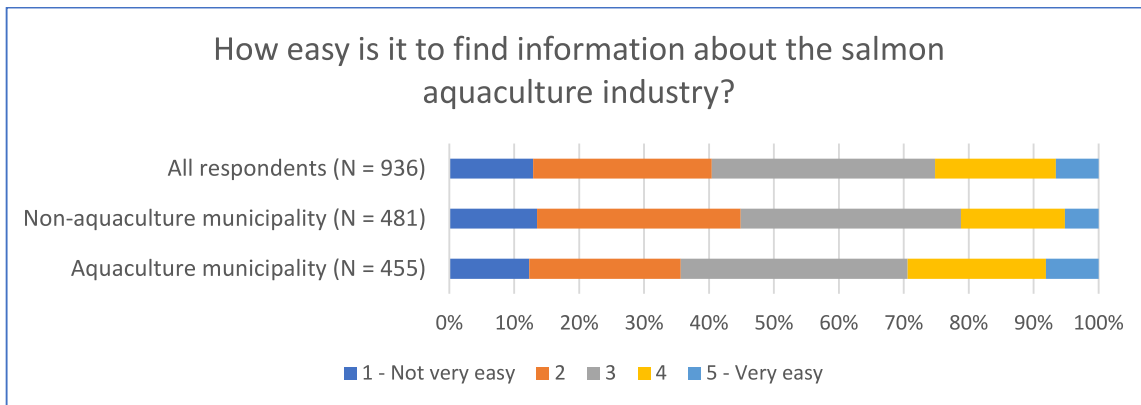


Fig. 2. Respondents view on how easy it is to find information about the salmon aquaculture industry, distribution among all respondents, and the division between respondents living in municipalities with and without aquaculture production.

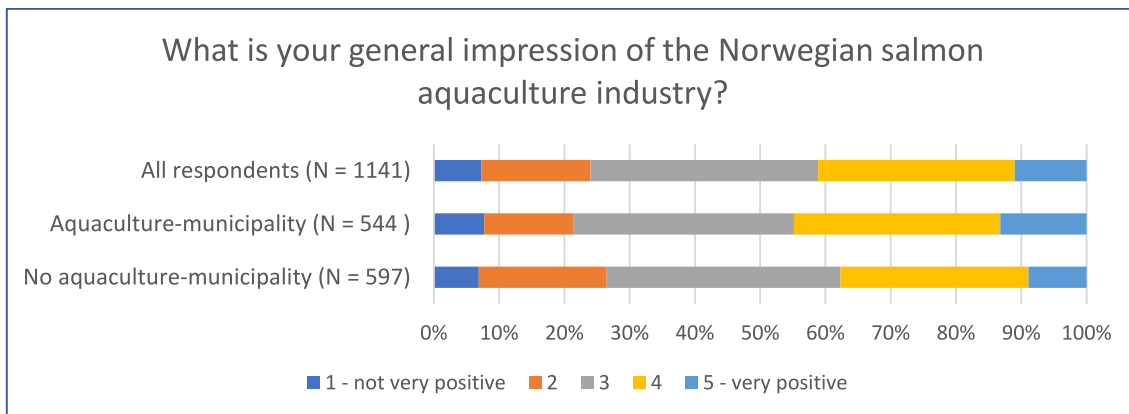


Fig. 3. General impression of the aquaculture industry, distribution among all respondents, and the division between respondents living in municipalities with and without aquaculture production.

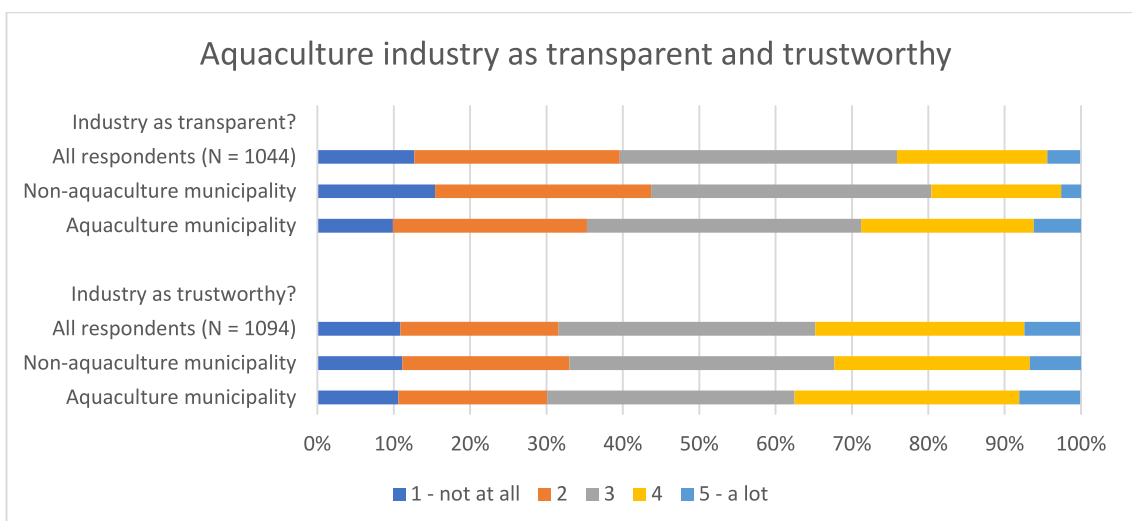


Fig. 4. Respondents view of industry as transparent (“To what extent do you perceive the Norwegian salmon aquaculture industry as transparent?”) and trustworthy (“To what extent do you perceive the Norwegian salmon aquaculture industry as trustworthy?”).

