

Briefing for investors

Fishing for Catastrophe

The risks to aquaculture and retailers from the production of fishmeal and fish oil to feed farmed seafood



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1. Introduction

Using information gathered from on-the-ground investigations and in-depth supply-chain research, a new report from the Changing Markets Foundation, which is the first to map fishmeal and fish oil (FMFO) supply chains from fishery to fork, establishes links between unsustainable – and often illegal – FMFO sourcing practices in the countries investigated and major European aquafeed producers, aquaculture companies, seafood processors and retailers. The report’s findings highlight a clear conflict of interests at the core of the FMFO trade association and certification body, the Marine Ingredients Organisation (IFFO). They show that FMFO certification is a sustainability smokescreen, and that IFFO is wholly unfit to serve as a certification body.

This briefing outlines the risks arising from continued reliance on FMFO for companies and their investors in a number of sectors. We suggest that investors encourage eliminating the practice of using wild-caught fish to feed farmed fish and diversifying the current aquaculture business model. We also suggest questions investors should ask companies.

Aquaculture currently accounts for over half of world fish consumption,¹ and is projected to continue to grow rapidly; farmed species are expected to contribute to an increasing share of global fish consumption, reaching about 60% of the total in 2030.^A Half of today’s global aquaculture production takes place in systems requiring the use of feed.² This includes carnivorous fish, such as salmon and tuna, as well as non-obligate carnivores, such as prawns and carp.³ Commercial aquafeeds vary in their composition, but are likely to include FMFO. In 2016, 69% of the world’s fishmeal and 75% of fish-oil production went to seafood farming.⁴

A FAO projections show that combined world capture fisheries and aquaculture production will reach 200 million tonnes (MT) (live weight equivalent - LWE) by 2030 - up from just under 100Mt in 1990. Capture production will remain roughly stable (with a slight downward trend) up to 2030, with aquaculture production accounting for most of the growth. See: FAO (2018) ***The state of world fisheries and aquaculture, 2018: Meeting the sustainable development goals***. Licence: CC BY-NC-SA 3.0 IGO. Rome: FAO.

Risks

- The growth of the FMFO industry heavily depends on wild-fish stocks, which are financially and ecologically unsustainable.
- Target species for FMFO are vulnerable to sudden collapse and El Niño.
- FMFO's social impacts and reliance on scarce marine resources create reputational risk, especially for consumer-facing clients.
- Illegal, unregulated and unreported (IUU) fishing takes place within supply chains.
- The origin and supply chain of farmed-seafood products continues to suffer a lack of traceability and transparency.
- Certification schemes do not guarantee sustainable sourcing.

Workers offloading "waste" fish, juvenile and other assorted species at Ullal, Karnataka



2. Links to unsustainable practices in global aquaculture and retail supply chains

Global aquaculture supply chains are interwoven and highly complex. While the aquafeed sector itself is quite concentrated, and dominated by a handful of large corporations, the whole supply chain - from fishery to fork - can involve as many as eight different stages: fishery, FMFO plant, aquafeed producer, aquaculture farms, seafood processor, distributor, retailer and many middlemen in between.⁵

Based on our on-the-ground investigations in The Gambia, Vietnam and India (see Section 2 of the report), and in-depth supply-chain research in the UK, France, Spain, Germany, the Netherlands, Norway and Denmark, we attempted to untangle this knotty supply network. While incomplete, the information we gleaned makes it possible to draw direct and indirect links between unsustainable and ecologically damaging practices as a result of FMFO production and the handful of multinationals that control the majority of global aquafeed trade:

- **In India** - where crashing fish stocks, indiscriminate use of species (including reef species), catching of juvenile fish, wastewater contamination, and human health and food-security issues were discovered - FMFO is supplied to Skretting, Trio S.A. (Chile), EWOS/Cargill and CP Foods (part of multinational Thai conglomerate Charoen Pokphand), with export markets including the US, Europe, China, Japan, Taiwan, Thailand and Vietnam.
- **In Vietnam** - where there is widespread IUU fishing, threats to the marine ecosystem, FMFO plant pollution, unsustainable fishing techniques and use of mixed species - FMFO is produced for markets in Western Europe, the US, China, Japan and Australia, with direct and indirect clients including CP Foods, EWOS/Cargill, Nutreco/Skretting, seafood-processing giant Minh Phu Seafood, Grobest and BioMar-Tongwei.
- **In The Gambia** - where our investigators reported ecological degradation from waste water, socioeconomic and food-security issues, food-safety concerns and

fish dumping - FMFO is supplied to Vietnam, China, Chile, Tunisia, Thailand and Saudi Arabia, as well as to aquafeed giant BioMar. Additionally, Skretting and Mowi source from Mauritania, where FMFO production has led to serious food-security concerns and community backlash.⁶



