Report

Social acceptance for salmon produced in new production systems

Report on willingness to pay for new production systems and social acceptance of salmon farming in general

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SUMMARY

This report summarizes the findings from a price experiment survey on the willingness to pay (WTP) for salmon produced using new production systems in salmon farming in three countries (Norway, Canada and Scotland). This includes land-based, floating closed containment cages and offshore production systems.

The results revealed that consumers preferred salmon produced using conventional (traditional) systems rather than new production systems. Regarding social acceptance, respondents stated they agreed that the environmental issues were problematic, while the economic contributions were considered as positive.

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1 Introduction

Aquaculture has experienced an enormous increase in production over the last few decades. While several species are produced globally (FAO, 2022), the majority of Atlantic salmon (*Salmo salar*) is produced in five countries, which accounts for approximately 90% of the total production. In terms of sheer production volume, Norway, Chile, The UK, Canada and the Faroe Island are the largest producers of salmonids (Pandey et al., 2023). However, the production growth and expansion of aquaculture has not been without conflict and controversy. Over the years, the salmon industry has faced criticism (Olsen and Osmundsen, 2017; Osmundsen and Olsen, 2017), and controversies often focusing on the environmental impact and fish welfare. Environmental concerns have become one of the major obstacles hindering further expansion and growth in the industry. Regulatory mechanisms, such as the traffic light system in Norway (Sønvisen and Vik, 2021), the ban of open net pens in British Columbia, Canada (Government of Canada, 2024), and the notification of more stringent environmental regulations in Scotland (The Scottish Government, 2023), are examples of constraints. In turn, the salmon farming industry is becoming more technologically diverse, and alternative production systems for producing market-size salmon are emerging (Føre et al., 2022; Misund et al., 2024). These developments include offshore salmon farming, closed floating cages and land-based salmon farming.

New production systems are designed to address some of the environmental challenging facing the salmon farming industry. However, despite this goal, it remains uncertain if these system will fully resolve the issues and some drawbacks may still persist (Misund et al., 2024; Misund and Thorvaldsen, 2022). This uncertainty is critical, as previous research suggests that environmental performance can significantly influence consumer behaviour and preferences (Whitmarsh and Palmieri, 2011). This report is based on data from an experimental online survey which was conducted to explore whether consumers are willing to pay (WTP) more for salmon produced using new production technologies, including offshore systems, floating closed containment systems, and land-based salmon farming. The survey has also examined publics attitudes and beliefs toward salmon farming in Norway, Canada and Scotland.

The objective of the report is to explore whether consumers are willing to pay more for salmon produced using new production systems. Perceptions and attitudes toward the salmon farming industry in Norway, Canada, and Scotland will also be presented. Thus, this study examines the social acceptance of salmon farming, focusing on willingness to pay and the general attitudes toward from a comparative perspective.

This report is a part of the research project: *Opportunities and challenges with innovations in aquaculture production systems (Compareit*), a competence and collaborative project financed by The Research Council of Norway, project number 319647 (2021-2024). The primary objective of COMPAREIT is to *provide knowledge of challenges and opportunities related to new aquaculture production systems with the aim of a sustainable development and regulation of the industry.* This report provides a summary of the findings in WP4 – Social acceptance and willingness to pay (WTP) and is structured into six sections. The first section presents the aim and scope of the survey. In section two, the methodological approach is described, including sample distribution and selection. Section four presents the results from the analysis, followed by a brief discussion and summary in section five.

1.1 Background - different production technologies

In the salmon farming industry, multiple new production technologies are being deployed and implemented to address some of the environmental impact linked to open net cages. A brief description of the different systems will here be presented.

Land-based salmon farming involves the production of salmon in tanks on land. These systems use either Recirculatory Aquaculture Systems (RAS), with 90-99% reuse of water, or a flow through systems (FTS) where water is continuously exchanged. Additionally, some salmon farmers use a hybrid system that reuses 60% of the water (Misund et al., 2024). Land-based salmon farming is complex in terms of operations and technology, involving water treatment systems, biosecurity measures, the exchange of massive water volumes and extensive infrastructure requirements (this list is not exhaustive).

Floating closed cages are cages with impermeable walls creating a barrier between the external marine environment and the internal cage environment. Closed systems also have technologies that exchange and circulate the water within the cage structure, while most also feature waste and nutrient collection and treatment (Føre et al., 2022; Misund et al., 2024). There is a wide variety of different closed cage designs, that uses different building materials and technologies for water and waste treatment. These systems are often placed at inshore sites.

Offshore or open ocean salmon farming aims to produce salmon at sites farther out at sea. These systems often consist of large structures, and some are designed to have open net cages, while others are designed to be submerged or partially closed (Bjelland et al., 2024; Føre et al., 2022). The structures are built to withstand harsher weather conditions that can occur farther out to sea.

2 Method

To explore consumers' willingness to pay for new production systems, an experimental survey was conducted by YouGov in Norway, Scotland and Canada. Additionally, the survey examined social licence aspects such as attitudes toward social, economic and environmental factors in salmon farming. The following section will describe the methodology used.

2.1 Survey design

The survey was split into three main parts: 1) price experiment, 2) social acceptance and 3) general knowledge about aquaculture. The experimental survey was developed based on previous studies and news articles about different obstacles or benefits of new production systems. Three price experiments were included in the questionnaire, with one experiment per production system (land-based, floating closed cages and offshore), alongside conventional salmon farming. The first section of the survey included the price experiments, with descriptions describing the benefits and drawbacks of each production system.

Since some of the production systems are still under development, and most people are not familiar with these production systems, we made descriptions to familiarize the survey participants with the systems (see appendix 1 for vignettes). The descriptions contained a short explantion of the production systems, including potential benefits and drawbacks. The descriptions were developed using results from WP1 of the Compareit project, which focused on the challenges and opportunities within each of the production systems (Misund and Thorvaldsen, 2022). In addition to input from WP1, statements regarding benefits and drawbacks of the different production systems in media and research articles was also included.

The prices for the experiment were based on the prevailing prices for salmon in supermarkets in each country. The price refers to 200 grams of salmon.

Table 1: Overview over prices between countries and panels.

	Production system	Panel 1	Panel 2
Norway	Conventional	NOK 79,99	NOK 79,99
	Land-based	NOK 79,99	NOK 99,99
	Closed cages	NOK 79,99	NOK 99,99
	Offshore	NOK 79,99	NOK 99,99
Scotland	Conventional	£4,99	£4,99
	Land-based	£4,99	£6,59
	Closed cages	£4,99	£6,59
	Offshore	£4,99	£6,59
Canada	Conventional	$9,99	$9,99
	Land-based	$9,99	$11,99
	Closed cages	$9,99	$11,99
	Offshore	$9,99	$11,99

Whether new production systems in aquaculture will be successful depends on a number of factors, including social acceptance and trust. These factors are crucial when new technology for food production is developed, as they may affect public acceptance of these technologies and resulting products (Siegrist, 2008). Thus, questions regarding acceptance of new aquaculture productions systems and trust in producers offering these systems were asked. These questions were derived from a previous quantitative study on salmon farming (Weitzman et al., 2022) which studied factors shaping public opinion about salmon aquaculture, especially in terms of social acceptance and environmental concerns. The study found that trust in the industry and environmental performance were crucial factors affecting public acceptance.

Finally, the last part of the survey asked about their general knowledge about aquaculture production and the aquaculture industry. See appendix 1 for an overview of the survey. As the survey was to be distributed in Canada and Scotland, the survey was translated into both French and English by. Before distributing the survey, the survey underwent pilot-testing to secure the quality of it.

2.2 Data collection and analysis

The survey was conducted by YouGov, an international polling company[1]. YouGov used online panels to conduct the survey between May 6th and May 21st, 2024, in Norway, Scotland and Canada. The data was analyzed with SPSS (Version 29.0.2.0 (20)), and Excel (Version 2408) for visualizing graphs and diagrams.

[1] https://today.yougov.com/

SPSS was employed to systematize and recode certain variables and for descriptive analysis, such as crosstabulations. The output was later on exported to Excel for further analysis and visualization.
The sample in each country was divided into two panels. A choice experiment is a survey-based method that allows us to analyze preferences by presenting respondents with hypothetical scenarios or choices, each defined by specific attributes. This allows us to explore the trade-offs consumers are willing between different products with different attributes. In a CE, social acceptance and trust is central as consumer choices are affected by how they perceive and select among different options. This is especially relevant when dealing with new and unfamiliar products or technologies (Siegrist, 2008).

The Canadian survey resulted in a total of 1,547 respondents, of whom 787 respondents were female and 760 respondents were male. Respondents in the survey sample were allocated into two different panels: Panel 1 (n=771) and Panel 2 (n=776).

The Scottish survey resulted in a total of 1,540 respondents, of whom 798 respondents were female and 742 respondents were male. Respondents in the survey were allocated into two different panels: Panel 1 (n=768) and Panel 2 (n=772).

The Norwegian survey resulted in a total of 1525 respondents, of whom 758 respondents were female and 767 respondents were male. Respondents in the Norwegian survey were allocated into two different panels: Panel 1 (n=764) and Panel 2 (n=761). A total of 4,612 respondents (n) are included in the study.

Table 2: Overview over sample from all countries. Norway n=1525, Canada n=1547, Scotland n=1540.

Sample selection - Norway			**Sample selection - Canada**			**Sample selection - Scotland**		
Gender	Female	49,7%	**Gender**	Female	50,9%	**Gender**	Female	51,8%
	Male	50,3%		Male	49,1%		Male	48,2%
Age	18-29	19,2%	**Age**	18-29	16,4%	**Age**	18-29	17,5%
	30-39	17,3%		30-39	18%		30-39	17,9%
	40-49	16,5%		40-49	15,6%		40-49	16,2%
	50-59	16,8%		50-59	16,5%		50-59	14,5%
	60+	30,2%		60+	33,6%		60+	33,9%

As Table 2 shows, the sample selection is almost identical across the countries. This includes the balance between the panels, gender and age groups. It should be noted that the 60+ groups is over 30%. However, this is due to that specific category spanning from 60 years to 90 years, almost three decades longer than the other age categories.

