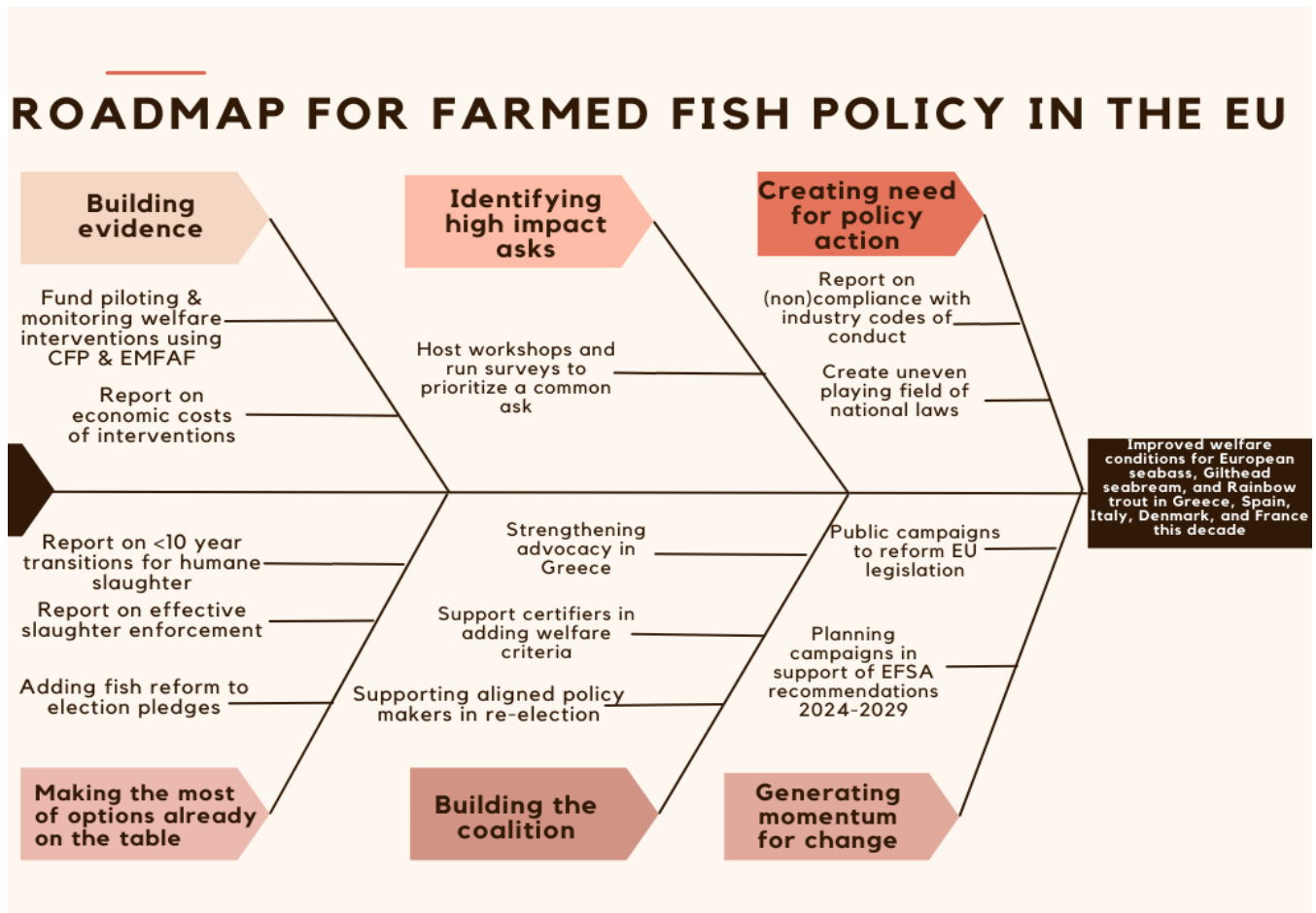


EU Farmed Fish Policy Reform Roadmap

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Last major update: 2023 Aug 18



Executive summary

- This report builds a strategy based on the strengths, weaknesses, opportunities, and threats of the animal advocacy movement in the European Union (EU) farmed fish policy space.
- The objective identified is to improve welfare conditions this decade for Gilthead sea bream, European sea bass, and Rainbow portion trout farmed in the EU.
- The strategic approach proposed here is:
 - Maximize the benefit of policy options already on the table, namely by **speeding up well-enforced humane slaughter**.
 - **Leverage public funds and rhetoric on fish welfare to pilot interventions** and gather data on costs and feasibility.
 - **Arrive at a consensus** in the movement on the highest-value rearing asks on the basis of this data.
 - **Report on the poor welfare conditions of industry codes of practice** to demonstrate that voluntary measures are not enough (if true).
 - **Pass higher welfare practices into national law** to create an uneven playing field to justify EU action to harmonize the market.
 - **Use EFSA opinions scheduled for 2024-2029 as momentum** to raise awareness and build support for EU action.
- Tactics that are essential to this strategic approach succeeding are:
 - This year, assembling **evidence of transitions to humane slaughter quicker than 10 years for sea bass and sea bream** from Ace Aquatec ([2023a](#), [2023b](#)), Aquaculture Stewardship Council ([2022, p.11](#)), Aenor, EU organic, Turkish retailer [METRO](#), and Turkish-based suppliers of UK retailers ([CIWF 2017](#)).
 - This year, assembling **evidence of how slaughter legislation has been enforced** in the cases of fish in Norway, Switzerland, New Zealand, Ireland, and the UK, for German rainbow trout and european eel ([Jung-Schroers et al 2020](#)), and for sea bass and sea

bream for Turkish retailers ([METRO](#)) and Turkish-based UK retail suppliers ([CIWF 2017](#)).

- **Presenting both to policymakers** (e.g., European Parliament committees assigned the proposal, DG Sante, DG Mare, governments in Spain, Greece, Italy, and Northern European governments that have called for farmed fish legislation since 2014 ([Council 2014](#))).
- **Advocate for public funding to trial welfare interventions as implementations of Good Management Practices** from the Common Fisheries Policy and European Maritime, Fisheries and Aquaculture Fund (EMFAF) (national 2021-2030 aquaculture plans include funding set aside for animal health and welfare: €8M in Spain ([2021, p 221](#)), €4M in Italy ([2021, p 143](#)), and a meager €560K in Greece ([2021, p135](#))).
- Over the next three to five years, **working with often-used EU consultancies to collect and present the specific economic indicators described in this report ([page 23-24](#)) on proposed welfare interventions** (e.g., Wageningen UR, IBF Consortium, VetEffeCT, Agra CEAS Consulting, Food Chain Evaluation Consortium, ICF International, Civic Consulting, European Policy Evaluation Consortium)
- Animal advocacy movement to continue workshops (e.g., [Summer Shoal](#)), replicate surveys and Delphi panels ([Van den Boogaart et al., 2023](#), [Pavlidis et al., 2023](#)), and **rank the various policy asks the movement is considering in line with the data gathered**. I tentatively lean towards water quality standards, maximum stocking density limits, and paying particular attention to low-cost environmental enrichments for juvenile welfare.
- Over the next three years, **produce a report on the compliance of producers with industry codes of practice**, such as fish welfare guides in Greece and Spain (despite their obvious industry bias) ([Pavlidis & Samaras 2020](#), APROMAR guide on farmed fish welfare in Spain ([2022](#)), and report on any discrepancies between these codes and best welfare science.

- Over the next five years, **lobby Vught countries¹ or Mediterranean Producer-countries** to take highly ranked asks included in industry Good Management Practices and put them into law to set a mandatory precedent.

Scope of Impact for Farmed Fish Policy Reform in EU

In the case of farmed fish, it is worth keeping in mind how narrow the scope of EU policy impact this decade may look:

- The majority of EU fish consumption (in tonnes) is not domestically farmed fish but a combination of wild-caught fish and imported farmed fish ([EUMOFA 2022a](#), [EC 2017](#)). The most consumed farmed fish across the EU by live-weight equivalent, Atlantic salmon, is mainly imported from non-EU Norway and Scotland. In fact, EU production accounted for only 2% of EU farmed salmon consumption ([EUMOFA 2021](#)).
- The leaked impact assessment of the European Commission's (EC) reform proposal included a 10-year transition for imports and did not include fish products; the import requirement more generally is an ambitious policy provision. This limits the ability of the EU legislation this decade to improve conditions for the huge numbers of salmon in Norway and Scotland, and sea bass and sea bream in Turkey that are imported into the EU.
- Of the five main farmed species in the EU (Atlantic salmon, Gilthead sea bream, European sea bass, Rainbow trout, and Common carp), the EU accounts for just 15% of the combined global total number of these fish alive at any one point in time ([Bollard 2019](#)).
- However, ~45% of global farmed sea bass and sea bream alive at any one time are in the EU ([Bollard 2019](#)), so this is an area where an EU focus can have a significant impact on the global problem. Additionally, most EU consumption of trout, sea bream, and sea bass comes from EU production ([EUMOFA 2023 p.19](#), [2022b, p.10](#), [2019](#)).

