

FEEDING A MONSTER:

How European aquaculture and animalfeed industries are stealing food from West African communities





Thieboudienne, a traditional dish in Senegal, made from fish, rice and tomato sauce

Credit: Elodie Martial / Greenpeace

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| Dutch flagged super trawler “Dirk Diederik”, fishing in Mauritanian waters 30 miles from the coast

| Credit: Pierre Gleizes / Greenpeace

EXECUTIVE SUMMARY

Globally, one billion people rely on fish as their main source of animal protein, according to the United Nations (UN) World Health Organization (WHO)¹. However, poor governance, illegal, undeclared and unregulated (IUU) fishing and overexploitation of fish stocks by industries like the global fishmeal and fish oil (FMFO) industry is leaving behind a trail of severe consequences for local populations, depriving them of one of their most important food sources and means of income in order to feed a broken food system. This report shows a clear example of exactly that.

Each year, over half a million tonnes of fish – which could feed over 33 million people in the region – are instead being extracted from the ocean along the coast of West Africa and converted to FMFO in order to feed farmed fish and livestock, mostly in Europe and Asia.

Virtually all FMFO produced in West Africa is exported for the benefit of other sectors – such as aquaculture, agricultural farming, dietary supplements, cosmetics and pet care – in third countries, most of them outside the African continent, in contradiction with international commitments on sustainable development, poverty alleviation, food security and gender equality.

This practice is not only undermining food security in coastal communities of Mauritania, Senegal and The Gambia but is also depriving people living in the interior of Senegal and non-coastal countries such as Mali and Burkina Faso of one of their most essential sources of protein. According to the UN Food and Agriculture Organization (FAO), the main fish species the FMFO industry in West Africa uses – sardinella and bonga – are already overexploited, posing ‘a serious threat to food

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www.changingmarkets.org

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¹ UN News (2019) Sustainable fishing staying afloat in developed world, sinking in poorer regions. 18 November. Available at: <https://news.un.org/en/story/2019/11/1051641>

security in the subregion'.² The FMFO industry thereby contributes to the exacerbation of social hardship and accelerates the depletion of fish resources, which threatens marine ecosystems and weakens the economies of several countries.

The bulk of the FMFO sourced from West Africa goes into feeding aquaculture, a voracious industry that is already providing over half of global fish consumption and is expected to grow further to reach 60% of total global fish consumption by 2030.³ Furthermore, resource-intensive fed aquaculture has far outpaced non-fed aquaculture, making up nearly 70% of all aquaculture production in 2018.⁴ The EU is a major market for West African fish oil. In 2019, more than 70% of the fish oil Mauritania exported was destined for the EU.

Key findings

1. The fishmeal and fish oil industry is diverting a valuable food source to feed

Every year, over half a million tonnes of fresh fish that could be feeding millions of people in West Africa are being diverted to produce FMFO in order to feed animals in industrial aquaculture and farming, mostly in Europe and Asia. The Gambia, Mauritania and Senegal have a consumption level of 15kg of fish per person/per year, which is higher than the rest of the continent (10kg per person/per year – the lowest in the world).⁵ We calculated that this amount of fish, extracted by the FMFO industry, could potentially feed over 33 million people each year – more than the combined populations of The Gambia, Mauritania and Senegal.

In West Africa, those who are most affected are women processors, who traditionally smoke, salt, dry and sell the fish to local markets, artisanal fishermen and the population of the subregion who depend on fish for their animal-protein intake; for instance, up to 70% of people in Senegal and over half The Gambia's population⁶. In The Gambia, the fisheries sector is a vital source of revenue for the country, and an estimated 200,000 people are indirectly dependent on fisheries and related activities.⁷ In Senegal, the fishing sector provides more than 600,000 jobs,⁸ although the number of people directly or indirectly deriving some income from fisheries could be as high as 825,000.⁹ The lack of small pelagic

fish for local women to process for consumption has a severe impact on livelihoods and food security in the West African region.¹⁰

2. The fish species the FMFO industry uses in West Africa are in dire straits

The FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa, considers the stocks of sardinella and bonga to be overexploited, posing 'a serious threat to food security in the subregion'.¹¹ Furthermore, in 2019 the FAO advised that a 50% reduction in fishing effort is required for all sardinella species and has repeatedly called – along with local community organisations – for 'strong and urgent action'. It is these same fish species – round and flat sardinella and bonga – that the FMFO industry prizes, and that are also fundamental to food security in the West Africa region.

3. West Africa has emerged as an FMFO supplier to the global market, especially supplying fish oil for the EU's voracious aquaculture sector

Despite this, West African production of FMFO has grown more than ten-fold in the past decade – from around 13,000 tonnes in 2010 to over 170,000 tonnes in 2019.¹² The EU is a major market for West African FMFO, particularly for fish oil, to feed its voracious aquaculture sector. Mauritania is the largest exporter of FMFO and the source of most EU imports; the country produces over 110,000 tonnes of fishmeal, 18% of which is exported to the EU, and close to 35,000 tonnes of fish oil, more than 70% of which is destined for the EU. In 2019, over

60% of the EU imports of fish oil from Mauritania went to France, while Spain was the main importer of fish oil from Senegal.

Most global FMFO from wild-caught fish is used in the production of carnivorous farmed fish, such as salmon and trout, while roughly one-third of fishmeal goes to the agricultural sector, a high proportion (23%) of which goes to feed pigs.¹³ As the demand for cheap salmon and meat increases, so does the demand for FMFO.

The information gathered in this report makes it possible to draw links between the consumption of farmed fish, seafood and animal feed in Europe on the one end, and extractive and unsustainable reduction fisheries in West Africa on the other. However, trade data discrepancies and a lack of transparency in supply chains make it difficult to build a complete picture and properly establish accountability.

Europe is home to several of the world's largest aqua-feed companies: Cargill Aqua Nutrition/EWOS, Skretting, Mowi and BioMar. Aquafeed is big business; in 2017, these four leading European aquafeed producers reportedly had combined sales of \$3.3 billion.¹⁴ Furthermore, these four aquafeed producers have all been connected to West African FMFO suppliers in recent years,¹⁵ and are therefore complicit in the plundering of West African fish stocks in the midst of an alarming (and worsening) food-security situation in the region.

2 FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa (2019). Summary report available at: <http://www.fao.org/3/cb0490en/CB0490EN.pdf>

3 FAO projections show that combined world capture fisheries and aquaculture production will reach 200 MT (LWE) by 2030, up from just under 100 MT 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, *The state of world fisheries and aquaculture 2018*. Available at: <http://www.fao.org/3/i9540en/i9540EN.pdf>

4 FAO, *State of the World's Fisheries and Aquaculture 2020*, p.6-7. Available at: <http://www.fao.org/3/ca9229en/ca9229en.pdf>

5 Failler, P., Bah, M., Deme, M. and Dia, A.D. (2015) Étude régionale « Commerce transfrontalier de poisson dans l'espace CCLME ». May 2015. Available at: https://www.researchgate.net/publication/281178771-Etude_regionale_Commerce_transfrontalier_de_poisson_dans_l'espace_CCLME

6 Greenpeace international (2019) *A Waste of Fish: Food security under threat from the fishmeal and fish oil industry in West Africa*. June 2019. Available at: <https://www.greenpeace.org/international/publication/22489/waste-of-fish-report-west-africa/>

7 The World Bank (2018). *Republic of Gambia. West Africa Regional Fisheries Program – Phase II Environmental and Social Management Framework (ESMF)*. Available at: <http://documents.worldbank.org/curated/en/919521545373344581/pdf/ESMF-WARFP-GAMBIA-Final-for-Disclosure-docx.pdf>

8 Ocean Action Hub (2017). *Présentation du Sénégal: Présentation du secteur de la pêche*. Available at: www.oceanactionhub.org/presentation-du-senegal-presentation-de-la-secteur-de-la-peche

9 Harper, S. and Sumaila, U. R. (2019). *Distributional impacts of fisheries subsidies and their reform. Case studies of Senegal and Vietnam*. International Institute for Environment and Development. Available at <https://pubs.iied.org/16655IIED/>

10 Hay Em News (2018) *Chinese investment fuels food security fears in west Africa*. 2 August. Available at: <https://hayemnews.com/chinese-investment-fuels-food-security-fears-in-west-africa/>

11 FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa 2019. Summary report available at: <http://www.fao.org/3/cb0490en/CB0490EN.pdf>

12 Trade Map (www.trademap.org) was used to obtain export data from Mauritania, Senegal and The Gambia under Harmonized System (HS) Codes 230120 (for fishmeal) as well as 150410 and 150420 (for fish oil). Last checked 26 March 2021.

13 Bachis, E. (2017) *Fishmeal and fish oil: A summary of global trends*. Washington: 57th IFFO Annual Conference. Available at: http://www.iffoevents.com/files/iffa/2.IFFO%20Washington%202017_1.pdf

14 IntraFish (2018) *The future of aquaculture feed: The supply trends and alternatives driving tomorrow's industry*, p.17.

15 Changing Markets (2019) *Fishing for Catastrophe: How global aquaculture supply chains are leading to the destruction of wild fish stocks and depriving people of food in India, Vietnam and The Gambia*. October 2019. Available at: <https://changingmarkets.org/wp-content/uploads/2019/10/CM-WEB-FINAL-FISHING-FOR-CATASTROPHE-2019.pdf>

4. Retailers across Europe are sourcing farmed fish from companies involved in the trade of FMFO from West Africa.

Well-known retailers across Europe are sourcing farmed fish (such as salmon) from companies linked in a supply chain to the big four aquafeed companies – EWOS/Cargill, Biomar, Skretting and Mowi – which are involved in the trade of FMFO from West Africa. Although we cannot establish a direct chain of custody between the retailers and West African FMFO, the retailers’ connection with companies involved in the West African supply chain is problematic, and irrespective of whether there is a direct chain of custody, they should not source from those who source from West Africa.

Our investigations uncovered that some European retailers source from aquaculture and aquafeed producers who, in turn, source from reduction fisheries in West Africa, including:

- UK:

Tesco,
Sainsbury's
M&S
Lidl
Aldi;
- France:

Carrefour
Auchan
E.Leclerc
Système U
Monoprix
Groupe Casino;
- Spain:

Mercadona
Lidl España;

- Germany:

Aldi Süd
Lidl
Kaufland
Rewe
Metro AG
Edeka.

However, Sainsbury’s, M&S and Mercadona have communicated that no FMFO from West Africa was used in their salmon/seafood products.

Additionally, the FMFO industry’s operations in the region have severe negative environmental, socio-economic, and human health consequences of the FMFO industry operations in the region.¹⁶ In Mauritania – the country with the largest number of FMFO factories – many complaints of chronic sickness and asthmatic disorders have been reported, as well as ecological damage to marine areas near the factories.¹⁷

The Covid-19 crisis has only exacerbated the impacts of this broken food system. The pandemic has disproportionately affected artisanal fishermen and women-dominated fish-processing communities,¹⁸ which have been restricted in their business activities due to lockdowns.¹⁹ At the same time, governments have prioritised industrial exploitation over the livelihoods of local communities, and have given industrial FMFO producers free rein to continue production for export.²⁰

Demands

The responsibility primarily lies with corporate stakeholders in Asia and Europe – and their respective political leaders – as well as with local governments, which need to regulate shortsighted benefit industries and prioritise local livelihoods and food security. In the short term, there is a need to rapidly phase out FMFO for aquaculture and other farmed animals, and prioritise wild-caught fish for local direct human consumption. In the long-term, the world needs to work towards a return to food sovereignty, relocation of production, shorter supply chains and reliable local markets.

- As an urgent starting point, Changing Markets and Greenpeace Africa demand:
- West African governments phase out any fishmeal and fish oil production using fish fit for human consumption, based on its negative environmental, social and economic impacts.

- West African governments grant women fish processors and artisanal fishermen a legal and formal status, opening access to labour rights and benefits, such as social security and consultation rights in local fisheries management.
- Companies and end markets stop trading fishmeal and fish oil produced using fish fit for human consumption from the West African region.
- All states involved in fisheries in the region establish an effective regional management regime – particularly for the exploitation of shared stocks, such as small pelagic fish – as required under international law, relevant national laws, pan-African and regional fisheries policies, and other instruments. This management regime should comply with a precautionary and ecosystem-based approach, ensuring the total allowable catch is within safe biological limits.

16 China Dialogue Ocean (2019) *Fishmeal factories threaten food security in the Gambia*. 28 November. Available at: <https://chinadialogueocean.net/11980-fishmeal-factories-threaten-food-security-in-the-gambia/>

17 Cridem (2017) *La malédiction de l’industrie des farines de poisson à Nouadhibou*. 27 January. Available at: http://cridem.org/C_Info.php?article=693730

18 The Conversation (2021) *Women are a mainstay of fishing in West Africa. But they get a raw deal*. 3 May. Available at: <https://theconversation.com/women-are-a-mainstay-of-fishing-in-west-africa-but-they-get-a-raw-deal-159283>

19 Ollivier, T. (2020) *Coronavirus : au Sénégal, le secteur de la pêche entre dans la tourmente*. Le Monde, 16 April. Available at: https://www.lemonde.fr/afrique/article/2020/04/16/coronavirus-au-senegal-le-secteur-de-la-peche-entre-dans-la-tourmente_6036833_3212.html

20 Greenpeace (2020) *Multinational fishing industries plunder West Africa’s ocean as artisanal sector is locked out by COVID-19*. 9 October. Available at: <https://www.greenpeace.org/africa/en/press/12358/multinational-fishing-industries-plunder-west-africas-ocean-as-artisanal-sector-is-locked-out-by-covid-19/>

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List of abbreviations

- CCS** Canary Current System
- EU** European Union
- FAO** Food and Agriculture Organization
- FMFO** Fishmeal and fish oil
- ITC** International Trade Center
- IUU** Illegal, undeclared and unregulated
- KMP** Köster Marine Proteins
- SPF** Small pelagic fish
- UN** United Nations

INTRODUCTION

Broken global food systems

Global supply chains allow wealthy countries to enjoy products from all over the world on the shelves of well-supplied supermarkets, regardless of the environmental and socio-economic costs in sourcing countries. Meanwhile, raw materials and food that should have been preserved for local populations are diverted to these wealthy countries paying higher prices, including through industries such as the fishmeal and fish oil (FMFO) sector, which convert these resources into feed for the agro-industrial and aquaculture sectors, or even for use in cosmetics, dietary supplements, mink farms and pet care products.