2.3 Representativity

YouGov uses active sampling when conducting surveys. Respondents are selected from a panel of registered users in each country, meaning only invited individuals can participate in the survey. The data is also statistically weighted by age, gender, social class, region and level of education[2].

3 Results

The first part of the results section presents attitudes and perceptions towards salmon farming in general and the second part presents the WTP results.

3.1 Consumption of farmed salmon

First, to set the stage, whether respondents eat farmed salmon or not is likely to affect their knowledge and attitudes towards salmon farming. Respondents were asked whether they eat farmed salmon or not. Of the Norwegian respondents, 61.7% stated they consumed farmed salmon, while between 36-37% of the Scottish and Canadian respondents said the same. However, it should be noted that 18% in Scotland and 23% of respondents Canada stated that they did not know if they are eating farmed salmon, while 11% of the Norwegian sample gave the same response.

Table 3: Number of respondents eating farmed salmon in Norway, Scotland and Canada.

Do you eat farmed salmon?	*Norway*		*Scotland*		*Canada*		*Total*
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**
Yes	941	61.7%	573	37.2%	564	36.5%	2078
No	414	27.1%	682	44.3%	613	39.6%	1709
Don't know	170	11.2%	285	18.5%	370	23.9%	825
Total	n=1525	100.0%	n=1540	100.0%	n=1547	100.0%	n=4612

[2] https://yougov.co.uk/about/panel-methodology

3.2 General perceptions of salmon aquaculture

Respondents were then presented with various statements regarding salmon farming. The statements included topics such as environmental impacts, economic benefits, and effects on other industries. Respondents were asked to rate the statements on a five-point scale from 1 – Completely disagree to 5 – Completely agree. With a "Don't know/ Don't wish to answer" option also provided.

3.2.1 Environmental effects

Perhaps the most contentious and debated concerns surrounding aquaculture pertain to the environmental impacts associated with the use of open net cages. Even though attention to specific environmental issues can vary among salmon-producing country, the industry faces many of the same challenges in each country. Salmon lice, escapes and disease outbreaks/transfers are among the primary concerns, along with the release of nutrients and organic matter.

Pollution

When asked whether they agreed that aquaculture caused marine pollution, 52.2% of Norwegian respondents agreed or completely agreed with this statement, compared to a more modest 34.6 % and 34.2 % for Scotland and Canada, respectively (Figure 1).

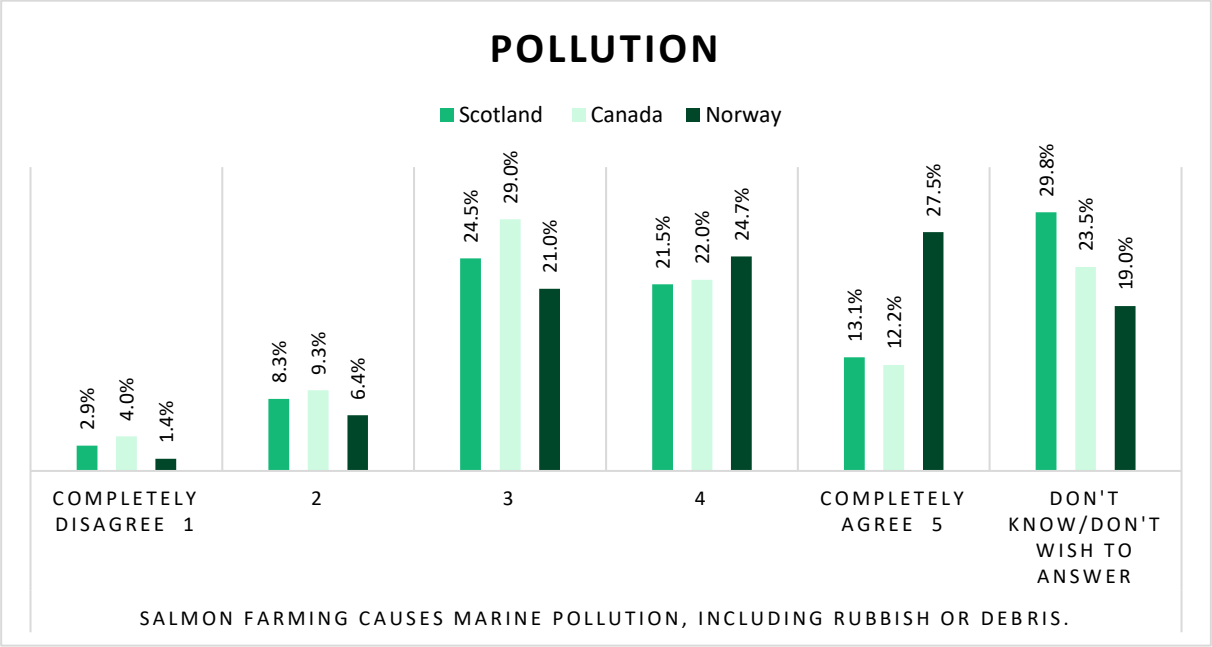

Figure 1: Perception of aquaculture pollution in Scotland, Canada and Norway.

Marine habitat

Open net aquaculture has the potential to affect the local marine environment and seabed beneath the fish farms. Organic matter (nutrients, excess feed, etc.) is released and dispersed by ocean currents. However, sites with insufficient current flow-through may experience an accumulation of organic matter beneath the open cages (Taranger et al., 2015). In the survey, respondents were asked whether they agreed that salmon farming could have a negative effect on the marine habitat (Figure 2).

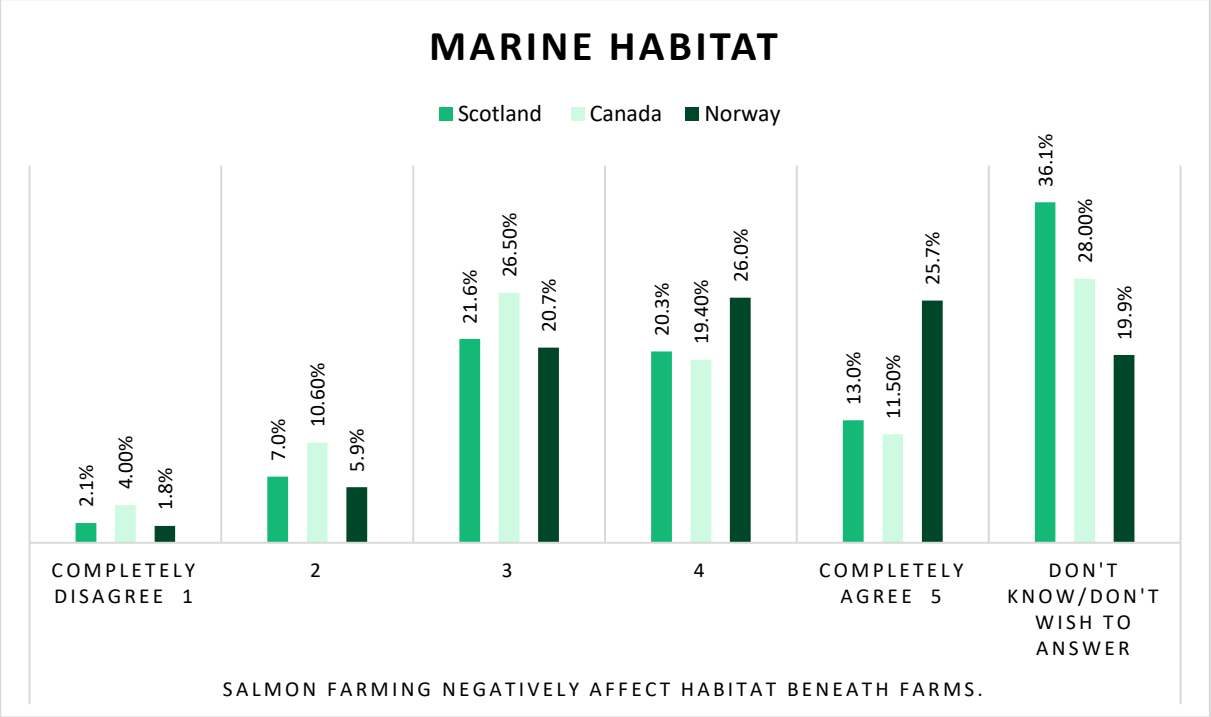

Figure 2: Perception of aquaculture effect on marine habitat in Scotland, Canada and Norway.

A total of 51.7% of Norwegian respondents either agreed or completely agreed with the statement that aquaculture negatively affects habitat beneath the farms. The number of Scottish and Canadian respondents stating that they agreed or completely agreed were 33.3 and 30.9%, respectively. Meanwhile, 36.1 and 28 % of Scottish and Canadian respondents stated they did not know or did not wish to answer.

Diseases and parasites

Respondents was also asked whether they agreed that salmon farming spread diseases and parasites. A total of 55% of respondents from Norway stated that they agreed or completely agreed with this statement. In comparison, 33% of Canadian and 35.3% of Scottish respondents agreed or completely agreed. Similar to responses on other environmental issues, 33% of Scottish and 26.8% of Canadian respondents stated they didn't know or didn't want to answer (Figure 3).

