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the Economic Sustainability of the
European Seafood sector***

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Arctic Char case study
CONSUMER FOCUS GROUPS AND
PANEL SURVEY in ICELAND
SUCCESS Salmonids Case Studies and WP2 focus groups



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PREFACE

The overall aim of the SUCCESS project is to explore factors that have an impact on the competitiveness and economic sustainability of the European seafood sector (<http://www.success-h2020.eu/>). The results reported in this working paper are from consumer studies associated with the project's work package 2 (WP2) entitled "Consumer preferences, market acceptance and social awareness towards seafood" with a focus on the Salmonids case study on Icelandic Arctic char (*Salvelinus alpinus*). The aim is to compare the results of Icelandic consumers focus groups with results obtained in different countries in the SUCCESS project. This work is part of Task 2.4: Identification of innovative seafood products. Focus groups for the different case studies followed a common guideline which was adjusted in order to better address the country specific situations (Subtask 2.4.a). Advantages and disadvantages with regard to the species characteristics such as taste and additional information and ways of communication were considered. The outcome of the Focus Group discussions will be used to develop a standardized questionnaire and an online survey will be conducted in the same countries (Subtask 2.4.b). The outcome of this survey will quantify the results of the qualitative Focus Groups and will show the potential of new seafood products in the markets.

The Arctic char case study is a collaboration of MarkMar, the Institute of Economic Studies (IoES) and the Applied Supply Chain Systems research group (ASCS) at the University of Iceland with the aim to assess the competitiveness of the Icelandic Arctic char industry and explore if it can be regarded as a success.

MarkMar was responsible for organising the focus groups on Arctic Char which were conducted with support from the Social Science Research Institute at the University of Iceland. The Task 2.4 leaders from the Thünen Institute in Germany, Yvonne Feucht and Katrin Zander were responsible for the development of the guidelines applied for the focus groups in the different countries (Appendix I) as well as setting recruitment criteria. Additionally, the questions in the on-line panel survey were developed by the MarkMar team to quantify and obtain more in-depth results on the Icelandic consumer's perception on sustainable seafood and different ways to communicate information.

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EXECUTIVE SUMMARY

Introduction

The overall objective was to identify innovative seafood products with potential for different national markets. “Innovative products” refer to new products as well as popular products in specific countries with low demand in other countries. With this in mind the Icelandic Arctic char is of interest as a niche product in the European market which could be sold at a higher price than other salmonids species.

The wild Arctic char is known as traditional fish product in Iceland, which has been available especially in the countryside as a seasonal product. Since 1987, farming of the species in land based flow through systems, has gradually increased. The annual production volume of Arctic char is currently about 3.500 tons, which is mainly exported to US and Europe, while less than 4% of the total volume is sold in the domestic market (Heimisson et al., 2016). Although the farmed Arctic char is a popular menu item in catering and restaurants as well as being available in fish stores in Iceland, the local market is small and has not received attention as a profitable market for the main producing companies in Iceland. However, with increasing amount of tourists in Iceland there are initiatives and efforts among local chefs to promote Arctic char as part of Icelandic culinary menu.

Studies have been performed to promote and strengthen the Icelandic Arctic char in the seafood market in US by the main Arctic char producers in Iceland¹ and in the German niche market². Accordingly, the objective to increase sales volume of fresh and frozen Arctic char fillets on the US catering market was achieved and product prices were successfully increased, but continued marketing efforts are needed.

In our earlier work in the Salmonids case study in the SUCCESS project, an assessment was made to answer the question if the Icelandic Arctic char industry can be regarded as a success based on economic theory of profitability and environmental impacts based on Life Cycle Assessment (Heimisson *et al.*, 2016; Olafsdóttir et al., 2017). The landbased systems in Iceland are favourable when considering the access to coastal areas, water and renewable energy as well as the lower risk of escape and diseases compared with Atlantic salmon farming in traditional marine cages. There are indications of significant growth potential in the industry,

¹ ICEFRESH FARMING (2010) Íslensk bleikja á sérmarkað í Bandaríkjunum , markaðsátak 2007-2009. Lokaskýrsla AVS: http://www.av.is/media/skyrslur/R020-07-Lokaskýrsla-til-birtingar_islensk_bleikja_a_Bandarikjamarkad.pdf

² Bleikja á sérmarkað, Mátis report (2011) <http://www.matis.is/media/matis/utgafa/38-11-Bleikja-a-sermarkadi.pdf>

although the Arctic char industry's success measured by the contribution of the industry to the nation's GDP (Gross Domestic Product) and the growth of this contribution over time indicates that only the largest company appears to be profitable and has means to enlarge their production and compete. However, the regulatory framework and, perhaps more importantly, inefficient administrative procedures have somewhat limited the growth of the industry (Heimisson et al., 2016).

The Arctic char industry has implemented best practices according to regulations and taken up voluntary B2B standards and certification of responsible practices to respond to demands from their customers (Ólafsdóttir et al., 2014a). Although certification is seen mainly as a tool for market entry, seafood industry stakeholders who participated in the SUCCESS project's World café in Reykjavík and Rome in 2016, generally agreed that certification is a motivation to implement good practices and monitoring, and enhances the transparency and integrity of the industry.

Knowledge on the Icelandic consumers' perception towards Arctic char is limited and therefore it is of interest to explore the main trends and compare the views obtained in the Icelandic focus groups with results from the SUCCESS project on consumers' views towards salmonids species in other European countries. It is suggested that knowledge on the perception of consumers in Iceland towards Arctic char could be of value for exporters to develop their international marketing strategies. In particular, to obtain the consumers' views on the main characteristics of the species and value attributes and thus help to establish an image for the Arctic char in the European market.

Objective

The objective of the focus groups and on-line surveys was to assess if consumers in Iceland were able to differentiate Arctic char products from Atlantic salmon in the domestic market. The aim was also to explore Icelandic consumers' perceptions regarding differences in fish purchase criteria, perception of wild vs farmed species, perception of organic seafood and different types of fish farming, and finally associations with sustainability with respect to seafood and information provision, including labelling.

Methods of data gathering and analysis

Focus groups were performed according to the SUCCESS project's guidelines and furthermore an online panel survey was conducted among Icelandic consumers (Annex I).

Overview of results

Fish purchase criteria and perception of Arctic char and salmon:

- Participants in the focus group associated fresh Arctic char with a delicate taste, and convenient size, in particular of the smoked products.

- Arctic char was differentiated from Atlantic salmon mainly with respect to the size and the texture. The participants perceived Arctic char more as a delicacy and more scarce than salmon and were willing to pay more for the Arctic char, although the presence of bones was a nuisance.
- High pricing was considered the main barrier for consumption of both Arctic char and salmon.
- Many participants preferred wild rather than the farmed species, which affected their perception of both Arctic char and salmon as seasonal products.

Perception of organic seafood and different types of fish farming:

- Organic fish was perceived as fish caught from the ocean and most participants were not aware of the term 'organically' farmed fish. A few participants perceived organic seafood as an environmentally friendly process, the fish had not come in contact with any unnatural chemicals through feeding and also that it resided in unpolluted habitats.
- The participants who were aware of the difference between marine net cage and land based farming, considered that more control of environmental factors would be possible in land based farming.

Associations with sustainability and communication of information

- Participants understood the concept of sustainability as not overfishing and maintaining the fish species by controlled fisheries management, although the concept was perceived as vague and lacking a clear definition.
- Sustainability with respect to seafood was directly linked to the Icelandic quota system. The quota system was perceived to secure sustainability and therefore, none of the participants consciously purchased sustainable seafood.
- Participants did not think that labels were necessary in Iceland for Icelandic seafood, although they were aware that exported fish from Iceland in some cases had ecolabels.
- Some of the participants envisioned communications on organic or sustainable production from fishmongers and retailers as a positive development, for example declaring with a label that all their fish products were harvested and produced in a sustainable way.
- Although the participants did not foresee themselves using seafood guides or apps in relations to obtaining information on seafood, most perceived this development as a positive development for future generations.

Consumers' perception of trust towards sustainably produced seafood

- Results of the on-line survey among the Icelandic population showed a high proportion of neutrals towards the question "do you trust that Icelandic farmed seafood (salmon and Arctic char) are produced in a sustainable way?" This may indicate that Icelanders have

limited knowledge on farming and therefore are not opinionated if they trust or distrust Icelandic farmed seafood to be sustainably produced.

- Respondents from rural regions appeared to have more trust that seafood was sustainably produced than those living in the capital region and respondents with primary education had more trust than those with other educational levels.

Influence of different ways of communication of information about origin, ingredients and production of seafood on consumers' trust towards the product?