According to the recent “2020 - Global Report on Food Crises” from the United Nations’ World Food Programme²¹ there were 135 million people suffering acute food insecurity in the world in 2019, of which 73 million were in Africa. In the West Africa region, due to weather impacts and deficit in crop production, around 610,000 people in Mauritania and 767,000 people in Senegal were forecast to be in crisis or worse (CH Phase 3 or above)²² during the lean season in June–August 2020. Similar impact was expected in The Gambia, “*where almost one in three Gambians are vulnerable to food insecurity*” as noted by the Sustainable Development Goals (SDG) campaign in 2017.²³

However since then, the food insecurity numbers are likely to have worsened due to COVID restrictions. In this respect, the United Nations (UN) report on “The state of food security and nutrition in the world” stated in June 2020 that “there is no doubt the pandemic will expose more people to food insecurity and accelerate the projected increase in the number of hungry people”.²⁴ The

World Food Programme estimated this could potentially double the number of food insecure to 43 million in the West African region in that same year.²⁵

If the current trend continues, the number of under-nourished people in the world is predicted to increase from almost 690 million in 2019 to over 840 million by 2030; although these figures do not yet account for the effects of the COVID-19 pandemic, which could have resulted in an additional 83 to 132 million undernourished people in 2020.²⁶

In West Africa, where fish availability has been declining for a number of years due to poor governance as well as illegal, undeclared and unregulated (IUU) fishing, the socio-economic situation has worsened with the continuous operations of extractive industries such as the fishmeal and fish oil (FMFO) sector. The plunder of small pelagic fish by foreign industrial fleets has continued unabated, while local artisanal fishermen were, and in many ways still are, restricted in their daily work, leading to an increase in the price of fish on the local market. Similarly, most of the fishmeal factories in the region have remained in operation and continue to divert food from the local population who need it the most.

The fishmeal and fish oil industry as an example of a broken food system

A number of small pelagic fish species occur along the West African coast. While fisheries for some of these species, especially sardinella, have long been important as sources of food and employment in the region, the industrial exploitation of these stocks rapidly developed in Mauritania and began providing material for processing into fishmeal and fish oil.

21 <https://www.wfp.org/publications/2020-global-report-food-crises>

22 IPC/CH Phase 3: Households either: · Have food consumption gaps that are reflected by high or above-usual acute malnutrition; OR · Are marginally able to meet minimum food needs but only by depleting essential livelihood assets or through crisis-coping strategies.

23 <https://es.wfp.org/countries/gambia#:~:text=The%20Gambia%20is%20classified%20as,characterized%20by%20short%20rainy%20seasons>

24 FAO, IFAD, UNICEF, WFP and WHO. 2020. *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO. <https://doi.org/10.4060/ca9692en>

25 UN News: <https://news.un.org/en/story/2020/05/1063232>

26 FAO, IFAD, UNICEF, WFP and WHO. 2020. *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO. <https://doi.org/10.4060/ca9692en>

A fish processor from the Mantulaye Dieye fish market of Cayar, Senegal.

Credit: Pape Diatta Sarr / Greenpeace



The primary species for the fishmeal and oil industry are round and flat sardinella and bonga which are essential to the livelihood of fishing communities, particularly in Senegal and The Gambia, as well as for maintaining food security in the region, in particular for the most vulnerable populations. These three species used for fishmeal and fish oil are over-exploited, posing “a serious threat to food security in the subregion”, according to the most recent stock assessment by the Food and Agriculture Organization (FAO) Working Group on Small Pelagics.²⁷

The management of these fisheries is a complex matter, adding to the fact that there are no regional management institutions strong enough to prevent the ongoing overfishing situation. The demand for pelagic fish from the fishmeal factories has added enormous pressure to an already dramatic overfishing and food security crisis - a context threatening West African fish stocks in the long term, stealing food and jobs from local communities and for some, ending up in a dangerous voyage at sea to reach Europe as migrants.²⁸

Hundreds of thousands of tonnes of fresh fish that could be feeding millions of people in West Africa are being diverted to produce fishmeal and fish oil in order to feed other animals in industrial aquaculture and farming, mostly in Europe and Asia. This industry thereby contributes to the exacerbation of social hardship and accelerates the depletion of fish resources, threatening marine biodiversity and weakening the economies of several countries.

The overexploitation of natural resources and the pollution generated by the FMFO factories have highlighted the weakness of a global economy which does not integrate environmental concerns. More generally, these environmental problems are driving social injustice since the damages are often unevenly distributed and the greatest burden borne by the least fortunate. In West Africa, those who are most affected are women processors who traditionally smoke, salt, dry and sell the fish to local markets, artisanal fishermen, and the population of the

subregion who depend on fish for their animal protein intake, for instance up to 70% in Senegal, while in The Gambia it's over half.²⁹

The FMFO processing industry has commodified a staple food that forms part of the standard diet of the local population into an exportable product, and in doing so, prices-out local buyers from a significant portion of the fishery's catch.

Virtually all fishmeal and fish oil produced is exported for the benefit of other sectors such as aquaculture, agricultural farming, dietary supplements, cosmetics and pet care products in countries abroad, most of them outside the African continent, in contradiction with international commitments on sustainable development, poverty alleviation, food security and gender equality. Unfortunately, local governments often lack economic might and political courage to sustain the local fishing sector and collectively manage the dwindling fishing resources in the long term, as opposed to granting fishing licenses and authorisations to foreign investors to increase their FMFO production capacity.

This report will examine:

1. The growing global aquaculture industry and its reliance on wild fish, as well as the status of fish resources.
2. The emergence of West Africa as a supplier of FMFO to the global market, as well as the industry's negative impacts in the region.
3. The supply chain of FMFO from West Africa towards European companies and destination markets.

27 <http://www.fao.org/3/cb0490en/CB0490EN.pdf>

28 <https://www.bbc.com/news/world-africa-46017359>
<https://www.greenpeace.org/africa/en/blogs/12686/when-despair-wins-and-disaster-takes-over-off-the-coast-of-senegal-and-europe/>

29 A Waste of Fish Report 2019 (Greenpeace). <https://www.greenpeace.org/international/publication/22489/waste-of-fish-report-west-africa/>

SECTION 1—THE AQUACULTURE INDUSTRY AND ITS RELIANCE ON WILD FISH

Aquaculture is often presented as the solution, not only to the ecological damage that unsustainable fishing techniques are wreaking on our oceans but also as a rapidly scalable source of protein for communities vulnerable to food insecurity and malnutrition. The notion that farmed seafood can both feed the world’s poor and relieve pressure on wild-fish stocks is a seductive one. Yet in reality, the aquaculture industry continues to extract precious finite resources from the very oceans it claims to protect.

Every year, billions of edible fish caught in the wild are diverted from direct human consumption and used to feed the voracious aquaculture industry, through the production of fishmeal and fish oil (FMFO). Almost a fifth of the world’s total catch of wild fish is processed into FMFO,³⁰ of which the vast majority is used in feed for aquaculture and agriculture.³¹ In FMFO production hubs across the Global South, fish catches are turned into fishmeal at a rate of 4 to 5 tonnes of fish for 1 tonne of fishmeal and exported abroad.³²

The types of fish turned into FMFO are mainly species lower down the marine food chain, including small

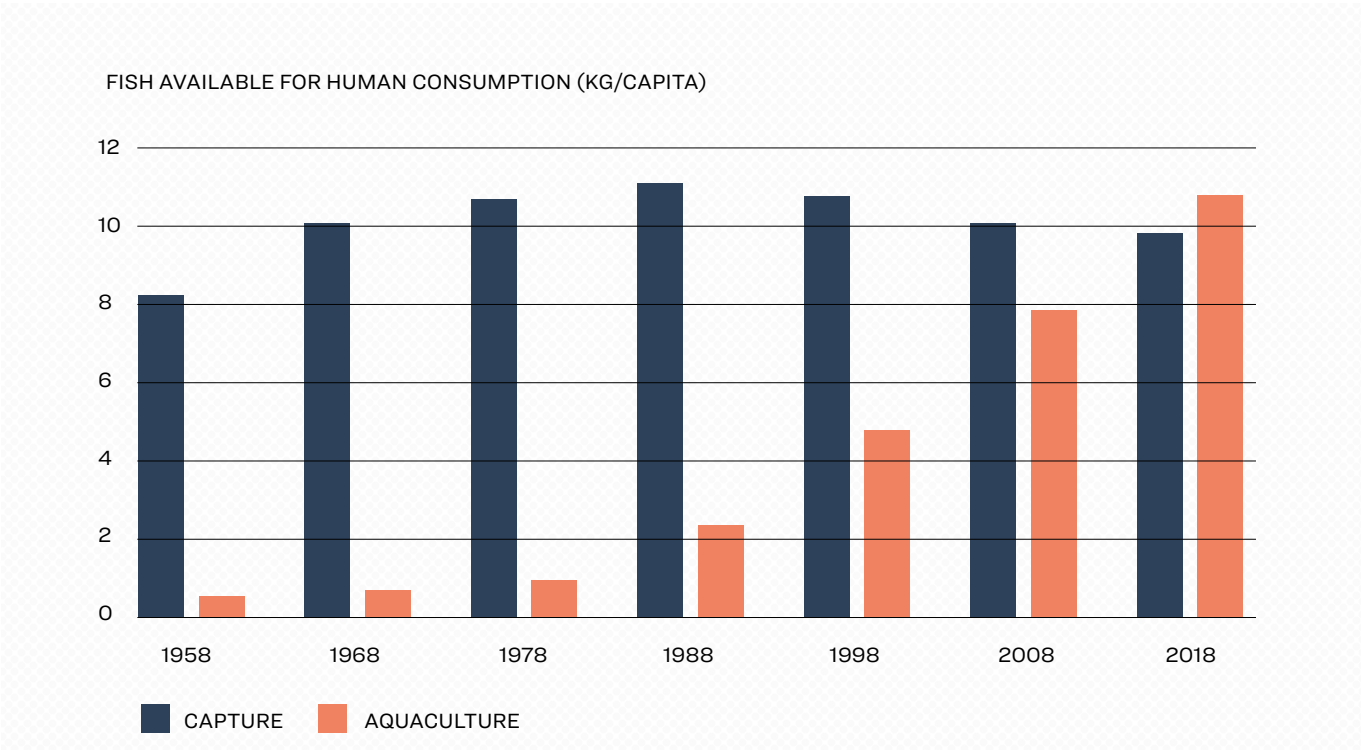
pelagic³³ ‘forage’ fish (such as anchovy, sardine, herring and mackerel) and also invertebrate species (such as krill). All of these species play an important role in the marine environment because the entire marine food web depends on them. Overfishing down food webs is unsustainable and can have large impacts on the ecosystem.³⁴ Furthermore, these fish are also a major source of protein for millions of people living in coastal communities, especially in West Africa, where the FMFO industry’s demand for small fish competes with demand for direct human consumption. Today, almost 70% of landed forage fish are processed into FMFO, representing roughly 20% of the world’s total catch of wild marine fish.³⁵

1.1. Aquaculture: The world’s fastest-growing food production sector

Demand for fish is growing rapidly and is outpacing demand for meat.³⁶ Aquaculture currently accounts for roughly half of world fish consumption³⁷ and is projected to grow rapidly; farmed species are expected to reach 60% of total global fish consumption by 2030.³⁸

Figure 1: Relative contribution of aquaculture and capture fisheries to fish available for human consumption

Source: FAO, State of the World’s Fisheries and Aquaculture 2020 (p.72)



In 1950 only 4% of fish for human consumption came from aquaculture, in 1980 this was still only at 9% and rose to 19% in 1990. In 2016, aquaculture overtook wild capture as the main source of fish for human consumption.³⁹

1.2. Fed aquaculture outpacing growth of non-fed aquaculture

Global aquaculture production reached an all-time high in 2018 with a total sale value of 263.6 billion USD; this was dominated by the farming of finfish, which accounted for 47% of total production.⁴⁰

Not all aquaculture requires the input of food, for example, some species filter their food from surrounding waters (such as mussels and oysters). However, resource-in-

tensive fed aquaculture has far outpaced non-fed aquaculture, making up nearly 70% of all aquaculture production in 2018.⁴¹

A paper published in the scientific journal *Nature Sustainability* noted in 2018: ‘As the fastest growing food sector in the world, fed aquaculture demand will eventually surpass ecological supply of forage fish, but when and how best to avoid this ecological boundary is unclear’.⁴²

According to the UN, without significant changes, we are at risk of pushing more than half of our planet’s marine species to the brink of extinction by the year 2100.⁴³ The collapse of fish stocks is already visible among some of the pelagic fish species, which are used to feed the global aquaculture sector – from crashing oil sardine stocks off the west coast of India⁴⁴ to the decline of bon-ga in The Gambia. In Europe, Baltic cod stocks are on

30 Cashion, T., Le Manach, F., Zeller, D. and Pauly, D. (2017) Most fish destined for fishmeal production are food-grade fish. *Fish and Fisheries*, 18(5): 1–8. [ONLINE] Available at: https://www.bloomassociation.org/wp-content/uploads/2017/02/Cashion_et_al-2017-Fish_and_Fisheries-1.pdf

31 Naylor, R.L., Goldburg, R.J., Primavera, J.H., Kautsky, N., Beveridge, M.C.M., Clay, J., Folke, C., Lubchenco, J., Mooney, H. and Troell, M. (2000) Effect of aquaculture on world fish supplies. *Nature*, 405(6790): 1017–1024. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/10890435>

32 Miles, R. D. and Chapman, F. A. (2006, reviewed February 2018). The Benefits of Fish Meal in Aquaculture Diets. IFAS Extension, University of Florida. Available at <http://edis.ifas.ufl.edu/pdf/FA/FA12200.pdf>

33 Pelagic fish are fish found near the ocean surface or in middle depths. They often move in large shoals, which greatly increases their detectability (see: <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/pelagic-fish>).

34 Smith, A. D. M., Brown, C. J., Bulman, C. M., Fulton, E. A., Johnson, P., Kaplan, I. C., Lozano-Montes, H., Mackinson, S., Marloff, M., Shannon, L. J., Shin, Y.-J. and Tam, J. (2011) Impacts of fishing low-trophic level species on marine ecosystems. *Science*, 333(6046): 1147–1150. Available at: <https://doi.org/10.1126/science.1209395>

35 Cashion, T., Le Manach, F., Zeller, D. and Pauly, D. (2017) Most fish destined for fishmeal production are food-grade fish. *Fish and Fisheries*, 18(5). Available at: <https://doi.org/10.1111/faf.12209>

36 FAO estimates that, since 1961, the 3.2% average annual increase in global fish consumption has outpaced population growth (1.6%) and exceeded increases in consumption of meat from all terrestrial animals, both combined (2.8%) and individually, except poultry (4.9%). 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.

37 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.

38 FAO projections show that combined world capture fisheries and aquaculture production will reach 200 MT (LWE) by 2030, up from just under 100 MT 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*.