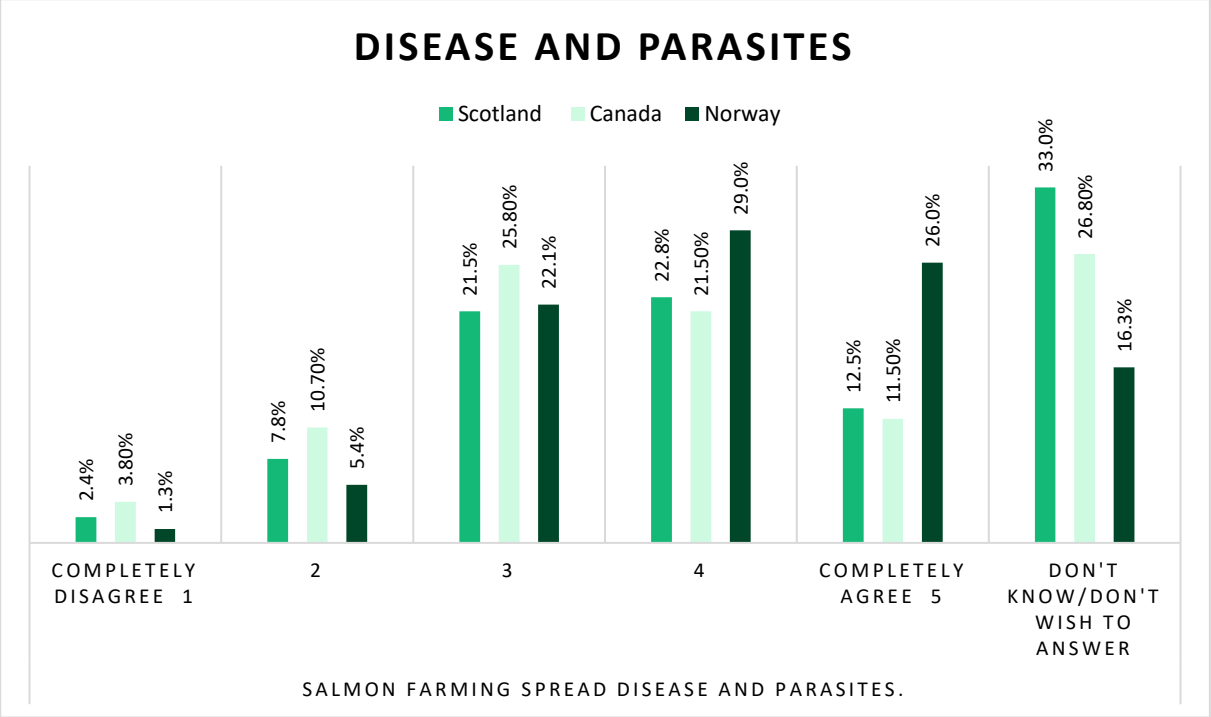

Figure 3: Perception of dispersion of diseases and parasites in the aquaculture industry.

Wild salmon population

Another environmental impact often regarded as controversial include the escape of farmed salmon and the potential negative effects of this on wild salmon population. Over half of the Norwegian respondents (52.6%) agreed or completely agreed that salmon farming negatively affects wild salmon populations. In contrast, only 31% of Scottish and 34.1% Canadian respondents answered that they agreed or completely agreed. However, 33.3% of Scottish and 24,4% of Canadian respondents answered, “don’t know/don’t wish to answer” (Figure 4).

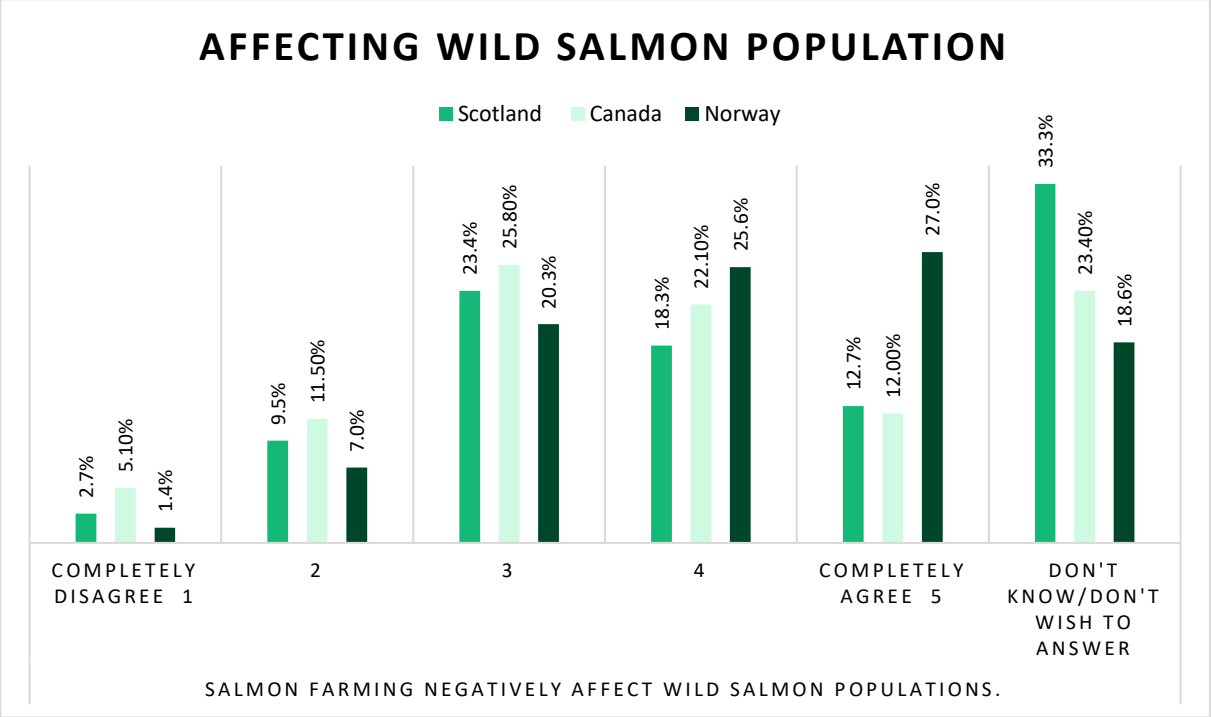

Figure 4: Perception of escaped salmon affecting wild salmon.

Protected and sensitive species

Yet another environmental question asked was whether the respondents felt that salmon farming affected protected or sensitive species. Forty-four percent of the Norwegian respondents agreed or completely agreed to this statement, while the number was 28.2% of the Scottish and 30.5% of the Canadian respondents. Again, the share of respondents that did not know or did not want to answer was rather high, with 36.1% of Scottish respondents and 25.9% of Canadian respondents answering this. I should also be noted that between 22.7 and 25.2% of the respondents answered “neither/nor” (category 3) on this for this statement, across the three countries (Figure 5).

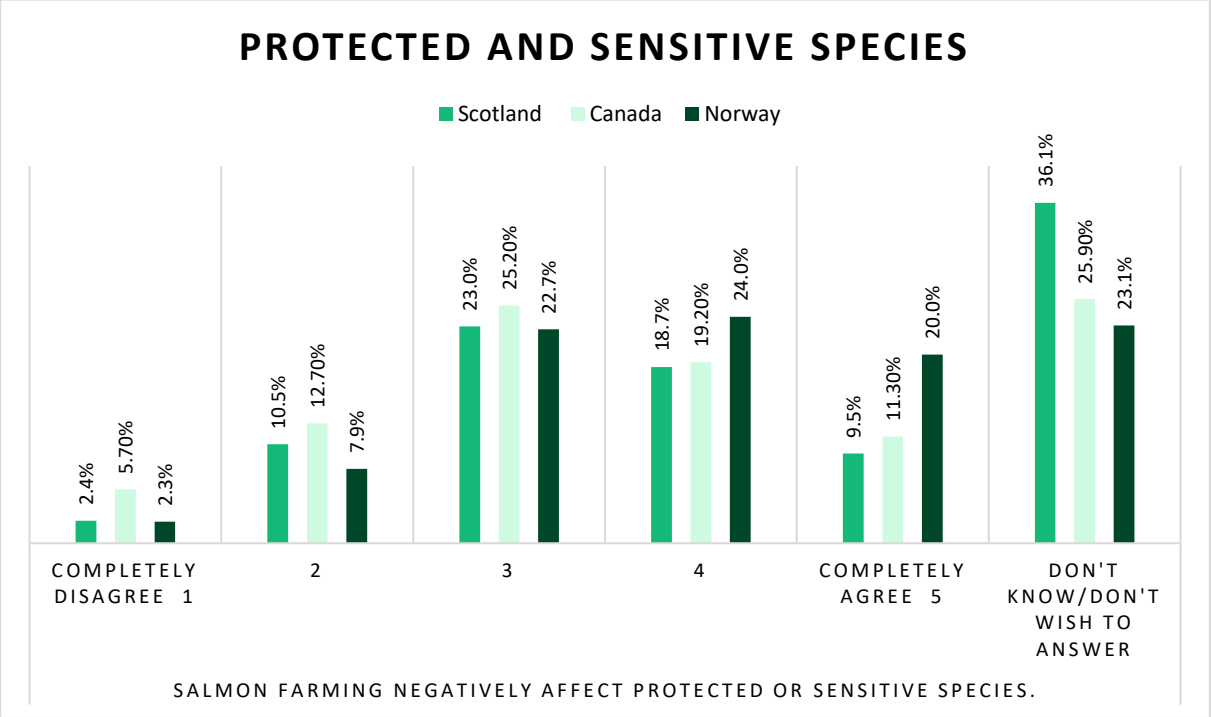

Figure 5: Perception on whether aquaculture negatively affects protected and sensitive species.

3.2.2 Effects on other stakeholders

Parts of the survey also focused on the relationship between salmon farming and society. In particular, we examine how salmon farming may affect other stakeholders in coastal areas.

Marine tourism

Regarding whether salmon farming negatively affects marine tourism, there were no major differences between the countries (Figure 6). Many respondents from all three countries answered “neither/nor”, or “don’t know/don’t wish to answer “on this statement. Apart from this, the answers were fairly evenly distributed between agree/completely agree and disagree/completely disagree, across the three countries.