- The majority of participants viewed *labelling on packaging* to be an important factor in influencing added trust towards seafood (88%). Females found it slightly more important than males (92% and 86% respectively), the youngest age group found it less important than older age groups.
- About half of the respondents found *information in social media* very or rather important in influencing added trust towards seafood. Females found it more important than males and those with primary education found such information more important than other educational levels, whereof those with university education found information on social media least important.
- Majority of respondents found *reviews or opinions of others about products and producers* to be important in influencing their added trust towards seafood products. The youngest age group found this information least important among the age groups and those with vocational education viewed it least important within the other educational levels.
- Overall, *communication on products from producers via apps* was not important to respondents. Those with primary education found it most important compared to those with university education who found it least important.
- About 88% of respondents viewed *public surveillance systems* very or rather important in influencing their added trust towards the product. Females as opposed to males found this more important and those living in the capital region found it more important than those living in the rural region.
- *Information on products provided by retailers/stores* was thought by most to be very or rather important. Females found it more important than males, 60 years and older found it least important within the age groups and those with university educations viewed it less important than other educational levels.

Discussion

The Icelandic consumers perceived both Arctic char and salmon as seasonal, highly priced fish products, which they purchased for special occasions, in particular the smoked products. They mainly differentiated the two species by taste and appearance. However, they did not appear to differentiate between wild and farmed origin. The knowledge on aquaculture production methods (e.g. organic) appears to be limited and their association with sustainably produced seafood products was mainly linked to responsible fisheries and the quota system. This may reflect the fact that fisheries are economically very important industries in Iceland whereas aquaculture has

so far not been a main industry, although it is growing in Iceland. The perception on different approaches to communicate information on fish and the influence on consumers' trust, may reflect the confidence in the Icelandic fisheries management system and regulatory authorities, as well as high consumption of fish and availability of fresh fish in fish stores which influences the fish purchase criteria of the consumers. This cultural background also reflects their limited interest in information on the origin and sustainable production from producers via apps or retailers. They appear to trust the fishmonger and do not need additional information.

Results on consumers' views on aquaculture in other countries indicate a negative image associated with concerns regarding environmental impacts of aquaculture like escapes and impacts on biodiversity and the ecosystem. However, according to results from on-line surveys in the SUCCESS project, participants from Germany, Poland, Finland, France, Spain, Italy, Ireland and UK, had rather positive attitudes towards aquaculture. Aquaculture was foremost associated with the provision of jobs and as an important contribution global fish supply. The perception of sustainability in fisheries was linked to environmental factors such as the protection of endangered species, to the avoidance of overfishing, the recovery of depleted stocks and the protection of juvenile fish. (D2.2 Success project).

Based on the results of the focus groups, the Icelandic consumers had an idea about the different aspect of sustainable production although it was not a part of their purchase criteria. It has been reported that consumers' knowledge about sustainable seafood vary according to country of origin and perception of attributes like animal welfare, organic and/or sustainable production which are expected to influence the value added of products. When consumers in several European countries were asked about WTP for fish (and seafood) produced according to sustainable production methods and from European origin, a small consumer segment (about 10%) indicated almost 50% higher WTP. Accordingly, there appears to be a positive perception of European origin of fish produce since consumers trust the European Union as a credible controlling agent, although the local/domestic origin is valued more by consumers than European origin (Feucht and Zanders, 2016). In a study in Ireland among the Irish public the results indicated a higher WTP for products with high sustainability attributes and the Irish public valued Irish salmon products more than the internationally produced salmon products. However, even though the Irish public had a higher WTP for Irish produced salmon products, the value for high sustainability (label A) compensated to such a degree that internationally produced salmon with high sustainability levels was valued higher than Irish produced salmon products with low sustainability levels (Van Osch et al., 2017).

Factors like culture, politics and the economic status of the fisheries and aquaculture sectors influence the consumers' views and it has been pointed out that the seafood industry (including aquaculture) needs to communicate much better about their performance to influence the positive image of the sectors (Olafsdóttir et al., 2014b). Results in the SUCCESS project have highlighted the need for communication:

„Sound communication, considering specific consumer interests and focusing on animal welfare, specific sustainability issues and/or organic production is needed and promising. With respect to sustainability issues the communication should focus more on environmental

sustainability than on economic and social sustainability. For the fisheries as well as the aquaculture sector the conservation of biodiversity is an important issue. In addition, topics related to an eco-friendly production should also be addressed by the aquaculture sector” (Feucht and Zander, 2016)

Furthermore, the potential use of smart ICT tools/apps to communicate product characteristics and to facilitate informed choices of consumer is of interest and could be a beneficial marketing tool for the industry. In this respect it was of interest to explore information needs and how different channels of information have an impact of consumers. Apparently, most of the Icelandic focus group participants perceived this development as a positive development for future generations, however, they did not foresee themselves using seafood guides or apps in relations to obtaining information on seafood.

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FOCUS GROUPS

RESEARCH DESCRIPTION

Collaborators	MarkMar ehf., Guðrún Ólafsdóttir and Sigurður G. Bogason
Objective	To explore participants' associations with Arctic char and salmon and barriers and motives for their consumption, perception of sustainability with respect to seafood, perception of different types of fish farming, perception of the use of labels on fish products and information provision with respect to seafood.
Data collection	27.02.17 – 02.03.17
Date of report	May 16 th , 2017
Administration	The Social Science Research Institute, University of Iceland (SSRI) http://fel.hi.is/english
Preparation and data collection	Árni Bragi Hjaltason Ágústa Edda Björnsdóttir
Preparation for data analysis	Árni Bragi Hjaltason
Report	Árni Bragi Hjaltason

REPORT OF THE FOCUS GROUPS IN ICELAND

1. Themes of the focus groups

Three focus groups were gathered by the Social Science Research Institute at the University of Iceland. The number of participants varied in each focus group due to last minute cancellations and participants not showing up. The first focus group consisted of 8 participants, the second focus group 4 participants and the third focus group 3 participants.

The main topics up for discussion were consumers' preferences and perceptions about Arctic char and salmon. The discussion started with each participant describing their fish purchase criteria and if they differentiated between fish from a special seafood store, fish freshly displayed behind a counter in a supermarket or pre-packaged fish, refrigerated in a supermarket. After this introductory discussion, participants were asked what associations they made to the concept of sustainability in fish products and if they buy sustainable fish. Next, associations with Arctic char and with salmon were discussed in a very general way (i.e. if they had tasted and what came first to mind when thinking of each species). Here, participants were shown one slide containing seven pictures of salmon and Arctic char, both fresh and filleted. Afterwards, participants' knowledge about perceived differences between farmed fish and wild fish was explored. Also, familiarity with different fish farming techniques was explored in the groups, showing a picture of net-cage farming and land farming. In the next step, participants were asked to discuss any motives and barriers for both Arctic char and salmon consumption, showing a slide with eight different dishes where either Arctic char or salmon had been prepared for consumption.

Further differences and similarities between Arctic char and salmon were discussed. Here, participants saw nine different filleted and packaged Arctic char and salmon products without any labels on them. Participants' perception of organic seafood was next up for discussion, what differences they perceived between organic aquaculture products and fishery products. Participants were then asked to discuss if they would like to be informed about sustainability with respect to seafood and if so, how would they like to be informed. Then they were asked if they were aware of and used any seafood guides when choosing fish products. This discussion led to an evaluation on the possibility of using an app as a guide on sustainability and origin for the purchasing of fish products.

Afterwards, the perception of sustainability claims made by the retail was put into discussion followed by participants' own awareness about substituting Arctic char with salmon and vice versa. Also, the focus groups were asked how much they were willing to pay for Arctic char and salmon, if they would pay more for one or the other. Lastly, short discussions were initiated on participants' views on Icelandic versus imported seafood.

2. Sample description

In total, 15 participants showed up for the three focus groups in Iceland, 8 females and 7 males. The average age distribution was fairly high, 55,2 years (females = 55,3 years; males = 55,1 years) with age ranging from 28 to 77. All participants had tasted both Arctic char and salmon. They all claimed to buy and consume fish regularly.