39 FAO, State of the World’s Fisheries and Aquaculture 2020, p.72: <http://www.fao.org/3/ca9229en/ca9229en.pdf>

40 FAO, State of the World’s Fisheries and Aquaculture 2020, p.21: <http://www.fao.org/3/ca9229en/ca9229en.pdf>. World aquaculture production was 114.5 million tonnes in live weight in 2018, this was dominated by finfish at 54.3 million tonnes.

41 FAO, State of the World’s Fisheries and Aquaculture 2020, p.6–7: <http://www.fao.org/3/ca9229en/ca9229en.pdf>

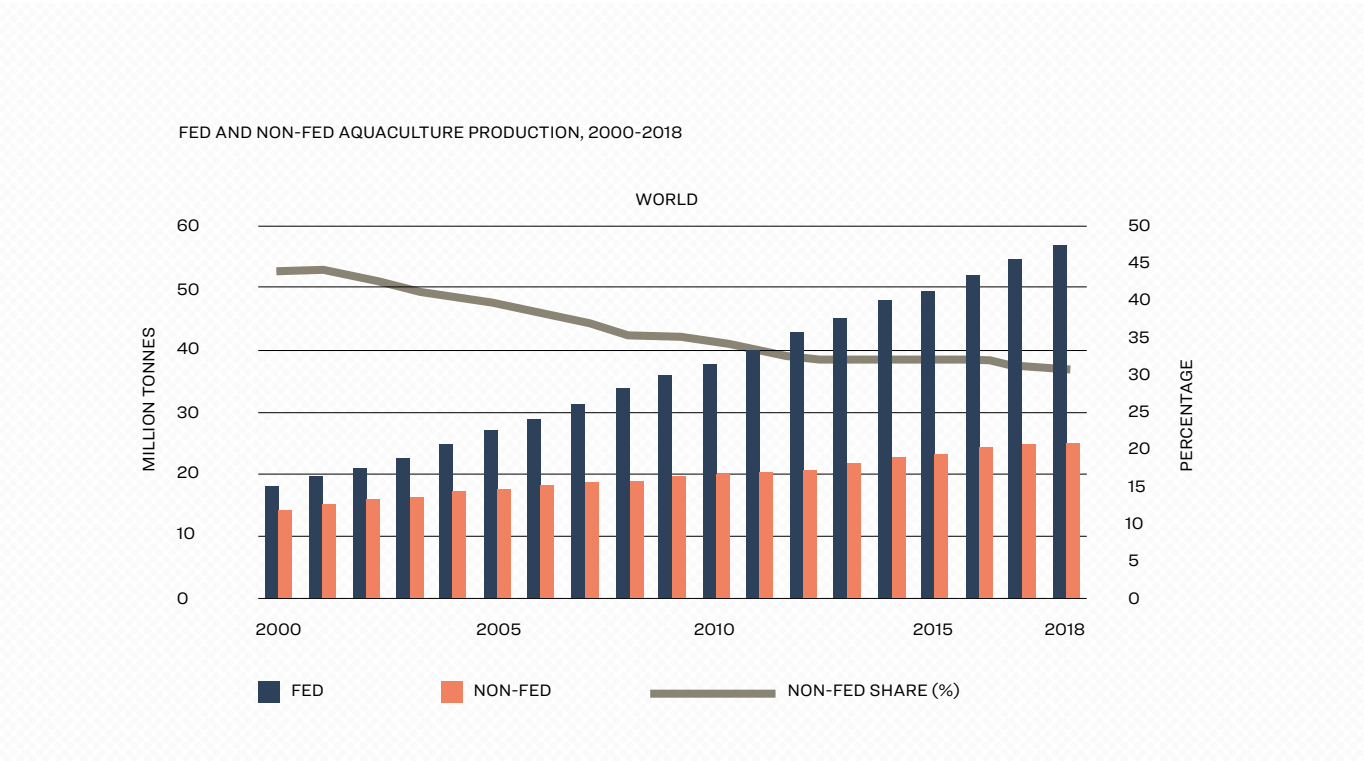
42 Froehlich, H. E., Jacobsen, N. S., Essington, T. E., Clavelle, T. and Halpern, B. S. (2018) Avoiding the ecological limits of forage fish for fed aquaculture. *Nature Sustainability*, 1: 298–303. Available at: <https://www.nature.com/articles/s41893-018-0077-1>

43 UNESCO (2015) *Facts and figures on marine biodiversity*. Available at: <http://www.unesco.org/new/en/natural-sciences/ioc-oceans/focus-areas/rio-20-ocean/blueprint-for-the-future-we-want/marine-biodiversity/facts-and-figures-on-marine-biodiversity/>

44 Chandrashekhar, V. (2019) Rattled by sardine stock crash, India begins regulating its fisheries. *Mongabay Environmental News*, 11 July. Available at: <https://news.mongabay.com/2019/07/rattled-by-sardine-stock-crash-india-begins-regulating-its-fisheries/>

Figure 2: Fed and non-fed aquaculture production, 2000-2018

Source: FAO, State of the World's Fisheries and Aquaculture 2020, (p.28)



the verge of collapse, partly as a result of the overfishing of their key food source, sprat, to feed the Norwegian salmon industry.⁴⁵

1.3. Case study: Expansion of salmon farming in Scotland and Norway

Salmon is a carnivorous fish and salmon farming is highly dependent on the use of FMFO. According to the European Market Observatory for Fisheries and Aquaculture products, 60% of fish oil used in aquaculture goes into salmon and trout ('salmonid') feed.⁴⁶

The total global production of farmed Atlantic salmon is estimated to have increased by 7% in 2019, to around 2.6 million tonnes. The three major contributors to this expansion were Norway, Chile and Scotland. Norway reg-

istered a year-on-year increase of 6.5%, while the Chilean annual total was 10% more than in 2018. Scotland rebounded from a poor year in 2018 with 20% growth.⁴⁷

A 2019 study by the UK-based campaign group Feedback found that the Scottish salmon farming industry currently uses roughly the same quantity of wild-caught fish to feed its salmon as the entire adult population of the UK purchases in one year. What is more, if the Scottish salmon industry wants to meet its expansion targets of doubling in size, it will need 310,000 tonnes more wild fish every year for feed alone.⁴⁸

Norway is the primary exporter of salmon to the EU⁴⁹ and has significant future growth ambitions for the sector.⁵⁰ Intensive farming of Atlantic salmon accounts for more than 80% of total Norwegian aquaculture



production⁵¹ and is hugely resource-intensive when it comes to feed, especially FMFO. While Norway produces large volumes of FMFO itself, it is also a major importer, predominantly from Denmark. Norway is also home to a number of large aquafeed companies which supply the salmon farming industry, including Skretting, Cargill Aqua Nutrition/EWOS and Mowi.⁵²

The campaign group Feedback estimates that if we ate some of the wild fish – like herring, sardines and anchovies – directly instead of feeding them to farmed salmon, we could still access the same level of micronutrients while leaving 59% of the fish caught to feed that industry in the sea.⁵³

1.4. Continued use of wild fish as feed in animal agriculture

In 2018, about 18 million tonnes of fish was reduced to FMFO,⁵⁴ which is mainly used as an ingredient in feeds for aquaculture and animal farming. Roughly one-third of fishmeal goes to the agricultural sector (5% to chickens, 23% to pigs), but aquaculture became the dominant user of 'reduction fisheries' (which supply fish for FMFO rather than for direct human consumption) in the early 2000s.⁵⁵ In 2016, 69% of fishmeal and 75% of fish-oil production went to seafood farming.⁵⁶ Global demand for FMFO is mainly driven by China's huge aquaculture sector,⁵⁷ but export-oriented sectors – such as salmon farming in Norway and Scotland, and prawn farming in Asia – are also significant consumers.

45 Hivert, A.F. (2019). Le cabillaud au bord de l'effondrement en mer Baltique. *Le Monde*, 26 July. Available at: https://www.lemonde.fr/planete/article/2019/07/26/le-cabillaud-au-bord-de-l-effondrement-en-mer-baltique_5493603_3244.html ; ICES (2019) *Sprat (Sprattus sprattus) in subdivisions 22–32 (Baltic Sea)*. Available at: <http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2019/2019/spr.27.22-32.pdf>

46 European Market Observatory for Fisheries and Aquaculture products – EUMOFA (2019) Monthly Highlights. Available at: http://www.eumofa.eu/documents/20178/148316/MH+4+2019+EN_final.pdf#page=23

47 <http://www.fao.org/in-action/globefish/market-reports/resource-detail/en/c/1296665/#:~:text=Total%20global%20production%20of%20farmed,around%205%20percent%20in%202018.>

48 Feedback (2019) *Fishy business*.

49 795,307 tonnes in 2018, worth NOK 49,421 million (see: <https://www.ssb.no/statbank/table/09283/>)

50 Norsk Industri (n.d.) Roadmap for the Aquaculture Industry. Available at: https://www.norskindustri.no/siteassets/dokumenter/rapporter-og-brosjyrer/veikart-for-havbruksnaringen---kortversjon_eng.pdf

51 FAO (2005). FAO fisheries & aquaculture national aquaculture sector overview (NASO). Available at: http://www.fao.org/fishery/countrysector/naso_norway/en

52 Changing Markets Foundation and Compassion in World Farming (2019) Until the seas run dry: how industrial aquaculture is plundering the oceans. p.40. Available at: <https://changingmarkets.org/wp-content/uploads/2019/04/REPORT-WEB-UNTILL-THE-SEAS-DRY.pdf>

53 <https://feedbackglobal.org/campaigns/fishy-business/>

54 FAO, State of the World's Fisheries and Aquaculture 2020, p.61: <http://www.fao.org/3/ca9229en/ca9229en.pdf>

55 Cashion, T., Le Manach, F., Zeller, D. and Pauly, D. (2017) Most fish destined for fishmeal production are food-grade fish. *Fish and Fisheries*, 18(5): 1–8. Available at: https://www.bloomassociation.org/wp-content/uploads/2017/02/Cashion_et_al-2017-Fish_and_Fisheries-1.pdf

56 Bachis, E. (2017) *Fishmeal and fish oil: A summary of global trends*. Washington: 57th IFFO Annual Conference. Available at: http://www.iffoevents.com/files/iffa/2.IFFO%20Washington%202017_1.pdf

57 Naylor, R.L., Hardy, R.W., Bureau, D.P., Chiu, A., Elliott, M., Farrell, A., Forster, I., Gatlin, D., Goldburg, R., Hua, K., and Nichols, P. (2009) Feeding aquaculture in an era of finite 617 resources. *Proceedings of the National Academy of Sciences of the United States of America*, 106: 15103–15110. Available at: <http://doi.org/10.1073/pnas.0910577106>

In many countries, the rapid expansion of the aquaculture industry is leading to growth in demand for FMFO. One industry expert estimates that there will be an additional 500,000 MT of new fishmeal demand in the coming five years.⁵⁸ In addition, as noted in a 2019 report by the FAO, in Peru, FMFO demand is growing⁵⁹ whereas supply remains limited and highly variable. 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]*’⁶⁰ off the coast of West Africa.⁶¹

Despite higher demand for FMFO for aquafeed, the sector has witnessed a long-term decline in the global supply of fishmeal since the mid-1990s.⁶² Supply will also continue to be influenced by the impacts of climate change as oceans warm and fish migratory patterns change, reducing their availability.⁶³

The declining trend of raw materials to sustain the FMFO sector was strongly evidenced by the Changing Markets Foundation investigation findings and media reports in India, Vietnam and The Gambia, where fishermen involved in the FMFO industry themselves acknowledge that key pelagic fish stocks are collapsing, and some recognise that they are likely to be the last generation involved in fisheries.⁶⁴ Finite wild-fish supplies combined with growing demand for FMFO carry the risk that demand will outstrip supply and – as is already being seen – lead to increased costs for local consumers.

Increased demand for FMFO is not just a function of increased production of farmed seafood; choices about the type of fish companies cultivate also matter, because the farming of more high-value carnivorous species (such as salmon) place upwards pressure on FMFO demand and prices.⁶⁵

1.5. Global fish resource and small pelagic fish status in West Africa

OVERVIEW

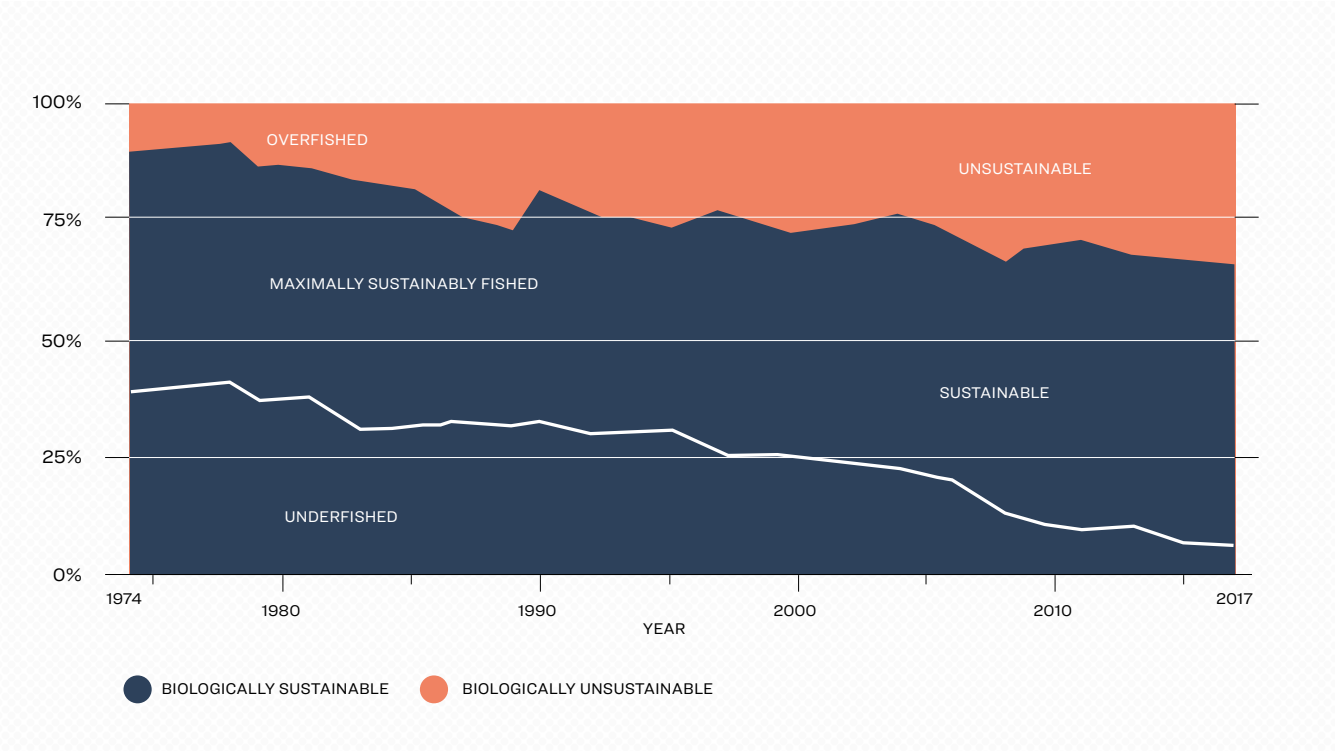
Based on FAO’s assessment in 2017, almost 60% of the world’s fisheries are fished at maximum sustainable levels and over 34% of the world’s fisheries are overfished. The percentage of stocks fished at biologically unsustainable levels increased from 10% in 1974 to over 34% in 2017, meanwhile underfished stocks have decreased continuously and now make up just over 6% of the world’s fisheries.⁶⁶ The Eastern Central Atlantic has seen an overall increasing trend in catches, but with fluctuations since the mid-1970s, reaching a record high of 5 million tonnes in 2017.⁶⁷