Weighing and unloading trash fishes on a transhipment vessel in Ca Mau

Retailers

Our supply-chain research focused on salmon and prawn products supplied to retailers in Europe, and their direct and indirect links to FMFO production. Information was gathered in mid-2019 through desk research, interviews with industry experts and in-store visits. We also sent letters to retailers in the UK, France, Germany and Spain, requesting information about their sourcing policies and practices.^B While all the markets we looked at were characterised by a surprising lack of traceability and transparency regarding the origin and supply chain of farmed-seafood products, we were able to establish that numerous European retailers are sourcing products from aquafeed companies and seafood processors linked to unsustainable FMFO supply chains. These retailers include:

- **UK:** Sainsbury's, ALDI, Lidl, Co-op, Tesco, Asda, Iceland, Morrison's, Waitrose, Marks & Spencer
- **France:** Auchan, Groupe Casino, Leclerc, Monoprix, Système-U
- **Germany:** ALDI Nord, ALDI SÜD, REWE, Lidl, EDEKA
- **Netherlands:** Albert Heijn, Lidl, Plus
- **Spain:** Mercadona

B The responses we received were disappointing – almost all retailers failed to disclose details about the origin or content of aquafeed in their farmed-seafood supply chain. Commendable exceptions were French retailer Système-U (which told us its salmon products are fed using feed manufactured by Skretting and EWOS) and UK retailer Tesco (which provided details of its seafood processors and aquafeed suppliers, but asked us not to share the information publicly).

3. Risks for the aquaculture industry and retailers

Beyond the social and ecological problems associated with FMFO production, our findings should also be a red flag to investors and any companies involved in aquaculture supply chains. Continued dependence on billions of wild fish poses a systemic threat to FMFO producers. Through their increasing reliance on farmed seafood fed using FMFO, other sectors – such as seafood processing and retail – are also exposed to risks, which include disruption of supply, rising costs of raw materials and reputational damage.

Resource risk: with soaring growth of the aquaculture industry, FMFO demand will outstrip supply

Due to the soaring growth of the aquaculture industry, FMFO demand will soon outstrip supply. The United Nations Food and Agriculture Organisation (FAO) projects that, in 2030, fishmeal production will be 19% higher than in 2016, with 54% of the growth deriving from improved use of fish waste, cuttings and trimmings obtained from fish processing,^{7,C} and the rest – presumably – from the use of whole fish. This means the industry's future growth is predicated on the continued extraction of marine resources that should either be left in the ocean or prioritised for human consumption. If the industry continues with the 'business as usual' approach, finite wild-fish supplies, combined with growing demand for FMFO, carry the risk that demand will outstrip supply, leading to increased costs – as is already being seen

One industry expert estimates there will be an additional 500,000 metric tonnes (MT) of new fishmeal demand in the coming five years – equivalent to 10% of current global supply, and more fishmeal than Vietnam produces in one year. According to the 'conservative' model used to calculate this, 200,000 MT of this demand will come from the prawn sector and 300,000 MT from the growth of Chinese coastal aquaculture.⁸ In addition (as noted in a 2019 FAO report), in Peru, FMFO demand is growing⁹ but supply remains limited and highly variable. This has a significant impact on FMFO prices (discussed below). The same report notes: 'The processing of SPF [small pelagic fish] for fishmeal, boosted by global market demand, is ... showing a marked tendency to increase in the CCS [Canary Current System]' off the coast of West Africa.¹⁰

C These predictions are based on the assumptions of higher demand and technological improvements, but uncertainties like climate change, environmental degradation, overfishing and macroeconomic conditions are not accounted for.

In June 2019, the Farm Animal Investment Risk & Return (FAIRR), an investor network representing companies with \$19 trillion of assets under management, examined a variety of environmental, social and corporate governance risks that could have a significant impact on aquaculture companies' future growth and financial performance. Noting that the industry is '*heavily dependent on wild stocks of certain fish for future growth*', FAIRR warned that '*demand is set to outstrip supply*', and stated that '*aquaculture is not a full solution to depleting fish stocks until this dependence is severely reduced*'.¹¹

The future growth of the aquafeed industry therefore hinges on its ability to reduce its reliance on FMFO and to embrace sustainable innovation, especially the use of novel feed ingredients. Despite numerous alternatives and innovations in the aquafeed market today, companies have made only limited progress in this direction; current growth strategies still rely on exploiting scarce marine resources, and aquafeed companies lack the determination and urgency to fully embrace the transition towards sustainability. Feed remains aquaculture's biggest cost, accounting for some 70% of companies' business expenditure, but multi-million-euro companies that dominate the market are still slow to make meaningful investments in alternatives.