Table 1. Description of the sample – summary statistics

	Total	%
Gender		
Female	8	53%
Male	7	47%
Age		
18-30	1	7%
31-40	3	20%
41-50	2	13%
> 50	9	60%
Tasted Arctic char	15	100%
Tasted salmon	15	100%
Buy consciously sustainable fish	0	0%
N	15	100%

3. Results of the focus groups

3.1 FISH PURCHASE CRITERIA

The focus groups all started with a discussion about what criteria they use when buying fish. Most participants mentioned that the fish had to be fresh or as new as possible. The appearance of the fish was a quality indicator for most, being firm to the touch, having shiny eyes and preferably with a bit of fish slime on it. Favourable price was a frequently mentioned criteria. Other criteria that were mentioned by participants were a sense of adventure when buying fish (e.g. tasting something new), buying fish that is in season (e.g. salmon tastes best midsummer, more fat) and what fish species was most favoured by members of the household. Further mentioned was premade fish courses, ready for cooking. One participant would not eat fish unless it had been hung outside for at least 3 days prior to consumption. Additionally, almost all participants preferred buying their fish in fish stores as opposed to prepacked fish in supermarkets. Most participants viewed staff at these stores as specialists, giving great service and recommendations, trusting that such stores supply the best quality available. As one participant described her experience:

"Yes, it's somehow this sense of reliability buying the fish in a fish store" (Participant 2, female, FG 3).

3.1.1 Perception of labels as fish purchase criteria

When participants were asked about their use of labels (e.g. organic, sustainable, ecological) when buying fish, none of the participants described using such criteria and thought that it was not necessary when buying fish in Iceland. Most did not believe such labels existed for the Icelandic fish market but were aware of such labels when Icelandic fish was exported. Participants described that outside of Iceland, there was a prerequisite for such labels. Most participants said they assumed that Icelandic fish was the best quality and needed no labels. Labels were also perceived with scepticism and disbelief about what they represented and their reliability. Some even mentioned that labels were just a marketing tool to increase prices on products. Fish stores were often mentioned by participants as a hallmark of quality. A few older participants also described that their sense organs served as their main guidance for quality, labels were not necessary.

3.1.2 Perception of Icelandic versus imported seafood

Although some participants described that Icelandic fish with the best quality was exported to other countries due to greater price value outside of Iceland, Icelandic fish was the preferred choice by all participants. As two participants described:

"I think that we [Icelanders] are relatively exacting when it comes to fish" (Participant 2, male, FG 2).

"I've lived abroad and when you heard of Icelandic fish being sold somewhere, you did not think twice about travelling long distances to get your hands on it and paid much more for it than you should have just because of this image you have of Icelandic fish being much better than any other fish" (Participant 1, male, FG 2).

A few participants described that they had tasted or bought imported salmon (e.g. Norway and South-America). Imported fish was linked to lower quality and being cheap relative to local fish. Other imported seafood that was mentioned by participants such as shrimp, lobster and squid, were positively viewed because those were deficient in Iceland:

"I find it somehow all right to import what we do not have" (Participant 4, female, FG 2).

3.2 PERCEPTION OF ARCTIC CHAR AND SALMON

Participants were shown Figure 1 with both fresh and fileted Arctic char and salmon. They were able to correctly differentiate between the two salmonids and further asked what they associated with each species.



Figure 1. Arctic char and salmon shown to participants both as fresh whole fish and fillets

3.2.1 Associations with Arctic char

Arctic char was perceived by participants as tasting good. Most described the taste as very good and a few described it as a 'delicacy'. Most participants described Arctic char as a fish they consume rarely but on special occasions. As one participant described the reason for its rare consumption was due to scarcity. Participants associated Arctic char with bones and having delicate and lean meat. Also, a few participants perceived it to be a seasonal product, mostly consumed during the summer as it is one of the main fish species caught in fresh water around the country. It was also associated with childhood for many, as it is something that was often consumed then but rarely at present times. Participants described Arctic char as easy to cook. Cooking methods and dishes that were mentioned were: smoked, gravlax, pan fried in butter, grilled and gratinated. Clearly, Arctic char was associated with diverse preparation methods, most participants preferring it smoked.

3.2.2 Motives and barriers for Arctic char consumption

The main barriers that participants described for Arctic char consumption, were price, availability and bones. Figure 2 was shown to participants to motivate their descriptions, showing both packaged Arctic char and salmon (unlabelled), differently processed (e.g. fresh filets, smoked, gravlax). Price was almost always mentioned as a barrier although participants were conscious about the fact that overall fish prices are high, not only for Arctic char. Arctic char was perceived by many as more of a seasonal product which in turn affected availability. Also, one participant described rarely seeing Arctic char in fish stores. Some participants mentioned cooking Arctic char as an inconvenience due to the fine fish bones found in the meat. One participant even described how she would completely lose her appetite if she would feel a bone from the fish in her mouth.

Some participants described that habit was a barrier in their consumption, not buying Arctic char due to the habit of buying other fish.

When participants were asked what would motivate their Arctic char consumption, most mentioned price. If price would decrease they would buy more. Participants also thought that if the bones from the fish would be picked out before buying it, it would motivate their consumption. A few participants mentioned lack of marketing as a possible reason for its small consumption. One participant talked about marketing it with pictures of appetizing Arctic char dishes. This would possibly create a new habit of buying Arctic char.

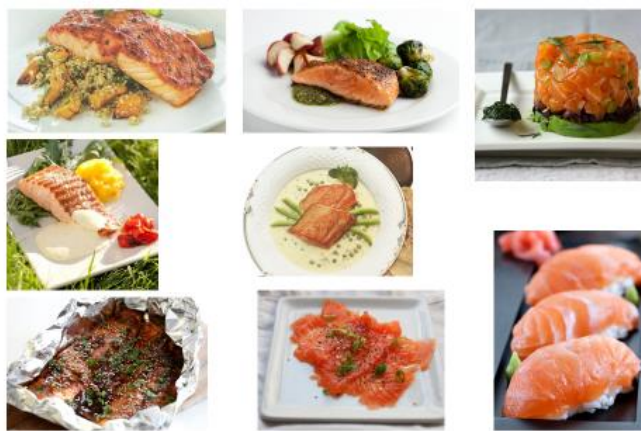


Figure 2. Arctic char and salmon dishes shown to participants

3.2.3 Associations with salmon

Participants associated salmon with good taste. However, many described that the taste was inconsistent. This inconsistency was mainly explained by the fact that it was either wild salmon or farmed salmon, farmed salmon being more fat. So, the environmental conditions where salmon is bred affected participants' perception of how the salmon would taste. Wild salmon was associated with firmer and leaner meat but farmed fish was associated with softer and fattier meat, even greasy. Some participants linked the difference to the fact that wild salmon does more exercise than farmed salmon. Salmon was also associated with healthy lifestyle and children preferring it over white fish. Overall, participants described the meat of salmon as big and flaky (e.g. easy to pull apart). Also, salmon was associated by a few participants as a seasonal product. Further, participants described the image of salmon changing from being a delicacy, rarely consumed in the past, to being a mundane fish in present times. Many participants associated salmon with difficulty in cooking. They said that it can be very easy to overcook salmon which affects the taste and consistency of the meat. Cooking methods and dishes that were mentioned were: boiled, smoked, gravlax, grilled, pan fried and oven cooked with marinate.

3.2.4 Motives and barriers for salmon consumption

Participants were again shown Figure 2 to initiate discussion of motives and barriers for salmon consumption. As with Arctic char, price was a main barrier for most participants for more salmon consumption. Some participants only consumed wild salmon during spring and summer, so they perceived it as a seasonal product. One participant described his main barrier for more salmon consumption being that there was no good fish store in his vicinity. Cooking salmon properly was described as a barrier by some participants, the problem being overcooking the salmon. The main motives that were mentioned by participants were lowering the price and the availability of premade meals, ready for cooking.

3.2.5 Similarities and differences between Arctic char and salmon

Figure 3 was shown to participants to show different Arctic char and salmon products (unlabelled), differently processed (e.g. fresh filets, smoked, gravlax). When comparing Arctic char with salmon, participants perceived the colour as the main similarity. Only a few participants thought the taste was similar and that they would not recognise the difference in a blind test. Most participants described a distinct taste difference between the two. Salmon, compared to Arctic char, was described as a larger fish, with thicker and longer filets. Many participants described the taste of Arctic char as stronger and more flavourful. When it came to comparing preferences between smoked Arctic char filets and smoked salmon filets, the majority of participants preferred smoked Arctic char filets because of convenience of the small filet sizes. Also, many described the taste as better. Smoked or gravlax salmon filets were also mentioned as a product some participants consumed on special occasions.