SPECIES

The small pelagic fish species that comprise the main catches in the waters of Mauritania, Senegal and The Gambia are sardines (*Sardina pilchardus*), round sardinella (*Sardinella aurita*), flat sardinella (*Sardinella maderensis*), horse mackerel (*Trachurus trachurus*), cunene horse mackerel (*Trachurus trecae*), chub mack-

Figure 3: Global trends in the state of the world’s marine fish stocks, 1974–2017

Source: FAO, *State of the World’s Fisheries and Aquaculture 2020*, p.48



erel (*Scomber colias*), anchovy (*Engraulis encrasicolus*) and bonga (*Ethmalosa fimbriata*). Of these species, it is primarily sardinella (both round and flat) and bonga that feed the fishmeal industry of the three countries.⁶⁸

CATCHES

According to the FAO,⁶⁹ over the past 25 years, the total catches of small pelagic species off northwest Africa (Atlantic coast of Morocco to the southern border of Senegal) have, with relatively minor fluctuations, more than doubled, increasing from 1.2 million tonnes in 1994 to 2.7 million tonnes in 2017.

STOCK STRUCTURE⁷⁰

The structure and migration of round sardinella remain uncertain. The traditional view, and as reflected in the stock assessments of the FAO Working Group, is that a

single stock migrates between the waters of southern Senegal (or even somewhat further south) and Morocco, being subject to fishing throughout its range. Under this scenario, overfishing in one zone would have an adverse impact throughout the region. This is the possibility illustrated by the map in figure 4. Another possibility has migrations of parts of the sardinella stock along portions of this path but with stock components undergoing lesser migrations, or even remaining relatively sedentary, for instance in northern Mauritania. If this were the case, overfishing in one zone would have less impact elsewhere.

58 Harkell, L. (2019) Rabobank’s Nikolik: Long-term market outlook still rosy for fishmeal producers, *Undercurrent News*. March 11. Available at: <https://www.undercurrentnews.com/2019/03/11/rabobanks-nikolik-long-term-market-outlook-still-rosy-for-fishmeal-producers>

59 FAO (2018) *Impact on climate change on fisheries and aquaculture*, p.331.

60 “The Canary Current Large Marine Ecosystem (CCLME) is an eastern boundary upwelling system, in fact one of the 4 major upwelling systems in the world.” See *Oceanographic and Biological features in the Canary Current Large Marine Ecosystem*, IOC-UNESCO Technical Series 115. Available at: <https://en.unesco.org/news/oceanographic-and-biological-features-canary-current-large-marine-ecosystem>

61 FAO (2018) *Impact on climate change on fisheries and aquaculture*, p.171.

62 Rabobank (2018) Alternative feed ingredients in a world of volatile fishmeal supply. Available at: <https://www.feedproteinvision.com/wp-content/uploads/2018/03/Day-2-Beyhan-de-Jong.pdf>

63 <https://www.scientiststudy.com/2021/04/mass-extinction-approaching-marine.html>

64 Changing Markets (2019) Fishing for Catastrophe <https://changingmarkets.org/wp-content/uploads/2019/10/CM-WEB-FINAL-FISHING-FOR-CATASTROPHE-2019.pdf>

65 FAO (2009) *Impact of rising feed ingredient prices on aquafeeds and aquaculture production*. Available at: <http://www.fao.org/3/i1143e/i1143e.pdf>

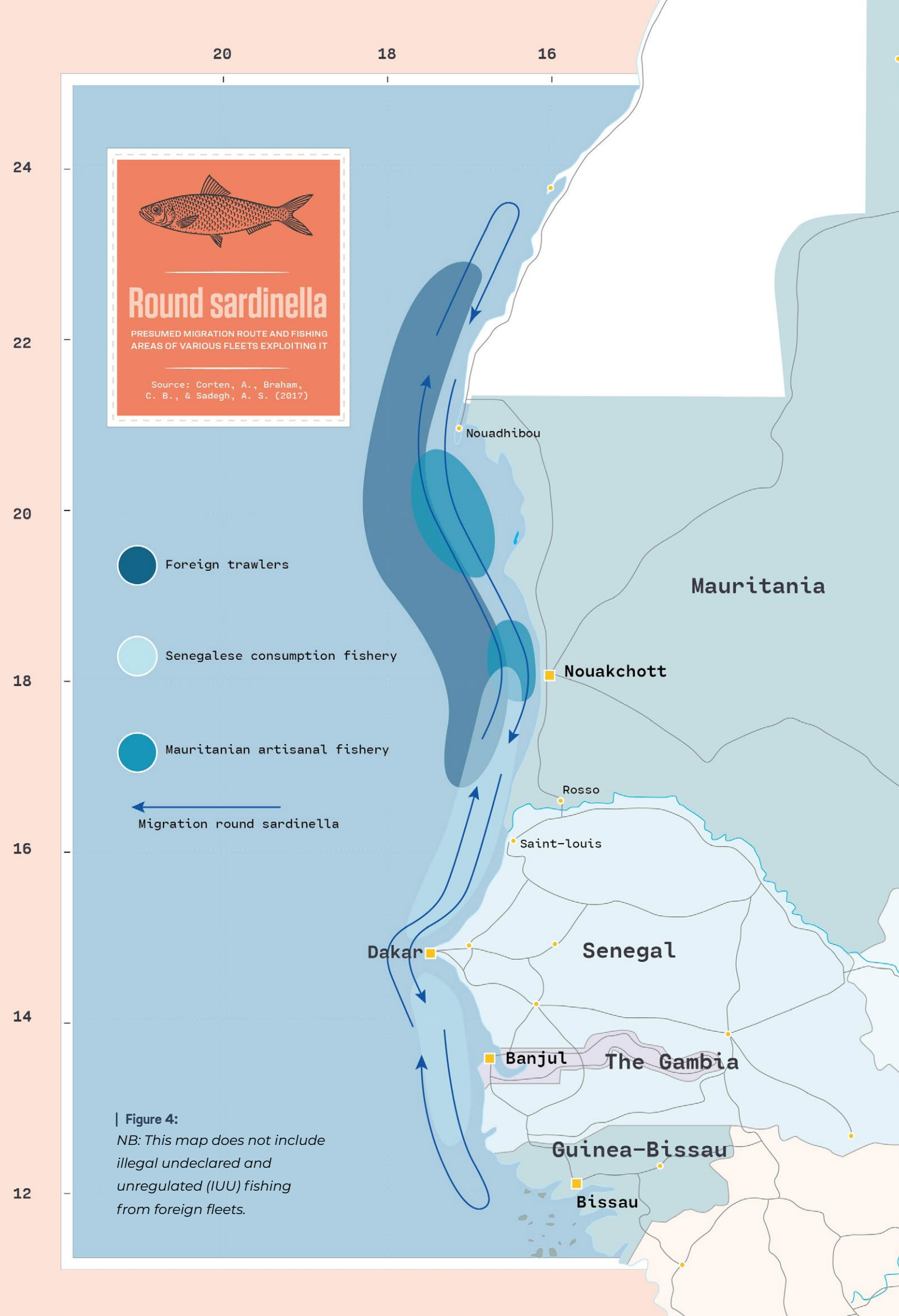
66 FAO, *State of the World’s Fisheries and Aquaculture 2020*, p.47: <http://www.fao.org/3/ca9229en/ca9229en.pdf>

67 FAO, *State of the World’s Fisheries and Aquaculture 2020*, p.51: <http://www.fao.org/3/ca9229en/ca9229en.pdf>

68 Corten, A., Braham, C. B., & Sadegh, A. S. (2017). The development of a fishmeal industry in Mauritania and its impact on the regional stocks of sardinella and other small pelagics in Northwest Africa. *Fisheries Research* 186:328-336. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S016578361630337X?via%3Dihub>

69 FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa 2019. Summary report available at: <http://www.fao.org/3/cb0490en/CB0490EN.pdf>

70 Corten, A., Braham, C. B., & Sadegh, A. S. (2017). The development of a fishmeal industry in Mauritania and its impact on the regional stocks of sardinella and other small pelagics in Northwest Africa. *Fisheries Research* 186:328-336. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S016578361630337X?via%3Dihub>



STOCK STATUS

As in previous years, the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa,⁷¹ considers the stocks of sardinella and bonga to be overexploited. It further estimates in its latest summary report of 2019 that a 50% reduction in fishing effort is required for all sardinella species. The working group also “stresses the urgency of taking strong action in the current situation” and that “urgent action is needed to rebuild the stocks of round sardinella (*S. aurita*) and bonga (*E. fimbriata*).”

The collection of accurate data for scientific assessments has long been a challenge in the region but the latest indicators, including a drop in daily catches from artisanal fleets in Senegal and Mauritania, as well as acoustic surveys in Mauritania show that the sardinella stock is at its lowest level in history,⁷² and that the fish-meal industry now increasingly relies on sardines.⁷³

- 71 FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa 2019. Summary report available at: <http://www.fao.org/3/cb0490en/CB0490EN.pdf>
- 72 CFFA-CAPA: https://static1.squarespace.com/static/5d402069d36563000151fa5b/t/5f9839d6d5e814745ab81d61/1603811798845/Facts_Flyer_CF-FA_08-Final.pdf
- 73 <https://www.cffacape.org/publications-blog/how-the-eu-mauritania-fisheries-agreement-can-be-used-to-improve-fisheries-management?rq=Ad%20Corten>

SECTION 2—THE EMERGENCE OF WEST AFRICA AS A FISHMEAL AND FISH OIL SUPPLIER TO THE GLOBAL MARKET

2.1. Fishmeal and fish oil trade overview

Chronic overfishing of small pelagics is partly a consequence of the overcapacity of the artisanal fleets that contribute to the supply for the fishmeal factories. For instance, a new fisheries agreement was concluded between Mauritania and Senegal in December 2019, allowing 400 Senegalese canoes to catch approximately 50,000 tonnes of sardinella in southern Mauritanian waters. A condition of this agreement, however, is the obligation for Senegalese fishermen to land their catches in Mauritania,⁷⁴ where it is processed in the FMFO factories. However, this is also compounded by poor governance from local governments granting licenses to foreign vessels without any transparency, together with the lack of regional fisheries management to address these issues effectively, as pointed out in a recent report released by Greenpeace:⁷⁵ *Seasick: as COVID-19 locks down West Africa, its waters remain open to plunder.*⁷⁶

In a previous report, “A Waste of Fish: Food security under threat from the fishmeal and fish oil industry in West Africa”, Greenpeace International and Greenpeace Africa documented 50 fishmeal and fish oil factories in the region – the bulk of which operate in Mauritania but also in Senegal and The Gambia – out of which 40 were active in March 2019.⁷⁷

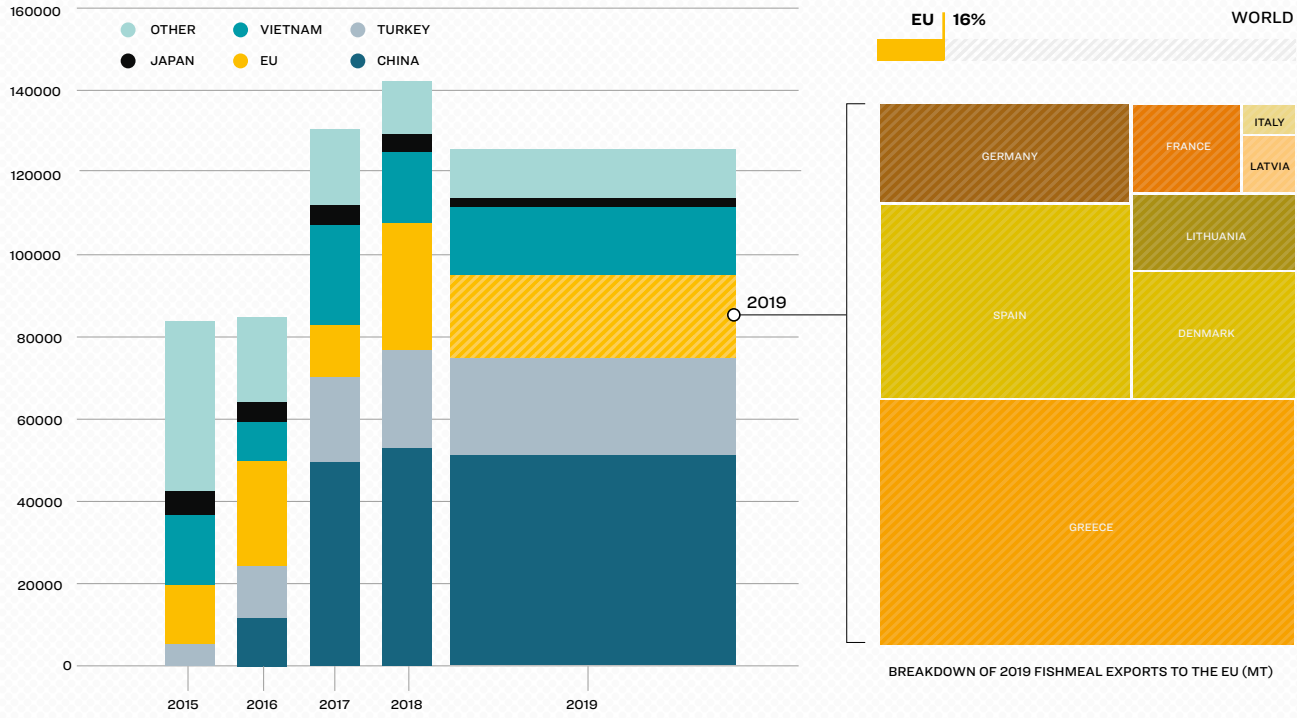
According to International Trade Center (ITC)'s Trade Map, based on UN Comtrade database,⁷⁸ the production of fishmeal has expanded rapidly in the past few years, particularly in Mauritania which is the largest exporter of these three countries, with 110,423 tonnes of fishmeal primarily delivered to China, Turkey, the European Union (EU) and Vietnam in 2019. This is followed by Senegal with 11,251 tonnes of fishmeal exported mainly to Vietnam, Japan and to other African countries in the same year. Vietnam and Tunisia received the majority of the smaller fishmeal production from The Gambia with 3,674 tonnes in 2019.

