Making Our Seas Sustainable: Examining Iceland's Maritime Sector through a Commercial, Legal, and Ethical Lens

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Abstract

Through the introduction of a tri-part framework focused on commercial, legal, and ethical considerations, this article examines the case of Iceland's fishing industry to explore key concepts of sustainability. The article focuses on the fishing sector, specifically, as it is poised to grow exponentially in the coming years, as the world looks to more eco-friendly alternatives for land-based meat (e.g., beef, pork). Iceland was selected as the ideal case study for exploring these concepts because not only is the fishing sector well-established within the nation, but because the country's industry has incorporated environmental, social, and governance (ESG) standards into its operations. Iceland's fisheries demonstrate ecological stewardship through the use of a monitoring system that collects data on the total number and type of species caught, utilizing all parts of the fish and minimizing waste, and employing responsible harvesting methods. They exemplify social responsibility by adopting fair labor laws at the federal level that protect temporary and foreign workers and engaging in responsible marketing and ecolabeling. While Icelandic fisheries are presented as pioneers in sustainable business, this discussion also attends to areas for improvement, including issues pertaining to equal access to fishing rights among smaller or newer companies and concerns for animal welfare in farm-raised fishing and open-water catches. However, both the areas where Iceland's fishing industry excels and falls short represent key considerations that can ideally be applied to a variety of other cultural

contexts and economic sectors so that true sustainability is no longer seen as bound by region or industry.

Keywords: sustainability, Iceland, fishing industry, ESG

Fair trade, ethically sourced, wild caught—these labels grace the packaging of a variety of everyday food products, from ground coffee to bananas to the tilapia one had for dinner the night before. But while such labels are commonplace, many consumers remain unsure as to what these different descriptors actually mean. Surely, for some, they appear no more than a clever marketing gimmick, a ploy to get the consumer to purchase one brand of frozen shrimp over another. For these critics, such labels are interpreted as a corporation's attempt to tap into the growing trend towards meeting the environmental, social, and governance (ESG) standards that are becoming increasingly important for a company's long-term viability. The move towards practices grounded in ESG has become a focal point within the global market landscape. Primarily driven by both investor and consumer demand, concerns for ESG have prompted various organizations to engage in value-based business decision-making, operating on the assumption that these actions will inevitably lead to greater profit margins. Yet, there are still those who see these labels as indicative not of a company's desire to capitalize on a marketplace trend, but to sincerely demonstrate their commitment to the end consumer, the laborers involved in harvesting and processing these products, and the local communities and broader ecosystems in which their farms and factories are a part of.

Regardless of the organization's motives for intentionally marketing their products with such labels, however, confusion remains over what exactly these descriptions actually mean, or

the extent to which they reflect a corporation's actual practices. Data published by the European Commission (2008), for instance, found that 42% of individuals claim that the labels that are currently on products do not allow them "to identify those products that are genuinely environmentally friendly." In another study by Brécard (2014), the researcher found that consumers experienced difficulty in discerning between various eco-friendly labels, as they essentially regarded all products as comparable in quality. This confusion has been exacerbated by a proliferation of such labels in recent years, and while efforts to standardize and regulate their use have been underway in the European Union and elsewhere throughout the world (Blot, 2025), questions nonetheless persist. Such questions include: "What are the defining characteristics of a "sustainable," "fair trade," or "eco-friendly" food product?" "How do such products benefit the consumer, the organization, and the local community and/or environment?" And finally, "How might these practices be replicated to scale up sustainability efforts?"

This article attempts to respond to questions such as these by taking an in-depth look at Iceland's fishing industry, specifically. Here, the authors present Iceland's fishing industry as a case study—a success story—for other countries to model. By offering this in-depth look at the country's approach to creating sustainable and ethical fisheries, the authors hope that other nations' governments may follow suit. Furthermore, in grounding more abstract commercial, legal, and ethical concepts in a concrete application, this article aims to make the various aspects of sustainability intelligible for a broader audience, thereby making them easier to implement by various stakeholders. It begins with a discussion of why Iceland was selected as exemplary in its efforts to move its fishing industry further in the direction of sustainability, and then offers a rationale as to why the fishing industry (as opposed to countless others) is at the center of this discussion. The discussion portion of this article is then presented in three parts, from a

commercial, legal, and ethical framework. By providing the reader with an integrated framework such as this, the authors hope to enlist the aid of multiple parties from all disciplines and professional backgrounds in a coordinated effort towards creating a more ethical and environmentally friendly world.