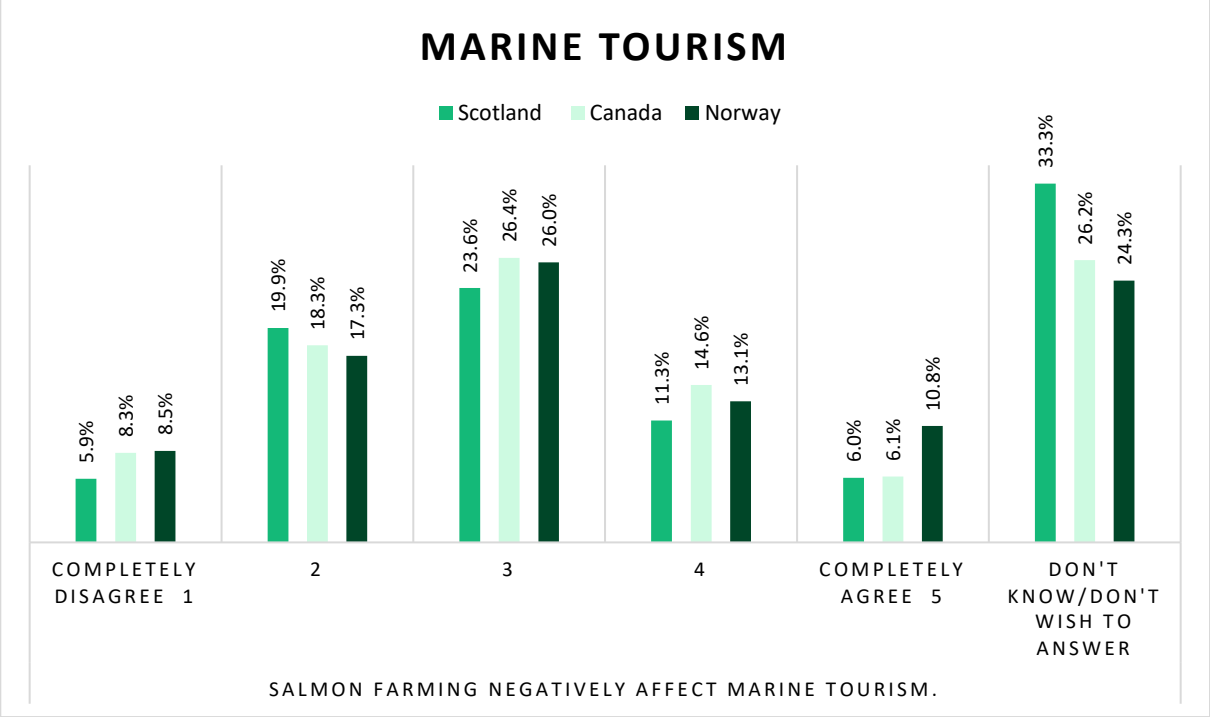

Figure 6: Effects of salmon farming on marine tourism.

Visual character of the coast

The respondents were also asked whether they agreed that salmon farming facilities and sites negatively affected the visual character of the coast. The Norwegian sample was more inclined to agree or completely agree (38.8%) that salmon farming causes visual pollution compared to Scottish (21.5%) and Canadian (24.8%) respondents (Figure 7).

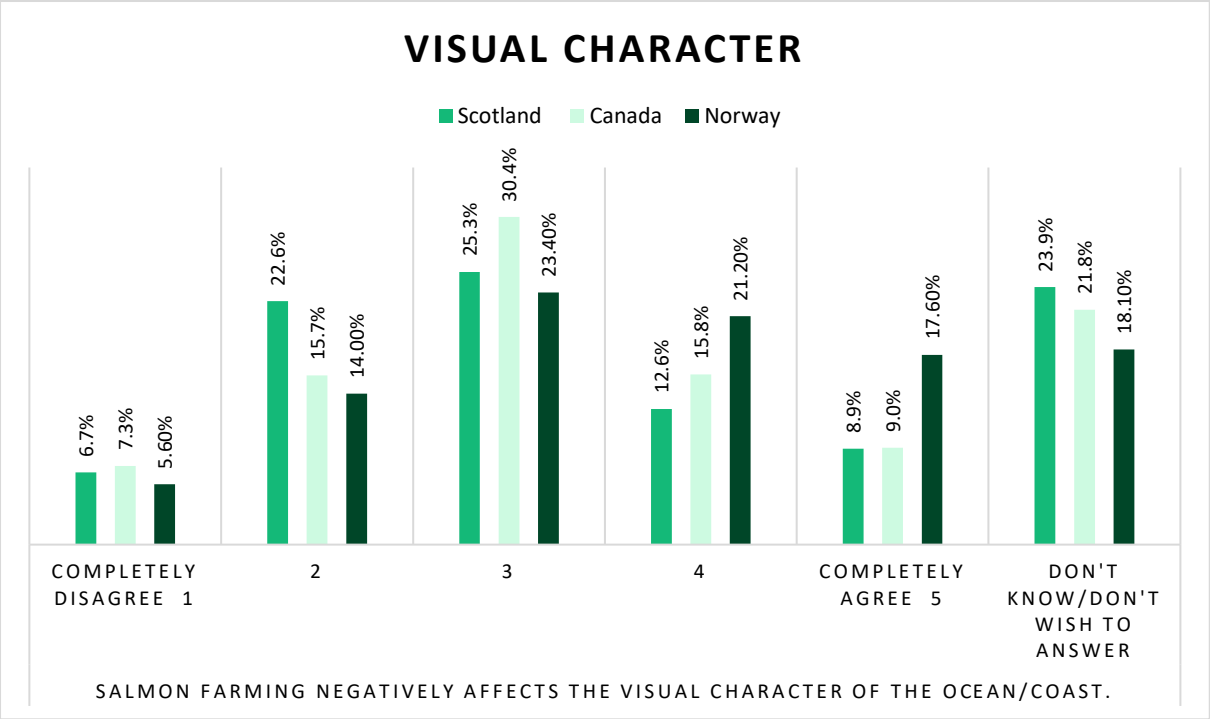

Figure 7: Perception of visual pollution from salmon farming.

3.2.3 Socio-economic effects

The survey also included questions pertaining to the economic contribution of salmon farming to rural and coastal development, to employment in rural communities and to the national economy.

Rural and coastal development

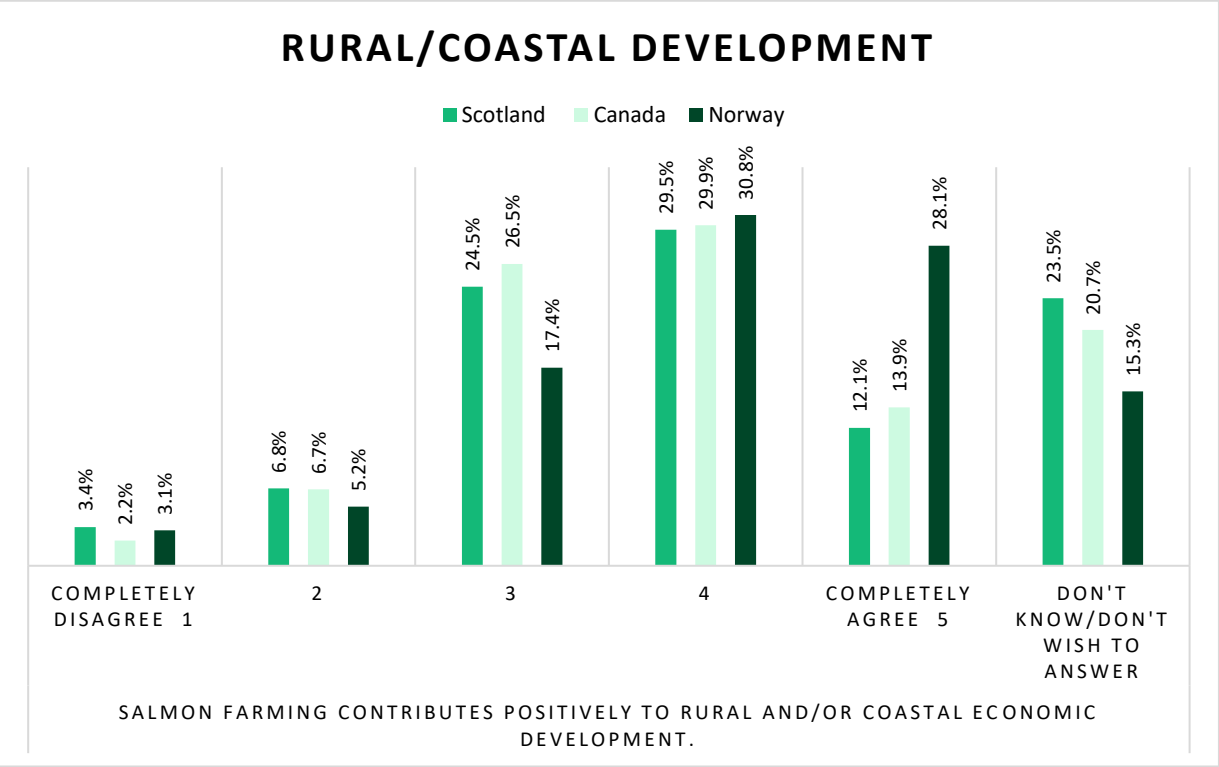

Figure 8: Salmon farming contributes positively to rural and/or coastal economic development.

When asked whether respondents agreed that salmon farming contributed to economic development of rural and coastal communities, 58.9% of Norwegian respondents agreed or completely agreed to this. Compared to Scottland and Canada, 41.6% and 43.8% of respondents agreed or completely agreed in these countries, respectively (Figure 8).

Employment and income

Respondents were then asked what they whether they thought salmon farming contributed to employment and income in coastal communities.