¹ Belgium, Denmark, Germany, Netherlands, Sweden

- Unlike with chicken meat and eggs, which are produced and consumed across the EU and often have a large consumer base in the country of production, farmed fish production is fragmented. We mostly find salmon production in Northern Europe, sea bass and sea bream production in the Mediterranean, and carp production in Central and Eastern Europe. While salmon consumption is common across the EU, consumption of these other species is similarly fragmented. This market fragmentation and species-specific differences in welfare interventions pushes against a uniform, specific, single, EU-wide policy ask like “no more than eight hens per square meter.”
- The European Commission’s leaked impact assessment showed it was only considering slaughter reforms for farmed fish as part of its broader EU animal reform proposal, and has signaled other reforms are only to come after EFSA opinions on farmed fish are released in 2024-2029.
- The only species-specific fish welfare regulations at the EU level are for stocking densities within the Organic regulation’s aquaculture section ([Commission Implementing Regulation 2020/464 2020](#)). For multi-national fish policy precedent, one must look to more vague or non-binding policy documents ([World Organisation for Animal Health 2021](#), [EU Platform on Animal Welfare water quality and handling guidelines 2020](#), [Council of Europe Recommendation concerning farmed fish 2005](#)). At the national level around the world, there are some general and some species-specific regulations. Here is a non-exhaustive list:
 - Slaughter regulations in Norway ([Art. 14](#)), Switzerland ([Art. 184](#)), Germany ([annex 1, 9](#)), and New Zealand ([Code of Welfare 2018](#)), and enforcement in the UK and Ireland (as reported in [EC 2017, p.7](#)).
 - Stocking densities in Maine ([Chase 2023](#), [L.D. 1951](#)), Norway ([Art. 25](#)), Switzerland ([Annex 2 Table 7](#)), and Chile ([Mallea 2018](#)).
 - Water quality standards in Switzerland ([Annex 2 Table 7](#)), Czechia ([Annex 5](#)), and water quality discharge standards in Turkey ([Annex 5](#)).

There are a huge range of policy reforms that are being advocated for to improve farmed fish welfare in the European Union. The aquatic animal advocacy movement is not resourced to push for all of them, and neither is it realistic to assume all asks have the same potential impact nor the same probability of success. The movement must choose and plan according to which policies positively affect the largest number of animal lives, by the largest amount, within the limited scope of what policies decision-makers will actually consider.

- I am weary of farmed fish interventions that have uncertain effects on wild-fish populations (e.g., changes to feed composition or switching to non-carnivorous fish) due to uncertainty about their welfare in the wild, if decreases in demand for wild-caught fish actually change the amount fished ([StJules 2023](#)), and differing survival and slaughter weights between carnivorous and non-carnivorous fish ([Greig 2020](#)).
- I am unsure about farmed fish interventions' population effects on farmed fish. E.g., perhaps some interventions that improve welfare allow for more fish to be farmed, which raises the empirical question about whether the welfare improvement offsets the larger number of individuals experiencing this welfare status in farms.

I feel more confident about policy interventions that robustly improve the lives of fish farmed in the EU without clear, large knock-on population effects, such as replacing ice slurry and CO2 with electrical and percussive stunning.

At the same time, the movement can make plans to gather data that can reduce our uncertainty about the population effects of other interventions before putting them into legislation.

Strategy & Tactics

The core of the EU strategy is to demonstrate that self-regulation of the industry fails to achieve improved welfare and to pass laws in some countries so the European Commission has a justification to harmonize the market.

The typical theory of change for EU policy work is that a relatively small advocacy effort can convince a few key national governments and members of EU agencies to champion a reform, weaken opposition in key countries to break blocking minorities, and provide technical expertise and public mobilization in support of reform (as described in [Dullaghan 2021](#)). It forces a change in the countries that otherwise would not have reformed, or would have done so more slowly and at greater expense (to the advocacy movement).

EU policy change's unique added impact comes when it can move the baseline conditions across the industry in an entire region of 27 countries (and possibly

affect imports from abroad) in one fell swoop, backed up by enforcement mechanisms, and leverages public funding and resources to do the work the movement would otherwise have to do itself (e.g., monitoring, research, enforcement, coordination).

The European Commission and national administrations have little incentive to regulate an industry they consider to be able to self-regulate, and governments have been shifting from regulatory to voluntary approaches in cooperation with the private sector ([Vogeler 2019](#)). Governments are concerned with achieving a level playing field, regardless of how that is achieved, i.e., they are only interested in harmonized standards for animal welfare, not in improving them necessarily. Furthermore, the areas in which the European Commission has competency and willingness to act is constrained. If there are only a few countries that employ a certain practice, if trade flows are limited on the internal markets, and if these few countries operate in a fairly similar way, the European Commission may consider this a matter for the Member States rather than the EU. This is a vote in favor of trying to get one of the producer countries to adopt different methods to create the uneven playing field. This might then convince the European Commission they should regulate to level the playing field (as described in [Dullaghan 2021](#)).

Based on a SWOT and TOWS analysis (see below), this report has identified strategic paths for achieving improved welfare conditions this decade for Gilthead sea bream, European sea bass, and Rainbow (portion) trout farmed in the EU.

- The strategic approach proposed here is:
 - Maximize the benefit of policy options already on the table, namely by speeding up well-enforced humane slaughter.
 - Leverage public funds and rhetoric on fish welfare to pilot interventions and gather data on costs and feasibility.
 - Arrive at a consensus in the movement on the highest-value rearing asks.
 - Report on the poor welfare conditions of industry codes of practice, to demonstrate voluntary measures are not enough (if true).
 - Pass higher welfare practices into national law to create an uneven playing field, to justify EU action to harmonize the market.
 - Use EFSA opinions as beachheads and momentum to raise awareness and build support for EU action.

STRENGTHS

- NGOs already working on fish welfare
- Policy experts in the movement already working on fish welfare
- Existing body of research supporting welfare improvements
- Advocates have allies in DG Agri, DG Mare, DG Sante, and EP
- Dedicated and passionate activists
- Fish welfare experts in the movement

WEAKNESSES

- NGO consensus on specific asks & relative ranking not complete
- No fish group in Greece
- Lack of economic knowledge on welfare interventions
- Movement is facing a limited funding landscape

SW
OT

OPPORTUNITIES

- EC proposal offers chance to put fish on the agenda
- EP elections offer a chance to raise awareness and get commitments
- EFSA Opinions scheduled to address farmed fish welfare 2024-2029
- Certifications including welfare
- Welfare rhetoric from industry and governments
- No fish NGO in Greece
- Interest from many groups in industry compliance
- Disagreement between employees and employers
- Public opinion polls show concern for fish
- Reductions in juvenile and feed costs are appealing
- Legislative precedents exist
- Pressure for sustainability in industry
- Welfare improvements may improve profits
- Public funding available for welfare

THREATS

- National and EP elections may produce conservatives who drop fish provisions and delay reform
- Offshore cages and RAS may hinder advocacy tactics
- Low-carbon, healthy, sustainable image of farmed fish
- Progress on hens and broilers
- Climate change may worsen welfare and site selection
- AI advances may speed up growth of the industry
- Increases in juvenile and feed costs are unappealing
- No single high impact welfare ask for fish
- Structure of the industry (SMEs impede mainstreaming best practices, consolidation makes industry stronger)



If the EU reform package, including fish slaughter, looks to be proposed by September *and* the European Parliament reaches the First Reading position before June 2024

The priority tactics in this strategy are:

- This year, assembling evidence from Ace Aquatec ([2023a](#), [2023b](#)), Aquaculture Stewardship Council ([2022, p.11](#)), Aenor, EU organic, Turkish retailer [METRO](#), and Turkish-based suppliers of UK retailers ([CIWF 2017](#)) of transitions quicker than 10 years to humane slaughter for sea bass and bream, and presenting it to aligned policymakers (e.g., DG Sante, DG Mare, Northern European governments that have called for farmed fish legislation since 2014 ([Council 2014](#))).

- This year, assembling evidence of how enforcement has been done in Norway, Switzerland, New Zealand, Ireland, the UK, Germany, and Turkey, and presenting it to aligned policymakers (e.g., DG Sante, Northern European governments that have called for farmed fish legislation since 2014 ([Council 2014](#))).
- Identifying and supporting Members of the European Parliament (MEPs) in the relevant committees in tabling amendments and providing strong evidence in support of them (as described above).

If the European Parliament can arrive at a first reading position endorsing a fast slaughter transition before the May 2024 European Parliament elections, it reduces the chance that the incoming European Parliament, even if it is more conservative, will simply throw away this position or delay proceedings. MEPs at events in 2023 hosted by Compassion in World Farming EU ([2023](#)) and Eurogroup for Animal ([2023](#)) did not express much hope about being able to move the legislation forward before the elections, especially due to a lack of unity, and cautioned that after the elections, the entire reform effort could simply stop. Therefore, **providing all support possible for MEPs to progress quickly and ambitiously once the European Commission releases its proposal is a key window of opportunity.** Obviously, since fish slaughter is one small provision in the larger reform package, many aspects of the process will depend on progress on all those other proposal provisions. Reaching a consensus on fish early will reduce the chance it is still up for debate by a new, less sympathetic European Parliament, while implicitly it means sacrificing other provisions which then may not survive the next European Parliament.

The most immediate opportunity for EU farmed fish policy reform is supporting the EU in adopting humane slaughter for sea bass, sea bream, and portion trout. Why?

- This is already an option on the table in the broader EU reform package.
- Less than 5% of sea bass and sea bream are already stunned in the EU (EC leaked impact assessment 2023). While the European Commission impact assessment also claims between 20% and 50% of trout are stunned, it's possible this underestimates the size of the problem by not accounting for the very small size of portion trout relative to large trout, which could mean the majority of trout individuals are not stunned even if the majority of tonnage comes from stunned fish.