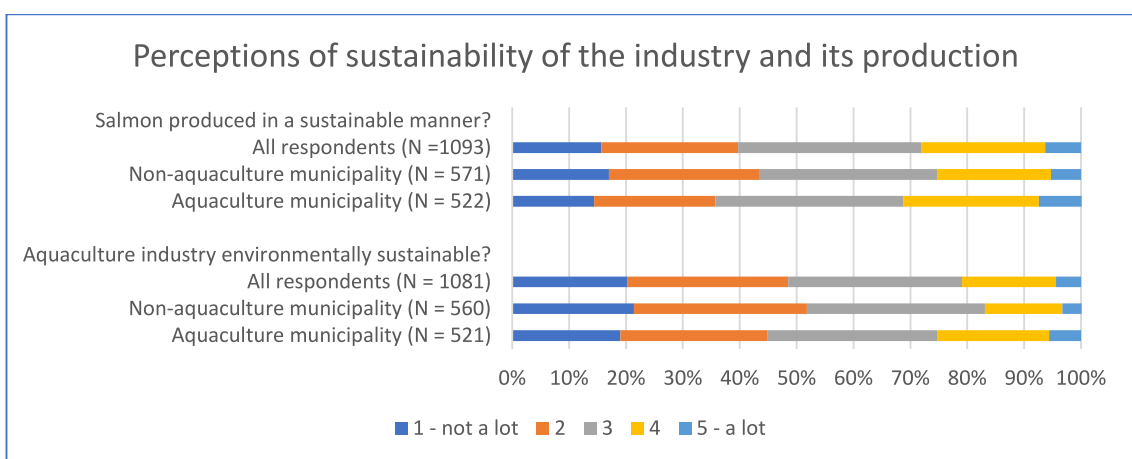


Fig. 5. Perception of the aquaculture industry as environmentally sustainable (“To what extent do you perceive the Norwegian salmon aquaculture industry as environmentally sustainable?”) and the production of salmon in the view of different sustainability aspects (“To what extent do you think that Norwegian salmon is produced in a sustainable manner, when you consider social, economic, and environmental aspects?”).

industry’s environmental sustainability and the sustainable production of salmon (Fig. 5).

4.3. Benefits and disadvantages

When asked to select one or more elements where the participants felt the industry contributed with the most, they emphasized employment (72.9%), food production (67.8%), increased business activity (47.3%), and robust communities (45.2%) (see Fig. 6). However, in the respondents’ evaluation of industry contributions, we find either no or only very small differences between respondents in municipalities with aquaculture present and those in areas without aquaculture (see Table 4 in the appendix for comparisons between the two respondent groups).

As to benefits, we found that very few respondents perceived the industry as having little or no value. Rather, several contributions had fairly high response rates, suggesting that our respondents viewed the aquaculture industry as important for several reasons. This finding is further strengthened by the answers to the question of how important the industry is for Norway (Fig. 7). Of all the survey questions, this one had the most positive score with a mean of 4.21 on a five-point scale. This means that almost all respondents found the industry to be very

important for Norway, independent of their proximity to aquaculture production. The differences between the two respondent groups were minimal on this matter.

As shown in Fig. 7, we found that the respondents expressed a more negative attitude regarding whether economic benefits were distributed fairly on a municipal and state level, with close to 50% of respondents choosing options [1] or [2]. Overall, respondents expressed quite negative perceptions on this point; however, the group of respondents residing in aquaculture municipalities had a more favorable attitude toward the distribution of benefits than respondents living in municipalities without aquaculture. It is noteworthy that for the questions on the distribution of economic benefits, there were a higher number of “I don’t know”-answers than seen in any other questions.

The respondents were also asked about the extent to which they found that the salmon aquaculture industry had financial significance for their local community. As Fig. 8 shows, a majority of respondents had a negative view on this matter, with almost 60% opting for a lower score ([1] or [2]). This outcome is not unexpected, given that most respondents do not reside in proximity to aquaculture production. However, the disparity between respondents residing in aquaculture municipalities and those who did not was most pronounced in response

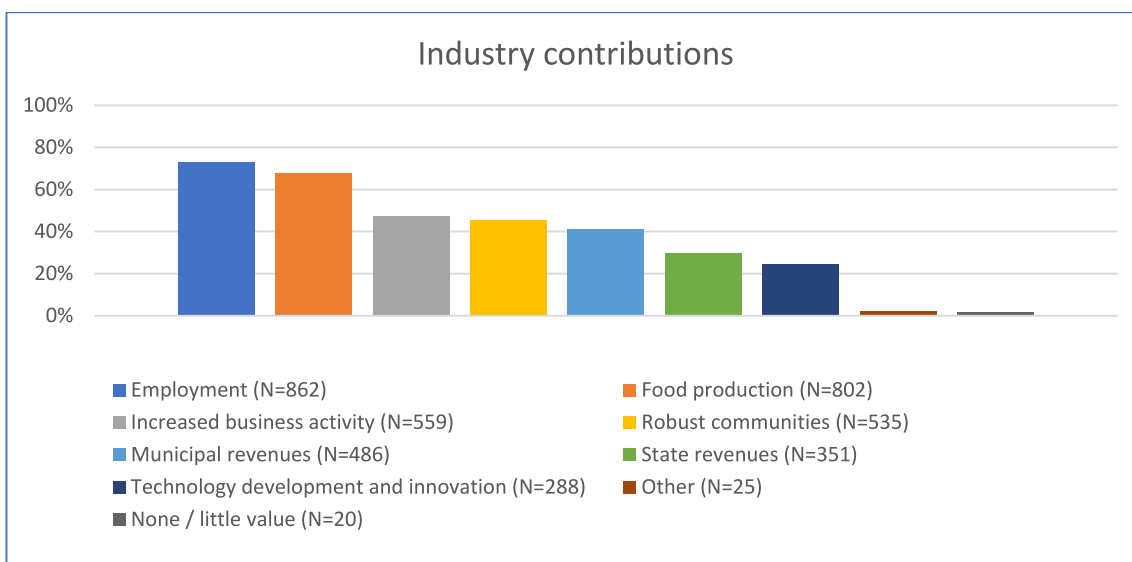


Fig. 6. Overview of respondents' choice of industry contribution when asked "Which of these elements do you think the industry contributes the most with? (Please select as many as you think apply)". Numbers presented as percentage per contribution (percentage of respondents choosing this option as an industry contribution based on total N = 1183) on the Y-axis, with N showing frequency (number of respondents choosing each option).