Aquafeed companies are at pains to highlight that the proportion of FMFO used in aquafeed has declined over time. However, marine scientists have shown that FMFO use in aquafeed has increased *overall*, despite lower proportional inclusion rates of FMFO in aquafeed.¹²

Rising cost of FMFO

The FMFO market is inherently volatile, reflecting its target fisheries' vulnerability to sudden collapse. This volatility is exacerbated by the preponderant role a handful of countries plays in supplying the global market - foremost among them Peru, which produced on average 835,000 tonnes of fishmeal annually between 2012 and 2015,¹³ but whose marine fisheries catches are subject to extreme variability as a result of El Niño.

The overall picture for FMFO prices over the past several decades is one of a sustained upward trend, and the FAO and OECD predict prices will increase by 58% for fishmeal and 83% for fish oil (compared to 2005 levels) by 2028.¹⁴

A 2016 FAO analysis states: '*In general, the fishmeal and oil sector remains vulnerable due to its limited supply sources, with not much progress being made in this regard as demand continues to increase. ... [I]n the long-term, prices will not revert back to lower levels.*'¹⁵ According to Rabobank, fishmeal will no longer be a commodity in the long term, as falling supply and rising demand are making it a '*high-price strategic marine protein*'.¹⁶

Piles of fish ready for grinding at Kartong

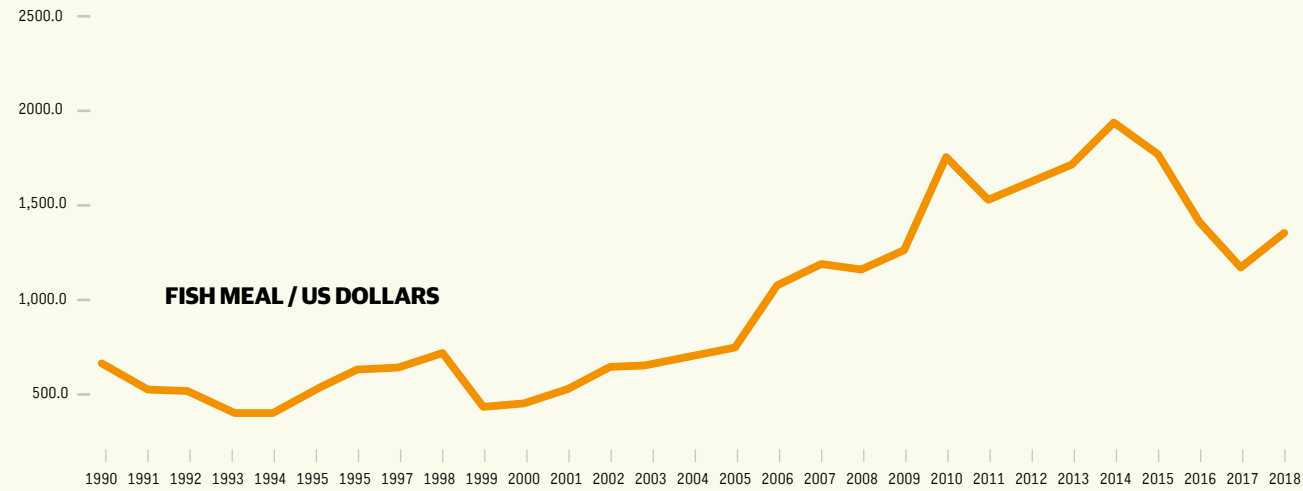


Figure 1: World price of fishmeal, 1990-2018
Source: International Monetary Fund Primary Commodity Price System