- The European Commission itself stated “As aquaculture has come under increasing scrutiny by NGOs and consumers, stunning methods have improved and this is expected to continue for some fish species (salmon, trout and carp) but not for others (sea bass and sea bream)” (EC leaked impact assessment 2023). Though certifications may increase slaughter requirements more than the European Commission anticipates.
- A survey from Eurogroup for Animals (2020) found EU consumers recognize humane slaughter as essential or important to fish welfare and include welfare as one factor that might influence product choice.
- Commercial stunners are available (Aquatic Life Institute 2023) and already deployed at a small scale for sea bass and sea bream (Ace Aquatec 2023a 2023b, 2022; Boyland 2018) and for rainbow trout (Durbant et al 2023, p.70-72)
- This could be a relatively inexpensive reform (Springlea, 2022a 2022b, EC 2017; private correspondence with Mowi), though these sources likely underestimate costs (to retrofit or build new boats, or energy demand).
- There is evidence for faster transition periods to humane slaughter than under consideration by the European Commission (ASC, Aenor, EU Organic, and certifications relying on EU organic timelines).
- Sea bass and sea bream are among the most numerous in terms of individuals farmed in the EU (444M sea bream and 381M sea bass juveniles produced per year (Pelekanakis et al. 2022), and the years of suffering per kg for portion trout is likely in the same order of magnitude as for sea bass and sea bream (~ 400M annually, but hard to estimate precisely).
- There is some weak evidence that farm owners are much more unsure than employees about how suitable ice slurry is as a welfare-acceptable slaughter method (Pavlidis et al. 2023), so there is an opportunity to exploit that gap.
- On welfare grounds, slaughter reform likely does not rank high compared to reforms to rearing due to the short time duration of the harm being caused,² except under certain ethical views that prioritize reducing acute intense suffering. However, slaughter reform ranks high on tractability in the current political climate.

Most of the EU-farmed adult sea bass and sea bream are killed in just Greece and Spain. Therefore, this approach seems promising in worlds where pursuing this reform via the EU level is quicker and more impactful than non-EU approaches (e.g., leveraging public funding in those countries to trial humane slaughter as part of national guidelines, corporate welfare campaigns, or incorporating humane

² The Welfare Footprint Project suggests that for broiler chickens, reducing suffering during slaughter has a smaller effect than treating chronic issues (Negro-Calduch, Alonso, & Schuck-Paim, 2022). It's possible this finding will extend to fish.

slaughter into certifications used in those countries). Given the current absence of a domestic aquatic animal welfare group in Greece to create robust bottom-up pressure, a top-down approach from the EU level may be more effective right now. In Spain, Equalia in particular has already begun engagement with the industry and government, with diminishing positive returns. Summer 2023 elections did not result in a conservative government,³ so the incumbent left-wing government will continue the rotating EU council presidency without farmed fish reform explicitly already on its agenda when the European Commission is due to release the reform proposal. Most of the portion trout are slaughtered in France, Italy, and Denmark where, with the exception of Denmark, it is not obvious there are receptive governments yet.

In tandem with this, so long as the EU reform package continues to include the provisions below, policy advocacy could continue to argue that fish slaughter should be included in their remit. This is especially so where they bolster slaughter requirements:

- Policy indicators (e.g., “% of farms still using cages” is the example the European Commission uses, but one could imagine using % of fish farms using electrical stunning methods)
- The monitoring and reporting of mistuned animals at slaughterhouses
- Video-surveillance in all slaughterhouses
- A mechanism for equipment (pre-)approval that gives the purchasers certainty that the equipment can produce the required kill or stun while fulfilling animal welfare requirements.
- Staff training on animal welfare.
- Harmonized animal welfare indicators (e.g., “abnormal levels of contact dermatitis, parasitism, and systemic illness in the holding” for broilers)
- Import requirements, which in the draft impact assessment appear to only apply to “eggs and egg products, meat and meat products from cattle, pigs, poultry, rabbits, dairy products,” but other products (e.g., farmed fish) are not envisaged to be included until delegated acts based on EFSA opinions are

³ According to Daniela R. Waldhorn, the conservatives planned to form a government coalition with the far-right party, and the latter is not only not amicable to animal welfare issues, but they actually plan to challenge EU legislation that threatens the productivity of the agricultural sector. “We will protect our producers from regulations that threaten the survival of [agricultural] employment due to the losses it is causing” (p. 48). They recently bypassed European legislation on animal health in an autonomous region, and their electoral program says they will continue to “demand from Brussels the revision of legislation to ensure the viability of productive sectors... far from arbitrary ideological impositions in the name of climate religion” (p. 48).

<https://votaabascal.es/assets/pdf/Programa-VOX-2023.pdf>

devised. (This entire provision probably needs a dedicated effort to be maintained as is, even without fish included).

Tactics for supporting this strategy are:

- Assembling evidence from ASC, Aenor, EU organic, Turkish retailer METRO, and Turkish-based UK retail suppliers of transitions to humane slaughter for sea bass and bream quicker than 10 years and presenting it to aligned policymakers (e.g., DG Sante, DG Mare, Northern European governments who called for farmed fish legislation).
- Assembling evidence of how effective slaughter enforcement has been done in Norway, Ireland, Germany ([Jung-Schroers et al 2020](#)), Turkey, Switzerland, and New Zealand, and presenting it to policymakers (e.g., DG Sante, DG Mare, Northern European governments that called for farmed fish legislation).
- Help aligned policy-makers in drafting amendments to the proposed legislation, providing research near the key votes to limit the industry's time to counter.
- Advocating for specific funding and programs to allow stunning equipment purchase and sharing among industry in EU and national funding mechanisms, as is already being done in some cases.
- Canvassing MEP 2024 election candidates in AGRI, PECH, & ENVI committees to publicly commit to humane slaughter methods.
- Replicate the survey in Pavlidis et al. ([2023](#)) with a larger sample of farm owners and employees to establish if there really is the apparent disconnect between fish farm owners and employees on ice slurry slaughter methods, to provide evidence that mitigates their united opposition to reform. (This comes from a survey, but note the small N of respondents and that employees and owners in the survey may not represent the same production systems/species used.)
- Given the major role in farmed sea bass and sea bream production that Greece plays, the absence of a dedicated fish welfare group there leaves open an opportunity for bottom-up pressure. While some groups have done work in Greece (e.g., Essere Animali and CIWF EU), the only domestic group I know of (Hellenic Animal Welfare Federation) is not working exclusively on farmed animal issues or working on farmed fish issues. Therefore, founding a dedicated fish welfare group that can leverage the openings the government and industry has made on fish welfare could mitigate opposition to EU-level change for this reform and future reforms.

- Identifying allies in the relevant European Parliament committee that has been assigned the proposal by the European Parliament Presidency (ideally the Rapporteur assigned is an ally).
- Provide these allies with credible experts and witnesses (including requesting to be invited themselves) who can contribute to hearings the committee may hold.
- Provide these allies with legislative subsidy
 - *policy expertise:*
 - constituency interests and opinions
 - in-depth policy analysis, reports, or expertise
 - analyze, synthesize, and summarize—in a politically user-friendly form—information to promote the policy goals that the movement and the legislator share
 - supply them with rhetorical ammunition that they can use in committee, during floor debate, or in media appearances.
 - *legislative intelligence:*
 - information necessary to anticipate other players’ reactions, generate headcounts, proffer procedural advice, and otherwise enable legislators to more fully approximate informed strategic actors in seeking policy “progress.” -> especially helpful to bill sponsors and party and committee leaders.
- Provide these allies with amendments that could be made, e.g., on faster slaughter transitions, language to improve enforcement, and inserting language on fish into other provisions.

If the slaughter proposal looks to be adopted or the European Parliament's first reading is significantly delayed until the new European Parliament after June 2024

The priority tactics in this strategy are:

- Over the next three years, a report on the compliance of producers with industry codes of practice, such as fish welfare guides in Greece and Spain ([Pavlidis & Samaras, 2020](#); APROMAR guide on farmed fish welfare in Spain ([2022](#)))
- Over the next three to five years, advocate for the Common Fisheries Policy (CFP) and EMFAF to allocate funds to trial welfare interventions and

collect the specific economic indicators described in this report (page 14) on proposed welfare interventions.

- Over the next five years, lobby Vught countries⁴ or Mediterranean producer-countries to implement versions of industry Good Management Practices into law to set a mandatory precedent.

If the passage of the EU reform package, including a fast slaughter transition, looks to be in a safe position, then reallocating resources to future non-slaughter asks starts to look more rewarding. Reforms to rearing become easier in a world in which the EU has passed the broader reform package with provisions to update laws via implementing and delegated acts in response to pre-scheduled EFSA opinions in 2024-2029 on farmed fish welfare, as suggested in the leaked impact assessment from the European Commission.

At the same time, it's very possible that the EU reform package will drag on for a few years if limited progress is made before the 2024 elections, and that the fish slaughter provision may not survive the negotiations. If the European Parliament has not arrived at a first reading position even informally in the trilogues, or agreed on the amendments it wants to make to the fish slaughter provision before the June 2024 elections, then it will be in the hands of the next European Parliament who may discard it or be less amenable to progressive amendments.

While slaughter should still be more tractable than non-slaughter reforms because of its previous consideration in the reform package, overall everything is much less tractable if the new European Parliament is starting from a worse position in terms of its positions on animal reform. Therefore, the higher scale of welfare impacts from rearing reforms (because they could affect so many days of life of chronic suffering) may tip the expected value in their favor, and the tractability of these rearing reforms should actually increase if EFSA opinions are still being released as scheduled.

Given the time needed to gather data and coalesce around what these readings asks should be, it may be necessary to divert resources sooner rather than later to avoid risking a future opportunity being missed because the movement lacks the data and unity to propose a rearing reform. If indicators suggest the European Parliament won't take the slaughter proposal to the First Reading before the June

⁴ Belgium, Denmark, Germany, Netherlands, Sweden

elections, then pivoting away from slaughter to these other issues already looks more promising, since we are then in a more long-term game anyway.

One could reasonably disagree and say that even if the EU reform looks to be slowing, we should focus 100% of fish policy advocacy efforts on slaughter to make sure we lock in a precedent for doing anything on fish at the EU level, which forms a beachhead for rearing reforms later. This may be compelling if you think it's not even at all clear that we will have opportunities to utilize EFSA opinions to create reform (if the opinions are dropped or delayed for example), especially in the absence of a fish slaughter precedent. I still think the expected value calculation leans toward the rearing approach because the impact assessment already said it would explore fish reforms after the EFSA opinions, and the larger EU reform package would need to include Commission powers to update regulations via delegated/implementing acts for future reform, regardless of the fish slaughter requirement being included now or not.