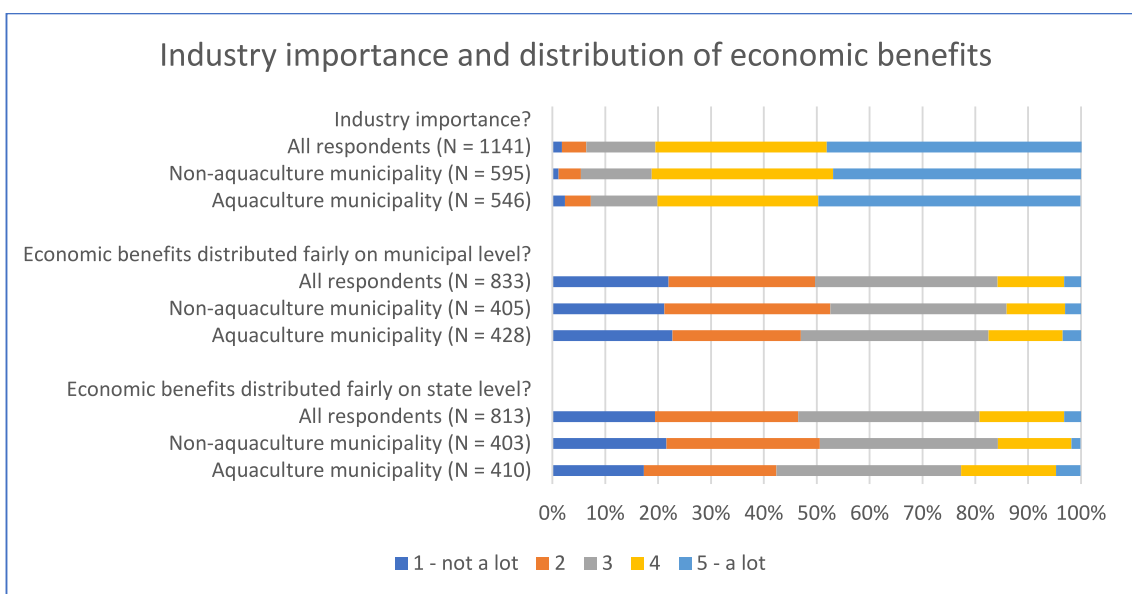


Fig. 7. The respondents' opinion of industry importance ("How important do you think the salmon aquaculture industry is for Norway?"), and the distribution of economic benefits on state and municipal level ("To what extent do you find that the economic benefits from Norwegian salmon aquaculture industry are distributed fairly, on a state and municipal level?").

to this question. While fewer than 10% of the respondents from non-aquaculture municipalities perceived the industry to be financially significant for their local community, almost 40% of those residing in aquaculture municipalities held this view. It is worth noting, however, that despite nearly half of respondents living in aquaculture municipalities receiving economic income from the industry and government support via the Aquaculture Fund, many still did not perceive the industry as financially significant for their local community.

4.4. Industry acceptance and tolerance

Other elements influencing the respondents' general impression of an industry could be the public's acceptance and tolerance of that industry. Two questions measuring these factors show that respondents

not only tolerated but also accepted the salmon aquaculture industry to a high degree (with more than 60% of respondents choosing [4] or [5], and fewer than 20% choosing [1] or [2])(Fig. 9). When asked if they were proud of salmon aquaculture production and how much they wanted to see more salmon aquaculture in Norway, respondents were more reluctant, with a balanced distribution in their responses. Respondents were fairly equally divided between a negative and a positive attitude when asked if they would like to see more salmon production. In other words, the results show that the industry was to a large extent tolerated and accepted, but the respondents expressed limited desire for increased production.

Comparing responses of individuals residing in close proximity to aquaculture production with those who do not, only minimal differences were observed in relation to the questions of industry acceptance and

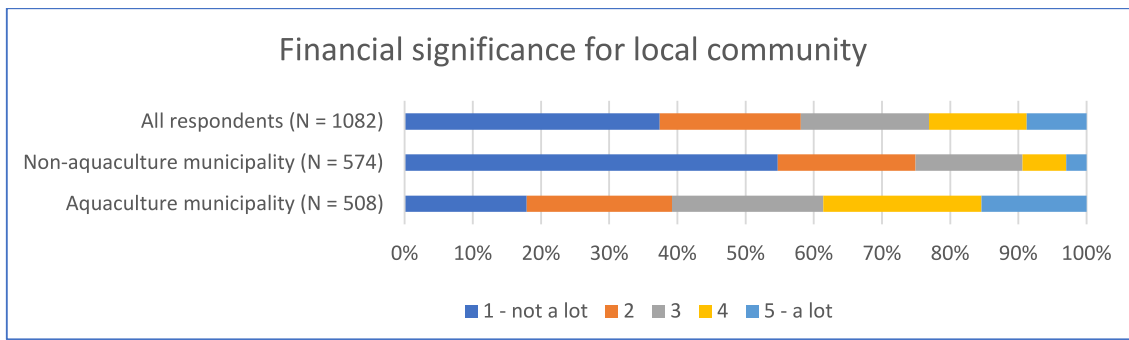


Fig. 8. The respondents’ opinion of the salmon aquaculture industry as financially significant for their local community (“To what extent do you find that salmon aquaculture industry has a financial significance for your local community?”).

