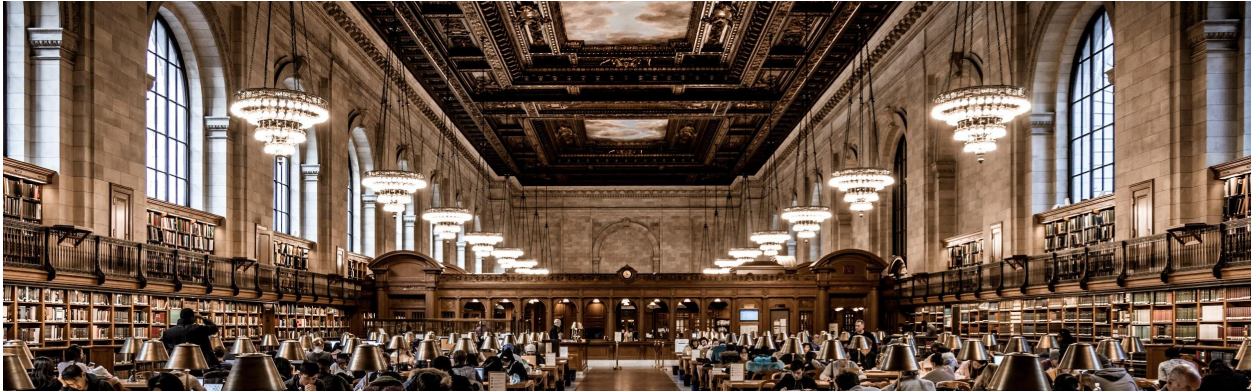




Thesis Ideas - Fish Welfare

Fish welfare is a neglected topic, even though it affects billions of fish each year. This document summarizes some of the most important questions that could be answered by research.



Note: If you are considering writing your thesis about a fish-related topic and you are not sure which one would be a good fit or if you just want to discuss options, feel free to contact us at jennifer@fishwelfareinitiative.org.

As of December 2023, we no longer maintain this document. Feel free to browse through it and [write to us](#) with any queries.

Contributions: If you think we missed something, [let us know](#) and we will consider adding it.

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Biology

Behavioral welfare indicators

Question: How do certain fish behaviors correlate with welfare?

Importance: Using observational behavioral data in farms to understand welfare: Someone who works on fish welfare in Norway told us, "A hot topic in Norway at the moment is monitoring behavior and using the data for all kinds of uses, such as welfare assessment, calculating feeding and lighting regimes, etc. Cameras monitor the fishes, and with machine learning, this can be used to analyze behavior. Even individual recognition by recognizing the individual pigmentation of each fish, which means that for the first time it will be possible to monitor individuals."

Apart from these advanced systems, research into indicators that can be used by simply observing fish by eye could be helpful for implementation in more extensive systems across Asia.

Preliminary resources: [CageEye](#) is already doing this. Similar studies may also be possible with delousing (see this [company](#)). There are also certain species-specific guidelines. [Reach out to us](#) to learn more.

Welfare needs of different species

Questions: What welfare needs do species commonly farmed have? What constitutes optimal welfare?

Importance: To effectively help fish it is imperative to understand the needs of individual species. Species like Atlantic salmon, rainbow trout, and tilapia have some preliminary welfare research done but other species commonly farmed mostly don't. Even the more researched species like salmon lack definite recommendations on, for example, environmental enrichment and positive welfare improvements.

Preliminary resources: [Priority Fish Species Report for Asia](#), [Fishethobase](#) (not in-depth), [Salmon Welfare Report](#), [Indian Carp Welfare](#).

Juvenile fish death rates

Question: How many juvenile fish die in hatcheries, and how does this vary across regions and species? How can these deaths be prevented?

Importance: Billions of young fish die in aquaculture hatcheries. Some of these deaths are natural as fish are [r-selectors](#) and naturally have high mortality rates, but it is likely that some of these deaths are due to poor hatching conditions and welfare issues.