Regarding fish oil, the EU was the first destination market for Mauritania and Senegal's fish oil exports in 2019, as in previous years, with France totaling over 60% of the EU imports from Mauritania with 15,101t, followed by Denmark with 5,955t. Spain is the main importer of the smaller Senegalese fish oil production with 2,116t out of a total of 4,836t. Whereas FMFO production always implies more fishmeal than fish oil production out of the same fish material input, it is peculiar to note that The Gambia declares 5,934t of fish oil exports in 2019 (and only 3,674 t of fishmeal), out of which 4,909 t were directed to Chile, a neighbouring country of the world's biggest FMFO producer by far, Peru.

It is relevant to highlight that we have found systematic discrepancies between export figures declared by some

Figure 5: Top five export destinations for fishmeal from West Africa (Mauritania, Senegal, The Gambia) in 2019, in metric tonnes (MT)

Source: ITC Trade Map / UN Comtrade



of the selected West African countries, and the import figures declared by importer countries even when using the same database (Trademap). For instance, Mauritania reported in the Trademap database that it exported 3,891 tonnes of fish oil in 2019 (most recent available year) to Norway under tradecodes 150410 and 150420. However, Norway's import data for that same year (2019) showed 24,344 tonnes imported from Mauritania for tradecode 150420 alone,⁷⁹ which is nearly as much as the total of Mauritania's fish oil exports to the EU (24,458t).

This is only one of the most striking examples, but sometimes the higher volume declared is coming from the exporting country, when the receiving country's import figures appear to be under-reported. Other national statistics data then also often indicate another different figure in any given year.

For the sake of consistency, this report primarily relies on figures declared by the export country, unless otherwise indicated for contextual purposes.

The fundamental conclusion stemming from these data discrepancies is that there is a critical need for more transparency and accountability in the supply chain and trade declarations of this industry.

In the first half of 2020, European countries received most of the Mauritanian fish oil, with a total of 20,609 tonnes, according to official data from the Mauritanian Government.⁸⁰

From January to June 2020, the Mauritanian fishmeal exports increased by 20% in comparison to the same period in 2019, when all other products declined mainly due to the impacts of Covid-19.

74 <http://www.fao.org/3/cb0490en/CB0490EN.pdf>

75 In this report, Greenpeace refers to Greenpeace Africa unless indicated otherwise.

76 https://storage.googleapis.com/planet4-africa-stateless/2020/10/7fef91ec-eng_report_1007.pdf?_ga=2.131629833.728482148.1602177055-2049969189.1602177055

77 <https://www.greenpeace.org/international/publication/22489/waste-of-fish-report-west-africa/>

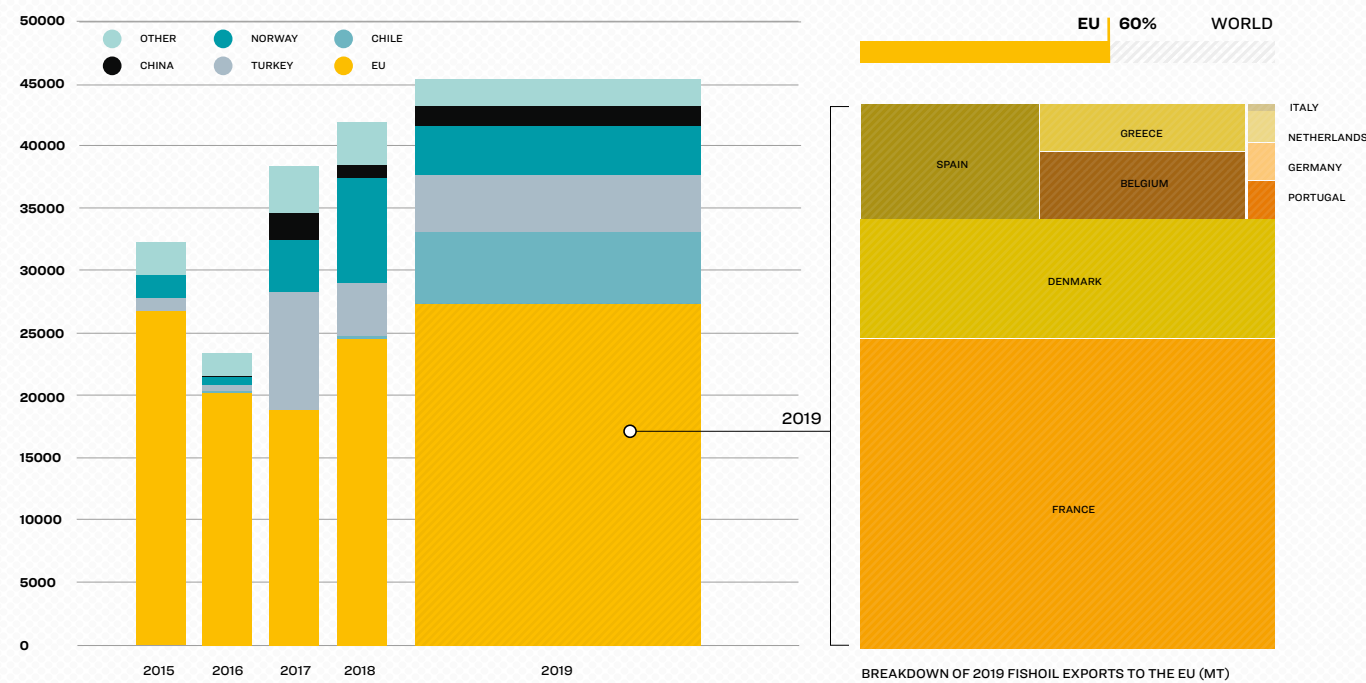
78 Trade Map (www.trademap.org) was used to obtain export data from Mauritania, Senegal and The Gambia under Harmonized System (HS) Codes 230120 (for fishmeal) as well as 150410 and 150420 (for fish oil). Last checked on 26/03/2021.

79 Direct link to Norway's import on trade code 150420 (6 digits) with Trade Map account: https://www.trademap.org/Country_SelProductCountry_TS.aspx?nvpm=1%7c579%7c%7c%7c%7c150420%7c%7c%7c6%7c1%7c1%7c1%7c2%7c1%7c2%7c2%7c1%7c1

80 Bulletin d'Information et d'Analyse de l'Observatoire Économique et Social des Pêches (OESP) de Mauritanie, 1er semestre 2020: https://www.peches.gov.mr/IMG/pdf/4bulletin_fr_oesp_1er_semestre_2020.pdf

Figure 6: Top five export destinations for fish oil from West Africa (Mauritania, Senegal, The Gambia) in 2019, in metric tonnes (MT)

Source: ITC Trade Map / UN Comtrade



For more details on trade data please refer to the relevant tables in Appendix 1.

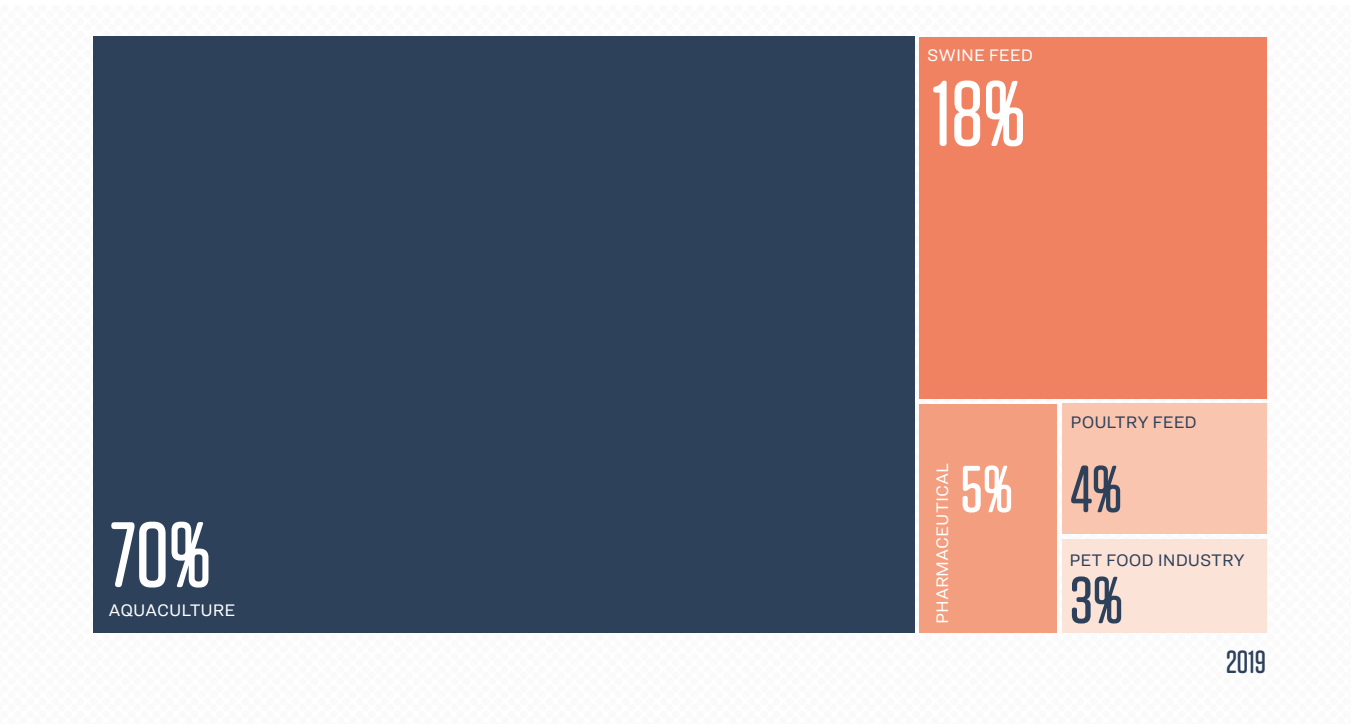
The lack of available catch data for the three main species used for the fishmeal and fish oil production (round and flat sardinella and bonga) makes it particularly difficult to assess the quantity of fish actually going into fishmeal production. However, considering the standard need of 4 to 5 tonnes of fish to produce 1 tonne of fishmeal⁸¹ and the total production of 125,348 tonnes in the latest available data for Mauritania, Senegal and The Gambia in 2019 (with lower volume than the peak year in 2018), we could extrapolate a conservative calculation of at least $4 \times 125,348$ tonnes = 501,392 tonnes of edible fish from depleted stocks that were ground up for animal feed and other secondary uses abroad, from a region suffering from chronic and increasing food

security issues. This is consistent with the fish landings for fishmeal having reached a record of 600,000 tonnes in Mauritania alone in 2018, according to CFFA-CAPE⁸². That is even without taking into account the significant FMFO production from Morocco, and the traditional view that round and flat sardinella caught in Moroccan waters are part of the same regional stock, and that overfishing in one zone would have an adverse impact throughout the region.⁸³

According to QYResearch,⁸⁴ the vast majority of the FMFO revenue from West Africa comes from the aquaculture industry, with animal feed (particularly swine feed) in the second position, followed by pharmaceutical use (including dietary supplements and cosmetics) and pet food.

Figure 7: Figure 7: West Africa fishmeal & fish oil revenue market share by application in 2019

Source: Experts interview, secondary sources and QYResearch, 2020



2.2. The negative impacts of the fishmeal and fish oil industry

In all three West African countries, beyond the documented environmental damage caused by some of these FMFO factories, there is also a severe socio-economic impact to consider as the small pelagic fish are no longer being processed by women for local consumption, whether it be in Mauritania or elsewhere in the sub-region.⁸⁵

Mauritania has the greatest number of FMFO factories of the three West African countries reviewed, and faces significant environmental and social problems stemming from the industry. On top of the ecological damage caused to marine areas adjacent to these factories, a large number of complaints about chronic sickness and asthmatic disorders have been reported.⁸⁶ A few years ago,⁸⁷ the Mauritanian government pledged to phase out FMFO production from whole fish by 2020, however its production has instead increased.⁸⁸

*You are looking for profit, we are looking to live!
Your investments are killing us in silence!*

The appeal from artisanal fishermen and the most disadvantaged Mauritanian citizens to importing countries and investors in Mauritania's fishmeal and fish oil industry:

The spectacular growth of Mauritanian production of fishmeal and fish oil encouraged by investments from Russia, Turkey, Denmark, China, Germany, Ukraine, Latvia, Estonia, Spain constitutes a threat to the stability and food security of the populations in West Africa. More than half a million tonnes of fish are caught each year in Mauritanian waters and powdered to feed the animals. This deprives millions of people in Africa of an essential source of animal protein. With our rudimentary means we cannot compete with your monster ships. Going from less than 40,000 tonnes of fishmeal in 2013 to more than 120,000 tonnes

81 Miles, R. D. and Chapman, F. A. (2006, reviewed February 2018). The Benefits of Fish Meal in Aquaculture Diets. IFAS Extension, University of Florida. Available at: <http://edis.ifas.ufl.edu/pdf/FA/FA12200.pdf>

82 <https://www.cffa-cape.org/publications-blog/how-the-eu-mauritania-fisheries-agreement-can-be-used-to-improve-fisheries-management?rq=Ad%20Corten?rq=Ad%20Corten>

83 <https://www.greenpeace.org/international/publication/22489/waste-of-fish-report-west-africa/>

84 <https://www.qyresearch.com/about/company-introduction>

85 <https://hayemnews.com/chinese-investment-fuels-food-security-fears-in-west-africa/>

86 http://cridem.org/C_Info.php?article=693730

87 https://www.peches.gov.mr/IMG/pdf/circulaire_farine.pdf

88 CFFA (2020) Mauritania pledged to eliminate fishmeal production by 2020. Today, it has tripled. 16 October 2020. www.cffa-cape.org/news-blog/mauritania-pledged-to-eliminate-fishmeal-production-by-2020-today-it-has-tripled

in 2020, this worsening is due to the increase in the number of flour factories which went from 14 factories in 2013 to 44 factories in 2020.