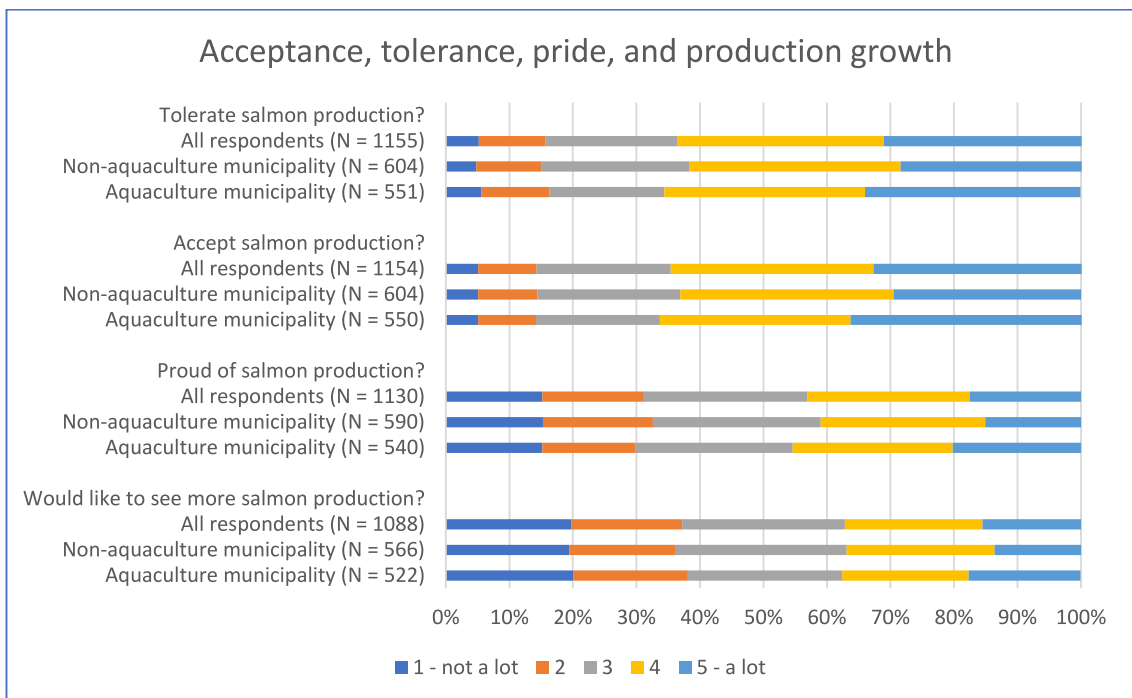


Fig. 9. Respondents’ acceptance (“To what extent do you accept salmon aquaculture production in Norway?”) and tolerance (“To what extent do you tolerate salmon aquaculture production in Norway?”) of salmon aquaculture as an industry, and the extent to which respondents were proud of that aquaculture production (“Are you proud of Norwegian salmon aquaculture production?”) and wanted to see more of it in Norway (“To what extent would you like to see more salmon aquaculture production in Norway?”).

tolerance, being proud of the industry, and welcoming industry growth. Overall, respondents from aquaculture municipalities demonstrated marginally more favorable views toward accepting and tolerating the industry. However, these variations were small, potentially owing to the positive overall perceptions among the total group of respondents. Notably, there were only minor differences between the two respondent groups on the question of feeling proud of Norwegian salmon aquaculture production, even though overall perception were more evenly divided. The two groups of respondents showed very similar attitudes to the question of wanting growth in aquaculture production.

4.5. Industry behavior and industry regulation

As to industry behavior, the respondents were asked about the extent to which they found it to be in accordance with the expectations of the authorities and of society. The results show that the respondents very much agreed that the industry’s behavior is in accordance with the expectations of the authorities (Fig. 10). More than 50% of respondents

were opting for the positive score ([4] or [5]), and fewer than 15% were in the negative end of the scale ([1] or [2]). However, the respondents stated that industry behavior was less in accord with the expectations of society. Consistent with the results in previously discussed questions, it is clear that respondents residing in close proximity to aquaculture production expressed more positive attitudes toward industry behavior than did those without aquaculture production in their municipality.

When asked about how confident they were in how the authorities regulated the industry, the respondents expressed a wide range of views, with some showing little (36% opting for [1] or [2]) and others showing considerable (34% opting for [4] or [5]) confidence (Fig. 11). Compared to questions on the industry behaving in accordance with authorities’ expectations, there was a marked increase in respondents with a more negative view of how the authorities regulated the industry. Comparing the two respondent groups, there was no observed difference in their perceptions of industry regulation, despite the mixed overall perception.

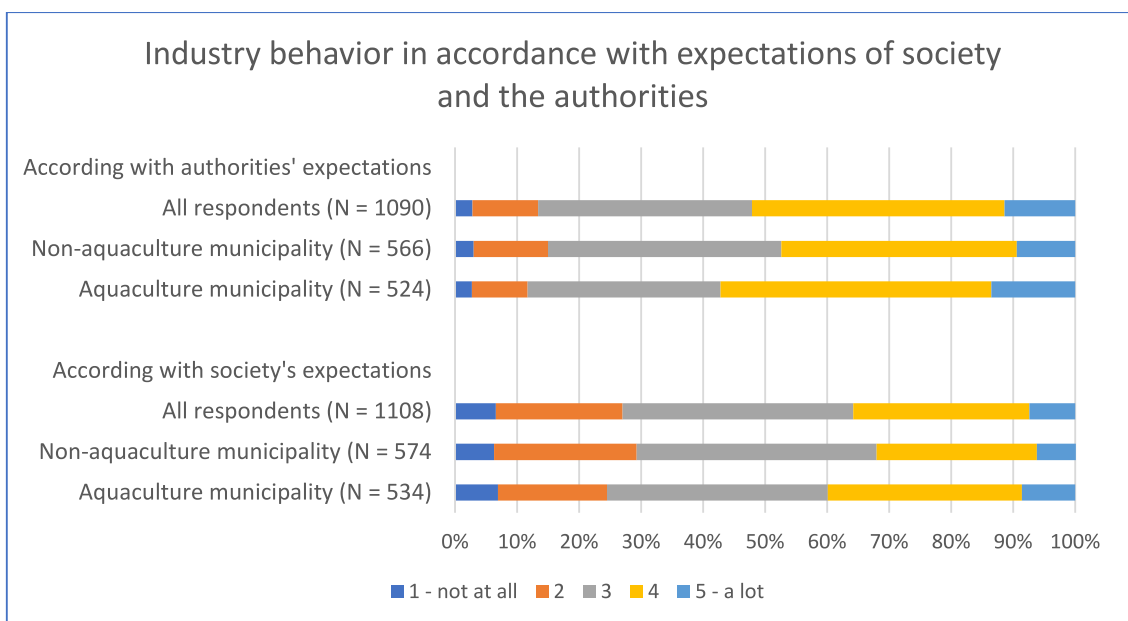


Fig. 10. The respondents' opinion of industry behavior in accordance with the expectations of society and the authorities ("To what extent do you find the industry is behaving in accordance with the expectations of the authorities / of society?").