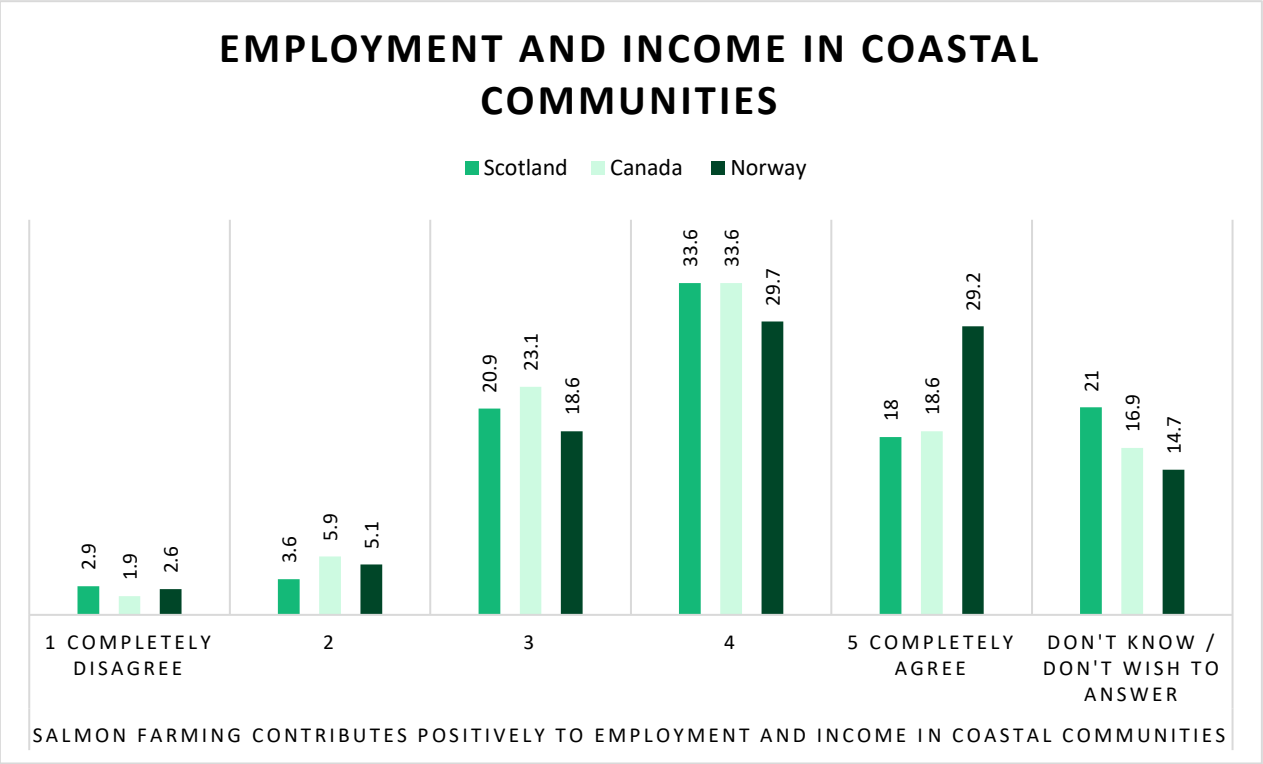

Figure 9: Contribution of salmon faring to employment and income in coastal communities

Overall, the majority of respondents indicated that they either agreed or completely agreed that salmon farming contributes positively to employment and income in rural communities. In the Norwegian sample, 58.9% agreed or completely agreed that salmon farming contribute to employment and income in coastal communities. In the Scottish and Canadian sample, 51.6% and 52.2% of the respondents reported that they agreed or completely agreed to this statement, respectively (Figure 9).

National economy

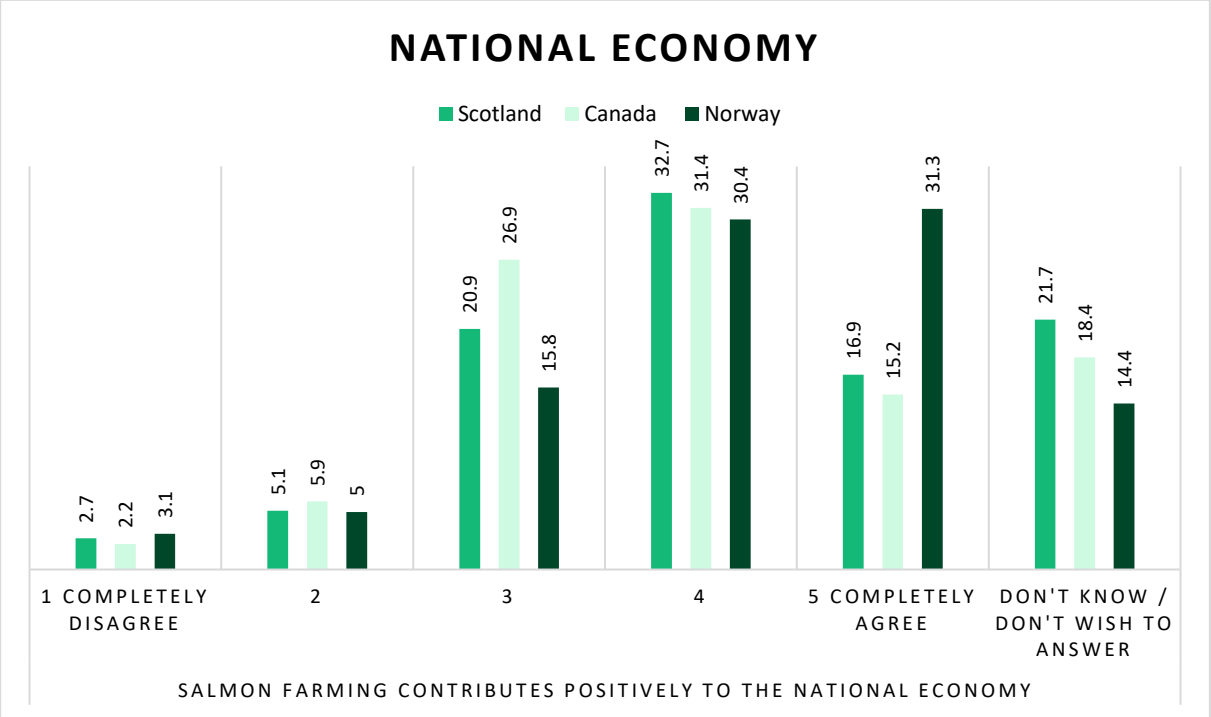

Figure 10: Contribution of salmon farming to national economies

As above, the majority (61.7%) of Norwegian respondents agreed or completely agreed that salmon farming contribute to the national economy. In comparison, 49.6% of Scottish and 46.6% of Canadian respondents answered that they agreed or completely agreed to this statement (Figure 10).

3.3 Willingness to pay (WTP) for salmon from new production systems

The following shows the results of the choice experiment. As described in the methods section, panel 1 respondents have a choice between salmon farmed in two different productions systems with the same price, whereas panel 2 respondents are faced with a choice between salmon farmed in two different production systems but with a price premium on the new production system. Our hypothesis is that, given the benefits, particularly environmental benefits, of new production systems, consumers may be willing to pay a price premium for fish produced with new technology.

3.3.1 Conventional vs. land-based

Respondents in Panel 1 (same price) were presented with the option to choose between salmon produced in conventional open cages and salmon produced in land-based cages, with the same price. In Panel 2

(different price), respondents were presented with the option of salmon produced in conventional open cages and salmon produced in land-based facilities, but with a price a price premium on salmon produced on land.

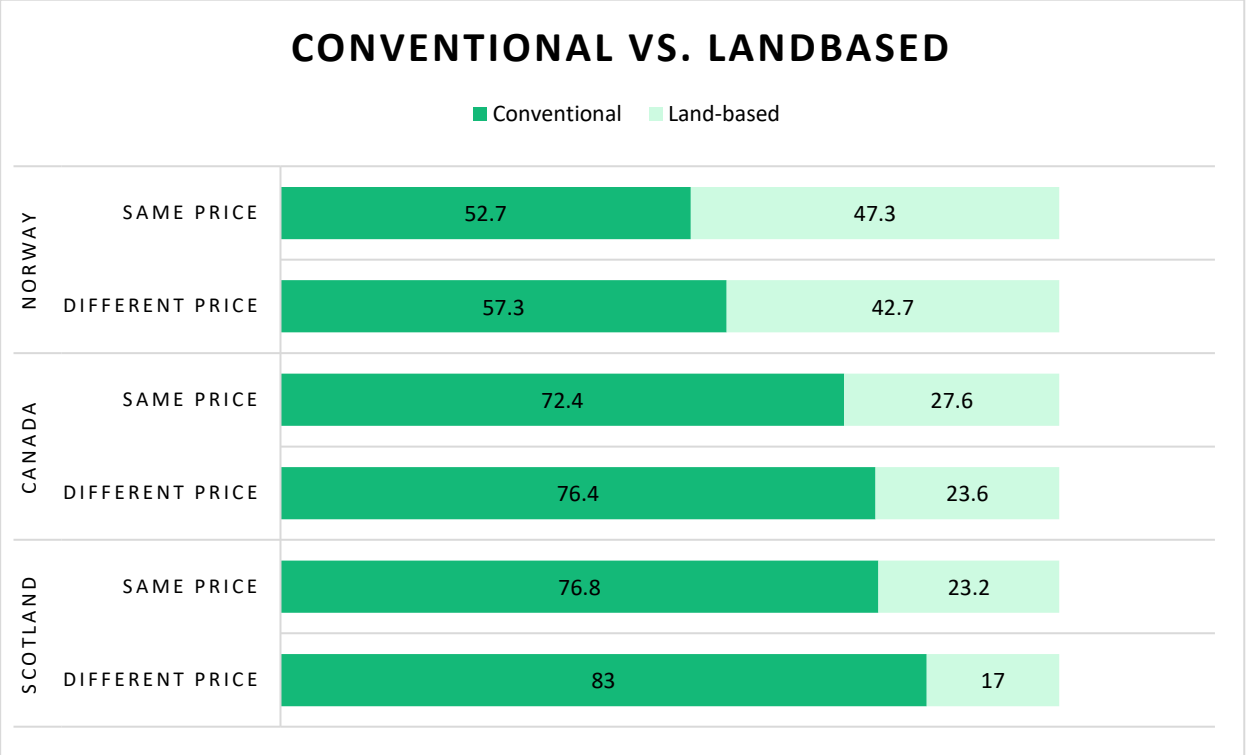

Figure 11: Respondents' choices between salmon produced in conventional vs. land-based facilities

Figure 11 shows what preferences consumers in the three countries have when faced with these choices. In Norway, 52.7% of the respondents would choose conventional farming when there was no price premium on the fish farmed on land, which increases to 57.3% when a price premium of NOK 20 is added to the salmon farmed on land. Canadian and Scottish respondents were more likely to choose conventional over land-based options, regardless of price. Only 17% of Scottish respondents and 23.6% of Canadian respondents were willing to pay more for land-based salmon, while 42.7% of Norwegian respondents were of the same opinion.