Your investments rob us of our fishery resources, your investments starve us, your investments threaten our stability, your factories make us sick, we can no longer breathe, you have polluted our atmosphere, the wastewater discharged by your factories pollutes our sea, our beaches and our environment. It's time to stop now !!!

Harouna Ismail Lebaye
President of FLPA (Artisanal Fishing Free Federation), Nouadhibou section, Mauritania



Harouna Ismail Lebaye, President of FLPA (Artisanal Free Fishing Federation), Mauritania

Credit: Ibrahima Kebe Diallo / Greenpeace

In Senegal, the fishing sector provides more than 600,000 jobs,⁸⁹ however the number of people directly or indirectly deriving some income from fisheries could be as high as 825,000.⁹⁰ Artisanal fishing represents about 80% of landings in Senegal, with small pelagic fish a main component.

In 2019, Greenpeace International's "A Waste of Fish" report⁹¹ identified eight factories in Senegal, of which four were active, two were under construction and two were temporarily inactive. This over-investment in fishmeal factories for export has led to excess in industrial and artisanal fishing capacity and increased the pressure on already dwindling resources. These factories compete with fishmongers and women processors for access to the caught pelagic fish, leading to decreased availability of fish on the market, higher prices, and declining employment in artisanal processing, which is mainly undertaken by women.⁹² The scarcity of the fish resource and its negative impact on livelihoods are also reflected in the stories of migrant fishermen who have attempted to reach European shores in the hope of a better future⁹³.

While Senegal's government has stated its commitment to develop and implement management plans taking into consideration artisanal fishing and the management of excess capacity, to date, there is no national management plan that is enforced for small pelagic fisheries while the capacity of the artisanal sector has continued to expand in a completely uncontrolled manner.⁹⁴

In parallel, there is increasing concern among local populations about the operations of the foreign-owned fishmeal plants and their environmental impact. For

example, the fishmeal factory in Abene beach has faced significant local resistance. Reportedly, the plant emitted a stinking black smoke that seriously disrupted tourism and local residents have witnessed the dumping of toxic waste into the sea.⁹⁵

This year, fish is scarce, we can't even find the raw material for our work. In addition to this scarcity and the difficulty of finding fish, the fishmeal factories are competing with us for the little fish that remains on the market. I think that this competition is unfair because these factories have more means than us. If the authorities do not react, we risk losing our work. From an environmental point of view, these factories pollute the environment by producing nauseating odors that have harmful consequences on the health of the population. From the point of view of food security, it is inconceivable that these factories process fish to feed other animals when the populations need it the most. I think that these factories do not have their place here because fish is becoming increasingly rare. I really ask the authorities to stop these factories because in addition to making us lose our jobs, they have harmful consequences on the environment and on our health.

Diaba Diop
President of REFEPAS (Senegal Artisanal Fishing Women Network)



Diaba Diop (centre), President of REFEPAS (Senegal Artisanal Fishing Women Network)

Credit: Pape Diatta Sarr /Greenpeace

I have a bruised heart, my right to a healthy environment scorned, trampled, my health and my economy threatened. Since 2016, the fishmeal and fish oil factory SEA PRODUCTION has been installed in the peaceful village of Keur Barka in the commune of NDIEBENE GANDIOL. This factory, installed near homes (which is a flagrant violation of the Senegalese environmental code, because it is a class B installation) affects our health because of its olfactory nuisance. All the people suffering from respiratory diseases live with difficulty in the village, the health of pregnant women is also affected.

This factory harms our living environment, has a negative impact on the working time of the children of the elementary school, contributes to the plunder of our fishery resources and even penalizes the activity of the women fish processors.

I have participated in several activities to fight for the closure of the factory, marches, social mobilization, correspondence to the authorities in charge of fisheries... even bailiffs have had to note the nuisances of this factory. Unfortunately, our local and administrative authorities, in complicity with the fishmeal and fish oil factories prefer to feed other animals than to take care of the wellbeing of their populations.

This factory installed in nebulous conditions, in violation of the environmental code of Senegal must be relocated or even closed permanently for the preservation of the material, moral and sanitary interests of the populations.

Amadou KAMARA
Impacted citizen in Senegal

89 Ocean Action Hub (2017). Présentation du Sénégal: Présentation du secteur de la pêche. Available at: www.oceanactionhub.org/presentation-du-senegal-presentation-de-la-secteur-de-la-peche

90 Harper, S. and Sumaila, U. R. (2019). Distributional impacts of fisheries subsidies and their reform. Case studies of Senegal and Vietnam. International Institute for Environment and Development. Available at <https://pubs.iied.org/16655IIED/>

91 <https://www.greenpeace.org/international/publication/22489/waste-of-fish-report-west-africa/>

92 Expanding Fishmeal Factories (Greenpeace Report): <https://www.greenpeace.org/static/planet4-africa-stateless/2021/02/c14f1ac5-expanding-fish-meal-factories.pdf>

93 Mixed Migration Center: A Gateway Re-opens: the growing popularity of the Atlantic route, as told by those who risk it. <https://reliefweb.int/report/canary-islands-spain/gateway-re-opens-growing-popularity-atlantic-route>

94 USAID (2017). Senegal Fisheries Applied Political Economy Analysis. Available at www.usaid.gov/sites/default/files/documents/1860/Senegal_Fisheries_PEA_Report_-_Public_20190207.pdf

Distributional impacts of fisheries subsidies and their reform: case studies of Senegal and Vietnam. Available at <https://pubs.iied.org/pdfs/16655IIED.pdf>

95 <https://ejatlas.org/conflict/fish-processing-plant-senegal>

Small pelagic fish are very abundant in high productivity regions such as upwelling areas: Peruvian coast for anchovies, California coast for sardines or Menhaden, West Atlantic coast for sardinella; forage fish for piscivorous marine species, staple food for the poorest coastal communities. After the drastic drop in yields of anchovy and sardine, the long-distance fleets, mainly from Asia, have fallen back on the sardinella of the West African coast, towards countries with weak legislation and authorities that are unaware of the strategic importance and the stakes of this resource. Many actions have been initiated in recent decades by professionals, scientists and civil society to slow down and even cancel the race of pelagic trawlers, especially Chinese through “mixed companies”, to empty our waters of their sardinella to supply foreign fishmeal factories and pirate factory ships in West Africa. In Mauritania, Senegal and the Gambia particularly, the proliferation of factories manufacturing fishmeal and fish oil is practically uncontrolled: no reliable data is collected on the activities of the factories, the rules of these countries requiring the use of waste as inputs are not respected, as is the defense of the interests of local populations. These practices to supply fishmeal to fish farming and animal breeding in Europe and Asia kill the fishmongering and traditional fish processing activities of African women, bring no added value to the economy of the countries and deprive their populations of a diet providing 50 to 70% of the proteins consumed: they also destroy an important social safety net and the factories cause severe damage to the health and well-being of coastal communities. The danger is there: in the cold season currently in Senegal, it is very difficult, if not impossible, to find sardinella at the usual landing points. The consequences on the food and nutritional security of populations are catastrophic as well as on the balance of the food chain at sea.

Dr. Alassane Samba

Former Director of Research and Director of the Dakar-Thiaroye Oceanographic Research Center in Senegal (retired)



Dr. Alassane Samba, Former Director of Research and Director of the Dakar-Thiaroye Oceanographic Research Center in Senegal (retired)

In The Gambia, the fisheries sector is a critical entry point for poverty alleviation. It provides a source of revenue and foreign exchange earnings for the country; but also contributes importantly to food and livelihood security, in particular for the disadvantaged. The sector is the third largest food provider after agriculture and livestock and plays a significant role from a nutritional standpoint, being the main supplier of animal protein in the diets of most Gambians. Fisheries and related activities (processing and marketing) represent the main source of income for coastal fishing communities, as well as an important complementary safety net for rural communities inland. In The Gambia, the artisanal sub-sector employs between 25,000 and 30,000 people, while about 2,000 people work in the industrial sub-sector. The livelihoods of an estimated 200,000 people are indirectly dependent on fisheries and related activities.⁹⁶ For women in particular, fish processing and marketing provide an important source of income and livelihood support: an estimated 80 percent of fish processors and 50 percent of small scale fish traders are women.⁹⁷

In The Gambia too, there have been demonstrations against the social and environmental impacts of this industry.⁹⁸ All 3 factories of the country, located in Sanyang, Gunjur and Kartong, have been facing continuous opposition from the local population over waste discharge issues and the broader impact on fish resources and livelihoods.⁹⁹ Furthermore, there is a growing activist movement fighting the operations of these fishmeal factories.¹⁰⁰

During the first Covid-19 outbreak, and as a result of the outcry by local communities, the President of the The Gambia ordered the closure of the three FMFO factories from 23 March 2020,¹⁰¹ although they quickly reopened in April 2020. This happened despite protests from local activists¹⁰² and while artisanal fishermen and women fish processors remained under lockdown restrictions.

In March 2021, the Golden Lead factory in Gunjur attempted to expand by grabbing land from women growing vegetables. This expansion would have affected 31 women depending on farming as their unique source of livelihood.¹⁰³ However, a notice from The Gambia National Environment Agency dated 10th March 2021, has required the factory to “cease all ongoing extension work; and evacuate all equipment and personnel on site immediately.”¹⁰⁴

The same month, the Nessim fishmeal factory in Sanyang reportedly got burnt down by a mob of protesters¹⁰⁵ following a crime that was not directly related to the factory’s business,¹⁰⁶ although the frustration of the population led to this violent retaliation.¹⁰⁷

Fishmeal investment has caused so much damage on the people of The Gambia. Our environment, economy and social lives have all been affected by fishmeal investment. Our tourism industry is going down every day as tourists can not stay where it’s stinking while our women fish sellers are getting jobless everyday. Families continue to be divided and communities disunite. There is no benefit fishmeal brought to The Gambia.

Mustapha Manneh

Activist in The Gambia



Mustapha Manneh, Activist in the Gambia

98 <https://thefishsite.com/articles/african-fishmeal-factories-under-fire>

99 <https://chinadialogueocean.net/11980-fishmeal-factories-threaten-food-security-in-the-gambia>

100 <https://www.bbc.com/future/article/20210323-the-factories-turning-west-africas-fish-into-powder>

101 <https://foroyaa.net/fishmeal-factories-temporary-closed-down>

102 <https://foroyaa.net/sanyang-youth-protest-against-resumption-of-nessim-fishmeal-factory>

103 <https://eyeafrica.tv/greenpeace-africa-calls-on-gambia-government-to-stop-land-grabbing-fishmeal-factory-expansion>

104 Stop notice NEA/TSN 32/51/05 Part I (46)

105 <https://allafrica.com/stories/202103180828.html>

106 <https://thefishsite.com/articles/gambians-torch-chinese-fishmeal-plant>

107 <https://news.mongabay.com/2021/04/a-fatal-stabbing-sends-a-gambian-fishing-village-into-turmoil-over-fishmeal/>

96 The World Bank (2018). Republic of Gambia. West Africa Regional Fisheries Program – Phase II Environmental and Social Management Framework (ESMF). Available at: <http://documents.worldbank.org/curated/en/919521545373344581/pdf/ESMF-WARFP-GAMBIA-Final-for-Disclosure-docx.pdf>

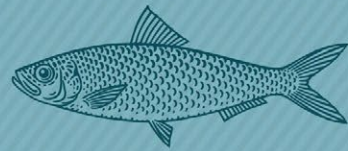
97 UN Conference Report 2014 “The fisheries sector in The Gambia: trade, value addition and social inclusiveness, with a focus on women”. Available at: https://unctad.org/system/files/official-document/ditc2013d4_en.pdf

FEEDING AQUACULTURE

EVERY YEAR, SMALL PELAGIC FISH, ARE TAKEN OUT OF THE OCEAN OFF THE COAST OF WEST AFRICA

500,000+ TONNES

Round Sardinella
(*Sardinella Aurita*)



Flat Sardinella
(*Sardinella Maderensis*)



Bonga
(*Ethmalosa Fimbriata*)



AND GROUND DOWN INTO FISHMEAL AND FISH OIL BY THE REDUCTION INDUSTRIES

INDUSTRIAL EXPLOITATION DEPRIVES PEOPLE IN WEST AFRICA

A TAKES AWAY JOBS FROM LOCAL FISHING COMMUNITIES



B IMPORTANT SOURCE OF FOOD AND NUTRITION

1

RAW MATERIALS: SARDINELLA AND BONGA



THE GAMBIA



MORE THAN
50%



SENEGAL



70%

PEOPLE DEPEND ON FISH FOR A % OF THEIR ANIMAL PROTEIN INTAKE

2

FISHMEAL AND FISH OIL FACTORIES



4=1

FISH CATCHES ARE TURNED INTO FISHMEAL AT A RATE OF 4/5 KG OF FISH FOR 1 KG OF FISHMEAL AND EXPORTED ABROAD



50 FACTORIES
IN MAURITANIA, SENEGAL AND THE GAMBIA

6

RETAILERS AND RESTAURANTS



WELL-KNOWN RETAILERS ACROSS EUROPE ARE SOURCING FARMED



FISH (SUCH AS SALMON) FROM COMPANIES INVOLVED IN THE TRADE OF WEST AFRICAN FMFO

5

PROCESSORS AND DISTRIBUTORS



SALMON FARMED IN NORWAY IS MAINLY SMOKED AND PROCESSED IN POLAND BEFORE BEING SOLD TO MAJOR RETAILERS ACROSS THE EU

4

FISH AND SEAFOOD FARMS



DENMARK IS THE LARGEST PRODUCER OF EU FMFO



THE WORLD'S LARGEST SALMON FARMING COMPANIES ARE BASED IN NORWAY

FISH OIL EXPORTED TO EUROPE

60%



3

FEED INDUSTRY

WEST AFRICAN FMFO IS SOLD TO EU-BASED FMFO COMPANIES AND TRADERS, AND AQUAFED SUPPLIERS

LEGEND



RESTAURANT



SALMON PROCESSING



FISHMEAL



FISH OIL



RETAILER

Although we cannot establish a direct chain of custody between the retailers and West African FMFO, the retailers' connection with companies involved in the West African supply chain is problematic, and irrespective of whether there is a direct chain of custody, they should not source from those who source from West Africa.



NORWAY

DENMARK

80%
DENMARK'S FISH OIL EXPORTS GO TO NORWAY, PRIMARILY FOR THE AQUACULTURE SECTOR

NETHERLANDS

POLAND

FRANCE

UNITED KINGDOM

Spain

GREECE

Mediterranean Sea

Black Sea

Red Sea

The Covid-19 pandemic has made an already complex and unsustainable situation in West Africa more difficult for the impacted communities. As in many other countries around the world, Mauritania, Senegal, and The Gambia restricted non-essential business activities, in order to protect their population from the health risks associated with the virus.