Iceland and Its Maritime Sustainability

At first glance, one might instinctively question why Iceland was selected as the representative case study for this discussion. However, further investigation into the nation's fishing industry provides insight into why its approach to sustainability is so instructive. Geographically speaking, Iceland's location in the northern central part of the Atlantic Ocean naturally positions it to make harvesting marine resources a key part of its economy. This area is rich in seafood with high commercial value, like cod, haddock, lobster, shrimp, and scallops. For the 2023 year alone, Iceland exported 685 tons of fishery products (Statistics Iceland, 2024). Frozen seafood products represented 44% of the export value. In terms of the nation's overall gross domestic product (GDP), fishery products represent anywhere from 7-10% of the nation's income (Sigfusson et al., 2013). The income it generates does not stop at a national level, however; this industry is also responsible for bringing income into thousands of households. To be more precise, the fishing industry employs approximately 8,000 workers (Iceland Responsible Fisheries, n.d.). And these figures only account for the direct economic benefits brought by the fishing industry; there are also ample indirect benefits to account for as well. When one considers adjacent or related industries in biotechnology, shipping, manufacturing, and so on, the number of people financially benefitting from this industry hovers around 40,000, which is equivalent to nearly 20% of the nations' workforce. When taken collectively, these various

statistics paint a picture of a country in which commercial fishing and processing is an integral part.

Outside of its economic impacts, another reason the fishing industry has such a large presence in the country is due to its longstanding cultural history. In fact, archaeologists and historians have shown that as far back as the medieval age—specifically, the 12th century onward—fishing has been a fundamental method for feeding the population and for forging economic connections with northern Europe (Amundsen et al., 2005). The industry's longstanding relationship within Icelandic culture is what has prompted some scholars to describe it as the "social mortar" that has historically held the society together, even allowing the nation to develop the self-reliance necessary to become independent (Antonova & Reiser, 2019). The fishing industry's central place within Icelandic society is evident in the annual celebration of Sjómannadagurinn, or "Fishermen's Day." For nearly a century now, the festival was initiated in major cities like Reykjavík to honor the sacrifices of seafarers. On this day, attendees partake in parades, boat rides, and simulated sea rescues (Visit Reykjavik, n.d.) to communicate to those both internal and external to the community the importance of this industry to the country's cultural identity.

A Focus on Fisheries

Given its well-suited geographical location and unique cultural history, it is not surprising that the industry as a whole in Iceland is on an upward trend. Over the past few decades, the global market share that aquaculture exports commands has grown exponentially. As of 2022, global aquatic animal production was valued at $472 billion (Food and Agriculture Organization of the United Nations, n.d.). That number is up $72 billion from just 4 years earlier in 2020 (Food and Agriculture Organization of the United Nations, 2025). A growth rate as accelerated as this has

enabled investors and business analysts to make projections about the potential for future expansion of its market share, which they see as ever-expanding.

A growing global population and an increased demand for protein options among the middle class are frequently cited as the main drivers behind this growth (Wei et al., 2023). And while this may be true, more eco-minded citizens are also responsible for the expansion of the seafood industry. When compared to fish, protein options, such as beef, pork, and chicken exact a much greater toll on local ecosystems. To put a number to the environmental impacts that raising livestock for meat consumption exerts, Takacs et al. (2022) sought to compare the outputs of individual plant-based meals with meat-based ones. They found that the meat-based meals had a 14-time higher impact than the plant-based ones—findings that echoed broader statistics about the role of meat cultivation and production in climate change and worsening environmental conditions. The discrepancy between seafood-based food products and land-based meat (e.g., beef, pork, lamb) is attributable not only to the carbon emissions produced by processing plants, but the demands for fresh water, the land mass needed, which is often achieved through deforestation, and the fertilizer and waste run-off that pollutes waterways. For these reasons, seafood products, especially those harvested from wild capture systems rather than farm-raised, are seen as carrying a much less pronounced carbon footprint (Mossler, 2018). This smaller carbon footprint is what has, in turn, fueled the growth of the industry as the public has become more mindful of the ethical and environmental implications of the food it consumes. In an effort to examine how Iceland is responding to consumer preferences, the section that follows discusses Iceland's sustainable fishing industry through three related lenses: its commercial, legal, and ethical implications.

