

2026 Summary Update

# Blue Empire

How the Norwegian salmon industry extracts nutrition and undermines livelihoods in West Africa



# Blue Empire: 2026 Update

The impact of Foodrise’s groundbreaking 2024 report has spread far and wide and is still making waves. In the past two years it has inspired further research into aquafeed supply chains and has been repeatedly referred to in international media coverage.<sup>1</sup>

Blue Empire gave name to the new form of food colonialism linked to the rise of the global salmon farming industry - which is responsible for the extraction of huge quantities of wild fish from the Global South to feed farmed salmon in the Global North.

Our findings exposed the role of the world’s biggest producer of farmed salmon, Norway, in this global chain of extraction. For the first time, we quantified the huge volume of wild fish used by the Norwegian salmon farming giants and detailed how they were taking fish from communities in West Africa, who rely on it as both food and a source of income, to fuel corporate profits.





Following the publication of our report, Foodrise sent an open letter to the Norwegian government calling for an immediate ban on sourcing fish oil from food insecure regions such as West Africa. This letter was signed by 39 organisations around the world, including Norwegian and West African groups.<sup>2</sup>

However, it garnered an underwhelming response from the Norwegian government, which stated: ‘Aquaculture and feed corporations are in a key position, as they are ultimately responsible for their own supply chains.’ In other words, leaving it up to companies to decide whether they source feed from West Africa or not.

Since then, Foodrise has been tracking various supply chain developments, which show that we cannot leave it in the hands of the farmed salmon industry to police itself:

- When we published Blue Empire, major multinational feed companies, Mowi, BioMar, Skretting and Cargill, were all sourcing fishmeal and fish oil (FMFO) from West Africa. As of 2026, based on company reports, Mowi is no longer sourcing fish oil from West Africa.<sup>3</sup> However, it is possible that Mowi may do so again in the future as it has made no formal commitment to stop sourcing from the region.
- In addition, according to latest data, global feed companies Skretting, BioMar and Cargill are still sourcing from West Africa (see Figure 1).
- All four companies are continuing to plunder wild fish populations in the Global South to fuel salmon farming companies in the Global North, further entrenching global power imbalances in the relentless pursuit of profit.
- Companies that are still sourcing from West Africa are continuing to use the Mauritanian Fishery Improvement Project (FIP) to greenwash their activities. FIPs are not a certification of sustainability in themselves but an indication that fisheries intend to become sustainable in the future. Yet feed companies consistently use them as signifiers of sustainability in corporate reporting.<sup>4</sup> Fishery protection measures are riddled with conflicts of interests with no artisanal fishers represented.<sup>5</sup> Despite their existence, the state of round sardinella<sup>a</sup> populations off the coast of West Africa continues to deteriorate.<sup>6</sup>

**Figure 1:** The percentage of ‘marine ingredients’ sourced from West Africa by feed companies

| Feed Company                                      |  <sup>7</sup> |  <sup>8</sup> |  <sup>9</sup> |  <sup>10</sup> |
|---|--|--|--|---|
| Percentage of marine ingredients from West Africa | 6.0%   | 6.1% <sup>b</sup>  | 1.6%   | 0.0%  |

a Sardinella are small pelagic fish which are a staple food for West African communities.

b This is based on Foodrise’s own workings, using BioMar’s 2024 Sustainability Report, assuming that each species used as marine ingredients in 2024 is split equally amongst the fishing areas cited.

Several critical policy developments in West Africa show that governments can lead the way in protecting our ocean and people's livelihoods against the damage inflicted by extractive aquaculture. These set an important example for other jurisdictions, including Europe:

- Since publication of Blue Empire, the Mauritanian government has taken strong action on FMFO factories. In 2021, more than half of Mauritania's total pelagic fish catches were being used for FMFO and by 2022 there were 44 fishmeal factories in operation in the country.<sup>11</sup> Advocating alongside Greenpeace Africa and Mauritanian organisations we have seen that the tide has started to turn. By late 2025 only eight factories remained active and FMFO production had fallen by more than half since its peak in 2020.<sup>12</sup>
- In Senegal, the government is similarly taking the issue seriously with steps which look set to prevent the FMFO industry's expansion, including measures to promote transparency.<sup>13</sup>
- Further down the coast, in Guinea-Bissau, the government issued a decree banning the production of FMFO in January 2026.<sup>14</sup> This is a huge win for communities in the region affected by this extractive industry, which was endangering local fish populations, harming the surrounding ecosystem and perpetuating a 'food-feed competition'.

***The following pages are taken from Foodrise's Blue Empire report published in 2024.***



World Fisheries Activity in Senegal. Credit: Clément Tardif / Greenpeace

# Executive Summary

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Norway is the world's biggest salmon farming country, with Norwegian companies occupying eleven out of the top 20 slots in the list of global producers of farmed salmon.<sup>15</sup> From its humble beginnings in the 1970s, the industry has come to be dominated by a handful of powerful companies including the world's largest salmon farmer, Mowi, which had a turnover of nearly €5 billion in 2022, and supplies supermarkets all across Europe.<sup>16</sup>

However, what is often presented as an exemplary corporate success story has come at huge costs which remain absent from Norwegian salmon companies' balance sheets. One such cost is the socio-economic harm resulting from the extraction of wild-caught fish to feed Norway's farmed salmon. This fish would otherwise provide valuable livelihoods and nutrition in some of the most food-insecure countries in the world.