Preliminary resources: [Report](#) by Dyrevernalliansen.

Natural spawning in captivity

Question: Can some fish species spawn naturally when in captivity?

Importance: For usual aquaculture operations, female fish are [stripped](#) - a process during which they are handled out of water. This handling creates welfare issues. Finding out how female fish can spawn naturally while in captivity could allow farmers to avoid this procedure altogether.

Preliminary resources: FWI can get you in touch with someone who has done preliminary research on this - [contact us](#).

Tank depth variation

Question: What are the impacts of farming fish at different depths than usual in the wild?

Importance: Several species, e.g., rainbow trout, are frequently farmed at far shallower depths than those they would naturally inhabit in the wild. Little research has analyzed the impacts of this difference on fish physiology and welfare. It is imaginable that this is a welfare concern, and clarifying this question is the first step towards asking for appropriate depths in farming operations.

Positive welfare

Question: What constitutes positive welfare for fish? What impacts do current rearing conditions have on fishes' psychological health?

Importance: In the past, welfare was defined as providing the [Five Freedoms](#). For many animals, especially fish (which are always farmed in their "natural environment") this might not be sufficient. Some scientists have started the debate about whether fish welfare should not only include the alleviation of negative experiences, but also foster positive ones.

Preliminary resources: [Fife-Cook & Franks, 2019](#), generally contact Becca Franks for information on this.

Welfare-oriented genetic selection

Question: Which species/strains of fish are more suited for living in captivity? Can and should we promote the use of these species over others (e.g. Atlantic salmon) that can never reach positive welfare in captivity?

Importance: Fish farming will not end in the foreseeable future. Thus, it is highly important to improve the lives of fish currently farmed to a standard that is acceptable. Some species such as Atlantic salmon naturally migrate thousands of miles - a behavior that they will never be able to exhibit in closed tanks. It remains an open question whether certain strains of fish species are more suited to a captive environment than others.

Preliminary resources: Rauw, W. (2016). [Improving Animal Welfare through Genetic Selection](#). [Research](#) into this topic by Nofima.

Herbivores and carnivores

Question: What are the health implications of feeding carnivorous fish species a more omnivorous diet?

Importance: Humans farm a number of carnivorous species that require other fish or animals for daily nutrition. They are fed fishmeal, fish oil (FMFO), and powdered and liquid fish remains, often from wild-caught fish. Theoretically speaking, an herbivorous fish product is responsible for only one death, while carnivorous fish products require the deaths of hundreds to thousands of fish. Few researchers have looked into the impact of an herbivorous diet on carnivorous species, though millions of fish lives could be saved each year if it were possible to feed carnivorous fish a herbivorous diet without nutritional deficiencies..

Preliminary resources: For the problem around FMFO see [Fishing the Feed](#). The Mississippi State University is working on [alternative feed projects](#).

Impacts of wild fish population decline

Question: What ecological impacts will the decline of wild fish populations have?

Importance: Fish farming has depleted wild fish populations due to disease spread, habitat destruction, toxic waste effluents, and overfishing to create fishmeal and fish oil (FMFO). Several scientists suggest the collapse of various wild fish species within the next few decades. This will impact various other species and elicit trophic cascades throughout the marine food web.

Effective stunning

Question: How can we most effectively stun a given fish species?

Importance: Fish slaughter causes great welfare concerns and often involves prolonged suffering. Stunning fish effectively and early on is meant to desensitize them throughout the slaughtering process. However, the effectiveness of stunning methods is highly species-specific and cannot be generalized. Salmon and trout are among the most researched species, but far more research is needed into how to effectively stun other commonly farmed species and ensure that they do not regain consciousness before being killed.

Preliminary resources: [Report about welfare during slaughter](#) by Compassion in World Farming, HSA [finfish consumer video](#), HSA [Humane Slaughter of Finfish Farmed Around the World](#).

Environmental enrichment

Question: Can environmental enrichment be implemented on commercial fish farms? Does it positively affect fish welfare in these settings?