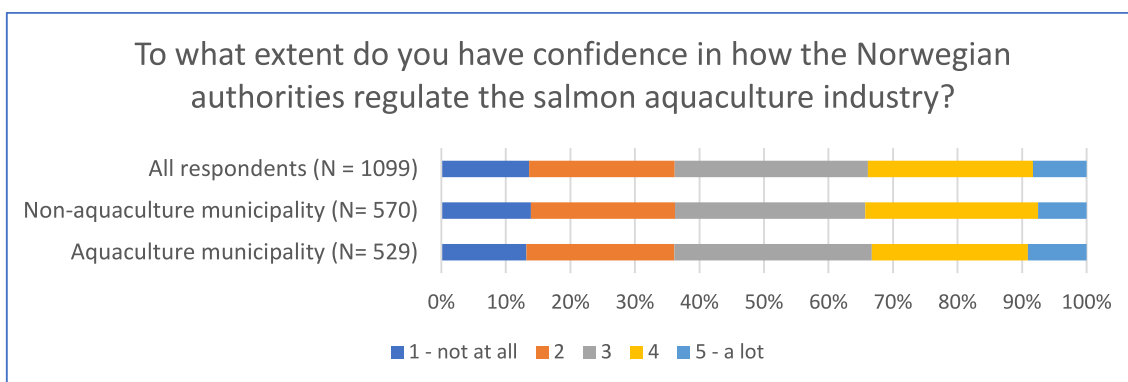


Fig. 11. The respondents' opinion of Norwegian authorities' regulation of the industry ("To what extent do you have confidence in how the Norwegian authorities regulate the salmon aquaculture industry?").

5. Discussion

This paper presents several important findings about public attitudes toward the Norwegian salmon aquaculture industry. It adds to previous studies investigating perceptions of salmon aquaculture and furthers our knowledge about societal acceptance of the industry's presence on the local and national levels. A key finding concerns how the general impression of the industry is quite positive overall, which is even more true among respondents living in an aquaculture municipality. This positive impression is notable because it differs from many other studies and opinion polls showing a decline in industry reputation. However, the last opinion poll carried out in Norway also showed an improvement in the public's evaluation of the industry (Intrafish.no, 2021), which may suggest a positive shift for salmon aquaculture in Norway. As emphasized by previous studies on perceptions of aquaculture (e.g., Krøvel et al., 2019; Whitmarsh and Palmieri, 2009), the general impression of the industry should be seen as a compound of several factors, and ultimately, a result of a process of weighing both negative and positive outcomes of the industry production and presence. Our finding implies that the overall positive general impression reflects that people perceived the industry contributing with positive aspects, as well

as confirming negative environmental impact from industry as an influential factor for societal support. In sum, the results showed favorable attitudes in relation to industry importance, acceptance, and tolerance. While respondents revealed greater variations in feeling proud of the industry, being confident about authorities' regulation of industry, and in welcoming production growth, they voiced clear negative opinions related to environmental sustainability, transparency, "fair" distribution of economic benefits, and to what extent industry behavior was in accordance with expectations from the authorities' and society.

In line with prominent media debates coverage of the industry (e.g., Cullen-Knox et al., 2021; Kraly et al., 2022; Olsen and Osmundsen, 2017; Schlag, 2011) and findings from previous studies of public attitudes (Hynes et al., 2018; Krøvel et al., 2019; Lindland et al., 2019), our results show that the respondents were concerned with environmental issues in general to a very high degree and that they to a lesser degree perceived the industry to be environmentally sustainable. As Krøvel et al. (2019) showed, environmental impact and perceived conflict are important predictors of attitudes toward aquaculture on a national level in Norway, while conflict and potential job creation appear to be more important in predicting attitudes in local communities with aquaculture

present. Concerning sustainability, our findings show that people residing in aquaculture municipalities were more likely to regard the industry as environmentally sustainable than those living in communities without aquaculture. One possible explanation is that respondents in non-aquaculture municipalities based their perceptions more on information accessible through news media than on direct experience or familiarity with the industry.

As we have demonstrated, the results support previous studies emphasizing how the industry's environmental impact has a negative influence on people's perceptions (Kraly et al., 2022). However, seeing as the general impression of the Norwegian salmon aquaculture industry is reported here to be quite positive, it is clear that industry-related benefits also play an influential role. The respondents emphasized that the industry contributes most with employment, food production, and increased business activity, which have benefits at the local, national, and global levels. However, it is likely that the direct benefits of employment have a greater impact on aquaculture municipalities than on communities without aquaculture. Interestingly, revenues directed to the state and municipalities were not highlighted as important contributions to the same extent. Nevertheless, many of the contributions emphasized by the respondents also indirectly contribute to economic benefits since job creation, food production, and increased business activity all generate at least some income for actors outside the industry. This could positively influence respondents' perceptions of the industry's contributions and behavior.

In contrast to Krøvel et al. (2019), we found no meaningful variation between respondents from municipalities with or without aquaculture in their assessment of industry contributions (Fig. 6), but we acknowledge that we measured differently than those authors in our study: we asked respondents to choose among pre-defined contributions without having to prioritize them or balance industry contributions against the industry's environmental impact). However, in line with Kraly (2019), Sinner et al. (2020) and other, our findings do suggest that in communities with aquaculture, the perception of potential industry contributions to local communities could still be more of an influencing factor than the environmental impacts from salmon production, as we found that respondents in aquaculture municipalities reported a more positive general impression of the industry than those living in municipalities without aquaculture and, as we discuss further below, respondents in aquaculture municipalities were more likely to perceive the industry as financially significant to their community.