A [database on fish welfare asks](#) (which might be somewhat outdated) suggests a general consensus among NGOs on broad categories of reform (slaughter, transport, stocking density, water quality, handling), but not on the relative ranking of each and the specific provisions in each. For example, some groups call for organic stocking densities, others just use the conventional status quo, and others use vague “species-appropriate” language. For water quality and slaughter, most groups have general language about meeting appropriate standards (e.g., immediate loss of consciousness), but without stating specific slaughter methods that are allowed/prohibited or whether “good water quality” must include monitoring all of the temperature, oxygen, pH, nitrates, ammonia, ammonium, etc., and what ranges are acceptable. Furthermore, some groups go beyond these asks and include other asks such as bans on triploidy, cleaner fish, carnivorous fish, environmental regulations, or a ban on the sale of live carp. Eurogroup for Animals members developed a list of aquaculture asks ([2022](#)), but they too suffer from being somewhat vague in some areas and closer to a wishlist of all asks than a prioritised ranking of the few most promising asks. A particular area of potentially high impact that does not seem to be highlighted in these asks is the welfare of juveniles, given their large number and the potential that many welfare issues in grow-out farms are downstream of conditions in hatcheries.

Therefore, there seems to be continued value in the movement coming together in workshops and explicitly ranking the various policy asks they are considering. I propose creating a living document or table that the movement contributes data to, as one place to collect data on the metrics below. Currently, I am agnostic about the best non-slaughter reform due to uncertainty about costs to producers, the current

state of welfare conditions in farms, and the feasibility of implementation. However, I present an example here for policy asks of implementing EU organic stocking densities and setting water quality standards for conventionally farmed sea bass and sea bream as potential top contenders. This is not meant to be an exhaustive or conclusive evaluation.

Policy	Stocking density: EU organic standards	Water quality standards stricter than EFSA recommendations
How does this improve fish welfare?	Less crowded conditions, possibly less aggression, closer to natural desires, fewer injuries, and fewer handlings needed for grading	Water quality might be the most important welfare factor for farmed fish. Poor water quality can lead to stress, disease, and mortality, which can cause suffering for the fish.
How bad are the existing conditions?	Sea bass and sea bream are currently stocked at 12-20kg/m ³ versus the proposed 10-15kg/m ³ . Seems plausible there are welfare benefits from lower stocking density, though the rates in conventional sea cages are not as high as those studies which show really terrible effects (e.g., 40kg/m ³).	<p>A Fish from Greece (FfG) industry guideline (Pavlidis & Samaras 2020) for sea bass and sea bream cites EFSA parameters for temperature which are wider than recommendations from CIWF (2-35 C and 5-34 C versus 18-24 C). These FfG guidelines seem to show awareness that 40% oxygen saturation is a lower limit, while CIWF recommends keeping it as close to 100% as possible, with 70-110% as acceptable variation. These FfG guidelines cite EFSA pH recommendations of below 6.5 and above 8.5 as poor welfare conditions (EFSA, 2008). That industry guideline does not mention ammonium, nitrite, or nitrate, suggesting they are not paying attention to those parameters.</p> <p>In actual practice, one expert in Spain told me more than half of the days are within recommended parameters, but there are peaks outside these ranges in summer. They have seen oxygen saturation under 70% but not under 40% and temperatures over 25 C but not over 35 C. An industry report acknowledged research showing farms were approaching the 40% oxygen saturation limit in summer months and "in normal rearing conditions in the sea, water pH range varies at around 8" (HAPO 2019). A report for the European Parliament (Pavlidis et al 2023) noted a welfare challenge as "long exposure to high water temperatures and low oxygen saturation during summer - early autumn months." This report also lists "inappropriate water quality" in the list of European sea bass welfare challenges at larval rearing and weaning stages.</p> <p>It seems plausible then that the industry is not optimizing for the most beneficial parameter ranges for welfare, and fish in particular may be exposed to temperature and oxygen ranges well outside optimal for welfare.</p>

<p>Are the bad conditions concentrated in just one country or many? (Therefore, could be dealt with national-level work rather than EU-level)</p>	<p>Majority of EU sea bass and sea bream are in Greece and Spain, followed by Italy (possibly the worst stocking densities though are in Andalusia and juvenile hatcheries)</p>	<p>Plausible worst conditions are in areas of the sea that are already, or will be in the future, most susceptible to heat waves due to climate change. Unclear if RAS maintains good water quality. Unclear on the status of juvenile water quality</p>
<p>Is government enforcement an effective way to ensure this reform is implemented (i.e., can compliance be verified with the meager inspection resources available, and are the penalties likely to be large enough to dissuade noncompliance)?</p>	<p>The inspections would only be useful if there is adequate record keeping on the number of fry and mortalities. Could use proxies such as hatchery sales and grow-out farm size and harvest size metrics (Bridgewater et al 2021). Saraiva et al. (2022) and Ellis et al. (2005) claim stocking density limits in legislation are unworkable, at least without also requiring water quality limits. Yet the EU Organic, as well as in Norway, Chile, RSPCA, and GAP must have some inspection and enforcement mechanisms- unclear how effective</p>	<p>Enforcement would require mandating recordkeeping and inspections of data ranges and fines for not correcting these trends</p> <p>Temperature and salinity are easy and inexpensive to measure and don't call for specialist staff. pH is easy to measure. Temperature control could be helped with automated monitoring, at a higher cost. However, the temperature is hard to control. Oxygen is harder to measure and automated systems are costly. (Pavlidis & Samaras 2020)</p> <p>Maintaining good water quality can be done by a number of methods, including careful management of feeding practices and altering stocking densities (Bridgewater & Odene 2021), therefore this one requirement may lead to producers adopting other potential asks (such as stocking density limits or management practices) without the advocacy movement asking directly for them.</p>
<p>Does this reform leverage public funds and personnel?</p>	<p>EU and national inspectors would need to add extra time to any inspections they are already doing. Possible EU capital would be needed if small-scale farmers chose to compensate for lower densities by increasing sea cage sizes or number of cages to maintain the same output.</p>	<p>EU and national inspectors would need to add extra time to any inspections they are already doing. Possible EU capital would be needed if small-scale farmers chose to improve water quality via lower stocking densities and need to compensate for lower densities by increasing sea cage sizes or the number of cages to maintain the same output.</p>

<p>Will it be relatively inexpensive for producers to implement, i.e., can we produce a favorable counter-economic analysis?</p>	<p>EU organic is ~30% more costly (Prins et al 2013), and since organic requires a lot of other requirements beyond stocking density, this cost increase should be lower than that. For cage systems-construction changes could be done within a month, plus regulatory delays). Could be cost decreases if it means less grading is needed (as there is a more uniform size in lower densities)</p>	<p>Plausibly not very expensive at first glance. Much of the equipment is probably already in possession. Added cost in staff actually monitoring trends and then taking mitigating actions, e.g., use of aerators, net cleaning, lowering stocking densities, altering feeding procedures (feed being a major cost), choosing more selectively when siting cages</p>
<p>How close is this ask to the EU's 2022 Organic aquaculture standard, as that is definitely the ceiling (sets species-specific stocking density limits but vague on most other issues)?</p>	<p>This is exactly the EU organic standard. Could face some resistance from the organic sector, as reducing the premium added value of their products</p>	<p>Organic only makes vague mention of water quality.</p>
<p>Is there legal precedent elsewhere (or could easily generate it with a campaign), e.g., slaughter regulations in Norway, environmental water quality standards in the EU water directive?</p>	<p>Stocking density standards for fish already set in EU Organic and associated labels, e.g., Naturland, Norway, Chile, RSCPA</p>	<p>Switzerland (Annex 2 Table 7) sets dissolved oxygen, oxygen saturation, ammonia, nitrate, saline, carbon dioxide, pH and temperature water requirements for salmonid and cypriniform fish.</p>

<p>Is it in areas already covered in EU and national policy priorities, such as fish health (e.g., reducing mortalities) or climate, sustainability, and economic growth interventions, which happen to have positive welfare benefits (e.g., providing capital and insurance for producers to reduce stocking densities and improve water quality such that it actually reduces their labor, feed, and energy costs)?</p>	<p>Possibly could argue this helps move the EU towards its Organic farming targets, and could be seen as more sustainable or environmentally friendly (lower feed and waste?)</p>	<p>Plausible it could fit with Water Quality Directive</p>
<p>Is this reform within the scope of things the EU is considering revising this decade, e.g., slaughter, issues EFSA opinions may cover?</p>	<p>No explicit mention of stocking densities in public comments so far</p>	<p>EC have not signaled interest in water quality, nor has EFSA. But a recent report for European Parliament stated that "these gaps should be filled by updating the existing regulations to incorporate specific provisions for handling fish, water quality provisions, stocking densities and life support systems when transporting fish."</p>
<p>Is there an obvious reason to think the industry is likely to do this anyway?</p>	<p>Probably not. Farmers have allegedly tried higher stocking densities but pulled back from that in the face of mass mortalities. With technological improvements, I would expect more efforts to be made to increase stocking densities rather than reduce them.</p>	<p>Even for water quality improvements that may increase revenue, a lack of capital may prevent businesses from making these changes.</p>
<p>Can it get cross-party support/avoid polarization?</p>	<p>Unclear at this stage</p>	<p>Unclear at this stage</p>

<p>Will it get the backing of many campaigners/does it need such high organizational support?</p>	<p>Stocking density in general seems to have buy-in from many animal advocacy groups, but not agreement on organic standards specifically. EFSA opinions, the EU organic regulation, and other guidelines already exist, meaning there is not a lot of basic research needed. Undercover investigations have already been done and published which show crowded conditions.</p>	<p>Many NGOs already include water quality in their asks. More work to be done on actually demonstrating poor water quality is the norm</p>
<p>Could it be supported by non-welfare groups?</p>	<p>Possibly the same groups who support organic farming?</p>	<p>Environmental groups concerned with ocean pollution, and consumer groups concerned with food safety</p>

EU action also becomes easier when there is clear evidence that the market alone is insufficient to deliver a harmonized common market, especially where it is not delivering on policy goals of the EU. A recent report for the European Parliament ([Pavlidis et al., 2023](#), p.11) recommends for welfare practices to be set by industry with competent authorities to verify these are in line with EU-level “fundamental goals” and “general principles,” suggesting little appetite for strict legislation at this stage, and echoing earlier recommendations from the Standing Committee on Agricultural Research ([Manfrin et al, 2018](#), p.18).⁵ While these are clearly industry-biased and not necessarily informing policymakers, it makes sense to adopt strategies that anticipate these policy preferences of key actors. Therefore, a robust strategy here is to partner with the industry to gather data in support of their codes of practice, and then turn a broad coalition towards pushing for regulations to a) highlight where the industry is not even meeting its own commitments and b) raise the bar on worst conditions.