This report exposes how the expansion of the Norwegian salmon farming industry has come at the expense of communities and fish populations in the Global South. While salmon producers tout their sustainability credentials, the industry's inefficient and wasteful use of finite natural resources is driving the loss of livelihoods and exacerbating malnutrition in nations including The Gambia, Senegal and Mauritania. We argue that the Norwegian salmon industry is not so much leading a 'blue revolution' as establishing a 'blue empire'.

Based on detailed analysis of corporate and government data as well as the latest academic research, Foodrise estimated the volume of wild fish required to feed Norway's huge salmon farming industry. We found that Norwegian salmon farming has a voracious appetite and an enormous feed footprint, driving the extraction of nearly 2 million

tonnes of whole fish from the wild every year. What is more, a significant share of its fish oil, a key commodity in salmon farming, is imported from Northwest Africa, a region facing acute food insecurity. Norway's demand for fish oil is depriving up to 4 million people in the region of fish required to meet their annual nutritional needs.

Faced with unfair competition from the global aquaculture industry, including major Norwegian companies, West African communities are mobilising to protect their fish and livelihoods; women, who play a central role in fish processing, are at the forefront of efforts to hold governments and companies to account.

The plundering of African fish stocks by Norwegian companies, and the Norwegian government's uncritical embrace of industrial aquaculture, stand in stark contrast to Norwegian development policy, which has identified food security and the fight against hunger as a priority area, notably in sub-Saharan Africa, as well as highlighting women's central role in food production. This reflects a startling lack of policy coherence.

By revealing the Norwegian salmon industry's enormous feed footprint, this report seeks to highlight the hypocrisy of global aquaculture corporations, who claim to be helping feed a growing world population while taking precious resources from the Global South for export to high-income markets. Shining a spotlight on a critical part of its supply chain, this report exposes how the Norwegian salmon industry relies on extracting nutrition from Northwest African coastal and inland communities, threatening health, food security and nutrition, in direct contradiction with the Norwegian government's stated development goals.



Salmon farm in Trondheim, Norway. Credit: Evgeny Sergeev (iStock).

# Summary of Findings

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Based on detailed analysis of corporate and government data as well as the latest academic research, we calculated that:

- In 2020, nearly 2 million tonnes of wild fish were required to produce the fish oil supplied to the Norwegian farmed salmon industry. 75% of these were fish that are otherwise widely eaten, such as anchovy, sardine, sprat and herring, with the remainder made up of fish critical to the marine ecosystem, such as sand eels.
- The volume of fish needed to produce the fish oil fed to Norwegian salmon every year is equivalent to 2.5% of global marine fisheries catch.
- Norway's annual output of farmed salmon is one-quarter (27%) lower than the volume of wild fish required to produce the fish oil used in Norwegian farmed salmon feed.
- In 2020, the Norwegian salmon farming industry sourced fish oil produced from between 123,000 to 144,000 tonnes of fish from FAO 34, the Major Fishing Area located off the coast of West Africa.
- The volume of fish sourced from FAO 34 to supply fish oil to the Norwegian salmon farming industry in 2020 could have provided between 2.5 million and 4 million people in the region with a year's supply of fish sufficient to meet their nutritional need.<sup>c</sup>
- Four big feed producers, Mowi,<sup>d</sup> Skretting, Cargill and BioMar supply close to 100% of the feed used in Norwegian salmon farming. All of them source fish oil from FAO 34. In 2020, one-quarter (23%) of the total volume of fish oil sourced from FAO 34 by Norwegian companies was purchased by Mowi: it sourced 5,100 tonnes of fish oil from Mauritania in 2020, which we calculate was produced from 28,300 tonnes of fish. A further 17,000 tonnes of fish oil were sourced by Skretting, Cargill and BioMar from FAO 34 (also referred to as the Eastern Central Atlantic Area) – which comprises Mauritanian fisheries – but these companies do not report sourcing per individual fishery area.
- Despite public sustainability pledges, salmon and feed producers' take-up of alternative ingredients to replace wild-caught fish in feed remains minimal. Without significant changes in feed composition, Norway's ambition to more than triple salmon production to 5 million tonnes by 2050 would require over three times as much wild-caught fish as in 2020.
- The extraction of precious fish from West Africa by corporations headquartered in the Global North for the benefit of mainly high-income consumers in Europe, North America and Asia has far-reaching consequences in terms of further entrenching global inequity and food insecurity. The expansion of industrial aquaculture is fuelling a modern-day nutrient colonialism, or food imperialism, with little attention or care paid to the grave ramifications of the food-feed competition driven in part by salmon farming.
- New modelling by Foodrise shows that it is possible to significantly reduce salmon production in Norway while increasing overall seafood production, improving food security and protecting fish stocks in Northwest Africa and other regions in the world where companies source feed. An alternative aquaculture-fisheries model combining the direct consumption of wild-caught fish alongside salmon fed on fish oil and fish meal exclusively made from trimmings (waste from processing) rather than whole fish delivers equal amounts of key micronutrients for the same number of people,<sup>e</sup> while freeing up nearly 1 million tonnes of wild fish to feed additional people or to continue playing their critical role in the marine ecosystem.