Importance: Environmental enrichment can take several forms, from providing shelter opportunities over changing light sources to different tank colors. Some of these have a measurable impact on fish welfare. So far, studies evaluating the positive impact of environmental enrichment have only been conducted in small, experimental settings. However, this method has found its way into the commercial fish welfare debate. Further research is required to determine whether environmental enrichment would actually have a net-positive effect on fish in captive environments, and whether implementing environmental enrichment is possible in a commercial setting.

Preliminary resources: Näslund, J. & Johnson, J. (2014). [Environmental enrichment for fish in captive environments](#). You may also contact the [Aquatic Life Institute](#) who is looking into this topic.

Juvenile fish sentience

Question: Are juvenile and small fish as sentient as bigger fish?

Importance: Several studies assess fish sentience, but there has been debate around whether juvenile and smaller fish are capable of feeling as much pain as bigger fish. Considering the often alarming rearing conditions in hatcheries, answering this question could help to move beyond this discussion and towards effectively improving juvenile fish welfare.

Wild fish suffering

Question: What does the life of a wild fish look like?

Importance: The life of a wild fish can be imaginably cruel due to predation, starvation, and often frequent human interaction. But few studies have looked further into how much wild fish suffer throughout their life and whether they lead a net-negative or net-positive life.

Preliminary resources: Organizations such as the [Wild Animal Initiative](#) and [Animal Ethics](#) have pioneered work on wild animal suffering.

Crustacean sentience

Question: Can crustaceans feel pain and suffer?

Importance: Various studies suggest that shrimp are capable of experiencing negative stimuli and, ultimately, feeling pain. These animals are farmed on a massive scale and thus their sentience would have large implications on treatment of these animals. There seems to be some research on shrimp (still not sufficient but all pointing towards sentience so far) but far less on other crustaceans. This project could take the form of a literature analysis, reviewing the existing research and ultimately answering the question of whether crustaceans are sentient or not.

Preliminary resources: Introduction to general [invertebrate sentience](#); [Crustacean Sentience Briefing](#); Elwood et al. (2009). [Pain and stress in crustaceans?](#); [Shrimp welfare](#); Groups

researching this topic: [Crustacean Compassion](#), [Rethink Priorities](#), [Charity Entrepreneurship](#).

Mollusk sentience

Question: Can mollusks feel pain and suffer?

Importance: Few studies suggest that mollusks (i.e. cephalopods, bivalves, gastropods) show avoidance behaviour to painful events. Mollusks are increasingly farmed in regenerative aquaculture and thus it is important to know whether they are sentient. This project could take the form of a literature analysis, reviewing the existing research.

Preliminary resources: [Overview](#), [decapod sentience](#), [mollusk sentience](#).

Crustacean and mollusk welfare

Question: What constitutes good welfare for farmed crustaceans and mollusks?

Importance: Studies suggest crustaceans' sentience, but their rearing conditions rarely to never take their welfare into account. Generally, there is little research on what even constitutes good welfare for crustaceans. This question needs to be answered before animal advocacy groups can reach out to corporations and farmers to demand an improvement in their rearing conditions.

Preliminary resources: See [crustacean sentience](#) and [mollusk sentience](#) above.

Impacts of feed alternatives

Question: How many lives are impacted by feed alternatives to FMFO?

Importance: Much of the feed for farmed fish contains fish meal and fish oil (FMFO) and thus involves the deaths of wild-caught fish. Alternatives to FMFO include herbivorous diets, insect diets, and potentially others. But how do these compare to the deaths caused by FMFO? What are viable alternatives to FMFO for certain species?

Preliminary resources: [Contact us](#) for resources.

Computer Science, Mathematics, Statistics

Modeling populations of wild fish

Question: What do wild fish populations look like several years or decades into the future?

Importance: Commercial fishing, different levels of ocean acidification, and climate change will arguably influence the future availability of wild fish. However, the extent of this shortage is not clear. Models looking into different variables and how they affect wild fish populations are highly valuable.