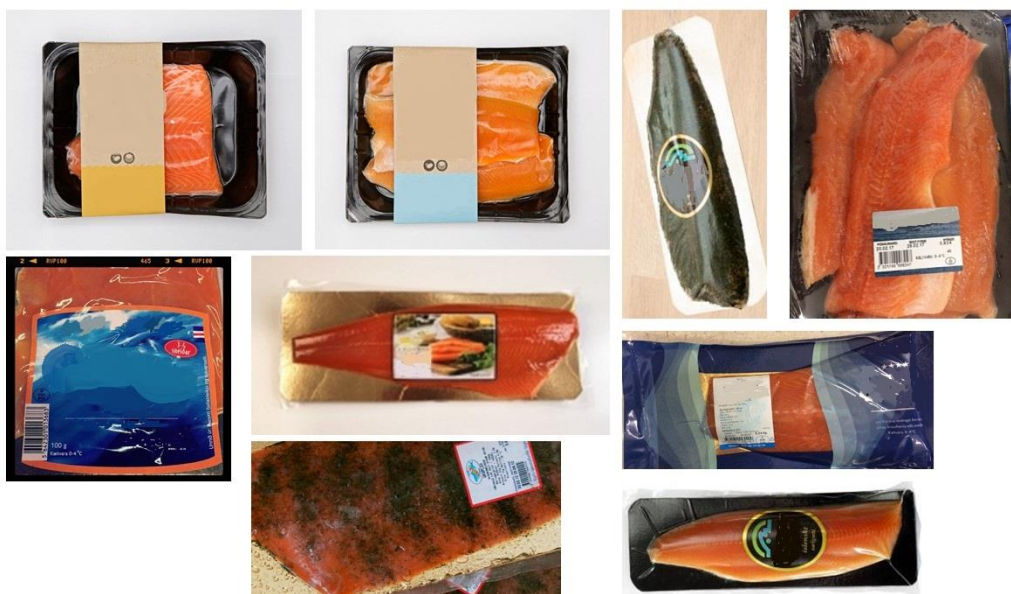


Figure 3. Packaged Arctic char and salmon, both fresh filets and smoked or gravlax.

Participants were also asked to compare their willingness to pay for Arctic char and for salmon. Eleven participants were willing to spend more money on Arctic char compared to four willing to pay more for salmon. It seemed that Arctic char was perceived more as a delicacy and more scarce than salmon. When participants were asked if they would ever substitute Arctic char for salmon or vice versa, few participants said they would substitute Arctic char with salmon and substitute salmon with Arctic char. One participant explained that he would not substitute salmon for Arctic char because of the bones in the Arctic char. On the other hand, most participants said that they would substitute smoked Arctic char with smoked salmon and substitute smoked salmon with smoked Arctic char.

3.3 PERCEPTION OF ORGANIC SEAFOOD AND DIFFERENT TYPES OF FISH FARMING

Most participants understood the term organic seafood as seafood caught in its natural habitat. Participants did not seem to differentiate between wild fish and organic fish, all fish in the nature was perceived as organic. As one participant described:

"I've heard about organic seafood but did not understand it. In my opinion, everything from the ocean is organic, except maybe farmed shrimp, salmon or such processes" (Participant 1, male, FG 3).

When it came to the question of organic fish farming, many had not heard of the term before but a few described what they thought it entailed. Those participants perceived organic seafood as an environmentally friendly process, the fish had not come in contact with any unnatural chemicals through feeding and also that it resided in unpolluted habitats. As the same participant described:

"There's maybe a need for some common awareness of the difference between organic fish farming and other fish farming. Do they feed the fish with something else than fishmeal or whatever they used to feed them with?" (Participant 1, male, FG 3).

Two participants were aware of organic fish farming but none of the participants were aware of such farming in Iceland. Furthermore, the majority of participants expressed overall scepticism with supervision and surveillance of organic productions.



Figure 4. Two different types of fish farming operations were shown to participants, land farming (left) and net-cage farming (right).

Participants were shown Figure 4 to explore their perception of different types of fish farming. Most participants described the main difference being that one was operated on land, the other in the ocean. Some participants expressed a preference for land fish farming due to the risks of fish releasing in net-cage farming. On the other hand, some perceived land fish farming as unnatural. For those that were aware of the difference between these two types of fish farming, there seemed to be a perception of more control of environmental factors in land fish farming. One participant also mentioned that the land fish farming was much more expensive, although he preferred that over net-cage fish farming.

3.4 ASSOCIATIONS WITH SUSTAINABILITY WITH RESPECT TO SEAFOOD AND INFORMATION PROVISION

Each focus group was asked to discuss their perceptions of what sustainability with respect to seafood meant to them. Almost all participants understood the concept as not overfishing and maintaining the fish species by controlled fisheries management. One participant had never heard the term before. Another participant explained that he did not believe the concept existed in reality due to changes and evolution in nature. Only one participant mentioned that the term indicated that the fishing industry would be economically sustainable. Never the less, most participants perceived the term sustainable as vague and lacking a clear definition:

"The definition that I have in mind of the term sustainable is the respect for nature, that you are not depleting the environment and natural stock so that it is not recoverable. Also, it is how you catch the fish, that it is done in agreement with nature. The term sustainable is never the less almost as broad and vague as possible. But in essence I think the term means that all the chains of respect are sustainable" (Participant 1, male, FG 2).

When asked if participants consciously tried to buy sustainable seafood, none claimed to do so. Instead, all participants assumed the fish they buy was sustainable. The main argument given for this assumption by most participants, was that the Icelandic quota system ensures sustainable seafood:

"The original purpose of the quota system was of course to direct or control the fishing of species" (Participant 4, female, FG 2).

And as one participant described his view towards the quota system:

"I try to eat cod as much as I can, there is too much of it" (Participant 1, male, FG 1).

3.4.1 Perception of retailers' claims of sustainability

In all focus groups, participants were asked about their perception of sustainability claims made by retailers/fishmongers. Firstly, participants directly linked fishmongers with retailers. Secondly, participants perceived Icelandic fish to be sustainable. Therefore, retailers or fishmongers were not expected to make such claims. However, some participants envisioned fishmongers and retailers declaring (e.g. with a logo or label) that all their fish products were either organic or sustainable, as a positive development.

3.4.2 Perception of seafood guides issued by NGOs

Only two participants stated that they were aware of seafood guides issued by NGOs. Most were not aware of the existence of such guides. Some participants who had not been aware of their existence became interested in the practicality of these guides but none of the participants thought they would ever use such guides, at least when it came to seafood:

"You just assume that everything is OK" (Participant 1, male, FG 2).

Participants were especially introduced to the idea of an app which would serve to inform consumers about, for example origin and sustainability of various products using the camera of a smartphone to scan products' bar codes. They were shown an existing app which was still in development at the time of the interviews, called Bonafide. Most participants did not imagine using such an app for their daily grocery shopping but found it important for informational transparency. Some saw the benefit of using such an app (i.e. with respect to food allergies), others were sceptical on who to trust with publishing right information. Participants expressed concerns on how an app could help when going to the fish store, where the fish lies in trays behind glass counters. Here are two perceptions from the focus groups on the use of the app:

"I think that I would not use an app like this. I just trust that the fish is good, fresh and in decent shape here in Iceland" (Participant 3, male, FG 1).

"I could much more see myself using this app for other food products than fish, because you kind of just presuppose that the fish is good quality" (Participant 2, male, FG 2).

Although the participants did not foresee themselves using such guides or apps in relations to seafood, most perceived this development as a positive thing. Some expressed that they could see future generations making more use of such technology.

3.4.2 Preference for information communication with respect to seafood

Overall, the participants were interested in receiving information about sustainability, origin and organic production. However, most participants did not see themselves benefiting from such information concerning seafood and did not think that they would actively seek out mediums that offered more details about it. Participants were asked how they would like to be informed about sustainability, organic production and origin of seafood. Most preferred that fish stores somehow marked the price tags with the concerning labels. A few mentioned that they would like the fish stores to mark seafood with information on how the fish was caught (e.g. with a line, with a net) and if the fish was in season. Seasonal information would give those participants an idea of how the meat was and if the fish was fat or lean.

“I would like to be informed about these things, whether I believe it or not, but I think that it starts with something like this [guides, apps] and then it will be investigated when people make claims about sustainability and organic with respect to their products” (Participant 4, female, FG 2).

4. Highlights

- Participants did not think that labels were necessary in Iceland for Icelandic seafood, although they were aware that exported fish from Iceland was preconditioned to have labels.
- Arctic char's main barriers for consumption were high pricing, that it was a seasonal product³ which in turn affected availability, and the inconvenience the fish bones entailed.
- The main barriers for salmon consumption were price and difficulty with cooking. Also, it was perceived as a seasonal product.
- Most participants were willing to pay more for Arctic char than for salmon and Arctic char was perceived as more of a delicacy than salmon.
- Organic fish was perceived as fish caught straight from the ocean and most participants were not aware of the term 'organically' farmed fish.
- Participants understood the concept of sustainability as not overfishing and maintaining the fish species by controlled fisheries management, although the concept was perceived as vague and lacking a clear definition.

³ Many participants preferred wild Arctic char or salmon rather than farmed Arctic char or salmon, which affected their perception of both Arctic char and salmon as seasonal products.