Tri-Part Framework: Commercial, Legal, and Ethical

Profit, the Planet, and Its People

About a decade ago, a story broke about Loro Piana—a luxury Italian wool clothier—exploiting the indigenous Peruvian communities that harvested the rare wool its uses in its apparel manufacturing (Bourge, 2024). The company was accused of violating fair trade practices. According to the Home of Fair Trade Enterprises (2001), "fair trade" is defined as "a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade." When Loro Piana was charging upwards of €4,000 for a sweater and paying the laborers harvesting the wool a mere fraction of that, the company was accused of violating the aforementioned ESG principles presently guiding the business landscape. As a three-pronged approach to conducting business, this particular business model is concerned with improving companies' carbon footprint (environmental), fairly compensating laborers and ensuring safe working conditions for them (social), and enacting legislation that works in the interest of these goals (goals). Loro Piana was accused of violating the "social" contract under this new ESG model, and as a result, the company had to contend with a public relations crisis, a skeptical consumer base, and disgruntled shareholders.

The case of Loro Piana served as a cautionary for many other corporations—an exemplary story of what not to do. Recognizing the pitfalls of ignoring ESG-related commitments, that is why companies like Patagonia have made these principles a cornerstone of how it does business. For example, the clothing manufacturer introduced its Worn Wear program, which encourages customers, in exchange for store credit, to send back their worn products for repair, reuse, and recycling these products at a lower price. In this way, Patagonia is attempting to appease the consumer not only through more affordable product offerings, but by demonstrating their commitment to conducting business in an environmentally friendly manner.

But the "social" in ESG does not just refer to the social contract a company has with its external stakeholders like its consumers; it encompasses its internal stakeholders—its employees—as well. That is why many of the companies in Iceland's fishing sector are part of the Icelandic Responsible Fisheries Foundation (IRF). The IRF has earned the FISH Crew Certification, which ensures that the crews manning the fishing vessels are ethically recruited to the profession, fairly compensated for their work, and have appropriate channels available to them for addressing any grievances (SGS, 2024). Having these protections in place, along with strong labor laws at the federal level, is especially important when one considers that the maritime sector relies heavily upon temporary or foreign workers. In fact, looking to the Eastfjords region that is home to several fish processing plants, foreign workers comprised approximately 40% of the overall labor force throughout the 2000s (Karlsdóttir, 2008). In many other countries throughout the world, workers without citizenship or formal legal status are offered few protections, but Iceland has made it a point to extend these to greater numbers of individuals (U.S. Department of State, 2024).

Outside of incorporating employee protections into its business model, the Icelandic fishing industry has also restructured product pricing to reflect their eco-consciousness. The fishing industry is credited with pursuing value-added offerings to maximize resource efficiency. By using inedible parts of the fish for alternative purposes, the industry is minimizing its waste output. Byproducts like fish oil, different enzymes like DHA, and medical-grade collagen have all been redirected from the disposal heap to the nutrition and supplement industries, the cosmetic and beauty industries, and medical industries. From the standpoint of long-term viability, such diversification works not only towards demonstrating their "waste not" approach, but expands the market base that the fishing industry reaches. This, in turn, translates to the

potential for increased sales and revenue, but also allows fisheries and related industries to better resist market volatility, as fluctuations may occur in one sector and not another.

The Legal Reform Driving Sustainable Fisheries

As landmark cases like the abovementioned examples of Loro Piana and Patagonia show, today's investor is consistently prioritizing a portfolio that is both socially minded and eco-conscious (Principles of Responsible Investment, 2024). One of the regulatory innovations that Iceland's fishing industry has introduced to meet this demand is a science-based quota system, known as the Individual Transfer Quote (ITQ) system, designed to prevent overfishing and maintain stable levels of potentially vulnerable fish species. The system was first rolled out in the 1980s and 1990s and involves the nation's Marine Research Institute (MRI) assessing current population totals for different fish species, and then setting a Total Allowable Catch (TAC), limiting the number of each that can be harvested. Iceland ensures that the quotas are being adhered to by enforcing compliance through real-time monitoring via satellites and random inspections by the Department of Fisheries (Pálsson & Gunnlaugsson, 2012).