Tactics for supporting this strategy are:

- Building collaborative data-collection efforts
 - Advocate for resources including training, subsidies, grants, and insurance to be tied to fish welfare improvements described in industry Good Management Practices (see the upcoming EU reference centre for fish welfare, [European Maritime Fisheries and Aquaculture Fund](#), [EU Aquaculture Assistance Mechanism](#), national multi-annual aquaculture plans, e.g., the €8M in Spain ([2021, p 221](#)), €4M in Italy ([2021, p 143](#)), and the €560K in Greece ([2021, p135](#)) set aside for animal health and welfare and Fish from Greece’s fish welfare guide ([Pavlidis & Samaras, 2020](#)), [the EU Platform for Animal Welfare published the ‘Guidelines on Water Quality and Handling for the Welfare of Farmed Vertebrate Fish](#), [APROMAR guide on farmed fish welfare in Spain](#))
 - Build relationships with forward-thinking industry leaders, support them in implementing welfare improvements using such resources, and publicize their success to encourage others in the industry to follow suit. This could be done by setting up research projects with universities and research consultancies the European Commission usually relies on (e.g., Wageningen UR, IBF Consortium, VetEffect,

⁵ “Strict legislation was seen as ineffective in improving fish welfare in European aquaculture. The group concluded that the application of scientifically valid [Good Management Practices] would represent a better strategy to improve harmonisation of implementation of state of the art of fish welfare in the EU. Research would be needed to support the development of such GMP, and legislation should encourage their use in practice”

Agra CEAS Consulting, Food Chain Evaluation Consortium, ICF International, Civic Consulting, European Policy Evaluation Consortium), using a collaborative approach with industry partners to implement welfare improvements, or supporting businesses in adopting Good Management Practices.

- Convene authors of small-scale welfare studies with aquaculture producers and suppliers into a conference/working group with specific aim to study cost (or lobby for EU to host such an even at the EU fish welfare reference center, or in a key Member State)

- Use these relationships to gather key economic data for future socio-economic impact assessments (mostly taken from the recent EU leaked impact assessment):
 - Increase (%) in total production costs – including labor costs
 - The difference in production cost (% and EUR) per animal in conventional system versus in the alternative system
 - The difference (% and EUR) in the production cost per end product
 - The effects of a % change in animal population size on costs per animal
 - Investment costs per proposed equipment
 - Changes to total production area needed to maintain same production volume
 - The average cost of training (EUR per number of farms)
 - Changes to weight of animal
 - Any sources of savings (e.g.. labor costs will be down X%, antibiotic costs will be down Y%)
 - Studies showing consumers' willingness to pay may potentially be higher than the additional production costs
 - Price increases (% , EUR) at retail level
 - If reform increases meat quality such that it leads to higher prices received by farmers for their agricultural products at the point of production (before any processing, transportation, or other costs are incurred)
 - Studies showing improved product quality from the proposed reforms (e.g., filet quality, taste, freshness, preservation, white stripping)
 - If there is a need for further training (and associated costs to producers)

- Any increase the workload total and per animal, which may be offset by a reduction in the number of animals.
- Change in workforce required to manage and implement the reform if there will be concentration of the sector, since SMEs will not be able to invest in X and will disappear.
- Any change in job satisfaction of farmers (assumed to increase due to their own observations of the naturally behaving animals and because of increased positive feedback and recognition by citizens, whose expectations are met by this reform)
- Coordinating around a high-value, tractable ask
 - Animal advocacy movement to continue hosting and attending workshops (e.g., [Summer Shoal](#)) and explicitly rank the various policy asks they are considering.
 - Replicate Van den Boogaart et al. (2023) (who surveyed mostly universities and research institutes in Norway on the prioritization of fish welfare issues in European salmonid aquaculture using the Delphi method) but expand it to include government, NGOs, industry, and more species, in order to establish the appetite for reform
 - Replicate survey in Pavlidis et al. (2023) with a larger sample of farm owners and employees to establish if there really is the apparent disconnect between fish farm owners and employees on stocking density limits and higher animal welfare labels to provide evidence that mitigates their united opposition to reform. (This comes from a survey, but note the small N of respondents and that employees and owners in the survey may not represent the same production systems/species used.)
- Building legislative precedent
 - Identify existing laws that welfare reforms may already fall under (e.g., where stocking density changes could align with existing animal health laws regulating disease outbreaks) and lobby for that interpretation.
 - Lobby for some countries to implement versions of industry Good Management Practices into law to set a mandatory precedent (e.g., stocking density limits for non-organic species, water quality monitoring requirements even just in line with EFSA 2008-2009 opinions).

- Successfully lobby national governments in Vught countries⁶ or Mediterranean producer-countries and the EU to tie subsidies to welfare improvements as part of the upcoming revision of the CFP, as measured by policy changes, within the next five years. For example, in the Netherlands, the Sustainable Aquaculture Benchmark (Maatlat Duurzame Aquacultuur) has financial schemes attached that allow new or renovated fish farms that meet the prescribed benchmark to enjoy tax benefits, and the Ministry of Agriculture, Nature and Food Quality approved five Aquaculture Innovation grant applications, some of which explicitly include welfare aspects.
- Building the case for the need for legislation
 - Conduct or request inquiries assessing how well producers are complying with their welfare codes of conduct (via the European Court of Auditors, national agencies, NGOs themselves, and academics).
 - Producing materials showing how the industry is lagging behind science (e.g., EFSA opinions, reports ranking companies and countries on how advanced their welfare interventions are).
- Building a broad base of support
 - Launch campaigns to educate the public about fish welfare issues, encourage consumers to demand better welfare standards (but show it's hard to do without government support), and generate media coverage on the topic timed to coincide with elections, EFSA opinions, and potentially a future European Citizen's Initiative on fish at the end of the decade.
 - Generate evidence of citizen expectations (public opinion polling or even a Eurobarometer survey)
 - Be ready to disseminate EFSA opinions as they are released and determine how they should translate into policy
 - Having candidates in European Parliament and national elections pledge to improve fish welfare
 - Look for allies in other movements (health, food safety, environment) who can produce data on anything that can suggest the proposed reform is coherent with environmental goals, e.g., reduced and less intensive food production pollution pressure (air, water), and feed conversion rate, i.e., lower carbon and environmental footprint associated with feed intake

⁶ Belgium, Denmark, Germany, Netherlands, Sweden (at a stretch Austria & Luxembourg)

- Align advocacy around EFSA opinions and Council presidencies with interests in aquaculture. This is less promising in worlds where the EU reform package does not adopt provisions allowing for iterative, ad-hoc updates to the legislation.

Year	6 month period	Trio Presidency	Country holding the presidency	EFSA delivery scheduled
2025	January–June	2025-2026	Poland	
	July–December		Denmark	
2026	January–June	2026-2027	Cyprus	Farmed salmon and trout
	July–December		Ireland	
2027	January–June	2027-2028	Lithuania	Farmed carp
	July–December		Greece	
2028	January–June	2028-2029	Italy	Farmed, sea bass, sea bream, european eel
	July–December		Latvia	
2029	January–June	2029-2030	Luxembourg	
	July–December		Netherlands	Farmed tuna
2030	January–June	2030-2031	Slovakia	
	July–December		Malta	

- The next EFSA panel (2024-2027) is currently being chosen (or already has been), so the movement should ensure that adequate welfare science exists on the MVP policy asks.
- The following EFSA panel (2027-2030) will be in charge of the sea bass and sea bream opinions, and likely seek new applications in Spring 2026, so advocates can help build the pipeline of candidates and support them to apply when the time comes.

An example of what this might look like in practice

Imagine, for the sake of simplicity, we just focus on gathering data on water quality, having decided the best ask is **requiring reporting on and maintaining certain thresholds for water quality for sea bream, especially in RAS systems**. Water quality has huge welfare benefits, is already discussed in 2008-09 EFSA opinions and Fish from Greece guidelines, is already monitored for productivity reasons, and, at least in RAS systems, is highly controllable. RAS systems have an uncertain trajectory, but given the potential for them to play a large role, especially in juvenile welfare, and the ability (in theory) to completely control welfare parameters, and that the EU organic regulation even completely prohibits RAS, it seems plausible that regulations here specifically could yield a large welfare dividend.