-
- Sustainability with respect to seafood was directly linked to the Icelandic quota system. The quota system was perceived to secure sustainability and therefore, none of the participants consciously purchased sustainable seafood.
 - Retailers were not expected to make sustainability claims although it was viewed as a positive development.
 - Participants did neither see themselves using seafood guides nor apps in relations to seafood but viewed it as a positive development.
 - More information in fish stores was viewed positively although not necessary. The participants did not think they would use other channels of information communication (e.g. off-/online) to obtain information about seafood, but thought it would perhaps be useful for other food commodities.

PANEL SURVEY

RESEARCH DESCRIPTION

Collaborators	MarkMar ehf., Guðrún Ólafsdóttir and Sigurður G. Bogason
Objective	To explore Icelanders' trust towards Icelandic fish farming and information on seafood
Data collection	16.03.17 – 03.05.17
Date of report	May 16 th , 2017
Administration	The Social Science Research Institute, University of Iceland (SSRI) http://fel.hi.is/english
Preparation and data collection	Andrea Gerður Dofradóttir
Preparation for data analysis	Ævar Þórólfsson
Report	Ævar Þórólfsson Árni Bragi Hjaltason

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INTRODUCTION

In the survey on national affairs which is organised by MarkMar and conducted by the Social Science Research Institute of the University of Iceland the attitudes of Icelanders towards various social issues are explored. In March to May 2017 respondents answered, amongst others questions about their attitudes towards Icelandic farmed seafood. This report outlines the results of those questions.

The data was obtained from a sample of 1733 members in the Social Science Research Institute's internet panel. The internet panel consists of people 18 years old or older in Iceland that have agreed to participate in internet surveys conducted by the Social Science Research Institute. The panel is built using a random sample from the National Register of Iceland. The accumulation of participants in the internet panel is a gradual process and the combination of participant in the panel is carefully monitored. Among other things it's ensured that the distribution of gender, age, residence, education and income of participants resembles the general population, 18 years old or older. By ensuring the quality of the internet panel as demonstrated here above it is possible to generalize about research findings that are based on the panel.

DESIGN AND ADMINISTRATION

The data were collected using an online survey. A stratified random sample of 1500 individuals was obtained from the Social Science Research Institute's internet panel. The sample was stratified by gender, age and residence to reflect the composition of the Icelandic population in the best possible way. Due to a certain project in the survey, an additional sample of 233 individuals was obtained from specific postal codes in the east of Iceland, making the total sample 1733 individuals. The data was collected between March 16th and May 3rd 2017. In total 1120 respondents participated in the survey. The response rate was 65% (see Table i).

Table i. Research design and administration

Research design	Online survey
Data collection	16.03.17-03.05.17
Sample size	1733
Number of respondents	1120
Response rate	65%

Table ii shows the distribution among respondents and the Icelandic population by gender, age and residence. As can be seen there is a difference in the age distribution between respondents and the population in general, where response is lower in the youngest age group than expected. Also, there is a difference in the educational distribution between respondents and the population in general, where responses are higher than expected in the group that consist of responses with University education and lower than expected in the group that consists of respondents that only have primary education. In addition, there was a difference in residence due to the additional sample gathered in the east of Iceland which deviated the sample. Therefore, the data was weighted by gender, age, residence and education in order for the results to represent the population most correctly. The additional sample in the east of Iceland was especially cared for when the data was weighted.

Table ii. Comparison of distribution by gender, age and residence of the respondents and the population

	Number of respondents	Proportion of respondents	Population	Proportion of the population
Gender				
Male	551	49,2%	130.409	50,4%
Female	569	50,8%	128.156	49,6%
Age ***				
18-25 years old	84	7,5%	39.362	15,2%
26-35 years old	168	15,0%	48.624	18,8%
36-45 years old	188	16,8%	44.905	17,4%
46-55 years old	224	20,0%	42.572	16,5%
56-65 years old	230	20,5%	38.988	15,1%
66-75 years old	141	12,6%	25.777	10,0%
76 years and older	85	7,6%	18.337	7,1%
Residence***				
Capital region	612	54,6%	166.120	64,2%
Rural region	508	45,4%	92.445	35,8%
Education***				
Primary education	151	14,1%	71.730	32,6%
Secondary school education	415	38,7%	82.300	37,4%
University education	507	47,3%	66.100	30,0%

Significant difference between groups; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

DATA PROCESSING

Responses to the survey were processed with the appropriate statistical analysis for each question. Tables in the report show percentages which are calculated based on weighted results. The report only shows answers from participants that chose to answer the questions. Because of this the total number of responses can differ between questions. Tables show percentage and the number of answers divided by gender, age, residence, marital status, education, position in the labour market, profession, income and whether there are children in the household. In some instances, columns in the tables show the addition of two percentages. In those instances, it can happen that the percentage that is shown in the column is not exactly the same as when the two percentages in the table are added together. The reason for this is that the percentage in the table is rounded to the nearest decimal.

The chi-square significance test is used to evaluate whether different percentages between groups are statistically significant. If statistically significant difference occurs, it is indicated with stars. One star indicates that there is less than a 5% probability that the difference between different groups of respondents will occur if there is no difference between the groups in the population ($p \leq 0,05$), that is among Icelanders in February 2015. Two stars indicate that there is less than 1% probability that the difference between groups of respondents occurs if there is no difference between the groups in the population ($p \leq 0,01$) and three stars indicate that there is less than a 0,1% probability that the difference between groups of respondents will occur if there is no difference between the groups in the population ($p \leq 0,001$). If the significance test is invalid because of few responses in the group, it is indicated with the abbreviation *inv.*

BACKGROUND INFORMATION

Table 1. Gender



	Number		Ratio	Confidence int. +/-		Proportion
	before weighting	after weighting				
Male	551	557	50%	2,9%		50%
Female	569	563	50%	2,9%		50%
Total	1120	1120	100%			

Table 2. Age





	Number		Ratio	Confidence int. +/-		Proportion
	before weighting	after weighting				
18-29 years old	143	248	22%	2,4%		22%
30-44 years old	279	308	28%	2,6%		28%
45-59 years old	343	281	25%	2,5%		25%
60 years or older	355	283	25%	2,5%		25%
Total	1120	1120	100%			

Table 3. Residence











	Number		Ratio	Confidence int. +/-		Proportion
	before weighting	after weighting				
Capital region	612	710	63%	2,8%		63%
Rural region	508	410	37%	2,8%		37%
Total	1120	1120	100%			

Table 4. What is the highest level of education you have finished?

	Number		Ratio	Confidence int. +/-		Proportion
	before weighting	after weighting				
Primary education	151	350	33%	2,8%		33%
Education in form of internship	82	70	7%	1,5%		7%
Apprenticeship - Vocational education - Secondary education	169	140	13%	2,0%		13%
Academic education - Secondary education	164	191	18%	2,3%		18%
Private school on university level education	67	37	3%	1,1%		3%
Basic university education	249	161	15%	2,1%		15%
Post graduate university education	171	112	10%	1,8%		10%
PhD education	20	12	1%	0,6%		1%
Number of responses	1073	1073	100%			
Do not answer	47	47				
Total	1120	1120				

In the analysis of the results, education is combined into four groups, where Education in form of internship and Apprenticeship are combined into Vocational education - Secondary education and all education on a university level is combined into University education.

RESULTS

Table 5. How well or poorly do you trust that Icelandic farmed seafood (salmon and Arctic char) is produced in a sustainable way? Sustainable entails production to meet environmental, economic and social objectives?

	Number		Ratio	Confidence int. +/-	Proportion
	before weighting	after weighting			
Very well	50	53	5%	1,4%	5%
Rather well	314	317	31%	2,9%	31%
Neither well nor poorly	379	409	40%	3,0%	40%
Rather poorly	205	172	17%	2,3%	17%
Very poorly	77	63	6%	1,5%	6%
Number of responses	1025	1013	100%		
Don't want to answer	95	107			
Total	1120	1120			

Table 5 shows the overall results for the first question on how well or poorly Icelanders trust that Icelandic farmed seafood is produced in a sustainable way. About 36% of respondents trust very or rather well that Icelandic farmed seafood is sustainably produced. The large percentage of neutrals (neither well nor poorly) could possibly indicate that Icelanders do not think much about sustainability when it comes to locally produced seafood.

