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## EUROPEAN CONSUMERS' PERCEPTION OF FISH FARMING AND NEED FOR INFORMATION

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### Introduction

For many consumers, aquaculture is not a well-known sector of food production (Fernández-Polanco & Luna 2012). To study the potential ways to increase the awareness, in Finland, France and Spain we assessed consumers' perceptions on fish farming and on the information they receive and would like to receive. Our previous results showed that consumers receive a limited information about fish farming but are open to receive more (Latvala et al., 2021). The present work is focusing the perceptions of consumers about their knowledge on fish farming techniques and related fields, and their interest to learn about them.

### Material and methods

To identify the key questions to be studied, during an initial workshop we collected the opinions of the AquaImpact program partners, researchers and professionals. Then a qualitative study was elaborated and carried out in five consumers focus groups in the three countries in 2019 (Mariojousl et al., 2021). Using the results of the qualitative study, we elaborated a quantitative study, carried out by online survey on a representative sample (415 people per country) in 2021. The master questionnaire included different parts, and we present here mainly results about farming practices. We asked questions such as "How do you think that farmed salmon in Europe are fed ? with...?", "How do you think that farmed salmon in Europe are cared ? with...?"; How do you do you think that farmed salmon in Europe are reproduced and selected ? ...", proposing several techniques for every question, the respondent giving for each technique a level of agreement (always, occasionally, never, I don't know). Some questions targeting on emerging techniques (in feed, genetics, RAS, fish welfare) concerned their acceptability.

### Results and discussion

The limits of knowledge are reflected in the difficulty for answering certain technical questions, translated into consistent or high rates of "I don't know".

The comparative approach between countries shows that there are significantly different response profiles in the three countries for most questions.

Regarding feeding practices, there are highly significant differences (at 0.1%) between countries for the two following techniques: the technique "with fishmeal" is considered effective (ratio of sum of shares for "always" and "occasionally" on total, after exclusion of "I don't know") by 95% of respondents in Finland, 92% in France, 74% in Spain where 65% choose "I don't know" VS 23% in Finland and 34% in France, and "with a mixture of ingredients" considered effective by 93% in Finland, 94% in France, 89% in Spain, with shares of "I don't know" at respectively 33%, 39% and 40%. For the other proposed techniques, the differences between countries were significant but less marked (at 5%). They were considered effective by 65 to 75% for "with little wild fish", by 79 to 84% for "with plant ingredients" and by 71 to 81% "with animal meals", and the shares for "I don't know" are in the range of 37 to 47%. Finland shows the lowest share of "I don't know" except in one case, meaning the best level of knowledge in salmon feeding.

Regarding care practices, we found highly significant differences between countries for all proposals (at 0.1%) except for "with vaccines" (significant at 1%). The shares of answer "I don't know" are high (41 to 54%) in all countries for three techniques ("vaccines", "other medicines", "cleaner fish to limit external parasites"), the lowest for "with high sanitary practices" (20 to 39%), and consistent for the others (29 to 54%), and for all techniques Finland has the lowest share meaning the best level of knowledge in care of farmed salmon. The method "with high sanitary practices" is considered effective at the highest level (Finland 96%, France 89%, Spain 94%) meaning a positive view of caring salmon in farms, while "with vaccines" is considered effective at the lowest level (Finland 66%, France 70%, Spain 64%) meaning a limited knowledge about the real use of this technique. Other techniques are considered effective by 71 to 90% of respondents.

The questions on reproduction and selection show that the shares for “I don't know” are in a range of 35 to 58%, the highest being for the proposed technique “Mating of close relatives is avoided to prevent inbreeding”. We found again the lowest shares of “I don't know” in Finland, meaning a better knowledge in fish breeding than in France and Spain. The technique “males and females mate naturally” is considered effective by the lowest shares (Finland 76%, France 73%, Spain 85%), while other techniques are at high levels (82 to 92%) except “Mating of close relatives is avoided to prevent inbreeding” with great discrepancies between Finland (82%) VS France (45%) and Spain (40%), confirming a better knowledge in Finland.

Questions about acceptance of emerging techniques in feeding had rather limited shares of “I don't know” (23 to 31%). In total panel, the acceptance (sum of « totally acceptable » and « weakly acceptable » on total incl. “I don't know”, in whole panel) is high (52 to 63% according to techniques) for feed containing insects, micro-algae, only plant ingredients, only local ingredients, but more limited for feed containing oil rich in omega 3 from GM seeds (45%), and feed containing authorized animal meals (42%), and low only for feed containing yeasts (34%). About genetics, « I don't know » is expressed by a limited share of respondents : 22% to 26 %. There is a good or very good acceptance for traditional selection (67%) and genomic selection (58%), and unsurprisingly, GMO shows the lowest acceptance (29%), as found in previous research (Barrey et al., 2011). For other emerging techniques, « I don't know » is expressed by a limited share of respondents (21 to 25 %), and the acceptance is high for proposal on improvement of fish welfare (67%) and for RAS technology (62%). Between countries there are significant differences for all proposed techniques at 0.1%, except for feed containing local ingredients (at 5%), and no significant differences for proposals on GMO, fish welfare, RAS.

Consumers in all countries consider that the information received today is insufficient, and that receiving information would be really useful at high rates, from 73 to 91% (sum of shares for “slightly useful”, “useful and “very useful” on total by country) with lesser levels in France, about a wide range of topics (farming practices, regulation & controls, nutritional content, economics) with various levels of interest for these topics according to countries.

**Conclusion :** Our results suggest the need for dissemination to consumers of information on fish farming, in forms adapted to the subject and the population of each country.

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