Artificial Intelligence and fish welfare

Question: How can we use Artificial Intelligence (AI) to improve fish welfare? How can we do so in a cost-efficient and effective way?

Importance: AI holds the potential to alleviate many of the problems that animal farming afflicts. We believe that this potential is still not fully understood. It could be highly valuable

to dedicate some resources to exploring how AI can help safeguard fish welfare. This project could also have a practical side, including the development of AI techniques!
Preliminary resources: [Createview](#) is one of the companies that use AI for monitoring fish health. We have more preliminary research from other groups - if you are interested, [reach out to us](#).

Modeling fish used in fish meal and fish oil (FMFO)

Question: What proportion of wild-caught fish are used in fish meal and fish oil? How would changes in raising carnivorous species (e.g. salmon) affect the number of wild-caught fish killed for this purpose?

Which wild fish species are commonly used in FMFO (e.g. sardines and herring), and how would different levels of fishing affect their populations?

Importance: Wild fish constitute almost 70% of FMFO ([Changing Markets Foundation, 2019](#)). Aquaculture frequently promotes itself as the savior of wild fish, but the reality is that aquaculture is the major driver of wild fish stock depletion.

Preliminary resources: [FMFO model](#), Compassion in World Farming [report](#) about the use of FMFO, [Fishing the Feed](#), [Fish meal Global Reporting Program](#)

Modeling aquaculture growth

Question: How much will aquaculture grow? What systems will dominate future operations, and in which countries will aquaculture likely grow the quickest?

Importance: As wild fish stocks are depleted, aquaculture has the burden of supplying over 50% of global seafood -- and that share is rising. However, aquaculture operations are limited by various factors such as regulations, feed availability, water quality, and land availability. Understanding the most likely growth scenario for aquaculture enables stakeholders to act accordingly when setting long-term strategies.

Preliminary resources: You can find the United Nations' predictions on page 164 of the [FAO's SOFIA report](#).

Communication, Psychology, & Marketing

Consumer behaviour change

Question: How successful have efforts to change consumer behaviour (e.g., to follow a more plant-based diet or buy sustainable seafood) been?

Importance: Consumers are a major driver for demand in the seafood market. There are several studies looking at seafood and meat demand and changes in consumer behaviour when given the option of alternative or sustainable products. However, there is no comprehensive analysis of all these studies. This project could be in the form of a literature to comprise the most important studies in this field and draw preliminary conclusions from these.

Public opinion on fish welfare

Question: What is the public perception of fish welfare? How do these opinions differ among countries?

Importance: Other animal advocacy movements have shown us that public awareness plays a key role in bringing about institutional change. Very few studies analyze the public perception of fish welfare issues. In fact, most of them are focused on whether consumers are willing to pay extra for higher welfare products. More general studies about how people view fish and what we can do to make them care are valuable for advocacy work. These studies are especially valuable for high-production regions such as East- and Southeast Asia.

Preliminary resources: [Report](#) by Rethink Priorities, [European consumers](#), [Asian consumers](#).

Changing public opinion

Questions: How can we influence public opinion regarding fish?

Importance: Many people still think that fish don't feel pain despite the fact that this has been established two decades ago. Various groups use different methods to educate consumers about the issues of fish farming and capture, for example through undercover investigations, retailer campaigns, and petitions. It is unclear how far these efforts reach and which methods are most effective at changing public attitude towards fish.

Preliminary resources: See ACE's evaluation of [leafleting](#) as an example for such a meta analysis. // THL's report on using [the right messaging for fish advocacy](#).

Economics

Supply/demand elasticity in aquaculture supply chains

Question: What drives global aquaculture production? What happens when production increases or decreases? How does demand affect production?

Importance: All food production supply chains are driven by supply and demand. Understanding the interplay between these two allows us to better understand what drives the aquaculture market, which in turn enables more effective advocacy work.

Understanding aquaculture supply chains

Question: Which stakeholders are involved in aquaculture production in different countries? What is their relationship to each other?