Table 6. How well or poorly do you trust that Icelandic farmed seafood (salmon and Arctic char) is produced in a sustainable way? Sustainable entails production to meet environmental, economic and social objectives? – **Background analysis**

	Very well	Rather well	Neither well nor poorly	Rather poorly	Very poorly	Number after weighting	Number before weighting	Very or rather well
Total	5%	31%	40%	17%	6%	1013	1025	36%
Gender								
Male	6%	32%	38%	16%	8%	524	520	39%
Female	4%	30%	43%	18%	5%	490	505	34%
Age								
18-29 years old	6%	31%	48%	13%	3%	219	123	37%
30-44 years old	4%	33%	35%	20%	8%	276	247	37%
45-59 years old	6%	27%	44%	17%	6%	255	319	33%
60 years or older	5%	34%	37%	17%	8%	264	336	39%
Residence***								
Capital region	3%	29%	42%	19%	6%	649	563	32%
Rural region	9%	35%	37%	13%	6%	365	462	44%
Education**								
Primary education	7%	36%	43%	10%	4%	313	133	43%
Vocational education - Secondary education	4%	28%	45%	17%	6%	200	240	32%
Academic education - Secondary education	6%	30%	39%	20%	5%	176	152	36%
University education	3%	30%	35%	23%	9%	303	479	34%

Significant difference between groups; * $p < 0,05$, ** $p < 0,01$, *** $p < 0,001$

0% 25% 50% 75% 100%

When the background data is analysed, residence and education showed significant differences between respondents (Table 6). About 44% of individuals living outside of the capital region trusted very or rather well that Icelandic farmed seafood was produced in a sustainable way, compared to 32% living in the capital region. Also, amongst those who only had a primary education, 43% said they trusted very or rather well, compared to 32% with vocational education, 36% with academic education and 34% with university education. Significant difference was not found within age and gender.

The next question in the survey was in six parts. Participants were asked to consider how important or unimportant various factors influenced their added trust towards Icelandic farmed seafood, when considering information about origin, ingredients and production. These factors were (1) labelling on packaging, (2) information on social media, (3) reviews or opinion of others about products and producers, (4) communication on products from producers via apps (mobile phones), (5) public surveillance systems and (6) information on products provided by retailers/stores.

Table 7. *When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – Labelling on packaging?*






	Number		Ratio	Confidence int. +/-	Proportion
	before weighting	after weighting			
Very important	646	639	60%	2,9%	 60%
Rather important	313	301	28%	2,7%	 28%
Neither important nor unimportant	74	89	8%	1,7%	 8%
Rather unimportant	21	18	2%	0,8%	 2%
Very unimportant	10	10	1%	0,6%	 1%
Number of responses	1064	1057	100%		
Don't want to answer	56	63			
Total	1120	1120			

Table 7 shows the overall results for the first factor, labelling on packaging. Almost nine out of ten respondents who answered the question considered labelling on packaging to be very or rather important in influencing their added trust towards products, when considering information about origin, ingredients and production of seafood. Only 3% considered it to be very or rather unimportant.

Table 8. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – Labelling on packaging? – **Background analysis**

	Very important	Rather important	Neither important nor unimportant	Rather unimportant	Very unimportant	Number after weighing	Number before weighing	Very or rather important
Total	60%	28%	8%	2%	1%	1057	1064	89%
Gender**								
Male	56%	30%	11%	3%	1%	537	531	86%
Female	65%	27%	6%	1%	1%	520	533	92%
Age***								
18-29 years old	48%	34%	13%	2%	2%	228	126	82%
30-44 years old	57%	31%	10%	1%	1%	291	264	88%
45-59 years old	70%	23%	4%	1%	1%	276	335	93%
60 years or older	65%	26%	7%	2%	0%	263	339	91%
Residence								
Capital region	61%	26%	9%	2%	1%	676	584	88%
Rural region	59%	32%	7%	2%	0%	381	480	91%
Education**								
Primary education	65%	22%	12%	1%	0%	334	143	87%
Vocational education - Secondary education	62%	29%	6%	3%	1%	203	244	91%
Academic education - Secondary education	51%	38%	7%	3%	2%	184	159	88%
University education	59%	30%	8%	2%	2%	315	497	89%

Significant difference between groups; * $p < 0,05$, ** $p < 0,01$, *** $p < 0,001$

0% 25% 50% 75% 100%

Table 8 shows the results when analysed with regards to background data. Here, gender, age and education all showed significant differences within each group. Females seemed to find labelling on packaging slightly more important in influencing their added trust towards products than males did, 86% of males compared to 92% of females. Although a very small difference in percentage but statistically significant, there seemed to be differences in age groups, where the youngest group of 18-29 year olds found labelling on packaging slightly less important in influencing their added trust towards the seafood product (82%) than the other age groups. Slight differences were between different educational backgrounds of the respondents. Those that had vocational education, 91% found labelling on packaging very or rather important in influencing their added trust compared to 87% with primary education, 88% with academic education and 89% with university education.

Table 9. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – Information on social media?

	Number		Ratio	Confidence int. +/-	Proportion
	before weighing	after weighing			
Very important	185	181	17%	2,3%	17%
Rather important	320	355	34%	2,9%	34%
Neither important nor unimportant	347	333	32%	2,8%	32%
Rather unimportant	111	100	10%	1,8%	10%
Very unimportant	97	85	8%	1,6%	8%
Number of responses	1060	1054	100%		
Don't want to answer	60	66			
Total	1120	1120			

The next factor that participants evaluated how important or unimportant it would influence their added trust towards seafood products when considering information about origin, ingredients and production, was information on social media. About 51% of the respondents that answered the

question found it very or rather important and 32% found it neither important nor unimportant. Also, 18% found information on social media very or rather unimportant (see table 9).

Table 10. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – Information on social media? – **Background analysis**

	Very important	Rather important	Neither important nor unimportant	Rather unimportant	Very unimportant	Number after weighting	Number before weighting	Very or rather important
Total	17%	34%	32%	10%	8%	1054	1060	51%
Gender*								
Male	14%	34%	32%	11%	10%	536	529	48%
Female	20%	33%	32%	8%	6%	518	531	54%
Age								
18-29 years old	13%	32%	34%	9%	12%	227	125	45%
30-44 years old	14%	34%	33%	12%	7%	289	262	48%
45-59 years old	19%	33%	32%	8%	7%	276	336	52%
60 years or older	22%	35%	28%	9%	6%	262	337	57%
Residence								
Capital region	17%	34%	30%	9%	10%	674	581	51%
Rural region	17%	34%	34%	10%	5%	380	479	51%
Education***								
Primary education	16%	44%	30%	6%	4%	334	143	60%
Vocational education - Secondary education	24%	32%	29%	9%	6%	203	245	56%
Academic education - Secondary education	17%	30%	32%	11%	10%	184	159	47%
University education	14%	26%	34%	12%	13%	312	492	40%

Significant difference between groups; * $p < 0,05$, ** $p < 0,01$, *** $p < 0,001$

0% 25% 50% 75% 100%

When the data was analysed with respect to respondents' backgrounds, significant differences were found within gender and education (see table 10). About 54% of females compared to 48% of males found information on social media very or rather important in influencing their added trust towards seafood products when considering information about origin, ingredients and production of seafood. Also, 60% of those with only primary education found information on social media very or rather important in influencing their added trust but only 40% of those with university education found social media information very or rather important in that respect.

Table 11. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – Reviews or opinion of others about products and producers?

	Number before weighting	Number after weighting	Ratio	Confidence int. +/-	Proportion
Very important	243	250	24%	2,6%	24%
Rather important	494	502	48%	3,0%	48%
Neither important nor unimportant	238	225	21%	2,5%	21%
Rather unimportant	57	47	4%	1,2%	4%
Very unimportant	31	30	3%	1,0%	3%
Number of responses	1063	1054	100%		
Don't want to answer	57	66			
Total	1120	1120			

Table 11 shows that of those that answered this question, 72% found that reviews or opinions of others about products and producers was very or rather important in influencing their added trust

towards seafood products, when considering information about origin, ingredients and production of seafood. Only 7% of those that answered found this kind of information very or rather unimportant.

Table 12. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – *Reviews or opinion of others about products and producers?* – **Background analysis**

	Very important	Rather important	Neither important nor unimportant	Rather unimportant	Very unimportant	Number after weighting	Number before weighting	Very or rather important
Total	24%	48%	21%	4%	3%	1054	1063	71%
Gender								
Male	22%	48%	20%	6%	4%	537	531	70%
Female	25%	47%	23%	3%	2%	517	532	72%
Age*								
18-29 years old	22%	45%	24%	3%	6%	228	126	67%
30-44 years old	26%	50%	17%	3%	3%	289	262	76%
45-59 years old	23%	49%	21%	5%	1%	276	336	72%
60 years or older	23%	46%	24%	6%	1%	262	339	69%
Residence								
Capital region	24%	49%	20%	5%	3%	674	584	72%
Rural region	24%	46%	24%	4%	3%	380	479	70%
Education*								
Primary education	24%	51%	20%	3%	2%	332	142	75%
Vocational education - Secondary education	26%	40%	26%	8%	1%	203	245	65%
Academic education - Secondary education	21%	50%	22%	3%	3%	184	159	72%
University education	24%	47%	19%	5%	5%	315	496	71%

Significant difference between groups; * $p < 0,05$, ** $p < 0,01$, *** $p < 0,001$

0% 25% 50% 75% 100%

The background analysis for this factor (Table 12) showed that when looking at age and education, there were significantly different results within the responses. Of those that were in the age group 30-44 years old, 76% found reviews or opinions of others about products and producers was very or rather important in influencing their added trust towards the product. The youngest age group found this information less important although the difference could not be said to be much. When it came to those with only primary education, 75% of those respondents found such information very or rather important compared to 66% of those that had vocational education.