3.4 Conventional vs. offshore

In Figure 12, data from the choice experiment between conventional open cage farming and offshore salmon farming is presented.

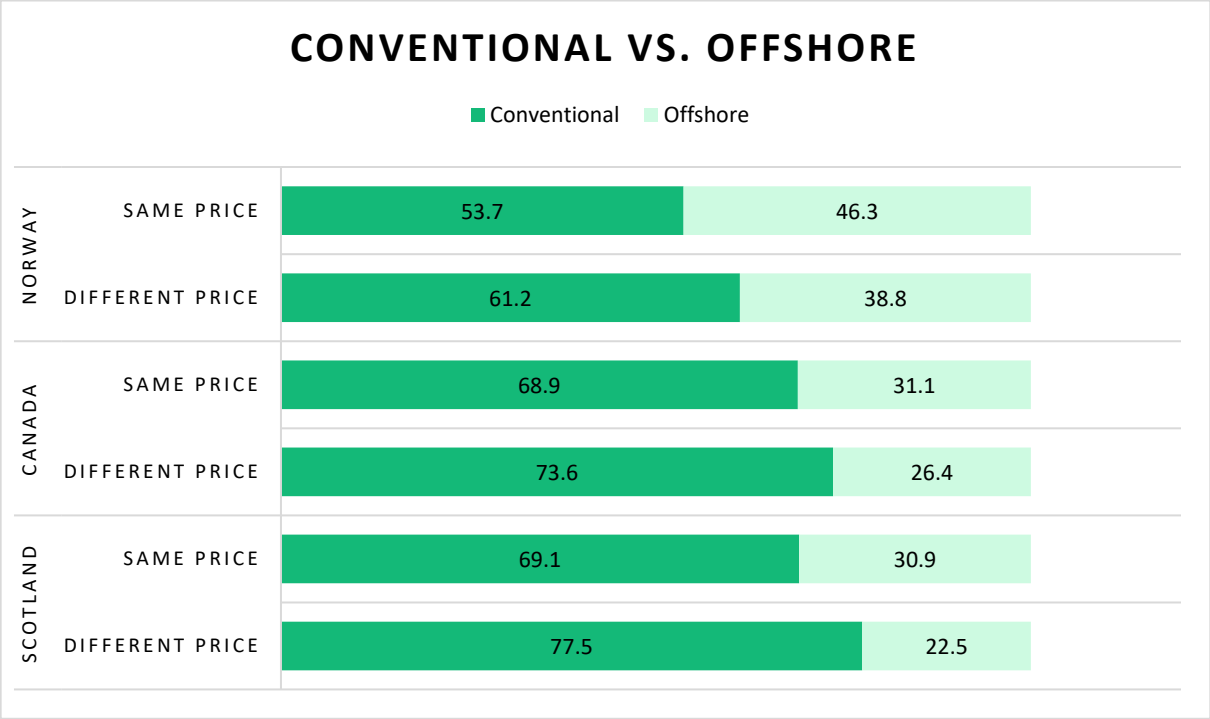

Figure 12: Respondents' choices between salmon produced in conventional vs. offshore facilities

In Panel 1, where the price for salmon from both production systems was the same, 46.3% of Norwegian consumers chose offshore salmon. When the price premium is added this share declines to 38.8%. The share is lower in Scotland and Canada where 31.1% of Canadian and 30.9% of Scottish consumers chose salmon from offshore when the prices were the same. With a price premium on offshore farmed salmon, this share declines to 26.4% of Canadian and 22.5% of Scottish consumers.

3.5 Conventional vs. closed-floating cages

In figure 13, data from the CE-experiment on floating closed cages is displayed.

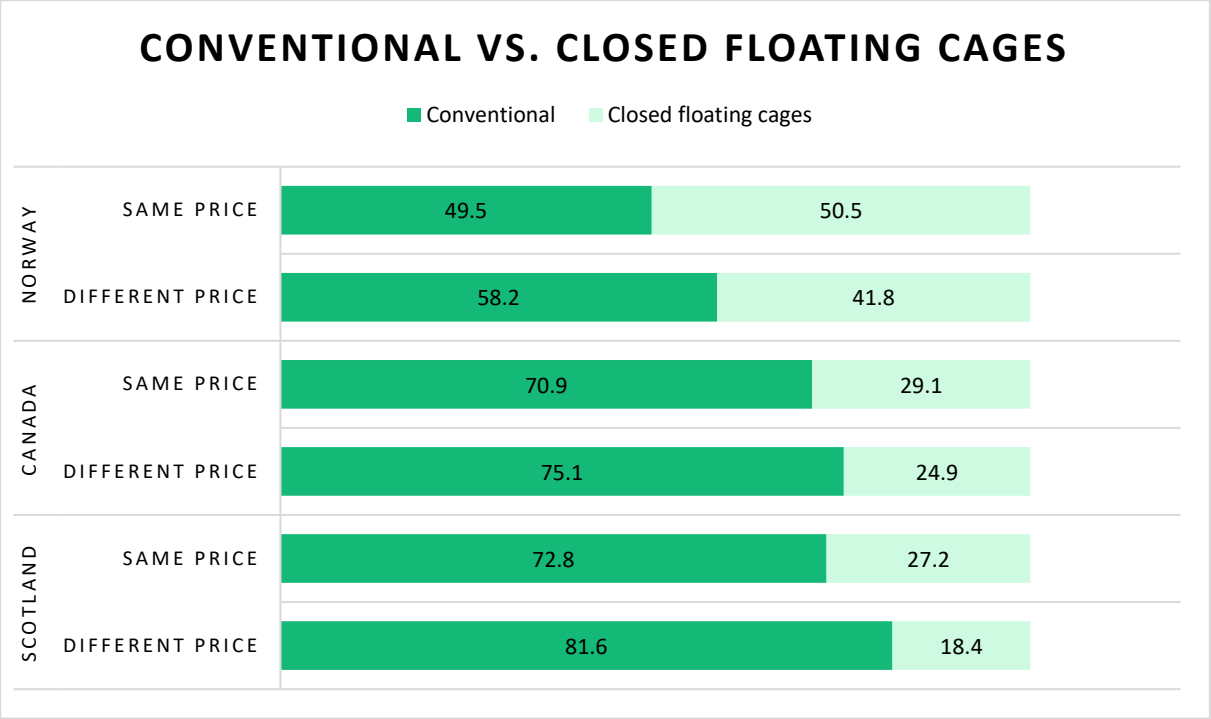

Figure 13: Respondents' choices between salmon produced in conventional or closed floating cages

In panel 1 (no price premium), Norwegian respondents are equally distributed between those that would buy fish produced in conventional open cage systems or fish produced in closed floating cage systems. Norwegian consumers were more inclined (41.8%) to choose salmon from closed cages than Canadian (24.9%) and Scottish (18.4%) consumers when there was a price premium on fish produced in closed floating cages. Thus, Norwegian consumers appear to be more likely to purchase salmon from closed cages compared to Canadian and Scottish consumers, independent of price premium. In general, the majority of respondents were more inclined to select salmon from conventional salmon farming, regardless of price.

4 Discussion and summary

In this report we have examined the general perception of salmon farming and consumers' willingness to pay (WTP) for salmon from new production systems, based on new technologies. Comparing the three countries, Norway, Scotland and Canada, Norway has the highest consumption of salmon. Environmental concerns were significant across the countries, and especially among Norwegian respondents. Perception of socio-economic benefits of the industry were more positive, particularly in Norway, where respondents more frequently recognized that salmon farming contribute to socio-economic developments.

Testing the respondents WTP for salmon produced in alternative production systems, such as land-based, offshore and closed pens, Norwegian respondents were in general more willing to pay a price premium for fish produced in alternative systems. Scottish and Canadian respondents, however, consistently preferred conventionally farmed salmon, with a lower WTP for these alternative, and potentially more sustainable food production systems.

The results reveal critical insights for the salmon farming industry, particularly in understanding consumer perceptions and demand for more sustainable production systems. In Norway, where environmental concerns are high, there is greater social acceptance of premium-priced alternatives, indicating a market segment willing to pay more for sustainability. This could encourage the industry to invest in new systems (e.g., land-based or closed-floating cages) that mitigate environmental impacts, potentially addressing concerns over pollution and species protection.

However, the relatively low WTP among Canadian and Scottish consumers highlights challenges for industry-wide adoption of costlier sustainable methods. For these markets, addressing specific environmental concerns through targeted communication, emphasizing eco-friendly practices, and building trust might improve acceptance of new technologies. Additionally, emphasizing socio-economic benefits (e.g., employment and local economic growth) could strengthen consumer support across all regions, helping the industry balance economic gains with environmental responsibility.