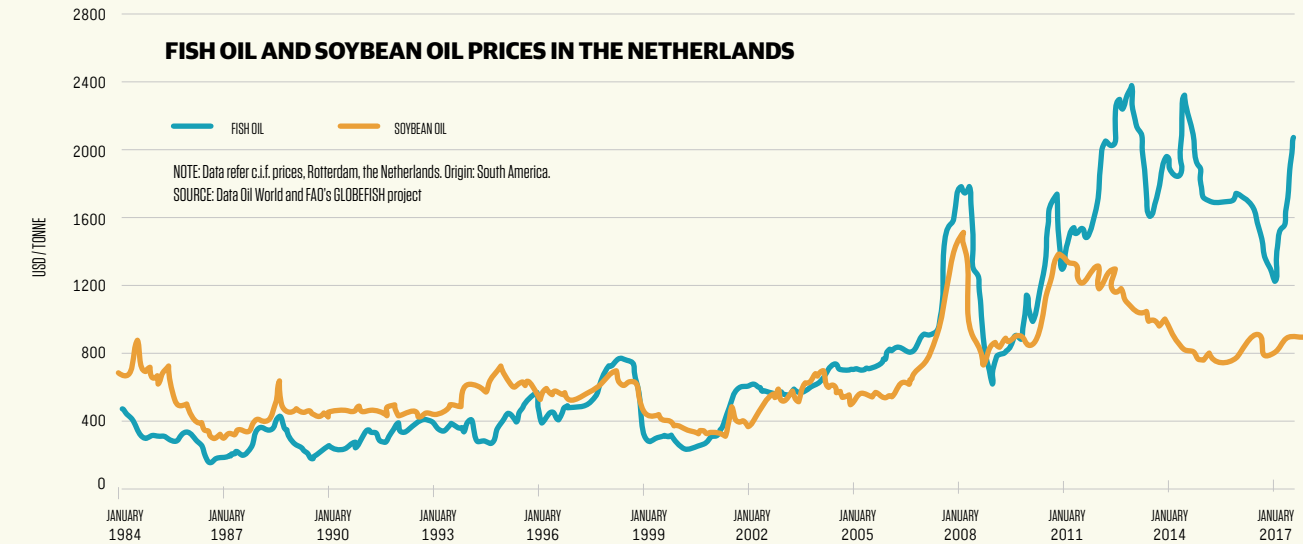


Figure 2: Fish oil and soybean oil prices in The Netherlands
Source: FAO (2018)

Higher prices, in combination with the stagnation of FMFO production, limit the further growth and profitability of the aquaculture industry. Fish farms feel higher FMFO prices keenly, as feed represents a significant share of production costs. Increased demand for FMFO is not just a function of *increased* farmed-seafood production; choices about the *type* of fish cultivated also matter, as farming higher-value species (such as salmon) places upwards pressure on FMFO demand and prices.¹⁷

Increased costs are also of concern to fish-feed manufacturers,¹⁸ who acknowledge the risk that volatility (in terms of both price and availability) presents to their business. For example, Cargill states: '*Fishmeal has long been the most important ingredient in commercial feed formulations, but fluctuations in price and availability makes it important for Cargill Aqua Nutrition to adapt a flexible and more rational use of marine proteins.*'¹⁹

Reputational risk

Direct or indirect association with the exploitation of scarce marine resources for FMFO raises serious reputational risk, particularly for consumer-facing companies such as retailers. Aquafeed companies could also suffer from the knock-on effects if retailers take steps to limit their exposure to risky FMFO supply chains.

It is worth noting that reputational considerations are not just confined to consumer attitudes; policymakers’ perceptions (which partly reflect and overlap with consumer concern) are also key, and may act as a spur to legislative action.²⁰

Certification does not mitigate risk

Reacting to consumer demand, major retailers have embraced certification as a way to ensure sustainability in seafood supply chains. However, according to our analysis, none of these schemes offer companies a meaningful way of mitigating against the reputational risk of exposure to destructive fishing practices in their supply chains. IFFO is fundamentally a trade association representing the interests of the FMFO industry, and argues that the ‘majority of wild-caught fish is responsibly sourced’.²¹ Its certification programme, IFFO RS – nominally a separate entity, yet governed by several industry representatives – certified several companies our investigation showed are linked to extractive and environmentally destructive practices.

Workers offloading “waste” fish juvenile and other assorted catch at FMFO company at Ullal, Karnataka



Our investigations revealed that FMFO and aquafeed companies with proven links to highly unsustainable fishing practices are certified by, or members of, IFFO. These include Trio S.A. (which has IFFO Responsible Supply Chain of Custody (RS CoC) certification, yet sources from plants identified in our Gambian and Indian investigations); Köster Marine Proteins and Olvea (both IFFO RS CoC), which in 2018 were embroiled in a scandal involving a blocked shipment from Western Sahara;²² CP Vietnam, Thai Union and TripleNine (all IFFO RS-certified); and others that use IFFO trade association membership as a proxy for certification, such as Bawa Fishmeal and Oil Co., and Janatha Fishmeal.²³ Danish FMFO producer, FF Skagen, proudly declares its IFFO RS certification but sources from Alfa Service Ltd. in Mauritania, where there are no IFFO RS-certified sites.²⁴