Table 13. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – *Communication on products from producers via apps (mobile phones)?*

	Number before weighting	Number after weighting	Ratio	Confidence int. +/-	Proportion
Very important	88	97	9%	1,8%	9%
Rather important	169	202	19%	2,4%	19%
Neither important nor unimportant	383	369	36%	2,9%	36%
Rather unimportant	158	151	15%	2,2%	15%
Very unimportant	241	216	21%	2,5%	21%
Number of responses	1039	1034	100%		
Don't want to answer	81	86			
Total	1120	1120			

Participants seemed to stress less importance for the next factor in influencing added trust towards seafood products than the first three factors (see table 13). About 36% of those that answered the

question thought that communication on products from producers via apps was rather or very unimportant in influencing added trust, whereof 21% found it very unimportant. Also, 36% found it neither important nor unimportant and only 28% found this type of information very or rather important in influencing their added trust towards the product.

Table 14. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – Communication on products from producers via apps (mobile phones)? – **Background analysis**

	Very important	Rather important	Neither important nor unimportant	Rather unimportant	Very unimportant	Number after weighting	Number before weighting	Very or rather important
Total	9%	19%	36%	15%	21%	1034	1039	29%
Gender								
Male	9%	20%	36%	13%	23%	528	522	28%
Female	10%	19%	36%	16%	19%	506	517	29%
Age								
18-29 years old	9%	23%	33%	10%	25%	228	126	32%
30-44 years old	6%	19%	40%	17%	17%	287	260	26%
45-59 years old	11%	19%	36%	15%	19%	268	325	30%
60 years or older	11%	17%	33%	16%	24%	252	328	28%
Residence								
Capital region	9%	20%	37%	13%	21%	657	568	29%
Rural region	11%	19%	33%	18%	20%	377	471	29%
Education**								
Primary education	11%	25%	34%	14%	16%	326	139	37%
Vocational education - Secondary education	12%	17%	33%	18%	20%	197	237	29%
Academic education - Secondary education	8%	15%	40%	14%	22%	182	156	24%
University education	6%	17%	37%	13%	27%	309	487	23%

Significant difference between groups; * $p < 0,05$, ** $p < 0,01$, *** $p < 0,001$

Significant differences were only found within participants' education when analysing with respect to background (see table 14). The most difference was found between those that had primary education and those with university education, 37% of those with primary education found communication on products from producers via apps very or rather important in influencing their added trust towards the product, compared to 23% of those with university education.

Table 15. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – Public surveillance systems?

	Number before weighting	Number after weighting	Ratio	Confidence int. +/-	Proportion
Very important	648	643	61%	2,9%	61%
Rather important	301	281	27%	2,7%	27%
Neither important nor unimportant	74	83	8%	1,6%	8%
Rather unimportant	13	11	1%	0,6%	1%
Very unimportant	26	35	3%	1,1%	3%
Number of responses	1062	1053	100%		
Don't want to answer	58	67			
Total	1120	1120			

For those that answered this question, 88% found public surveillance systems very or rather important in influencing their added trust towards the product when considering information about

origin, ingredients and production of seafood, whereof 61% found it very important. Also, 4% of the respondents that answered the question found this factor very or rather unimportant (see table 15).

Table 16. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – *Public surveillance systems?* – **Background analysis**

	Very important	Rather important	Neither important nor unimportant	Rather unimportant	Very unimportant	Number after weighting	Number before weighting	Very or rather important
Total	61%	27%	8%	1%	3%	1053	1062	88%
Gender**								
Male	56%	28%	9%	1%	5%	537	530	85%
Female	66%	25%	7%	1%	1%	516	532	91%
Age								
18-29 years old	60%	30%	6%	1%	3%	225	123	90%
30-44 years old	59%	27%	10%	0%	5%	290	264	85%
45-59 years old	61%	26%	8%	2%	3%	276	336	87%
60 years or older	64%	24%	7%	2%	3%	262	339	88%
Residence*								
Capital region	61%	28%	6%	1%	4%	672	582	89%
Rural region	61%	24%	11%	1%	3%	382	480	85%
Education								
Primary education	59%	23%	12%	1%	5%	332	142	82%
Vocational education - Secondary education	60%	30%	7%	1%	2%	203	245	90%
Academic education - Secondary education	63%	27%	6%	1%	3%	182	157	90%
University education	62%	29%	6%	1%	3%	315	497	91%

Significant difference between groups; * $p < 0,05$, ** $p < 0,01$, *** $p < 0,001$

0% 25% 50% 75% 100%

Background analysis revealed significant differences within gender and residence but not for age and education. About 91% of females found public surveillance systems very or rather important in influencing their added trust towards the product but 85% of males found this factor very or rather important. Further, 89% of respondents living in the capital region found this factor very or rather important in influencing their added trust compared to 85% of those living in rural regions.

Table 17. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – *Information on products provided by retailers/stores?*

	Number before weighting	Number after weighting	Ratio	Confidence int. +/-	Proportion
Very important	413	424	40%	3,0%	40%
Rather important	372	376	36%	2,9%	36%
Neither important nor unimportant	182	162	15%	2,2%	15%
Rather unimportant	55	53	5%	1,3%	5%
Very unimportant	39	39	4%	1,1%	4%
Number of responses	1061	1053	100%		
Don't want to answer	59	67			
Total	1120	1120			

The last factor that participants were asked to evaluate the importance of influencing their added trust towards seafood products when considering information about origin, ingredients and production of seafood, was information on products provided by retailers/stores. The majority of those that responded to the question, that is 76%, found this type of information very or rather

important in influencing their added trust towards the product. On the other hand, 9% evaluated it as rather or very unimportant (see table 17).

Table 18. When considering information about origin, ingredients and production of seafood, how important or unimportant are the following factors in influencing your added trust towards the product? – Information on products provided by retailers/stores? – **Background analysis**

	Very important	Rather important	Neither important nor unimportant	Rather unimportant	Very unimportant	Number after weighting	Number before weighting	Very or rather important
Total	40%	36%	15%	5%	4%	1053	1061	76%
Gender***								
Male	35%	36%	18%	6%	6%	537	531	70%
Female	46%	36%	12%	4%	2%	516	530	82%
Age**								
18-29 years old	35%	39%	15%	7%	4%	226	125	74%
30-44 years old	42%	39%	11%	5%	2%	290	263	81%
45-59 years old	42%	38%	15%	4%	2%	275	334	79%
60 years or older	41%	27%	21%	4%	7%	262	339	68%
Residence								
Capital region	39%	35%	15%	6%	4%	672	582	75%
Rural region	42%	36%	15%	3%	3%	381	479	78%
Education**								
Primary education	40%	39%	15%	2%	4%	332	142	79%
Vocational education - Secondary education	47%	33%	9%	6%	5%	200	242	80%
Academic education - Secondary education	43%	31%	16%	9%	2%	184	159	74%
University education	34%	37%	19%	6%	4%	315	497	71%

Significant difference between groups; * $p < 0,05$, ** $p < 0,01$, *** $p < 0,001$

0% 25% 50% 75% 100%

Here, gender, age and education all showed significant differences between respondents in the background analysis. About 82% of females found this factor very or rather important in influencing their added trust towards the product compared to 70% of males. There were also significant differences between age groups, where 81% of 30-44 years old participants found information on products provided by retailers/stores very or rather important compared to 68% of the participants that were 60 years or older. Further, 71% of participants with university education found this factor very or rather important in influencing their added trust towards the product compared to 80% of those with vocational education, 74% of those with academic education and 79% of those with primary education.