The above restrictions have been particularly painful for the artisanal fishermen and women-dominated fish processing communities, who have seen significant cut backs in their allowed working hours, impacting their economic livelihoods.

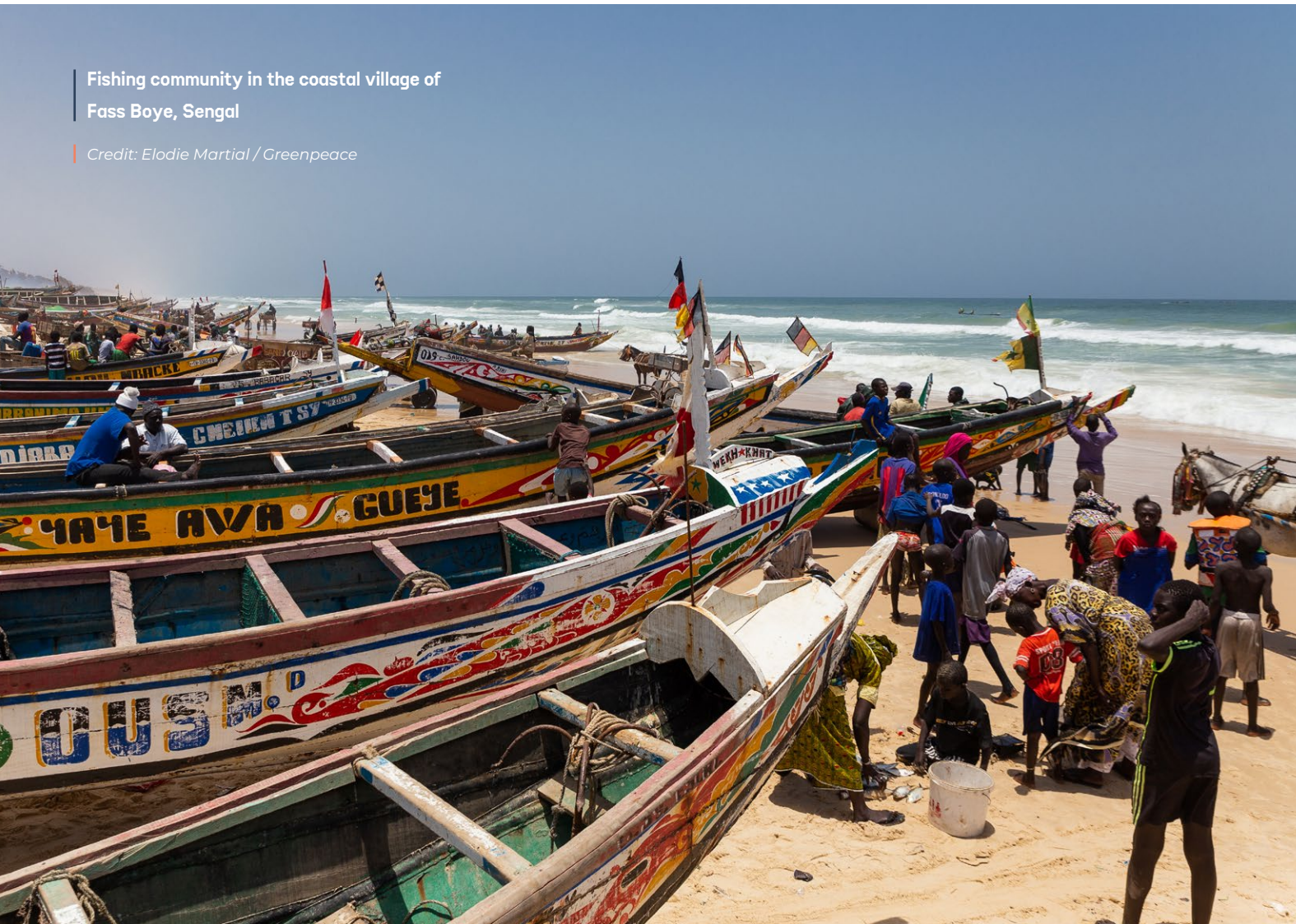
While the small and artisanal players have faced limitations on their operations due to the Covid-19 restrictions in selected West African countries,¹⁰⁸ many of the fishmeal and fish oil industrial players have managed to continue operating. This unfair and uncompetitive situation has been reported in Greenpeace's report "*Seasick: as COVID-19 locks down West Africa, its waters remain open to plunder*".¹⁰⁹ This report is based on observations of fishing vessels and FMFO factories in Senegal, The Gambia and Mauritania from March 2020 until end July 2020, a period in which COVID-19 pandemic lockdowns were introduced across West African countries.

108 https://www.lemonde.fr/afrique/article/2020/04/16/coronavirus-au-senegal-le-secteur-de-la-peche-entre-dans-la-tourmente_6036833_3212.html

109 <https://www.greenpeace.org/africa/en/press/12358/multinational-fishing-industries-plunder-west-africas-ocean-as-artisanal-sect-is-locked-out-by-covid-19/>

Fishing community in the coastal village of Fass Boye, Senegal

Credit: Elodie Martial / Greenpeace



SECTION 3—A PICTURE OF THE FISHMEAL AND FISH OIL SUPPLY CHAIN FROM WEST AFRICA TO EUROPE

3.1. Overview

There is substantial variability in the production of fishmeal from region to region and from year to year. This has many causes, for example, the harvest of Peruvian anchoveta (*Engraulis ringens*), one of the fish most often used in fishmeal and fish oil, is heavily affected by the climate phenomenon known as El Niño. Environmental fluctuations, overfishing, and quotas can also have an impact on stock levels and production of fishmeal and fish oil. This is why today, fishmeal is traded across oceans and between countries, and why West African fishmeal production has so rapidly become a major industry.

Within this global picture, and according to International Trade Center (ITC)'s Trade Map, based on UN Comtrade database,¹¹⁰ West Africa's production of fishmeal and fish oil, including Mauritania, Senegal and The Gambia, has grown more than ten-fold in the past decade, from around 13,000 tonnes in 2010 to over 170,000 tonnes in 2019. The EU is a major market for West African FMFO, particularly for its fish oil. The majority of this production, and the source of most EU imports, is Mauritania. The country produces over 110,000 tonnes of fishmeal, 18% of which is exported to the EU, and close to 35,000 tonnes of fish oil, more than 70% destined for the EU. Senegal also produces around 5,000 tonnes of fish oil, more than half of which is exported to the EU (59%).

The main trade flows of West African FMFO into the EU in 2019 were fish oil from Mauritania to France (15,101 tonnes), from Mauritania to Denmark (5,955 tonnes) and from Senegal to Spain (2,116 tonnes). For fishmeal, significant volumes were exported in 2019 from Mauritania to Greece (9,249 tonnes), Spain (4,415 tonnes), Germany (2,322 tonnes according to Trade Map, however Germany's own import data indicated 7,662 tonnes of fishmeal imports from Mauritania in 2019¹¹¹) and Denmark (1,902 tonnes).¹¹²

It is extremely challenging to build a picture of the trade of FMFO from West Africa to Europe. Firstly, while sardine, sardinella and bonga are directly consumed by coastal communities in West Africa, once they are rendered into fish oil or meal they become just another globally traded commodity that might be substituted with Peruvian anchoveta, added to Brazilian soymeal, fed to salmon in Norway, pigs in Denmark or taken as capsules by affluent consumers to supplement their diet. Secondly, many companies involved in the FMFO sector are processors or traders, who combine and sell on products from different sources to end users often in different countries again - making it challenging to differentiate imports for local use from processing and re-export. Thirdly, trade data is fragmented and many discrepancies exist between trading partners' import and export declarations. Within the EU countries there is free movement of goods within the common market,

110 Trade Map www.trademap.org was used to obtain export data from Mauritania, Senegal and The Gambia under Harmonized System (HS) Codes 230120 (for fishmeal) as well as 150410 and 150420 (for fish oil). Last checked on 26/03/2021.

111 German National Statistical Office (DESTATIS): www.destatis.de

112 International Trade Centre (ITC) Trade Map database, accessed February 2021. www.trademap.org

and trade is not publicly recorded at a company level. Shipments imported to Europe by sea may then be transported onward by another ship or by road or rail.

The FMFO sector lacks transparency, traceability and oversight, right the way through from the factories producing FMFO to the aquaculture and agriculture operations utilising it as feed to produce meat and fish for human consumption. This was illustrated, for example, in the recent investigation by Changing Markets, published in the report *Fishing for Catastrophe*.¹¹³ Their investigation found that three FMFO factories were operating in The Gambia despite the government and FAO holding no records, and were exporting without the required food safety certificates for export.

3.2. European companies driving the demand

The demand for fishmeal and fish oil is high; as a digestible protein it is used in feed for farmed fish and animals all over the world. Most global FMFO from wild-caught fish is used in the production of carnivorous farmed fish such as salmon and trout, while roughly one-third of fishmeal goes to the agricultural sector with a high proportion (23%) going to feed pigs.¹¹⁴ As the demand for cheap salmon and meat increases, so does the demand for fishmeal and fish oil.

According to the European Parliamentary Research Service, for pig production, in 2018, of the 148 million pigs in the EU almost three quarters were reared in six Member States: Spain (20.8 %), Germany (17.8 %), France (9.3 %),

Denmark (8.5 %), the Netherlands (8.1 %) and Poland (7.4 %). The EU is currently the world's top exporter of pig meat products and increased demand for EU pork pushed prices to a peak in early 2020.¹¹⁵

Some farmers manage the entire production process on their farms, while other farmers specialise in sows and sell piglets to the European market. The latter is a growing business in Denmark; in 2013 the country exported 9.7 million piglets and by 2018 this had risen to 14.4 million piglets.¹¹⁶ This is significant in the demand it places on FMFO production because many farmers use fishmeal for piglets while they are being weaned from the sows. In fact, according to Greenpeace investigations, the industry norm is that fishmeal is only used in feeding piglets until they weigh 35-40 kg.

In terms of aquafeed, Norway has been identified as Europe's largest producer, contributing 45% of the region's total aquafeed production (1.83 million MT), followed by Turkey.¹¹⁷ Both of these countries experienced strong growth in 2018, while Spanish production grew by a substantial 31% in the same period.¹¹⁸

Europe is home to several of the world's largest aquafeed companies: Cargill Aqua Nutrition/EWOS, Skretting, Mowi and BioMar. These companies have been highlighted in this report on the basis of their presence in Europe; however, like all major aquafeed producers, their supply chains are global.

Skretting¹¹⁹ and Cargill¹²⁰ were established in the 19th century and have roots in the animal feed industry. It was

only in the second half of the 20th century, when aquaculture production started to take off,¹²¹ that these companies ventured into aquafeed and others entered the sector: BioMar in the 1960s¹²² and Marine Harvest (now Mowi) in 2012.¹²³

The industry generates high returns: In 2017, these four leading European aquafeed producers reportedly had combined sales of \$3.3 billion, including Norway-based companies Cargill Aqua Nutrition/EWOS (\$2.19 billion, estimated),¹²⁴ Skretting (\$742 million) and Mowi (\$371 million), and Denmark's BioMar (\$2.6 million).¹²⁵

According to Changing Market's *Fishing for Catastrophe* report, these four aquafeed producers have all been connected to West African FMFO suppliers in recent years.¹²⁶

Global aquaculture supply chains are interwoven and highly complex. While the aquafeed sector itself is 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, trader, aqua-feed producer, aquaculture farms, seafood processor, distributor, retailer and many middlemen in between.¹²⁷

3.3. Supply chain links, trade and shipping routes between West Africa and European markets

Based on in-depth supply chain research in European countries, we attempted to untangle this knotty supply network. While incomplete, the information we gathered makes it possible to draw links between consumption of farmed fish and seafood as well as animal feed in Europe and extractive and unsustainable reduction fisheries in West Africa. In terms of methodology, this research

was based on a combination of trade data (ITC's Trade Map, based on UN Comtrade database), EU and national statistical data, shipping data, AIS ship tracking data, industrystakeholders interviews and enquiries, desktop and field investigations. The highlighted companies were given the opportunity to comment.

Fish oil

Fish oil is shipped from West Africa to Europe, mainly carried by chemical tankers with specific stainless steel tanks for fish oil. An estimated 80% of such exports are carried in this way. This shipping is dominated by Norwegian company **Tank AS**, which owns *Key Shipping AS* and *Key Tankers AS*, both located in Vestland, Norway. Some fish oil is transported by container ship, often in shipments also containing fishmeal. A number of container vessels ply routes between West African ports, Las Palmas and Europe, delivering FMFO to ports where EU-based companies often have processing facilities and headquarters nearby. Shipping data from Mauritania reveals that these shipments go to a range of European companies, which manufacture products from fish and livestock feed and pet food through to pharmaceuticals for human consumption.

Fishmeal

The majority of fishmeal exported from West Africa to Europe is carried by container ship, with containers often transshipped between vessels in between their source and their destination countries. The southern Spanish port of Algeciras is the initial port of arrival of the majority of fishmeal coming from West Africa (for example, 74% of containerised shipments from Mauritania), however much of this is transshipped onwards to other parts of the world, most significantly to China but also countries including Turkey, Nigeria, the USA as well as vari-

113 Changing Markets (2019) Fishing for Catastrophe: How global aquaculture supply chains are leading to the destruction of wild fish stocks and depriving people of food in India, Vietnam and The Gambia. Changing Markets Foundation, October 2019. <https://changingmarkets.org/wp-content/uploads/2019/10/CM-WEB-FINAL-FISHING-FOR-CATASTROPHE-2019.pdf>

114 Bachis, E. (2017) Fishmeal and fish oil: A summary of global trends. Washington: 57th IFFO Annual Conference. Available at: http://www.iffoevents.com/files/iffa/2.IFFO%20Washington%202017_1.pdf

115 European Parliamentary Research Service. (2020) The EU pig meat sector. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/652044/EPRS_BRI\(2020\)652044_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/652044/EPRS_BRI(2020)652044_EN.pdf)

116 Danish Agriculture and Food Council

117 Alltech (2019) Alltech 2019 global feed survey. Available at: <https://www.alltech.com/feed-survey>

118 Aquafeed.com (2019) 2019 Alltech global feed survey. Press release, 30 January. Available at: <http://www.aquafeed.com/news/headline-news-article/8468/2019-Alltech-Global-Feed-Survey/>

119 Skretting (2017) We are proud of our long history in the aquafeed industry. Available at: <https://www.skretting.com/en/about-us/history/>

120 Cargill (2019) Cargill animal nutrition: Livestock feed & fish feed. Available at: <https://www.cargill.com/animal-nutrition>

121 European Commission (2016) A short history. Available at: https://ec.europa.eu/fisheries/cfp/aquaculture/aquaculture_methods/history_en ; FAO (2018) The state of world fisheries and aquaculture, p.26.