Importance: The structure of supply chains differs greatly across continents and between individual countries and territories. Analyzing local supply chains shows us who is involved in aquaculture production processes and, ultimately, who can drive forward change. This knowledge allows animal advocacy organizations to accurately target these stakeholders.

Preliminary resources: Fish Welfare Initiative is about to publish a report including an overview of supply chains in Asian countries.

Regulations as incentives? Import and export of seafood

Question: To what extent do regulations in receiver countries dictate aquaculture operations in exporting countries?

Importance: There is a great discrepancy in regulatory frameworks safeguarding fish welfare between many Western and Asian countries. Producers from countries like Vietnam have to comply with far more stringent rules when exporting to Europe as opposed to selling their produce on local markets. The regulations of import countries can thus impact how fish are farmed in exporting countries. An analysis of this relationship might reveal leverage for safeguarding fish welfare.

Shifting Subsidies

Question: How can we shift subsidies from contributing to aquatic animal suffering towards supporting ways to alleviate this suffering?

Importance: As for the terrestrial livestock industry, subsidies support the exploitation of fish and the aquaculture and fisheries sector. This project could explore whether and how we can shift these subsidies towards research into higher welfare farming and capture instead.

Engineering

Wild fish stunning

Question: How can we develop cost-effective stunning mechanisms on board fishing vessels?

Importance: Wild fish welfare has been a highly neglected topic due to its complexity and the limited tractability of interventions. The biggest opportunity seems to be at the point of human interaction - during capture and slaughter. Most fish are not effectively stunned. Currently, there appears to be only one company that provides on-board stunning, but their equipment is highly expensive. Developing an easy-to-use, affordable, and effective on-board stunning device could spare billions of fish per year tremendous suffering.

Preliminary resources: A [summary of available solutions](#) by Fishcount. [AceAquatec](#)- one of the companies offering electric stunning that can be installed on boats. Also, see [Shinkei System](#), a pioneer in this space.

Welfare improvement technology for traditional farms

Question: How can small-scale and semi-intensive farms use affordable technology to improve welfare?

Importance: In many countries (e.g. India) farmers genuinely want to improve welfare but don't always have a way to access and maintain the necessary equipment to do so. The reasons for this lack of access include financial and infrastructure constraints. For example, aerators require electricity, so a farm without electricity cannot use these. Engineers worked on this problem and developed aerators which operate with solar panels instead. Other examples of constraints include farmers getting quality feed and appropriate

slaughter methods. If marketed right, affordable and effective developments for rural farmers could greatly increase fish welfare.

Environmental Sciences

Environmental impacts of aquaculture

Question: What impact do individual production systems have on the local environment (river, forests, ocean, etc.)?

Importance: As for any intensified animal farming operation, fish farming holds severe risks for local ecosystems. In most countries, aquaculture farms are allowed to discharge their wastewater into local rivers and the ocean, leading to anoxic dead zones. Mariculture operations diminish entire populations by spreading diseases and parasites.

Preliminary resources: For an introduction to this topic see [Greenberg, 2014](#) and [Cole et al., 2009](#). Fish Welfare Initiative has an extensive list of environmental problems arising from aquaculture, reach out to us to learn more.

Climate change impacts on aquaculture

Question: How will climate change affect farmed fish?

Importance: Global warming comes with various side effects such as more acidic water, droughts, extreme heat, extreme weather events, and reduced crop yields. All of these effects can impact farmed fish. Further research is needed to determine the actual impacts on fish welfare and to what extent fish in different farm systems are impacted.

Preliminary resources: See the resources mentioned [here](#) as a starting point.

Plastic, toxins, and aquaculture

Question: What levels of plastic and other toxins are found in farmed fish?

Importance: Previous research has suggested the presence of toxins and plastic in wild and farmed fish. How high are these levels really, and is this a public health concern?

Preliminary resources: Scheer, R. & Moss, D. (2011). [Harvest of Fears](#). Smith, M. et al. (2018). [Microplastics in Seafood and the Implications for Human Health](#).