Research and Data Collection

- **Establish Baseline:** Conduct comprehensive surveys of current water quality conditions in sea bream farms across the EU, with a particular focus on countries like Greece, Spain, and Italy, which have large sea bream farming industries. Data to be collected should include parameters like oxygen levels, pH, temperature, salinity, and levels of pollutants and waste products (nitrates and ammonia) and be crosschecked against EFSA 2008-2009 opinions, Fish from Greece's fish welfare guide ([Pavlidis & Samaras, 2020](#)), and [the EU Platform for Animal Welfare published the 'Guidelines on Water Quality and Handling for the Welfare of Farmed Vertebrate Fish, APROMAR guide on farmed fish welfare in Spain](#)). While some organizations can attempt to do this cooperatively with industry, others may conduct independent investigations of water quality at various sea bream farms, particularly those known for poor practices. Publish these findings to draw public attention to the issue. (Note: We may discover that in fact water quality is mostly within recommended parameters, with exceptions during peak events like hot summer months).
- **Estimate Equipment Costs:** Calculate the costs for acquiring, installing, and maintaining this equipment for different scales of farming operations. It's plausible that many producers already possess the required equipment but are not monitoring the indicators we care about or taking mitigating actions when welfare thresholds are breached.
- **Economic Impact Studies:** In addition to baseline data collection and equipment cost estimates, conduct economic impact studies that show the potential benefits to producers from improved water quality, such as increased growth rates, lower mortality, and reduced disease incidence. This

data can be valuable in convincing producers that investing in water quality can have a positive return on investment.

Advocacy and Building Partnerships

- **Partner with Academic Institutions:** Collaborate with universities and research institutions to study the effects of various water quality parameters on the welfare of farmed sea bream. This literature probably already exists for experimental settings, but ensuring there is recent data on the welfare in commercial settings will give EFSA a stronger basis on which to make recommendations. It may be possible to identify researchers who are already conducting studies in commercial settings on outcome metrics the industry cares about (mortality, disease, growth rates) and ask them to include animal welfare-based indicators in their data collection.
- **Engage with Producers:** Establish relationships with sea bream producers and industry groups. Share initial findings on water quality and its impact on fish welfare, discuss the potential benefits of improved water quality, and involve them in the design and implementation of pilot programs.
- **Demonstrating Consumer Demand:** Show producers that there is a growing market for higher welfare products, and consumers are willing to pay a premium for such products. This could involve willingness-to-pay-studies and consumer awareness campaigns.
- **Risk Mitigation Measures:** Discuss with producers the potential risks involved in transitioning to higher welfare practices and develop measures to mitigate these risks. This could include financial assistance for initial setup, assistance with technical issues, and the development of a contingency plan in case of unforeseen problems.

Pilot Programs and EU Funding

- **Implement Pilot Programs:** Run pilot programs with willing producers to demonstrate the effectiveness of improved water quality management systems. Monitor and record the impact on fish welfare and productivity. This could involve working with suppliers of equipment to offer leasing of any additional probes or aerators needed for producers. Use the positive results from the pilot programs as a contrast to highlight the improvements that are possible with better practices.
- **Access EU Funding:** Advocate for and assist producers in applying for funds from the European Maritime Fisheries and Aquaculture Fund or the EU

Aquaculture Assistance Mechanism to offset the cost of equipment and changes in farm management practices. Lobby for revisions to EU law so that Member States are allowed to fund these measures more than they're currently allowed to (due to limitations on state aid; but such limitations don't apply to other non welfare measures, and so the EMFAF regulation should be amended to provide a derogation from state aid rules for fish welfare measures)

- **Incentivize Participation:** Offer incentives for producers to participate in pilot programs, such as subsidies or priority access to funding sources. Highlight successful case studies from other sectors or regions where similar transitions have resulted in improved profitability.
- **Insurance Mechanisms:** Work with financial institutions to develop insurance products that can protect producers against the potential financial risks involved in transitioning to higher welfare practices.

If the reform package fails

- Pursue change in Greece and Spain via national policy advocacy or non-policy approaches (e.g., corporate campaigns)
- This year, assembling evidence from Ace Aquatec ([2023a](#), [2023b](#)), Aquaculture Stewardship Council ([2022, p.11](#)), Aenor, EU organic, Turkish retailer [METRO](#), and Turkish-based suppliers of UK retailers ([CIWF 2017](#)) of transitions quicker than 10 years to humane slaughter for sea bass and bream, and presenting it to the ministries in charge of aquaculture, consumer agencies, and producer associations in each country.
- This year, assembling evidence of how enforcement has been done in Norway, Switzerland, New Zealand, Ireland, the UK, Germany, and Turkey and presenting it to the ministries in charge of aquaculture, consumer agencies, and producer associations in each country.
- Over the next three years, produce a report on the compliance of producers with industry codes of practice, such as fish welfare guides in Greece and Spain ([Pavlidis & Samaras, 2020](#), [APROMAR guide on farmed fish welfare in Spain](#)) and any gaps between these codes and other standards (such as certifications, 2008-2009 EFSA opinions, legislation in other countries, or multinational aquaculture guides: [World Organisation for Animal Health 2021](#), [EU Platform on Animal Welfare water quality and handling guidelines 2020](#), [Council of Europe Recommendation concerning farmed fish 2005](#))
- Advocate for resources including training, subsidies, grants, and insurance to be tied to fish welfare improvements described in industry Good Management Practices (national multi-annual aquaculture plans, e.g., the funding set aside for animal health and welfare (€8M in Spain ([2021, p 221](#)), €4M in Italy ([2021, p 143](#)), and a meager €560K in Greece ([2021, p135](#)))

It is very plausible not just that the reform proposal is delayed, but that it simply stops or drops the fish section completely, without any clear beachheads for future fish policy advocacy. In this scenario it's hard to make the case that EU-level policy change is the path to our objective with the highest expected value. Rather, work that affects sea bass and sea bream produced in Greece and Spain via other means may look more promising. This could still include corporate campaigns in the countries who consume fish products produced there (*Shah, forthcoming*), or national policy advocacy, i.e., advocating for more welfare spending from governments, for government inquiries into welfare, mandating reporting on welfare, and national legislation on welfare improvements.

Humane slaughter may still be the most promising door into advancing welfare, and so producing the evidence for short transitions for sea bass and sea bream can bolster the case to governments.

If core to the EU strategy is demonstrating that industry fails to meet their commitments, that their commitments fail to meet best science, and that there exists an unharmonized market, there is a risk that if non-EU welfare interventions are successful across a number of countries, it will undermine the case that EU-level legislation is needed. So this approach should be calibrated to the probability of EU legislation not being a promising pathway anyway.

Acknowledgments



This report is a project of [Rethink Priorities](#)—a think tank dedicated to informing decisions made by high-impact organizations and funders across various cause areas. The author is Neil Dullaghan. Thanks to Daniela R. Waldhorn for her guidance, Sagar Shah, Kieran Greig, Alice Di Concetto, Ren Springlea, Míriam Martínez, Doug Waley, Gautier Riberolles, and Dr Krzysztof Wojtas for their helpful feedback, and Adam Papineau for copyediting.

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APPENDIX

SWOT ANALYSIS

External Opportunities

Opportunity	Description	How might it affect farmed fish policy reform?
<p>Autumn proposal to European Parliament election season (September to November)</p>	<p>the European Commission has said it intends to make its broad reform proposal in Sept/Oct (CIWF 2023), 64% Metaculus forecast for the European Commission making the proposal before October 31, 2024. My own forecast was higher before the Regulatory Scrutiny Board negative opinion, and now I'm at 70%, with most of that still being for the proposal being made in 2023.</p> <p>However, lower odds (45%) of it progressing far after that: MEPs at CIWF and Efa events did not express much hope about being able to move the legislation forward before the elections.</p> <p>Spanish national elections happening earlier in 2023 than anticipated, most likely leading to a conservative government holding the EU</p>	<p>There appears to be a gap between the European Commission proposal on humane slaughter for fish and what we know is possible, and the coherence with their own other policy provisions (that they exclude fish), so there is still room to move the proposal towards more reform.</p> <p>The median community forecast on Metaculus, a prediction platform, estimates only a 31% chance that the EU will require stunning for at least 50% of farmed fish before 2030.</p>

	<p>presidency from July-December which already does not include advancing the AW reform in their priorities.</p>	
<p>EP election season (Jan-June 2024)</p>	<p>Politicians are more receptive to salient public issues before an election, and may be willing to state positions and even advance (symbolic) bills to signal support.</p>	<p>While the Political Science literature suggests the Parliament is the weakest of the three institutions (the other two being the European Commission and Council), this is the institution where the advocacy movement has the most opportunities to influence, both through directly appealing to MEPs and via the European Parliament intergroup on animal welfare.</p>

[EFSA Opinions](#) &
Council
Presidencies

Scheduled delivery date - species:
June 2026 - Farmed salmon and trout (other aspects than killing)
June 2027 - Farmed carp (other aspects than killing)
June 2028 - Farmed, sea bass, sea bream, european eel (other aspects than killing)
December 2029 - Farmed tuna (other aspects than killing)

Rotating Council presidencies
January–June 2026: Cyprus (as part of previous trio)
July–December 2026: Ireland (as part of new trio)
January–June 2027: Lithuania
July–December 2027: Greece
January–June 2028: Italy (as part of new trio)
July–December 2028: Latvia
January–June 2029: Luxembourg
July–December 2029: Netherlands (as part of new trio)

EFSA opinions may present a consensus on the state of welfare in the industry that is contrary to what the industry claims, and make recommendations for change.

Some major aquaculture countries will hold the rotating council presidency during this time and could push for EFSA opinions to be expedited (as the UK did for veal in the 1990s) and use the release of opinions as the impetus for new legislation.

The next EFSA panel (2024-2027) is currently being chosen (or already has been), so the movement should ensure that adequate welfare science exists on the MVP policy asks.

The following EFSA panel (2027-2030) will be in charge of the sea bass and sea bream opinions, and likely seek new applications in Spring on 2026, so advocates can help build the pipeline of candidates and support them to apply when the time comes.