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Appendix

Questionnaire – COMPAREIT – WP4 – Social Acceptance

Background questions

- Gender
- Age
- Region
- Provinces and Territories
- Municipalities
- Education
- Household income
- Income

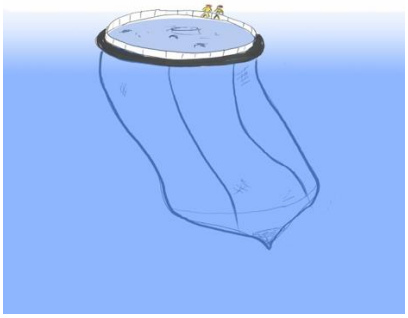
Countries:

1. Canada
2. Norway
3. Scotland

Conventional Salmon Farming

Conventional Salmon Farming

In conventional salmon farming, Atlantic salmon are farmed in open net cages in the sea. These cages are located close to the shore. This is the most common method to raise salmon (figure below).



[q2] There are several potential advantages with conventional salmon farming. Which potential advantage is most important to you?

1. Low energy consumption due to ocean currents.
2. Closest-to-natural environmental living conditions for the salmon due to open net ~~pens~~ cages.

3. Few fish welfare issues due to inadequate water quality, when situated at suitable locations.

[q3] There are several potential downsides with conventional salmon farming. Which potential downside is most problematic to you?

1. Potential for salmon lice transfer to wild fish stocks due to open net cages.
2. Potential for fish welfare issues due to treatment for lice and/or diseases.
3. Potential for escaped salmon that may genetically interact with wild salmon stocks due to open net cages.
4. Potential for disease transfer to other fish farms due to open net cages.
5. Release of nutrients/organic matter into the sea due to open net cages, with local negative environmental impact at traditional farming sites.

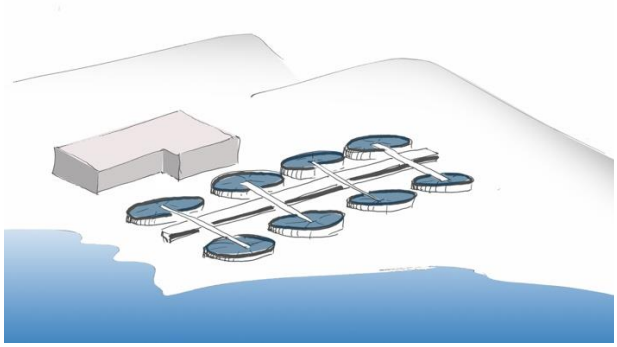
Trust_conventional

[q1] How much trust do you have in companies using conventional salmon farming methods?

1. 1 - No trust at all
2. 2
3. 3
4. 4
5. 5 - Complete trust
6. Don’t know

Land-based Salmon Farming

One production method developed to tackle some of the challenges with conventional salmon farming is land-based salmon farming. In land-based salmon farming, salmon are farmed in tanks on land. Several companies have started the production of market-size salmon on land. However, this method consists of different technologies with different degrees of complexity.



[q6] There are several potential advantages with farming salmon in tanks on land. Which advantage is most important to you?

1. No disease transfer between fish farms due to on-land location.
2. No salmon lice transfer to wild fish stocks due to on-land location and water disinfection.
3. Reduced release of nutrients/organic matter into the sea compared with conventional due to on-land location and sludge collection.
4. No escaped salmon that may genetically interact with wild salmon stocks due to on-land location.
5. Reduced potential for compromised fish welfare related to parasite control compared with conventional due to water disinfection.

[q7] There are several potential downsides to farming salmon in tanks on land. Which potential downside is most problematic to you?

1. Higher energy consumption compared with conventional due to need for pumping water and increased use of construction material.
2. Less natural environmental living conditions compared with conventional due to water quality, lighting, and fish density in closed tanks.
3. Increased potential for compromised fish welfare, including mass mortality, due to quickly arising water quality deterioration.
4. Potential for fish welfare issues due to spread of diseases within the facility.

Below are the prices for experiments

For Canada if qcountry=1

	Conventional price1a	**Land-based price2a**	**Closed floating cages price3a**	**Offshore price4a**
Panel 1 Show if Panel=1	$9.99-, 200 grams	$9.99-, 200 grams	$9.99-, 200 grams	$9.99-, 200 grams
	Conventional price1b	**Land-based price2b**	**Closed floating cages price3b**	**Offshore price4b**
Panel 2 Show if Panel=2	$9.99-, 200 grams	$11.99-, 200 grams	$11.99-, 200 grams	$11.99-, 200 grams

For Scotland if qcountry=2

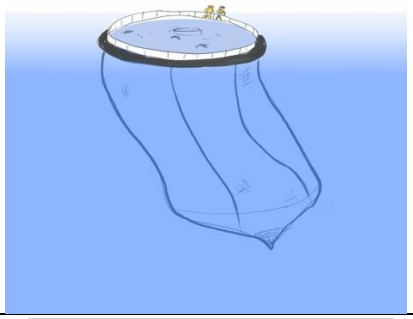
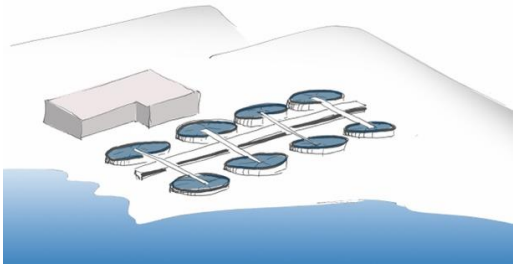
	Conventional price1a	**Land-based price2a**	**Closed floating cages price3a**	**Offshore price4a**
Panel 1 Show if Panel=1	£4,99-, for 200 grams	£4,99-, for 200 grams	£4,99-, for 200 grams	£4,99-, for 200 grams
	Conventional price1b	**Land-based price2b**	**Closed floating cages price3b**	**Offshore price4b**
Panel 2 Show if Panel=2	£4,99-, for 200 grams	£6,59-, for 200 grams	£6,59-, for 200 grams	£6,59-, for 200 grams

For Norway if qcountry=3

	Conventional price1a	**Land-based price2a**	**Closed floating cages price3a**	**Offshore price4a**
Panel 1 Show if Panel=1	NOK 79,99-, for 200 grams	NOK 79,99-, for 200 grams	NOK 79,99-, for 200 grams	NOK 79,99-, for 200 grams
	Conventional price1b	**Land-based price2b**	**Closed floating cages price3b**	**Offshore price4b**
Panel 2 Show if Panel=2	NOK 79,99-, for 200 grams	NOK 99,99-, for 200 grams	NOK 99,99-, for 200 grams	NOK 99,99-, for 200 grams

Text

Imagine you are in the aisle of your local grocery store and given the choice to buy conventionally farmed salmon or salmon farmed in tanks on land.

	Conventional	**Land-based**
		
Price per portion	[INSERT price1a if Panel=1] [INSERT price1b if Panel=2]	[INSERT price2a if Panel=1] [INSERT price2b if Panel=2]

[q4] Which would you choose?

1. Salmon farmed using conventional methods
2. Salmon farmed in tanks on land

Trust_Land-Based

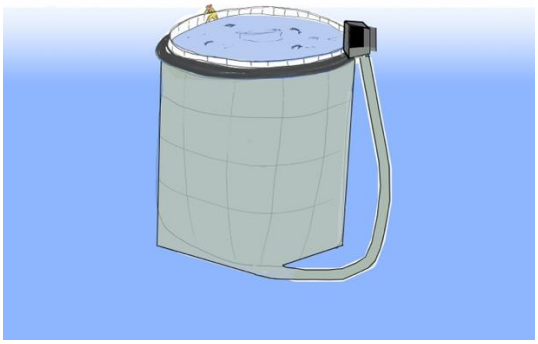
[q5] How much trust do you have in companies farming salmon in tanks on land?

1. 1 - No trust at all
2. 2
3. 3
4. 4
5. 5 - Complete trust
6. Don’t know

Text

Salmon Produced in Closed Floating Cages

Another technology developed to tackle the challenges of conventional salmon farming is closed floating cages. Salmon are farmed in cages with an impermeable barrier between the internal cage environment and the external marine environment (figure below). Water is pumped through the system, and waste (sludge) may be fully or partially collected from outlet water if sludge collection systems are used. There are a few closed floating cages producing salmon at present, and it is therefore still some knowledge gaps surrounding production conditions, fish health and welfare and environmental effects.



[q10] There are several potential advantages with salmon farmed in closed floating cages. Which potential advantage is most important to you?

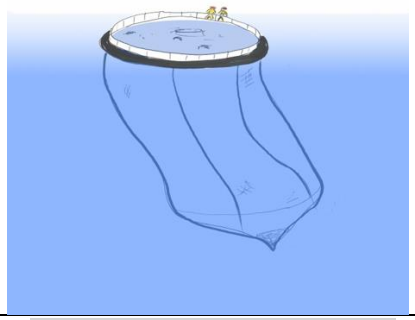
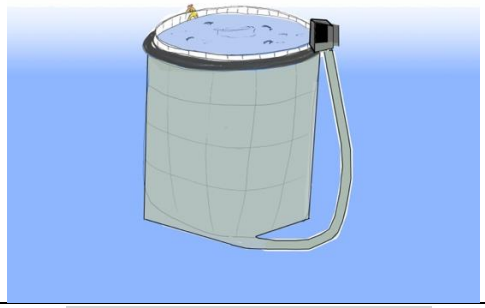
1. Reduced potential for salmon lice transfer to wild fish stocks compared with conventional due to closed floating cages.
2. Reduced potential for disease transfer to other fish farms compared with conventional due to closed cages.
3. Reduced release of nutrients/organic matter into the sea compared with conventional due to closed floating cages, if sludge collection systems are used.
4. Reduced potential for compromised fish welfare issues related to parasite control, compared with conventional, due to closed floating cages.

[q11] There are several potential downsides with salmon farmed in closed floating cages. Which potential downside is most problematic to you?

1. Higher energy consumption compared with conventional due to the need for pumping water.
2. Increased potential for compromised fish welfare related to suboptimal water quality compared with conventional due to inadequate water quality control
3. Less natural environmental living conditions compared with conventional in terms of water quality, lighting, and water flow patterns due to structural features of closed floating cages.
4. Potential for fish welfare issues due to spread of diseases within the cage.