The respondents deemed the industry to be very important and were aware of many of its potential economic benefits. However, they did not agree that economic benefits from industry are distributed fairly on either the local or national level. Notably, on the questions concerning distribution of economic benefits, there was a higher number of respondents answering, "I don't know", which could indicate that people had less knowledge of what the economic benefits of salmon aquaculture and/or how they are distributed. It can also be assumed that people have different opinions on what constitutes a "fair" distribution; thus, we only measured their opinions about the distribution as they are, without asking about their view on what might be a fairer distribution.

The issue of how economic benefits are distributed to local communities remains a persistent debate in Norway. Despite the industry's high profitability over a long period, coastal communities are seeking increased and more reliable economic benefits from facilitating aquaculture production in their areas. While regulations have been introduced to ensure that municipalities hosting aquaculture production receive economic gains through the national Aquaculture Fund, disputes persist regarding the volume of these benefits. The debate has also revealed a potential conflict between expectations regarding distributive justice at the national and local levels. As demonstrated by Åm (2021), discussions on the taxation of resource rents from Norwegian salmon aquaculture have exposed disagreements about who should receive those rents and whether there should be compensation for local communities hosting aquaculture and whether state revenues should be

shared with the wider public.

A comparison between respondents from aquaculture and non-aquaculture areas displays a general tendency of respondents living in municipalities with aquaculture to respond more positively to most questions about the industry. However, the results show that the differences in responses between these groups is not very large. On certain items, such as financial significance in local communities, the difference are more apparent. Financial significance is thus an important determinant for perceptions of aquaculture, but this is also relative to the presence of other business sectors in a given community (Whitmarsh and Palmieri, 2009).

Comparisons between respondents from aquaculture municipalities and those in non-aquaculture municipalities reveal that the former reported more favorable views of the industry's financial significance to their community. Notably, this difference in opinion stands out as the most prominent among all observed variations between the two groups of respondents. It is worth noting that the majority of respondents did not consider the aquaculture industry as financially significant to their local community; this is unsurprising because more than half of respondents were from municipalities without aquaculture. This finding underscores the potentially crucial role of financial significance in gaining support from communities, which previous studies have highlighted as an influential factor shaping attitudes toward the aquaculture industry, particularly when balancing socio-economic benefits with environmental impact (e.g., Krøvel et al., 2019; Whitmarsh and Palmieri, 2009).

The respondents view of the trade-offs between benefits and disadvantages of the aquaculture industry are also expressed through the question of whether the respondents would like to see more salmon production. The difference between the responses here can be interpreted as voicing a more reluctant attitude, possibly reporting a higher acceptance of the current industry production, but not an equal positive approval of increasing production. Despite respondents indicating a high level of acceptance of the industry, it is apparent that such acceptance does not equal support for further expansion. The reluctance toward growth may suggest a more passive form of acceptance rather than active support, as described by Billing (2018), who distinguishes between *acceptance* (a passive and not wholly positive behavior) and *support* (a more active recognition of the benefits). However, the key implication of these findings is that further improvements are necessary for increasing societal support and thus the industry's development and growth, particularly regarding environmental and social sustainability. Lindland et al. (2019) indicate that the desires for expansion by the aquaculture industry, coupled with the need for suitable space and high-quality waters, are expected to generate conflicts in coastal regions. The issue at stake for enabling this growth is sustainability. This presents a significant challenge, as sustainability is subject to varying interpretations, potentially leading to divergent preferences concerning trade-offs and underlying values. Environmental concerns have been central to both sustainability perceptions and regulatory measures. However, incorporating social and economic dimensions is critical for achieving truly sustainable growth, as evidenced by respondents' reluctance to support growth despite their generally positive perceptions of the industry and its overall importance.

Seen together with respondents' reluctant attitudes toward further expansion, it is unsurprising that the respondents perceived the industry's behavior as more aligned with authorities' expectations than with society's. This finding suggests that the respondents viewed society's expectations as more demanding than those of the Norwegian authorities. Although the observed differences in attitudes are small, respondents from aquaculture municipalities are more positive in their perception of whether the industry fulfills the expectations of both authorities and society, compared to people living in communities without aquaculture. These respondents in aquaculture areas perceive to a larger extent that the industry meets the demands expressed by the authorities (e.g., complying with regulation), but also those of society, which could

be due to their familiarity with the industry's contributions and importance to local community. Additionally, it may indicate differences in expectations between aquaculture municipalities and non-aquaculture municipalities, resulting in differences in perceptions of whether the industry complies.

Regarding regulatory trust, the findings indicate that, despite reporting a high level of confidence in the Norwegian governance system overall, respondents did not exhibit the same level of confidence in how the authorities regulate the aquaculture industry. This suggests that they see that meeting the requirements of public regulation as not sufficiently demanding, implying that current regulations are inadequate or are being enforced in an inadequately manner. This observation could also reflect a lack of trust, which could be attributed to either the industry's or the regulatory authorities' performance. Even though the Norwegian regulatory regime for salmon aquaculture is comprehensive, the industry needs to comply with higher standards than those required through regulation, in order to achieve and maintain a social license (Billing, 2018; Gunningham et al., 2004).

Seeing this together with the findings in this paper, it is apparent that context plays an important role in shaping community expectations of aquaculture production, though they will vary across communities. Such differences could be related to industry profitability, the transparency of benefits for the community, and the type of ownership and historical context of the companies in the community (e.g., the extent of ripple-effects in local and nearby communities), as well as contextual factors concerning the community as a whole. Data on these factors have not been included here, but other studies have found that these factors influence attitudes and thus social acceptance (Aanesen and Mikkelsen, 2020; Whitmarsh and Palmieri, 2009). Further investigation of variations in attitudes and geographical context would benefit from adding supplementary data on these (and other) elements.

The analysis reveals that respondents residing in aquaculture municipalities report higher levels of knowledge about the industry compared to those living in municipalities without aquaculture. This finding suggests that the presence of the industry contributes to increased knowledge levels. However, it is also possible that easier access to information sources, such as media coverage, may explain this difference. Prior research of media coverage indicates that topics of salmon aquaculture industry are frequently discussed in regional newspapers (Olsen and Osmundsen, 2017), indicating that information about the industry is more accessible for people living in aquaculture municipalities and regions with aquaculture. This is further supported by our findings on transparency, implying that the industry is perceived as more transparent when the industry is visible in people's local community, e.g., through local media or through direct contact with the industry.