HIGHLIGHTS

- High proportion of neutrals possibly indicates that Icelanders do not contemplate if they trust or distrust Icelandic seafood to be sustainably produced. Respondents from rural regions have more trust that seafood is sustainably produced than those living in the capital region and those respondents with primary education have more trust than those with other educational levels.
- Most participants viewed *labelling on packaging* to be an important factor in influencing added trust towards seafood. Females found it slightly more important than males, the youngest age group found it less important than older age groups.
- About half of the respondents found *information on social media* very or rather important in influencing added trust towards seafood. Females found it more important than males and those with primary education found such information more important than other educational levels, whereof those with university education found information on social media least important.
- Majority of respondents found *reviews or opinions of others about products and producers* to be important in influencing their added trust towards seafood products. The youngest age group found this information least important among the age groups and those with vocational education viewed it least important within the other educational levels.
- Overall, *communication on products from producers via apps* was not important to respondents. Those with primary education found it most important compared to those with university education who found it least important.
- About 88% of respondents viewed *public surveillance systems* very or rather important in influencing their added trust towards the product. Females as opposed to males found this more important and those living in the capital region found it more important than those living in the rural region.
- *Information on products provided by retailers/stores* was thought by most to be very or rather important. Females found it more important than males, 60 years and older found it least important within the age groups and those with university educations viewed it less important than other educational levels.

APPENDIX I

Guideline focus groups for WP 2 Task 2.4 – Identification of innovative seafood products – Trout and coastal fisheries

The order of the topics 'salmonids' and 'coastal fisheries' should be changed in each focus group! (The guidelines were adapted and translated to Icelandic)

Themes and main questions	Directions	Background and stand-by questions
1. Greeting and Introduction (5 minutes)	<ul style="list-style-type: none"> Greet participants. Have a short chat with everyone. Ask participants to create a name tag stating only their first name. Short introduction of the moderator and potential assistant: Name, area of expertise Point out privacy details: We would like to record the discussion for the purpose of data analysis. Everything you say will be treated confidentially. We will not identify you by name in any analysis originating from this discussion. In this context, I propose that we use only our first names during the discussion. Is it Ok with you that we record the discussion? <p>Fine, now I would like to show you our discussions rules and afterwards we will start the discussion and the recording.</p> <ul style="list-style-type: none"> Explain discussion rules Start recording 	<ul style="list-style-type: none"> The idea is to create a comfortable situation for everyone.
2. Icebreaker (5 minutes) <ul style="list-style-type: none"> Please tell us your first name and what do you look for when buying fish? 	<ul style="list-style-type: none"> After everyone gave a statement: Sum up the statements in a 'We'-sentence: E.g., Now we have here a very diverse list of purchase criteria. 	<ul style="list-style-type: none"> Create a sense of community
3. Associations with sustainable seafood (5 minutes) <ul style="list-style-type: none"> What does sustainable seafood mean to you? What are your associations? 		

<p>4. Purchase of sustainable fish (2 minutes)</p> <ul style="list-style-type: none"> Who of you buyes sustainable/responsible sourced fish? Please lift your hand. 	<ul style="list-style-type: none"> The assistant should write down the number for each focus group. 	<ul style="list-style-type: none"> Who tries to buy sustainable/responsible sourced fish? Also occasionally is included here
<ul style="list-style-type: none"> If consumers are confused by the question the moderator might give some hints like: 'Are you looking out for example for the MSC-label, organic labels, fair trade labels or similar indications?' - 'Are you trying to avoid overfished species?' – 'Are you looking out for products who guarantee better employment conditions?'. Sustainable products do not need to show a label to be perceived as sustainable However, the moderator needs to be careful to not suggest too much to the participants because this can generate socially desirable answers. Also, the moderator can define sustainability as follows ' the respect of ecological, biological, economic and social equilibriums'. 		
<p>5. Associations with Arctic char and salmon (5 minutes)</p> <p>Ok, now we like to talk about two other fish species: Arctic char and salmon.</p> <ul style="list-style-type: none"> Who has tasted trout thus far? Please lift your hand. What do you think about trout? And what are your thoughts about/ -associations with salmon? 	<ul style="list-style-type: none"> (When you start talking about salmon and Arctic char show slide X (empty slide)) → only if other topic with slides has been mentioned beforehand Count how many participants have already tried trout and note the number. This should be done by the assistant. Give the participants some time to articulate their thoughts about trout before passing to salmon. 	
<p>6. Motives and barriers for Arctic char consumption (5 minutes)</p> <ul style="list-style-type: none"> What do you in particular like about trout? 		<ul style="list-style-type: none"> What prevents you from eating (more) Arctic char? What could be done to motivate you to eat (more) Arctic char?
<p>7. Similarities and differences between Arctic char and salmon (10 minutes)</p> <ul style="list-style-type: none"> When you think of smoked and filleted salmon and/or Arctic char: Do you perceive salmon and trout as similar for example in taste? And what about fresh trout and salmon? Please compare the two. 	<ul style="list-style-type: none"> Relate the questions to the statements made to the introductory question. Discuss differences and commonalities with the participants. 	<ul style="list-style-type: none"> What differences do you perceive? What do you think are commonalities and differences between salmon and Arctic char? Do you perceive any differences in the production process? Do you have preferences for one of the production processes?
<p>8. Perception of organic seafood (10 minutes)</p> <ul style="list-style-type: none"> What do you understand under the term organic seafood? 		<ul style="list-style-type: none"> Do you also find organic labels on captured seafood?

<ul style="list-style-type: none"> Please compare organic aquaculture products with fisheries products. What are differences and commonalities? 		<ul style="list-style-type: none"> OR Can captured seafood also be labelled with an organic label?
<p>9. Communication about sustainability with respect to seafood (10 minutes)</p> <ul style="list-style-type: none"> How would you like to be informed about the sustainability of a seafood product? Do you know seafood guides issued by NGOs? Would you consider using your smartphone/app to gain further information about origin of fish and/or sustainability? 	<ul style="list-style-type: none"> Consider the answers to the ice breaker question and relate them to this question if suitable. Consider the statements made to the question before hand. It might be that participants already mentioned seafood guides. If this is the case ask directly question related to the use of seafood guides. 	<ul style="list-style-type: none"> What about labels? Do recommendations from seafood guides influence your choice of fish?
<p>10. Perception of sustainability claims made by the retail (5 minutes)</p> <ul style="list-style-type: none"> Some retailers commit themselves increasingly to sustainable products. What do you think about this commitment? 		<ul style="list-style-type: none"> Would you prefer such a commitment over the display of labels on products? Why?
<p>11. Conclusion (5 minutes)</p> <ul style="list-style-type: none"> Finally, I would like to thank you for participating in this discussion. We have gained many interesting insides. 	<ul style="list-style-type: none"> Shortly sum up the most important results. Thank participants for their participation and let them know that the incentive will be handed out by your assistant after the participants have signed a receipt. 	

Questions in Panel Survey

Q1

Hversu vel eða illa treystir þú því að íslenskar fiskeldisafurðir (lax og bleikja) séu framleiddar á sjálfbæran hátt? Með sjálfbærni er átt við stjórnun á eldi og framleiðslu í samræmi við umhverfisleg, hagræn og félagsleg markmið?

- ☐ Mjög vel (1)
- ☐ Frekar vel (2)
- ☐ Hvorki vel né illa (3)
- ☐ Frekar illa (4)
- ☐ Mjög illa (5)
- ☐ Vil ekki svara (9)

Q2

Þegar horft er til upplýsinga um uppruna, innihald og framleiðslu fiskafurða, hversu miklu eða litlu máli skipta eftirfarandi þættir til að auka traust þitt sem neytanda til afurðarinnar?

	Mjög miklu (1)	Frekar miklu (2)	Hvorki miklu né litlu (3)	Frekar litlu (4)	Mjög litlu (5)	Vil ekki svara (9)
Merkingar umbúða (Q46_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upplýsingar á samfélagsmiðlum (Q46_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Umsagnir annarra um vörur og framleiðendur (Q46_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snjallsímaforrit sem miðla til þín upplýsingum um matvæli frá framleiðanda (Q46_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opinbert eftirlit (Q46_5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upplýsingar söluaðila (Q46_6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1. How well or badly do you trust that Icelandic farmed seafood (salmon and Arctic char) are produced in a sustainable way? Sustainable entails production to meet environmental, economic and social objectives?

- ☐ Very well
- ☐ Rather well
- ☐ Neither /nor
- ☐ Rather badly
- ☐ Very badly
- ☐ Don't want to answer

Q2. When considering information about origin, ingredients and production of seafood, how much or little do following factors influence your added trust towards the product?)

	Mjög miklu (1)	Frekar miklu (2)	Hvorki miklu né litlu (3)	Frekar litlu (4)	Mjög litlu (5)	Vil ekki svara (9)
Labelling on packaging (Q46_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information in social media (Q46_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reviews or opinion of others about products and producers (Q46_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication on products from producers via apps (mobile phones) (Q46_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public surveillance systems (Q46_5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information on products provided by retailers /stores (Q46_6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>