While ITQs have been hailed as an effective mechanism for maintaining the balance of local ecosystems, some critics have raised concerns about concentrating fishing rights among a select few corporations. Scholars like Einarsson (2015) and Pálsson (2020) have argued that this becomes a question of community access versus privatization, as small-scale and newer fishers are edged out by more established, large operators. Because the current ITQ system allows fishing rights to be bought, sold, leased, or otherwise traded, those fisheries that have not accumulated significant capital may be essentially barred from obtaining these rights. So, on the one hand, this regulatory approach has prevented the fishing sector from reaching over-capacity

and the negative environmental effects that follow, it may have inadvertently created a monopoly when it comes to the number of fisheries that can access fishing grounds. This has broad implications for the industry as a whole, as Lebedef and Chambers (2023) point out. In reflecting on the future trends of the industry, the authors argue that because young or first-time fishers found it difficult to enter the ITQ system, the demographics of the industry are changing. The researchers argue that the current system is partly responsible for "ageing" the industry, as younger fishers are prevented from entering it, leaving only the older generation to extend its life. Others have added that in rural areas, where the fishing industry has historically commanded a large presence, fishers have relocated to pursue opportunities elsewhere, and the residents have followed suit. In short, the ITQ system governing Iceland's maritime sector may be, in practice, a double-edged sword, one that protects local ecosystems and upholds fair labor standards, but also one that leads to resource enclosure, in which a public good once accessible to all becomes the right of a select few (Benediktsson & Karlsdóttir, 2011).

Outside of ITQs, another way that Iceland's fisheries are prompting changes at the legislative level has to do with labelling standards. As discussed in the introduction, there is much confusion around the use of these labels, and corporations are often accused of using them haphazardly or for ulterior motives (i.e., to simply encourage the consumer to buy). But Iceland's fishing industry has pursued greater transparency with respect to the ecolabels attached to marine products. An ecolabel is a third-party certification granted to products that meet certain environmental standards, thereby better enabling consumers (both individual and commercial) to make informed purchases (International Organization for Standardization [ISO], 2012).

In the case of fisheries, specifically, seafood products produced in accordance with certain criteria may receive a Marine Stewardship Council (MSC) certification, a type of

ecolabel overseen by strict third-party monitoring (MSC, 2023). To receive an MSC certification, a fishery must meet rigorous criteria in three core areas: maintaining sustainable fish stocks, minimizing overall environmental impact, and effectively managing the fishery itself.

Receiving an MSC label has very important implications when it comes to exports. Buyers throughout the UK, the EU, and North America often require that the products they purchase come with an ecolabel. This is due to their own sustainability goals. In other words, in order to present themselves as sustainability-minded to their internal and external stakeholders, they need to do business with those who share these commitments only. Forging ethical partnerships like this, in turn, imparts a competitive edge to Icelandic seafood within the global market by demonstrating in a tangible way Iceland's leadership position in the environmental, social, and governance (ESG) arena.

Iceland as a Steward of the Sea

When developing the policies that govern its fishing industry, Iceland has made it a point to avoid adopting an anthropocentric view. In fact, concerns for the ethics of animal welfare are a cornerstone of its current operations. One way in which the nation aims to promote animal welfare in this sector is by preventing bycatch. Bycatch refers to the unintentional capture of other marine animals, like seabirds, dolphins, and whales, which get ensnared in fishing nets. Bycatch has become a problem for trawl fisheries in particular (Marine and Freshwater Research Institute, 2023). These fisheries drag a net on the seabed floor to harvest seafood staples like haddock, cod, and shrimp. Through this sweeping motion, however, several other species, many of which are vulnerable or endangered, may be caught as well. Additionally, dragging a net

across the ocean floor like this can also do severe damage to the coral reef systems, rocky structures, and sponge gardens that a variety of sea animals rely on for food and protection.

To mitigate the effects of bycatch and the harm it causes to other marine animals, Iceland has taken measures by placing inspectors onboard vessels and directly reporting all catch-related data to the Department of Fisheries. Yet, critics argue that inspectors may be inconsistent in their appraisals and remain skeptical of the veracity of a self-report system, as the system is set up to discourage fishers from reporting accurate catch data. To overcome these limitations, some have advocated for midwater trawling, which, unlike seabed trawling, involves pulling a net through a column of water in the middle of the ocean (Clark et al., 2016). Because the net never comes in contact with the ocean floor, it theoretically leaves it undisturbed. That said, midwater trawling does not completely avoid the downsides of bycatch, as other species of marine life are capable of getting caught in these nets as well. So, while midwater trawling represents a step in the right direction, it is by no means an all-encompassing solution.