Improving public knowledge about the aquaculture industry and its production processes is crucial for fostering positive perceptions of the industry and its products (Bacher et al., 2014), and has implications at both the national and global levels. However, as previous studies on social license and social acceptance have demonstrated (Alexander, 2022), engaging in dialogue with stakeholders and communities can be a challenging task, particularly when an industry is controversial. Despite this, given Norway's position as a leading producer of salmon, it is imperative to improve the public's knowledge of the industry. Improving public knowledge about aquaculture production may be easier in communities with aquaculture due to proximity to production sites, greater prominence of industry issues in regional media (compared to national media), the visibility of direct contributions such as job creation and economic benefits, and increased opportunities for industry actors to engage in dialogue with local citizens. However, the industry should also actively seek to increase knowledge about the industry and its potential significance and impact among a broader audience beyond the communities in which it operates. Such knowledge is also dependent on being perceived as transparent and trustworthy, issues also important to emphasize by the industry.

Studying perceptions of the wider public is necessary to broaden the picture of what is important for acquiring a social license. In terms of salmon aquaculture in Norway, the industry is situated along the coast and in many different communities, including both small, rural areas and larger cities. Following this, and in line with previous studies, it is important to emphasize that there will be a variety of stakeholders and community groups included in what we refer to as society and the public, and they will have different criteria for granting a social license. However, these groups do not have equal influence (Kelly et al., 2017). Nevertheless, the use of the commons needs to be conducted in such a way that meets society's expectations. Because aquaculture is a major export industry in Norway, expectations of industry contributions will also exist on a national level, such as reallocation of economic benefits to the entire country, regardless of whether a given locality is geographically situated so as to take part in the industry. These issues speak to concerns about distributive justice and influence industry and regulatory legitimacy and trust. All of these are key aspects for achieving societal support.

In sum, our findings signal that improvements are necessary in terms of industry impact on the environment, distribution of economic benefits, transparency, and regulation. As pointed out by previous research, communication and dialogue could be important tools to improve public knowledge and understanding of industry activity (Alexander, 2022; Chu et al., 2010; Condie et al., 2022b; Hynes et al., 2018), even though it is potentially challenging to meet all stakeholders' concerns, if, for example they are related to identity (Bailey and Eggereide, 2020), scientific uncertainty (Hynes et al., 2018), and/or incompatible expectations such as what constitutes a fair distribution of benefits and to whom they should be directed (Åm, 2021). As Lindland et al. (2019) note, different perceptions also reflect different ways of viewing reality. Hence, within the same contextual (i.e., geographic) location, different segments of the public could perceive sustainability differently and have different expectations of the industry. Thus, contextual factors and the degree of acceptance and societal support of industry production may vary, perhaps widely. Weitzman (2022) found a complex discourse around salmon farming that was strongly linked to different local contexts. To further improve our understanding of public perceptions and important determinants, we suggest a more in-depth exploration of potential geographical variations in expectations of the aquaculture industry. Combining data on industry significance in communities and perceptions of the industry could be one possible approach for further studies. As observed in the present study, expectations might vary between communities including municipalities with aquaculture production, independent of their size and the industry's impact on and visibility in the community. It would therefore be useful to further investigate how perceptions in these communities will vary according to industry significance relevant to value creation, size of production, financial return from the Aquaculture Fund, and so on. Especially in Norway, where the industry is present in almost half of the country's municipalities but with large variations in terms of impact and visibility, the results presented here show that contextual factors could provide important insights into variations in public perceptions of what is deemed important for obtaining a social license. Expanding on these results with a more detailed understanding of contextual variations could prove fruitful.

CRediT authorship contribution statement

Marit Schei Olsen: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization. **Vilde Steiro Amundsen:** Conceptualization, Methodology, Investigation, Writing – original draft. **Tonje C. Osmundsen:** Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Supervision, Project administration, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be available on website, and in a separate data paper

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Appendix A

Table 1
Geographical distribution of respondents, per county.

County	N	Percent
Viken	69	5,8
Oslo	61	5,2
Innlandet	61	5,2
Vestfold og Telemark	68	5,7
Agder	75	6,3
Rogaland	139	11,7
Vestland	211	17,8
Møre og Romsdal	73	6,2
Trøndelag	140	11,8
Nordland	84	7,1
Troms og Finnmark	202	17,1

Table 2
Distribution of respondents living in municipalities with or without aquaculture, on gender, education level, and area of residency. Numbers presented in frequency and percent (of total N for each group).

	Aquaculture municipality	Non-aquaculture municipality
Gender:		
Male	309 (54,7%)	304 (49,2%)
Female	256 (45,3%)	314 (50,8%)
Education:		
Primary and lower secondary school (1–10)	20 (3,5%)	22 (3,6%)
Upper secondary school (11–13)	178 (31,5%)	139 (22,5%)
College/University (Bachelor)	251 (44,4%)	281 (45,5%)
College/University (Master or higher)	116 (20,5%)	176 (28,5%)
Area of residency:		
Large city	122 (21,6%)	289 (46,8%)
Small city	206 (36,5%)	125 (20,2%)
Densely populated area	111 (19,6%)	132 (21,4%)
In the country (rural area)	126 (22,3%)	72 (11,7%)

Table 3
Overview of all survey questions, and descriptive statistics.