Conditional on the EU reform package being already adopted and containing powers for the European Commission to update the annexes via delegated/implementing acts, as each of these EFSA opinions are released the movement can launch campaigns to pressure the European Commission to put EFSA recommendations into the regulations. The movement therefore should also be preparing the socio-economic data to support these recommendations along the same timeline.

Hard to forecast whether the incoming EFSA panel will be reform-minded or captured by industry (EFSA's level of capture merely reflect the scientific community's capture)

Most EFSA opinions in the past have been issued and led to no legislative change or to legislation significantly watered down compared to EFSA recommendations.

<p>Certifications</p>	<p>A number of certification programs already require certain welfare standards, or are planning to.</p> <p>For example, the EU Organic regulation and a number of standards that basically replicate it (Naturland, Soil Association, Bio Swiss) sets specific stocking density requirements, and vague slaughter, water quality, and enrichment requirements.</p> <p>A few seafood certifiers are about to release welfare standards for fish which will include humane slaughter</p>	<p>Given the small coverage of these certifications, it does not undermine the need for legislation, but it does offer potential partners who may be willing to share experiences on how they have implemented various welfare changes and signals to legislators a market for welfare improvements.</p>
<p>Compliance gaps</p>	<p>Consumer protection and competition agencies are getting very interested in how compliant corporations are with their voluntary commitments on animal welfare.</p>	<p>Conduct or request inquiries assessing how well producers are complying with their welfare codes of conduct (via European Court of Auditors, national agencies, NGOs themselves, academics).</p>
<p>Industry, including Greece, already including welfare in plans</p>	<p>The industry is already starting to pay lip service to fish welfare, not just fish health, and in particular, the Fish From Greece label has very detailed good management practices for sea bass and bream</p>	<p>This offers potential partners, who may be willing to share experiences on how they have implemented various welfare changes and signals to legislators, a market for welfare improvements.</p>
<p>Greek fish group</p>	<p>There is no domestic group available to work in Greece, the biggest EU farmer of sea bass and bream.</p>	<p>The continued absence of a group in Greece increases the value of EU-level work (to impose a change on the government it otherwise would not be lobbied to make) but also leaves a large hole in the strategic picture. Charity Entrepreneurship in particular could incubate a fish charity in Greece, or existing groups with some experience in Greece (e.g., Essere Animali, CIWF) could increase their presence and hire more local staff.</p>
<p>AI could help monitor welfare</p>	<p>Precision aquaculture methods, aided by AI, will increase the precision and automation of on-farm welfare monitoring (Barreto et al., 2021,</p>	<p>May make it easier to lobby for regulations in individual welfare and more sophisticated systems of monitoring environment.</p>

	O'Donncha et al., 2021, Føre et al., 2018 in Pavvlidis et al., 2023).	Movement could seek to work with industry R&D and academics to develop AI-assisted welfare tools and deploy them. Advocate for general regulations which cover more species and more production systems given that the exact species and systems may change.
Gap between owners and employees	A small datapoint in a survey (Pavvlidis et al., 2023) shows some gaps between the views of farm owners and employees. Employees more open to stocking density limits than owners, including for larval and on-growing (but less open to densities tied to water quality). Owners and employees apparently split on ice slurry.	This could provide a way to break the united front of the industry, create wedge issues, and find areas of agreement on reform.
Existing precedents	There are already laws on species-specific stocking density, slaughter, and bans/moratoriums on certain production systems (e.g., EU organic prohibition on RAS, Danish moratorium on sea cages).	Advocates can use these examples to justify their calls for reform as moderate and well within reasonable grounds, not a radical ask.
Consumers care about fish	Many surveys show consumers have as much concern for fish as land animals, and will claim to be willing to pay more for higher welfare.	This may make public advocacy easier, in particular around elections and when using tools like European Citizen's initiatives.
Juvenile mortality & feed costs	Juveniles and feed are a large cost for producers	Reductions in mortalities or welfare improvements that reduce feed consumption might be appealing to producers.
Water quality may pay for itself	It has been claimed that improving water quality may actually pay for itself over the longer term.	This should weaken resistance to reform, if producers can get access to capital for up-front investment costs.
The industry's existing pressures for more	The industry is already facing a lot of pressure to appear more sustainable, and this is a policy area where there is more support.	To the extent advocates can find messages or facts that weaken the credibility of the industry status quo as sustainable, or that reforms can be

sustainable practices		seen as sustainability reforms, the industry will face more pressure from more places to implement them.
EU funding and national funding in theory available for welfare	EU funds and national aquaculture plans specifically mention welfare as one area where funding can be used.	This can be an area that advocates argue funding has already been set aside to offset costs of trialing interventions, so use this funding to test and gather data (funds could be used for grants or insurance).
Some cases where production and consumption happen in the same country, enabling leverage of consumer power	While a general problem for fish welfare in Europe is that production happens in a different country to where most of that production is consumed (e.g., Atlantic salmon farmed in Norway being consumed across the EU), there are some cases where domestic production is aligned with domestic consumption (e.g., Spanish sea bass and sea bream production).	It should be easier to link to advocacy in these countries.
Has been less media coverage of farmed fish issues	Relative to other farmed animal issues, fish welfare is still neglected.	This provides a lot of room for growth and learning on the part of the public and elites, where the dominant narratives from industry of a sustainable, low-carbon, healthy industry can be challenged as a polluting, wild-fish fed system of cruelty.

External threats

Threat	Description	How might it affect fish reform?
Elections	Upcoming European Parliament elections in June 2024, where more reform-friendly Greens, Social Democrats, and Renew Europe are projected to lose seats.	The tractability of policy change is in a limited time window and on an uncertain, but probably downward trajectory.

	National elections have already produced more conservative governments in Italy and Greece, and are expected to in Spain.	Reform-friendly Greens, Social Democrats, and Renew Europe are projected to lose seats, but as far as I know there are already plans to have MEPs publicly commit to their animal welfare commitments. At best, we still have a less supportive European Parliament than we have now, but maybe still enough policy champions to prevent it stalling out, conditional on the European Commission reform having already been made in 2023.
Industry Growth & Advances	<p>Expansion of Recirculation Aquaculture Systems (RAS) and offshore farming are expected.⁷</p> <p>Projections for EU finfish production are mixed, with some sources predicting a doubling of production to 2030 and others predicting more modest rises, according to SCAR (2023), FAO (2022), and European Parliament (2014).</p> <p>The EU will pursue efforts to break the industry out of stagnation via subsidies (Guillen et al., 2019), VAT, and institutional seafood promotion (EP, 2023).</p>	<p>The scale may remain relatively the same or increase, while tractability may decrease, because resistance to reforms will increase.</p> <p>Structural barriers have held the industry stagnant for decades and are not particularly malleable by the advocacy movement (inefficient subsidies, small-scale companies unable to spread efficiencies or raise capital for investments, high feed costs, environmental regulations, food safety regulations, high energy & capital of RAS).</p> <p>RAS has uncertain welfare implications—it could allow for more fish to be produced in poor conditions and for more mass mortality events, but theoretically provides much more control of welfare conditions.</p> <p>Further offshore farms may require more automated systems, which could be programmed with higher welfare parameters, but also may make checking compliance harder (including undercover investigations)</p>
Positive associations with fish farming	<p>Certifications may increase the salience of welfare, pushing up against the tide of marketing creating awareness of low-carbon, sustainable, healthy farmed fish.</p> <p>The EU intends to introduce a labeling scheme for animal welfare (possibly voluntary rather than</p>	<p>Uncertain effects on tractability. Advocates clearly have the ability to influence certifiers.</p> <p>Unclear if the movement can find allies in other movements or mitigate conflicts, e.g., highlight pollution from fish farms, Lobby for national labels (e.g., AW label in Germany, Fish in Greece label) to include farmed fish welfare</p> <p>Labeling for sustainability and less carbon footprint is also a risk of welfare-washing</p>

⁷ 'Offshore aquaculture' is aquaculture 'located > 2 km or out of sight from the coast, in water depths > 50 m, with wave heights of 5 m or more, ocean swells, variable winds and strong ocean currents, in locations that are exposed (open sea, e.g., ≥ 180o open) and where there is a requirement for remote operations, automated feeding, and where remote monitoring of operating systems may be required (definition in the context of the 2010 FAO workshop 'Expanding mariculture further offshore, Technical, spatial and governance challenges').

	<p>mandatory) but it's unlikely it will immediately apply to seafood. There is positive public association of fish with health and low-carbon production.</p>	<p>products; thus, the rise of this type of labels that are not including welfare, can confound the general public. This makes it harder to find allies in other movements and creates strong incentives for policy makers to want to ignore welfare issues and promote the industry as a solution.</p>
Advocacy capacity	<p>Progress on chicken welfare: The leaked EU impact assessment predicts a 3% decline in caged hens per year in the absence of new legislation. Production is ~60% cage-free today, so a naive extrapolation would suggest 100% cage-free in 13 years (2036) if this were a consistent trend, but, of course, this is unlikely, and the EU is considering a 10-year transition anyway, which would likely mean an end to cages would not come until at least 2040. Additionally, the same reform package also calls for much slower growing breeds of broilers by 2030.</p>	<p>The slower progress is on hens and broilers, the fewer resources available to work on fish, meaning the movement has to be even more strategic in picking the few avenues it has the ability to work on.</p>
Climate change	<p>Changes in sea temperatures may worsen welfare and affect growth rates for fish in sea cages (Ceres project, 2020), and associated mitigating regulations may hamper industry growth, but also may lead to more consolidation of industry and more limits on welfare improvements (e.g., the water framework directive environmental restrictions on site selection cutting against site selection based on optimal welfare). We should</p>	<p>Generally will make the scale of the problem and tractability worse. Not much the movement can do about changing sea temperatures. Try to form coalitions with environmental groups to identify any win-win solutions and mitigate climate change solutions that harm farmed fish.</p>