Text

You are in the aisle of your local grocery store and given the choice to buy conventionally farmed salmon or salmon farmed using closed floating cages.

	Conventional	Closed floating cages
		
Price per portion	[INSERT price1a if Panel=1] [INSERT price1b if Panel=2]	[INSERT price3a if Panel=1] [INSERT price3b if Panel=2]

[q8] Which would you choose?

1. Salmon farmed using conventional methods
2. Salmon farmed in closed floating cages

Trust_Floating closed cages

[q9] How much trust do you have in companies farming salmon in closed floating cages?

1. 1 - No trust at all
2. 2
3. 3
4. 4
5. 5 - Complete trust
6. Don’t know

Text

Offshore Salmon Farming

Yet another method that can increase the production of salmon is offshore salmon farming (figure below). Offshore aquaculture is salmon farmed at facilities sited offshore. There is no existing offshore farms at present, and it is therefore uncertain how production conditions, fish health/welfare and environmental effects will develop as these technologies are implemented.

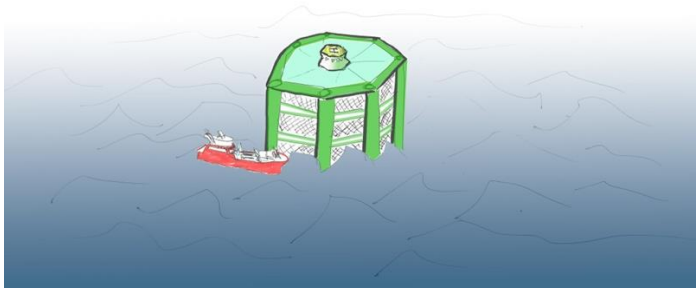


Figure 14: Offshore fish farm

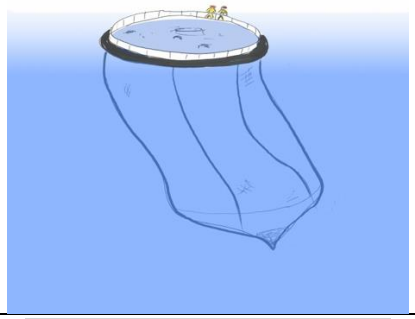
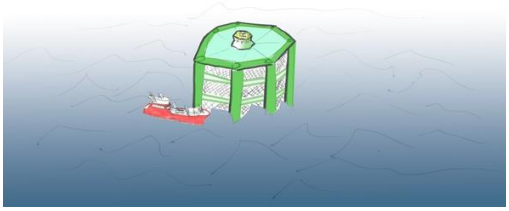
[q14] There are several potential advantages with farming salmon offshore. Which potential advantage is most important to you?

1. Reduced potential for disease transfer to other fish farms compared with conventional due to greater distance between farms.
2. Less concentrated release of nutrients/organic matter into the sea compared with conventional due to greater dispersal at an offshore location.
3. Closest-to-natural environmental living conditions for the salmon, similar to conventional, due to open net cages.

[q15] There are several potential downsides to farming salmon offshore. Which potential downside is most problematic to you?

1. Higher energy consumption compared with conventional due to higher use of construction materials and travel distance from land.
4. Potential for salmon lice transfer to wild fish stocks, similar to conventional, due open ~~pens~~ cages.
2. Potential for fish welfare issues, similar to conventional, due to treatment for lice.
3. Potential for fish welfare issues due to spread of diseases within the cages.
4. Potential for escaped salmon that may genetically interact with wild salmon stocks, similar to conventional, due to open cages.

Text
Imagine you are in the aisle of your local grocery store and given the choice to buy conventionally farmed salmon or salmon farmed offshore.

	Conventional	Offshore salmon farming
		
Price per portion	[INSERT price1a if Panel=1]] [INSERT price1b if Panel=2]]	[INSERT price4a if Panel=1]] [INSERT price4b if Panel=2]]

[q12] Which would you choose?

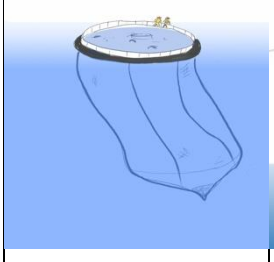
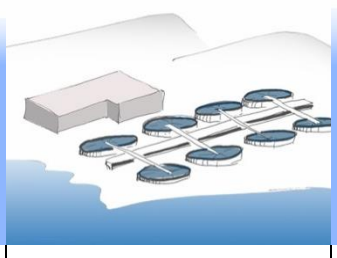
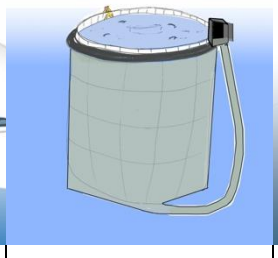
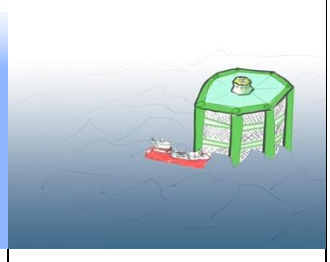
1. Salmon farmed using conventional methods
2. Salmon farmed offshore

[q13] How much trust do you have in companies farming salmon offshore?

1. 1 - No trust at all
2. 2
3. 3
4. 4
5. 5 - Complete trust
6. Don’t know

Start of section 2

[q16] Imagine you are in the grocery store and have the opportunity to buy salmon produced by each of the following production systems.
Click on the production system that you would be most inclined to buy salmon from.

	Conventional	Land-based	Closed Floating Cages	Offshore
				

Price per portion	[INSERT price1a if Panle=1] [INSERT price1b if Panle=2]	[INSERT price2a if Panle=1] [INSERT price2b if Panle=2]	[INSERT price3a if Panle=1] [INSERT price3b if Panle=2]	[INSERT price4a if Panle=1] [INSERT price4b if Panle=2]

Start of section 3

Text
Now, we will ask you a few questions regarding fish farming and fish consumption.

1. Knowledge

[q17] In general, how knowledgeable would you say you are about salmon farming?

1. 1 - Not knowledgeable at all
2. 2
3. 3
4. 4
5. 5 - Very knowledgeable
6. Don’t know

2. Trust in government

[q18] To what extent do you trust that the government is effectively managing the salmon farming industry in [INSERT chosen country]?

1. 1 - Do not trust at all
2. 2
3. 3
4. 4
5. 5 - Trust completely
6. Don’t know

3. Characteristics

[q19] Next, we will make some statements related to salmon farming in [INSERT chosen qcountry]. To what extent do you disagree or agree with the following statements?

1. Salmon farming uses too much antibiotics.
2. Salmon farming contributes positively to employment and income in coastal communities.
3. Salmon farming contributes positively to rural and/or coastal economic development.
4. Salmon farming contributes positively to the national economy.
5. Salmon farming negatively affects the visual character of the ocean/coast.
6. Salmon farming causes marine pollution, including rubbish or debris.
7. Salmon farming reduced people’s access to ocean and/or coastal areas.
8. Salmon farming negatively affect community identity and culture.
9. Salmon farming negatively affect marine tourism.
10. Salmon farming negatively affect commercial fisheries.
11. Salmon farming negatively affect fish welfare.
12. Salmon farming negatively affect water quality.
13. Salmon farming negatively affect habitat beneath farms.

14. Salmon farming spread disease and parasites.
15. Salmon farming negatively affect protected or sensitive species.
16. Salmon farming negatively affect wild salmon populations.

Scale:

1. Completely disagree
2. 2
3. 3
4. 4
5. Completely agree
6. Don't know/don't wish to answer

4. Eatfish

[q20] Do you eat farmed salmon?

1. Yes
2. No
3. Don't know

5. Perception farmed salmon (if no, or I don't know)

[q20a] To what extend do you agree or disagree to the following statements?

1. I do not eat farmed salmon because it's not sustainably produced.
2. I do not eat farmed salmon because it's not healthy
3. I do not eat farmed salmon because it's not good for the environment
4. I do not eat farmed salmon because I don't like the taste of farmed salmon
5. I do not eat farmed salmon because it's too expensive
6. I do not eat farmed salmon because it's not available to me
7. I do not eat farmed salmon because I don't know enough about farmed salmon
8. I do not eat farmed salmon because I'm against salmon farming
9. I do not eat farmed salmon because I believe there is too much antibiotic use in the salmon farming industry
10. I do not eat farmed salmon because I'm vegetarian
11. I do not eat farmed salmon because I'm vegan
12. I do not eat farmed salmon because I do not eat fish in general

Scale:

1. Completely disagree
2. 2
3. 3
4. 4
5. Completely agree
6. Don't know/don't wish to answer

5b. PerceptionFarmed (if yes)

[q21] To what extend do you agree or disagree to the following statements?

1. I eat salmon because it's healthy.
2. I eat salmon because it's sustainably produced.
3. I eat salmon because I like the taste.

Scale:

1. Completely disagree
2. 2
3. 3
4. 4
5. Completely agree
6. Don't know/don't wish to answer

6. Information about salmon farming industry

[q22] Where do you receive information about the salmon farming industry from?
Please select all that apply

1. Television
2. Radio
3. Newspapers (paper version and online version)
4. Social media (such as Facebook, Twitter, LinkedIn)
5. Social networks (friends, family, etc)
6. School
7. Work
8. I do not receive information about the salmon farming industry

Start of section 4

Text
Finally, we will ask you a few questions about your background.

7. Visable ocean

[q24] Is the ocean visible from your home?

1. Yes
2. No

8. Urban-rural

[q25] Would you characterise the area in which you live as urban or rural?

1. Urban
2. Rural

9. Politics

[q27] On a scale from 1 to 5, how would you place yourself on the political scale (1 = left, 5= right)?

1. 1 – Left
2. 2
3. 3
4. 4
5. 5 – Right
6. Don’t know