Descriptive statistics – survey questions				
Question	N	Mean	Std. deviation	Median
What is your gender? (percent)	51,8%			
- Male	48,2%			
- Female				
What is your age? (scale)	1183	46,64	13,196	47
What would you estimate your household's total broken income at per year? (total income before taxes and deductions) (percent)	5,6%			
- Up to 300,000 NOK	10,9%			
- 300,000–499,999 NOK	23%			
- 500,000–799,999 NOK	18,4%			
	27,4%			

(continued on next page)

Table 3 (continued)

Descriptive statistics – survey questions				
Question	N	Mean	Std. deviation	Median
- 800,000–999,999 NOK	8,3%			
- 1,000,000–1 499,999 NOK	4,2%			
- 1 500,000 NOK or more	2,2%			
- Do not want to state income				
- I don't know				
What is your highest education? (percent)				
- Primary and lower secondary school (1–10)	3,6%			
- Upper secondary school (11–13)	26,8%			
- College/University (Bachelor)	45%			
- College/University (Master or higher)	24,7%			
How many people in your household? (percent)				
- 1 person	16,7%			
- 2 persons	33,6%			
- 3 persons	16,2%			
- 4 persons	22,6%			
- 5 persons	8,2%			
- 6 persons	1,9%			
- 7 persons	0,4%			
- 8 persons	0,2%			
- 9 persons or more	0,3%			
How many children under the age of 18 living at home are in the household? (percent)				
- No children	50,1%			
- 1 child	15,5%			
- 2 children	19,4%			
- 3 children	6,7%			
- 4 children	1,9%			
- 5 children	0,4%			
- 6 children or more	0,2%			
- Missing / no answer	5,7%			
Where do you live? (percent)				
- Large city	34,7%			
- Small city	28%			
- Densely populated area	20,5%			
- In the country (rural area)	16,7%			
On a scale from 1 (not very easy) to 5 (very easy), how easy is it to find information about the salmon aquaculture industry?	936	2,79	1,094	3
Where do you get your information about the aquaculture industry from? (select up to 3 responses from below)				
- TV				
- Radio				
- Printed newspaper/magazines	593			
- Internet – new sites	146			
- Internet – social media	413			
- Internet – company websites/information	711			
- Family /friends/colleagues	286			
- Other – (comments)				
- None of these / I don't know	145			
	207			
	115			
	82			
On a scale from 1 (not at all) to 5 (a lot), to what extent do you perceive the Norwegian salmon aquaculture industry as.. transparent?	1044	2,76	1,045	3
On a scale from 1 (not at all) to 5 (a lot), to what extent do you perceive the Norwegian salmon aquaculture industry as.. trustworthy?	1094	3	1,1	3
On a scale from 1 (not very positive) to 5 (very positive), what is your general impression of the Norwegian salmon aquaculture industry?	1141	3,21	1,075	3
On a scale from 1 (not very important) to 5 (very important), how important do you think the salmon aquaculture industry is for Norway?	1141	4,21	0,954	4
Which of these elements do you think the industry contributes the most with? (Please select as many as you think apply) See Table 4.				
All in all, on a scale from 1 (not very fairly) to 5 (very fairly), to what extent do you find that the economic benefits from Norwegian salmon aquaculture industry are distributed fairly, on a council level?	833	2,47	1,066	3
All in all, on a scale from 1 (not very fairly) to 5 (very fairly), to what extent do you find that the economic benefits from Norwegian salmon aquaculture industry are distributed fairly, on a state level?	813	2,56	1,071	3

(continued on next page)

Table 3 (continued)

Descriptive statistics – survey questions				
Question	N	Mean	Std. deviation	Median
On a scale from 1 (not very sustainable) to 5 (very sustainable), to what extent do you perceive the Norwegian salmon aquaculture industry as environmentally sustainable?	1081	2,57	1,117	3
In your opinion, in which areas should the industry become more sustainable? (comment field)				
On a scale from 1 (not at all) to 5 (a lot), to what extent do you find that the industry is behaving in accordance with... The expectations of society?	1108	3,1	1,02	3
On a scale from 1 (not at all) to 5 (a lot), to what extent do you find that the industry is behaving in accordance with... The expectations of the authorities?	1090	3,47	0,927	4
On a scale from 1 (not very confident) to 5 (very confident), to what extent do you have confidence in how the Norwegian authorities regulate the salmon aquaculture industry?	1099	2,92	1,162	3
On a scale from 1 (not very sustainable) to 5 (very sustainable), to what extent do you think that Norwegian salmon is produced in a sustainable manner, when you consider social, economic and environmental aspects?	1093	2,79	1,139	3
On a scale from 1 (not a lot) to 5 (a lot), do you tolerate salmon aquaculture production in Norway?	1155	3,74	1,157	4
On a scale from 1 (not a lot) to 5 (a lot), do you accept salmon aquaculture production in Norway?	1154	3,78	1,148	4
On a scale from 1 (not a lot) to 5 (a lot), would you like to see more salmon aquaculture production in Norway?	1088	2,96	1,343	3
On a scale from 1 (not a lot) to 5 (a lot), are you proud of Norwegian salmon aquaculture production?	1130	3,14	1,307	3
On a scale from 1 (not a lot) to 5 (a lot), to what extent do you find that the salmon aquaculture industry has a financial significance for your local community?	1082	2,36	1,34	2
On a scale from 1 (not a lot) to 5 (a lot), how much confidence do you have in the Norwegian governance system?	1051	3,25	1,087	3
On a scale from 1 (not a lot) to 5 (a lot), how concerned are you with environmental issues?	1121	3,91	0,931	4
On a scale from 1 (not a lot) to 5 (a lot), how knowledgeable are you about Norwegian aquaculture industry?	1119	2,9	1,016	3

Table 4

Industry contributions – comparison between respondents in aquaculture municipalities (N = 565) and non-aquaculture municipalities (N = 618).

Industry contributions – comparison between respondents				
Industry contribution	Respondents from aquaculture municipalities (N = 565)		Respondents from non-aquaculture municipalities (N = 618)	
	Percent	Frequency	Percent	Frequency
Employment	73,8	417	72,0	445
Robust communities	44,8	253	45,6	282
Municipal revenues	41,6	235	40,6	251
State revenues	29,7	168	29,2	183
Increased business activity	48,8	276	45,8	283
Technology development and innovation	26,2	148	22,7	140
Food production	67,6	382	68,0	420
Other	2,3	13	1,9	12
None of these/little value	1,6	9	1,8	11

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