Large-scale feasibility of integrated multi-trophic aquaculture

Question: Is the concept of integrated multi-trophic aquaculture (IMTA) feasible on an industrial scale? Is this a more sustainable alternative to conventional fish farming operations?

Importance: In IMTA, farmers rear fed species with extractive species that feed on the waste of the fed species. As a result, less waste needs to be discharged and more biomass is produced. This seems like a promising system and has already found small-scale success. If IMTA can be done on a commercial scale, sustainability could be increased. An important open question is whether IMTA also has the potential to improve individual fish welfare.

Preliminary resources: [Description of IMTA](#).

Other Options for Aquaculture Farmers

Question: How could farmers use existing farms for alternative agriculture?

Importance: In many regions, aquaculture is not the most promising option of earning one's livelihood due to natural resource constraints, high mortality rates, and a myriad of diseases to cope with. Some farmers may just be wary of farming fish altogether.

Therefore, it might make sense for some farmers to change their business model. What alternatives do they have? Can fish farms be converted into, for example, algae farms? If so, what resources are needed, and what is the expected return-on-investment for farmers?

Preliminary resources: For a terrestrial example of this work see [Transfarming](#).

International Studies

Fish welfare across countries

Question: What are welfare conditions like in different countries across the globe?

Importance: There is still a great lack of research dedicated to assessing the status quo of conditions on fish farms worldwide. A literature review tying together all the relevant publications in order to answer this question may identify priorities for the fish advocacy movement.

Preliminary resources: [Vietnam Scoping Report](#), [India Scoping Report](#), [Philippines Scoping](#), [China Scoping](#), [Fish Investigations](#)

Law

Fish Welfare Initiative is not an expert in law-related cases. However, we are in contact with various law firms working on fish issues. If you would like to further discuss one of the ideas mentioned below, or any other ideas related to law, [reach out to us](#) and we can refer you to experts.

Animal welfare laws and aquatic animals

Question: Do animal welfare laws in given countries include aquatic animals? Do these laws also apply to farmed aquatic animals? [How do the legal protections for aquatic animals differ from other animals in different contexts (such as farmed terrestrial animals / companion animals / animals in testing / animals in entertainment / and others?]

Importance: Legislation is a major driver of change. Countries that have laws safeguarding animal welfare and a strong law enforcement unit arguably see less animal abuse. Animal advocacy groups can push governments to create animal welfare laws and/or include aquatic animals in these. But first, we need to understand which countries include aquatic animals in their welfare laws. From there, we need to determine whether these also apply to farmed aquatic animals.

Preliminary resources: Some groups are working on this, [contact us](#) for more information.

False advertisement, consumer protection, and fish welfare

Question: How can consumer protection law/false advertising law be used to advance fish welfare?

Importance: Retailers offer a variety of products with labels such as “sustainable,” “natural,” and “humanely raised.” But how many of these labels actually hold what they promise? This project looks at how the aforementioned terms could be unlawfully misleading in the context of fish welfare.

Environmental law and fish welfare

Question: How can environmental law be used to promote fish welfare and protect fish?

Importance: Environmental problems are tightly linked to fish welfare. Identifying this overlap and discovering how environmental laws can in turn affect fish welfare could help ensure better rearing conditions on fish farms.

Species conservation and fish welfare

Question: How can endangered species laws and other laws be used to promote fish welfare or protect fish?

Importance: This could give extra leverage for impactful lawsuits. Laws could include the Endangered Species Act and the Marine Mammal Protection Act.

International and/or foreign law and fish

Question: Do international laws and policies fail to protect fish and aquatic animals?

Importance: A comparative analysis of different countries and how they protect, or fail to protect, aquatic animals can help develop country-specific advocacy strategies. Examples include CITES, CBD, and UNCLOS.

“Seafood”¹ alternatives and their regulation

Question: What is the regulatory framework for cell- and plant-based seafood alternatives?