Ethical considerations within Iceland's fishing industry also arise outside of wild-catch harvests. Farm-raised salmon have received a great deal of attention in this regard, as animal rights activists and conservationists have taken issue with the overcrowding of the pens used in these farms. Critics also argue that due to overcrowding, these fish become more prone to parasitic infections, like sea lice (North Atlantic Salmon Fund, n.d.). Furthermore, selectively breeding for fast growth rates has also resulted in more fish with physical deformities and other health conditions (Reimer et al., 2017). Collectively, these reasons are what prompt scholars like Osmundsen et al. (2017) to position ethical debates regarding the humane treatment of animals are central to the sustainable development of Iceland's fishing industry.

Although farm fisheries in Iceland are tasked with addressing the above concerns, the industry and nation have made strides to do so. To address potentially inhumane overcrowding in farm pens, some companies are rolling out semi-closed sea-based systems that effectively prevent the fish from escaping, reduce the spread of disease by affording more space to each fish, and confine waste byproducts to the enclosure. Other companies are keeping the land-based pen enclosures, but are making them deeper and larger, thereby reducing disease, stress, and mortality levels among the fish (McGrath et al., 2015). Stress reduction efforts are also underway within these fisheries through the inclusion of simulated water currents that mimic natural ones. Other ways that fisheries are managing the spread of disease, particularly parasitic infections (e.g., via sea lice) is by enlisting the help of nature's cleaners, like lumpfish, which eat the lice off salmon. Other natural treatment options like using thermal baths are also being explored as a means to promote the living conditions and general welfare of these fish (Overton et al., 2019).

Selectively breeding for salmon with thicker skin that is more resistant to parasites is another solution currently being pursued by Iceland's fisheries. However, given the concerns for genetic abnormalities, this method of improving the quality of life experienced by these fish should be approached with caution. Gjedrem et al. (2012) advocate for breeding that is less geared towards a direct economic benefit (e.g., larger, fattier fish) and instead suggest focusing on genetic markers that may predispose the fish to certain heart and spinal conditions. So, while there are many available paths to explore when it comes to acting ethically in harvesting fish for seafood consumption, these different options must be considered holistically, in terms of their risks, benefits, and tradeoffs.

Scaling Up Sustainability Efforts: Global Takeaways from Iceland's Fishing Industries

Iceland serves as an exemplary case of how one nation's industry can be transformed from mere resource extraction to a global model of sustainability. By utilizing commercial incentives, putting legal safeguards and regulatory policies in places, and upholding ethical commitments within fishing operations, Iceland has developed a maritime system that balances concerns for cultural identity, fair working conditions, socioeconomic realities, and animal welfare. Through the use of its ITQ system, third-party certifications and endorsements such as those provided by the MSC, value-added innovations, protective labor laws and improved methods for harvesting fish that are wild-caught or farm-raised, Iceland's approach to sustainability is undoubtedly one to be applauded.

That said, this article cautions against attempting to replicate Iceland's approach in its entirety; instead, proponents of sustainable industries should consider the particularities of the region in question. For countries with economies situated along their coasts, however, Iceland's example offers insight into merging environmental stewardship with economic resilience. Its quota system and alternative harvesting methods (e.g., midwater trawling) may also be instructive for communities and regions experiencing an over-exploitation of its marine life.

It is important to note, though, that Iceland's path to sustainability is not without own setbacks and a fair share of criticism. These critics question, for example, if the ITQ system really promotes equity among fisheries or if it creates a monopoly by pricing out newer fisheries or those with less capital. As this example shows, true sustainability means balancing various interests and tensions—between environmental preservation and economic growth, human welfare and animal welfare, and tradition and innovation. In a world where ecosystems are constantly under siege, consumer sentiments have called for greater integration of ESG principles across a variety of industrial sectors. So, while this case study is but of one nation and

one industry, lessons learned from Iceland's fishing sector may be applied to a variety of other contexts in order to bring about a future where profit does not come at the expense of people or the planet.

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