	also expect more and more studies showing the relatively low GHG emission from fish farming (e.g., HAPO (Pelekanakis et al. 2022) mention one started in 2021).	
Artificial Intelligence	A sudden boom in economic growth due to AI systems (Metaculus forecasts put a 25% chance on a 30% annual increase in global GDP by 2045) could enable an expansion in production and more sophisticated systems for farming more fish and more species of fish.	Generally, the case is that legislation is behind technology, so reforms we advocate now may be obsolete or have much less expected value by the time they are implemented (e.g., if the movement focused on sea cages and AI enabled a negative-welfare RAS boom).
Feed & juvenile costs	Feed and juveniles are huge costs for producers.	While any interventions that could reduce these costs for producers would be an opportunity, the possibility that many welfare interventions could actually increase these costs creates a major hurdle for advocacy.
No cage-free ask for fish	As far as we know, there is no consensus on a welfare improvement that would deliver as much benefit as moving hens out of cages does for those animals, not for a single species of fish, nevermind the entire category “fish.”	The lack of a single uniform ask makes it harder for policymakers, as it then requires much more nuanced understandings of the problem, more work making specific requirements, and designing systems to check compliance.
Potential financial crises or other global events diverting attention and resources away from animal welfare issues.	Inflation, the war in Ukraine, the costs of climate change, and immigration all suck attention away from animal welfare.	Fish are neglected even within the animal advocacy space, so any loss of attention towards this issue will doubtless affect fish most by leaving only a trivial amount of resources/attention in absolute terms.

Structure of the industry	Historically, the industry has been characterized by a large number of SMEs, though particularly in Greece the last decade has seen a lot of consolidation of the industry.	The fragmented SME nature of the industry can slow down widespread changes and make expensive welfare improvements more challenging for farms with little access to capital. On the other hand, a more consolidated industry would both be better able to implement reform but also potentially more united in its opposition.
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Internal Strengths

Strength	Description	How might it affect fish reform?
Groups working on fish already	There are already a number of advocacy groups in the region dedicating significant shares of their resources to farmed fish issues (CIWF, Essere Animali, Eurogroup, ALI, VDB, Wakker Dier, Equalia, Wellfarm, Norway, Denmark, Turkey)	Therefore, there already exist experienced individuals familiar with fish welfare issues and organizations and structures to support them.
Policy experts	There are already a number of advocates actively working on farmed fish policy work at the EU level (e.g., Doug Waley, Giulia Malerbi)	These people have connections and experience needed for lobbying work.
Existing body of scientific research supporting welfare improvements for farmed fish.	The movement has already produced a number of reports and resources on fish welfare that policy makers and industry can be referred to.	Has already helped to make the issue more mainstream and provide counter-narratives to the industry
Have allies in European Parliament and EC	It appears that Stella Kyriakides (DG Sante) & Janusz Wojciechowski (DG Agri) are allies to the movement, and a number	Makes it easier to perform legislative subsidy- <i>policy expertise:</i> constituency interests and opinions

	of MEPs are also willing to expend political capital on farmed animal issues.	in-depth policy analysis, reports, or expertise. Analyze, synthesize, and summarize—in a politically user-friendly form, information to promote the policy goals that their group and the legislator share. Supply them with rhetorical ammunition that they can use in committee, during floor debate, or in media appearances. <i>legislative intelligence:</i> Information necessary to anticipate other players' reactions, generate headcounts, proffer procedural advice, and otherwise enable legislators to more fully approximate informed strategic actors in seeking policy “progress.” -> Especially helpful to bill sponsors and party and committee leaders.
Dedicated and passionate activists	The movement has a wide network of volunteers and staff members that can be deployed	Makes it easier to engage in outsider lobbying
Fish welfare experts on our side	Some key experts are already involved in or willing to assist the movement (Michelle Lavery, Doug, Hans at WUR)	Prevents the movement from making obviously ridiculous asks

Internal Weaknesses

Weakness	Description	How might it affect fish reform?
Existing asks	NGOs are not currently aligned on specifics of asks and relative weight of each, as far as I know.	My status quo expectation is for diverging uncoordinated effort which weakens the strength of the policy asks being made.

No group in Greece	There are few animal groups in Greece (e.g., Hellenic) with limited focus on fish	Makes EU-level reform more promising but means we lack a bottom-up pressure in this important country
Lack of fundamental economic knowledge	My impression is that there is an inadequate understanding of the intricate supply chain dynamics and differences compared to other farmed animals, like chickens.	Increases the risk that the movement focuses on a policy that misses the highest impact or has effects smaller than anticipated because it underestimates barriers and power dynamics in the supply chain
Less funding	The movement overall has seen increasing funding, but this may be hurt by external events, and the movement has not yet secured new sources of funding.	Limits both the number of different levers the movement can pull to seek policy change and reduces the absolute output per lever.

TOWS Analysis

<p>Strategies that minimize weaknesses by taking advantage of opportunities. Does this weakness prevent or risk this opportunity? Should we address the weakness? What actions do we need to take to remove the weakness?</p>	<p>Strategies that minimize weaknesses and avoid threats concerned with defensive strategies. Put these into place to protect yourself from loss. However, don't rely on them to create success. Which relate to each other? Are there weaknesses that result in threats? Which elements should be addressed?</p>	<p>Strategies that use strengths to maximize opportunities. Can this strength be used to take advantage of the opportunity? What actions do we need to take to make use of the strength?</p>	<p>Strategies that use strengths to minimize threats. Can this strength reduce or remove this threat? What do we need to do to remove or reduce this threat? Is it a priority?</p>
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<p>Collaborate with existing advocacy groups in neighboring countries to establish partnerships and extend their advocacy efforts into Greece, focusing on raising awareness and driving change in sea bass and bream farming practices.</p>	<p>Foster strong alliances with existing advocacy groups, scientific institutions, industry stakeholders, and policymakers across Europe.</p>	<p>Utilizing the existing network of advocacy groups and expertise in policy advocacy: Organize joint campaigns, workshops, and conferences to raise awareness, share best practices, and build a unified voice for farmed fish welfare within the advocacy network.</p>	<p>Collaborate with advocacy groups to address the regulatory scrutiny and negative opinions surrounding the EU reform package.</p>
<p>Facilitate stakeholder dialogues and expert consultations to prioritize the broad categories identified (slaughter, transport, handling, water quality, stocking density) and establish specific, measurable, and achievable goals for each area.</p>	<p>Develop targeted awareness campaigns to educate the public about the welfare issues in fish farming and promote consumer demand for improved welfare conditions.</p>	<p>Building on aligned allies in the European Commission, European Parliament, and some Northern European governments: Provide policymakers with evidence-based research and policy briefs that highlight the welfare benefits and feasibility of proposed reforms, reinforcing their existing support and influencing decision-making processes.</p>	<p>Engage with supportive policymakers to counter the potential conservative election results and ensure the continuity of reform efforts.</p>

<p>Invest in research and pilot projects to explore alternative paths for farmed fish welfare improvements, such as innovative production systems, technology applications, or sustainable feed solutions. Action: Collaborate with research institutions, industry partners, and relevant stakeholders to conduct feasibility studies, collect data, and assess the viability and impact of these alternative approaches.</p>	<p>Establish regular dialogues and build relationships with policymakers, members of the European Parliament, government officials, and influential individuals who can support and champion farmed fish welfare. Action: Organize meetings, workshops, and events to present scientific evidence, share best practices, and advocate for policy reforms that prioritize fish welfare.</p>	<p>Work with national governments to pilot and implement welfare-focused initiatives, showcasing successful case studies that can serve as examples for other EU member states and strengthen the argument for broader reforms.</p>	<p>Collaborate closely with the incoming conservative government in Spain to maintain their commitment to farmed fish welfare and ensure it remains a priority during their Council Presidency.</p>
<p>Establish partnerships with supply chain actors, industry associations, and market experts to conduct in-depth research on the intricacies of fish supply chains, including production, distribution, and consumption patterns. Action: Conduct comprehensive analyses, gather data, and engage in dialogues to gain insights into the specific challenges and opportunities within the</p>	<p>Develop sustainable funding models and diversify funding sources to ensure long-term financial stability for farmed fish welfare advocacy. Action: Explore partnerships with philanthropic organizations, secure grants, engage in fundraising initiatives and explore potential collaborations with corporate sponsors aligned with the mission.</p>	<p>Collaborate with consumer organizations, animal welfare NGOs, and media outlets to raise the visibility of farmed fish welfare concerns, promoting informed consumer choices and creating demand for welfare-certified fish products.</p>	<p>Address the threat of lack of public awareness and consumer demand by implementing targeted awareness campaigns and educational initiatives that highlight the importance of farmed fish welfare.</p>

<p>fish supply chain, and identify leverage points for driving welfare improvements.</p>			
<p>Strengthen collaborations with foundations, donors, and philanthropic organizations that align with the mission of improving farmed fish welfare to secure financial support for advocacy initiatives. Action: Develop compelling proposals, engage in fundraising efforts, and build partnerships with funding entities to secure resources dedicated to farmed fish welfare advocacy.</p>		<p>Engage with academic institutions, researchers, and experts in the field to conduct studies and publish research papers that shed light on the welfare benefits and economic viability of implementing specific welfare measures.</p>	<p>Invest in research and collaboration with experts to address the complexity of fish species and supply chain dynamics, providing a solid scientific foundation for the development of uniform welfare standards.</p>
		<p>Collaborate with existing certification programs, such as ASC (Aquaculture Stewardship Council), to strengthen and promote their welfare standards, encouraging industry participation and consumer recognition of these certified products.</p>	<p>Collaborate with certification programs and advocate for the inclusion of comprehensive welfare criteria in order to counter the potential overshadowing of welfare issues by health and low-carbon production concerns.</p>

[END]