Compliance issues within the supply chain

Our investigations show that IUU fishing for FMFO is rampant in Asia and Africa. In the case of the South China Sea – a hotly contested zone – IUU fishing for FMFO has potential geopolitical implications. There are disputes as to the ownership of the waters, with China, Taiwan, Brunei, Malaysia, the Philippines and Vietnam all laying claim to various islands, rocks and reefs around the sea.²⁵ According to our research, within this context, the Vietnamese government has been using Vietnam fishing vessels to further strategic interests.⁹ These kinds of problems are not limited to Asia: in West Africa, fishing for FMFO production has resulted in tensions between Senegal and Mauritania, with reports of dozens of fishermen caught up in disputes over access to fishing grounds being killed.²⁶

The presence of IUU fishing in FMFO supply chains should concern all corporate actors directly or indirectly exposed. Companies should take meaningful action to address this risk; for example, by conducting thorough due diligence, and enhancing transparency by opening up their supply chains to external scrutiny.

Competitive risk

Companies reliant on FMFO will lose out to competitors that make the switch to sustainable alternatives. Solutions that make it possible to produce aquafeed without the use of wild-caught fish need to be scaled up. It is critical that these ingredients are truly sustainable and do not disrupt and destroy livelihoods and natural habitats and ecosystems, creating new problems in their wake.⁵

Aquaculture companies should consider resource utilisation and efficiency and the long-term sustainability of farming carnivorous species, such as salmon, which is placing upwards pressure on FMFO demand.

D According to a European Parliament analysis: ***The government... encourages Vietnam's fishing fleet to sail out into disputed waters and provide a maritime defense function as part of a fishing militia.*** European Parliament (2018) ***Research for PECH Committee: Fisheries in Vietnam***, p.11, October. [ONLINE] Available at: [http://www.europarl.europa.eu/RegData/etudes/STUD/2018/629175/IPOL_STU\(2018\)629175_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2018/629175/IPOL_STU(2018)629175_EN.pdf).

E We have explored, in detail, the problems with numerous voluntary initiatives and certification schemes (including MSC and Roundtable for Sustainable Palm Oil) in our previous report, *The false promise of certification*: http://changingmarkets.org/wp-content/uploads/2018/06/THE_FALSE_PROMISE_OF_CERTIFICATION_FINAL_WEB.pdf.

4. Conclusion

Evidence gathered at fishing ports and FMFO production plants in India, Vietnam and The Gambia demonstrates that the FMFO industry poses a serious threat to marine ecosystems and global food security and that, by continuing with extractive and unethical practices, it will be the architect of its own downfall. Our research has established that the leading European aquafeed companies source significant volumes of FMFO produced through highly destructive practices in the Global South. Feed containing this FMFO is ending up in farmed seafood sold by major European retailers. European multinational companies are therefore exposed to the resulting risks, including claims of complicity in some of the most extractive and environmentally destructive practices in the modern food system.

Small fishes being sold to a floating fish farm at Phuoc Tinh port



Recommendations for investor engagement

We suggest that investors encourage eliminating the use of wild-caught fish to feed farmed fish and diversifying the current aquaculture business model to encourage greater breeding of omnivorous and herbivorous fish, or species requiring no external inputs. Investors may wish to ask investee companies the following questions:

Aquafeed industry

- In light of the unsustainable dependence on wild-fish stocks, what steps are companies taking to reduce reliance on FMFO in their products?
- What efforts are companies making to research and develop alternatives at scale, and what steps are they taking to ensure alternative feed sources do not create other social and ecological problems?
- What steps are companies taking to ensure no IUU or other compliance failures occur in their supply chains?

Aquaculture industry (fish and seafood farms)

- In light of projected future price increases for FMFO, what steps are companies taking to mitigate the impacts?
- Are companies considering prioritising cultivating species that do not require feed (e.g. shellfish), require fewer inputs (e.g. tilapia) or can be fed an entirely vegetarian diet (e.g. carp)?
- For species that require feed, are companies encouraging their aquafeed suppliers to provide genuinely sustainable alternatives to FMFO?

Retailers

- What steps will the retailers mentioned in this briefing take to investigate and address the social and ecological impacts identified in their supply chains?
- To prevent these risks from recurring, and to counter consumer backlash, will retailers provide full transparency about farmed-seafood supply chains - from the identities of their suppliers, processors, aquafeed companies and FMFO producers to the locations of reduction fisheries?
- To address the long-term risks to ecosystems and food security, will retailers take steps to eliminate the use of FMFO inputs from whole wild-caught fish in their products, and conduct regular audits to ensure these steps are being implemented?²⁷

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