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c 4 million figure assumes fish is eaten whole, a practice promoted for the consumption of small fish in Asia and Africa. 2.5 million figure is a conservative estimate based on edible portion sizes estimated by the FAO. For instance, for *Sardina Pilchardus* and two different sardinella species, the edible flesh makes up 62% and 65% of the whole fish according to the FAO estimates. Based on daily consumption of 100g of fish per person. This is at the upper end of the range recommended by *EAT-Lancet* and the portion size considered by Hicks et.al in their 2019 paper on *Harnessing global fisheries to tackle micronutrient deficiencies*. References: Christina C. Hicks et al., 'Harnessing Global Fisheries to Tackle Micronutrient Deficiencies', *Nature* 574, no. 7776 (October 2019): 95–98, <https://doi.org/10.1038/s41586-019-1592-6>; FAO, Yield and nutritional value of the commercially more important fish species. FAO Fisheries Technical Paper. No. 309. (1989) Torry Research Station, Aberdeen (UK). Rome, FAO. <https://www.fao.org/3/t0219e/T0219E01.htm#ch1>; Walter Willett et al., 'Food in the Anthropocene: the *EAT-Lancet* Commission on healthy diets from sustainable food systems', *The Lancet* (January 2019) [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4).

d Mowi is a vertically integrated company which produces farmed salmon as well as feed.

e It is important to note that we are not suggesting here that these fish should necessarily be consumed by the high-income consumers currently buying salmon. Our calculations show that in an alternative aquaculture-fisheries model we do not need to rely on any fish oil from West Africa to deliver the nutrition currently delivered by the Norwegian farmed salmon industry. Further analysis would be needed to determine more broadly our moral obligation to avoid nutrient colonialism and nutrient extractivism.

# Conclusion and recommendations: Global justice calls for a rethink of the Norwegian salmon industry's blue empire

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The Norwegian salmon farming industry's huge and expanding appetite for wild-caught fish is accelerating the exploitation of marine resources beyond their limits to the detriment of biodiversity, the environment, and the good nutrition, food security and livelihoods of communities around the globe. This is especially true for fisheries already under pressure from overfishing and climate change, such as the sardinella species targeted by the aquafeed industry off the coast of West Africa.

In highlighting Norwegian salmon farming's voracious appetite, our analysis has also drawn attention to a shocking structural injustice which is being driven by the expansion of this industry. By this, we mean the scandal of removing food from people in the Global South, who are disproportionately impacted by food insecurity and malnutrition, to market a high value-added product to consumers in the Global North.

This deeply problematic practice gives the lie to aquaculture companies' claims to be on a mission to feed a growing global population; if this were the case, salmon farming, an inefficient way to produce both protein and micronutrient-rich food, would be an odd sector to prioritise. The Norwegian salmon industry's promise to feed the world is both unfounded and unrealistic and its actions are undermining Norway's development policy goals.

Given the nutrient loss inherent in all salmon farming and pressures on global fish stocks, it is impossible for Norwegian salmon farmers to source feed sustainably whilst maintaining or increasing production volumes. Hollow pledges from the likes of Mowi, Cargill, BioMar and Skretting to adopt more sustainable sourcing practices will not improve the situation for people on the ground and we are concerned that the much-touted Mauritanian Fisheries Improvement Project backed by these companies will result in nothing more than the greenwashing of their West African FMFO supply.

While some forms of aquaculture can improve food security, the farming of high-trophic species such as salmon is driving an unfair 'food-feed' competition. As the world's single largest producer of farmed salmon, Norway is one of the key players driving this dynamic.

## Our demands to aquaculture and aquafeed corporations

- Aquafeed companies must stop sourcing fish meal and fish oil (or products dependent on FMFO) from locations where its production is driving food-feed competition and exacerbating food insecurity.
- Salmon producers must have clear policies on responsible feed sourcing, which exclude the sourcing of feed produced with ingredients that are driving food-feed competition and exacerbating food insecurity.
- Producers must be fully transparent, consistent and granular on their aquafeed sourcing, including volumes, locations, species.

## Our recommendations to the Norwegian government

Norwegian policymakers should:

- Halt the growth of Norway's salmon farming sector.
- Make full transparency on feed sourcing mandatory at each stage of the aquaculture supply chain.
- Ensure that the activities and sourcing practices of Norwegian companies in the Global South do not run counter to Norwegian development policy.

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Published February 2026

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charity number: 1155064

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