Importance: Legal issues arise with the growth of alternatives to seafood, both plant- and cell-based. Examining these issues while the seafood alternative sector is still growing will be helpful in the long run.

Further ideas

- Treaties, Tribes, State, & federal laws & regulations: Drawing regulatory lines in the seafood industry
- Constitutional law, rights, and seafood
- Ag-gag, undercover investigations, and seafood

¹ Seafood includes wild-caught and farmed fish

Philosophy

Moral obligations to aquatic animals

Question: Given the specific capabilities and needs of aquatic life, what moral obligations do we have towards them? Are there any reasons why they would be substantially different than the ethical obligations we generally agree to have towards other animals?

Importance: Farmed fish are raised in ways that often inflict a great deal of suffering upon them, and wild fish probably suffer some of the most brutal deaths humans could inflict on any animal. Another interesting element concerning the ethical treatment of fish could be comparing the deaths that wild-caught fish face at the hands of humans to the deaths they would face (and suffering they would endure) in nature. This would involve considering [wild animal suffering](#) and [welfare biology](#).

Preliminary resources: Animal Liberation (by Peter Singer, an argument for equal moral consideration for all sentient life); [Bounty: Guide To Switching From Farmed Fish To Wild-Caught Fish](#)

Public Health

Safety research on fish sedatives

Question: What are the food safety implications of sedatives, anesthetics, and analgesics?

Importance: Intensive fish farming holds many health risks due to the unnaturally high stocking densities the fish are reared in. Isoeugenol, a fish anesthetic used in some countries, is not allowed in the E.U because there has not been enough research about its food safety implications. This project looks at the most common sedatives/anesthetics used and determines their public health implications. This information can then be used by animal advocacy groups to bring about legislative change.

Public Policy

Third-party certification

Question: How effective are small-scale third-party certifications? What small-scale third-party certifications exist and to what extent do they incorporate welfare?

Importance: Especially in developing countries, small-scale third-party certification offers an affordable alternative for small-scale and low-income farmers who cannot afford bigger certifications. However, these certification bodies seem to be extremely localized. An analysis of which options already exist and to what extent they incorporate welfare would bring this arguably important leverage point into light.

Effectiveness of third-party certification

Question: Do certification scheme standards hold what they promise?

Importance: Questions have been raised as to whether certification schemes are too lenient, not actually regulating fisheries and aquaculture to the expected extent.

Preliminary resources: [La Manach et al., 2020](#)

Sociological Meta-Research

Discussing Moral Circle

Question: How does discussing the concept of a moral circle affect someone's moral circle?

Importance: Reducing suffering is common amongst many philosophical systems. Finding out the roots and causes of these intuitions may help us better understand our behavior, emotions, altruism and help us make predictions about the future or hypothetical situations.

Preliminary resources: Peter Singer's [The Expanding Circle: Ethics and Sociobiology](#). Laham, S. M. (2009). [Expanding the moral circle: Inclusion and exclusion mindsets and the circle of moral regard](#). Journal of Experimental Social Psychology, 45(1), 250-253.

Understanding Impact of Social Movements

Question: Which factors cause social movements to either decline or become a success?

What kind of impact do successful social movements produce (e.g. changing the public opinion via advocacy, activating people to directly work on a given cause, setting up new institutions)? What does a successful social movement look like for its given goals (e.g. what is the structure, size, coordination mechanisms)?

Importance: Building social movements is a common strategy when attempting to change the world for the better. Some mass social movements like the anti-apartheid, civil rights, women rights, animal rights, LGBT rights and environmental movements have already achieved changes. Learning more about how this strategy of changing the world works could help current and future movements to maximise their impact. Social movements include but are not limited to mass movements. Much attention has been paid to mass movements, but it may be impactful to study smaller, more niche movements (like the neoliberal or effective altruism movements) to better understand in which situations these kinds of movements may be the best strategy.

Preliminary resources: People who have started on this field are mentioned in [Effective Thesis](#)