122 BioMar (2014) BioMar history. Available at: <https://www.biomar.com/en/denmark/about/biomar-history/>

123 Mowi (2019) About – Mowi. Available at: <https://mowi.com/about>

124 Based on Cargill estimates of 2% of 2017 group sales, revenue of \$109.7 billion, following IntraFish (2018)

125 IntraFish (2018) The future of aquaculture feed: The supply trends and alternatives driving tomorrow's industry, p.17.

126 Changing Markets (2019) Fishing for Catastrophe: How global aquaculture supply chains are leading to the destruction of wild fish stocks and depriving people of food in India, Vietnam and The Gambia. Changing Markets Foundation, October 2019. <https://changingmarkets.org/wp-content/uploads/2019/10/CM-WEB-FINAL-FISHING-FOR-CATASTROPHE-2019.pdf>

127 Changing Markets Foundation and Compassion in World Farming (2019) Until the seas run dry: how industrial aquaculture is plundering the oceans. Available at: <http://changingmarkets.org/wp-content/uploads/2019/04/REPORT-WEB-UNTILL-THE-SEAS-DRY.pdf>



Figure 8: Example of fish oil tanker route

Tank AS Key Sund voyage during August and September 2020 via ShipView, showing port calls including Nouadhibou, Mauritania; Tan Tan, Morocco; Fécamp, France; Ghent, Belgium; Esbjerg, Denmark and Kristiansund, Norway.

Source: ShipView

North Atlantic Ocean



ous European countries. A smaller volume of fishmeal is shipped to Europe by cargo vessel directly in their holds, for instance facilities in Germany are equipped to receive fishmeal in this way. Again, this fishmeal is regularly shipped onwards, so the initial port of arrival is not necessarily indicative of the final destination or use of the fishmeal.



FRANCE

Trade Map data for France indicates it imported a total of 37,503 tonnes of fish oil in 2019, rising to 42,181 tonnes in 2020. According to the production countries' export data, Morocco was the biggest supplier until 2018 when Mauritania supplied the highest volume with 14,790 tonnes of fish oil exported to France, and 15,101 tonnes in 2019.

The majority of the fish oil imported from Mauritania and Morocco was brought in by tankers, mainly to the port of Fécamp in Normandy. SeaSearcher records show Tank AS vessels *Key Bay*, *Key Sund* and *Key Breeze* stopping at various times at the port during 2019. In most cases these vessels stop in Morocco (Tan Tan and Agadir) between their departure from Mauritania and arrival to Fécamp, so it is unclear which country the deliveries of fish oil originate from, nor whether they are kept separate or combined. In January 2021, SeaSearcher shows *Key North* came directly to Fécamp from Nouadhibou in Mauritania, however the ship's draught indicates that during its stop in Fécamp it was loading rather than discharging cargo, suggesting that it then carried fish oil from Fécamp as well as Mauritania onward to various ports in Norway.



Olvea is a supplier of vegetable and fish oils for animal feed and human consumption. Its headquarters and refinery are located in Fécamp, France, and the company also has a refinery in Agadir, Morocco (since

2003) and a storage plant in Nouadhibou, Mauritania (since 2012). Olvea's facility in Nouadhibou, *Winterisation Mauritania*, is the largest buyer of fish oil locally, buying, storing and exporting oil from the majority of surrounding processors. Olvea is also the only fish oil producer with a storage facility within the port of Fécamp, therefore the likely importer of fish oil shipped to that port. In addition to the shipments arriving at Fécamp by tanker, Olvea is also listed as receiving 72 tonnes of fish oil by container shipment from Mauritania in 2019, shipped by *Mauritania Business SARL* to the nearby port of Le Havre. Olvea launched a partnership with *IQI Petfood* in 2019¹²⁸ and a 2021 industry certificate lists Olvea's facilities in Fécamp as a sub-contracted site of Netherlands-based IQI.¹²⁹



Winterisation Mauritania's fish oil storage tanks

Credit: Greenpeace



DENMARK

In addition to imports, the EU is also a producer of FMFO itself, in the region of 450,000 to 500,000 tonnes of fishmeal and 150,000 to 200,000 tonnes of fish oil per year, representing around 10-15% of global production.¹³⁰ Denmark (followed by Spain) is by far the largest producer, accounting for almost half of EU FMFO production.¹³¹

128 Olvea (2019) OLVEA joins forces with IQI to become stronger together: www.olvea.com/2019/04/14/54837/


129 Global Trust Certification (2021) of IQI b.v. <https://www.marin-trust.com/sites/marintrust/files/2021-02/MTCOC104%20IQI%20b.v.%20Certificate%202021-2023%20Final%2019%20Feb%2021.pdf>

130 European Market Observatory for Fisheries and Aquaculture products – EUMOFA (2019) Monthly Highlights. Available at: http://www.eumofa.eu/documents/20178/148316/MH+4+2019+EN_final.pdf/#page=23

131 EUMOFA (2019) Monthly highlights. No. 4 / 2019. Available at: https://www.eumofa.eu/documents/20178/148316/MH+4+2019+EN_final.pdf/

Trade Map data for 2019 indicates Denmark imported close to 115,000 tonnes and exported 145,000 tonnes of fish oil, and imported 83,291 tonnes of fishmeal, exporting 186,764 tonnes. Close to 80% of Denmark's fish oil exports go to Norway, along with almost 30% of its fishmeal. Greece and the UK also import significant volumes of fishmeal from Denmark.

Denmark is also importing from Mauritania and Senegal, with Trade Map's export data for Mauritania recording 5,955 tonnes of fish oil to Denmark in 2019 and 1,902 tonnes of fishmeal the same year.

TripleNine Group  **TripleNine Esbjerg** (formerly TripleNine Polar Omega) is a Danish company based in Esbjerg. It specialises in purifying fish oil and fishmeal from the Atlantic, North Sea and Baltic Sea for use as fish feed, mainly exporting to Norway, but have also produced other animal feeds and fish oil for dietary supplements in the past. In 2013 TripleNine had a processing facility in Mauritania, *TripleNine Mauritanie Sarl*,¹³² however there is no recent reference to this facility nor does it appear on the current EU SANCO list of processing plants approved for export to the EU, and the company is now liquidated. It also has four sub-contracted storage facilities in other parts of Denmark, and one in Norway.¹³³

In 2016, according to import data from the EU, TripleNine imported fishmeal from both Senegal and Mauritania, however EU trade records indicate it has not done so since 2016¹³⁴ and in 2019 it seems from private investigation that it did not import any fishmeal from outside the EU. The company's 2016 imports were 2 shipments of 773 tonnes of fishmeal from Senegal and 7 shipments of fishmeal amounting to 7,663 tonnes

from Mauritania, although 3 shipments were denied entry by port authorities as they did not originate from EU-approved facilities.¹³⁵

Although it appears that TripleNine has not sourced from West Africa for some years, it is unclear whether this reflects a permanent company policy or simply shifting buying patterns. In recent communication with the company, it was stated they have chosen to focus on their own FMFO production rather than sourcing from other parts of the world, and that they were not importing FMFO from West Africa either directly or via third countries. Tank AS vessels regularly stop in Esbjerg, where TripleNine and *ED&F Man*¹³⁶ both have facilities, on shipping routes that include Mauritania. Most recently *Key Sund* stopped in the port on 11 January 2021 after departing Nouadhibou on 31 December 2020 and stopping in Ghent, Belgium en route. The ship's draught indicates that it was unloading in Esbjerg, although TripleNine denies to have been the recipient of any fish oil from West Africa from this shipment.

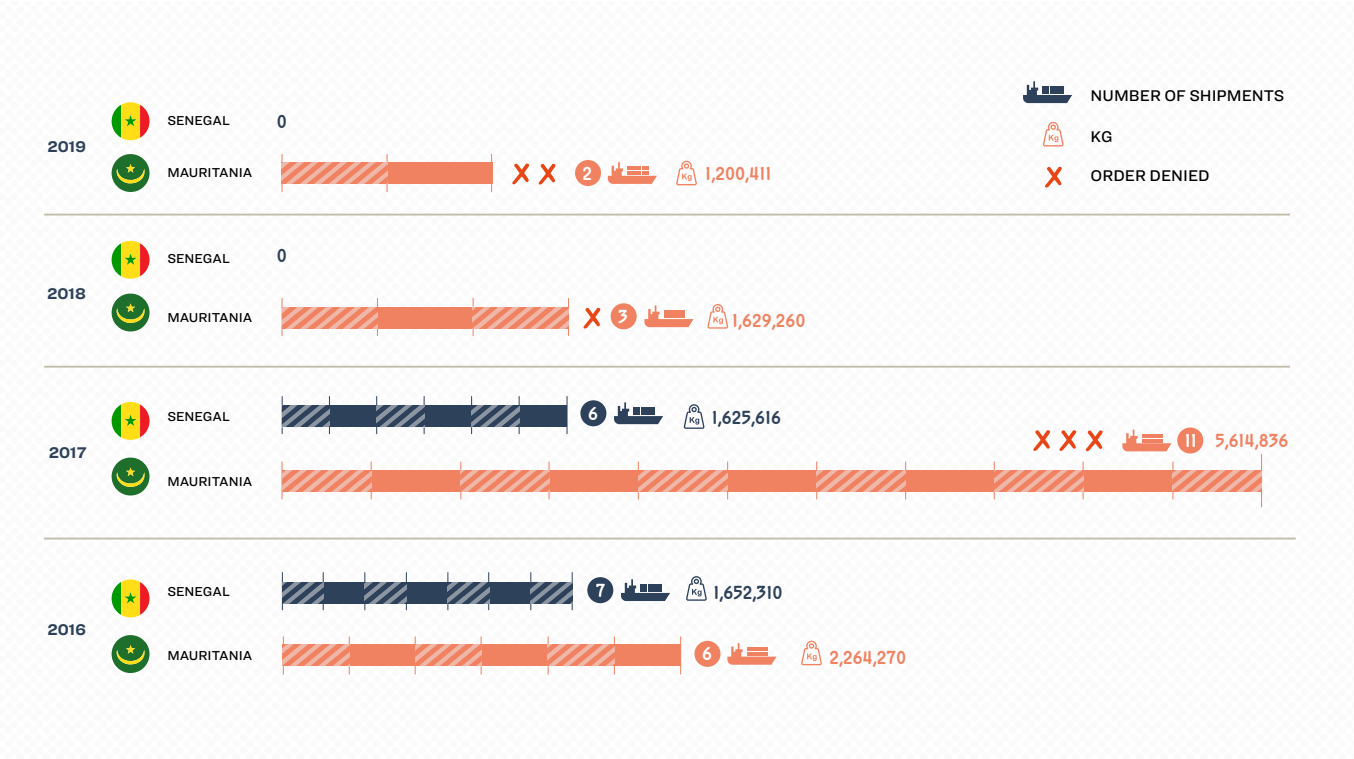
   **Biomar, Pelagia and ED&F Man Terminals** in Denmark have also reportedly imported FMFO from West Africa in recent years.¹³⁷

 **FF Skagen** is based in the port of Skagen in North Denmark. The company's website¹³⁸ states that it is Denmark's largest producer and trader of fishmeal, and the product is used in feed for dogs, horses, pigs, mink, chickens, fish and cats. Denmark is a major exporter of pig products; fishmeal is an important component of piglet feed as it promotes rapid weight

Figure 9: FF Skagen direct fishmeal imports from Mauritania and Senegal between 2016 and 2019

- According to import data, some shipments into the EU were denied entry by port authorities. According to the Danish Veterinary and Food Administration, the shipments did not come from factories approved by the EU.

Source: EU TRACES trade data



gain, is high in protein and generally easy to come by at low cost, since it is produced in many parts of the developing world. FF Skagen supplies a range of FMFO products to pig feed producers, which then sell their

products on to pig farms. Some of those feed producers claim that their feed contains only fishmeal from local sources, while others do not.



Pigs feeding from a trough

Credit: Shutterstock

132 TripleNine (2013) Company brochure, 22/11/2013: https://issuu.com/crossmind/docs/7156_triplenine_gb_profilbrochure/9

133 SAI Global (2018) Global Trust Certification certificate of conformity of TripleNine A/S. Available at: https://www.marin-trust.com/sites/marintrust/files/2020-01/COCIFFO105%20TripleNine%20AS%20Certificate%202018-2021_0.pdf

134 EU TRACES trade data

135 EU TRACES trade data

136 ED&F Man, a London-headquartered company, also trades in fish oil mainly importing from South, Central and North America and exporting to Norway. See Port of Esbjerg Newsletter (4 March 2020), There is still a slight smell of fish at Port Esbjerg. Available at: <http://portesbjerg.dk/en/about/news/there-still-slight-smell-fish-port-esbjerg>

137 Danwatch (2019) They buy fish meal and fish oil from West Africa. Available at: <https://danwatch.dk/en/perspektiv/they-buy-fish-meal-and-fish-oil-from-west-africa>

138 <https://ffskagen.dk/en>

Danish Statistics further reveal that FF Skagen imported 2,041 tonnes of fishmeal from Senegal in 2017, and 1,087 tonnes of fish oil from the same country in 2019.

Meanwhile, information on FMFO shipments from Mauritania shows 1,209 tonnes of fishmeal and 546 tonnes of fish oil were shipped to FF Skagen from *Alfa Services Ltd* in Nouadhibou in 2019.

FF Skagen confirmed to Danwatch that it imported “quite a volume” of fishmeal from Morocco and Mauritania between 2017 and 2019, but that most of the imports were certified and came from the fish filleting industry as byproducts.¹³⁹ In 2020, the company was asked if they can guarantee that fishmeal from Mauritania does not end up in feed for pigs but declined to comment on this.



Norway is a major player in the FMFO industry, as a producer and trader - both imports and exports - of fishmeal and oil. Despite its own domestic fisheries and production of fish oil, Norway is by far the world's biggest importer of fish oil (as well as being consistently the third biggest exporter) importing 219,095 tonnes in 2019. Peru and Denmark are its main sources, followed by Mauritania, the USA and Iceland. According to Trade Map data, Norway imported 24,344 tonnes of fish oil from Mauritania in 2019, however there is a serious discrepancy between this figure and the Trade Map data for Mauritania's exports, which indicated only 3,891 tonnes of fish oil exported to Norway in 2019. Norway is also the ‘home’ of salmon aquaculture, and fish oil supplements for human consumption, developed in the 1850s.

Norway's fishmeal imports in 2019 were 143,559 tonnes, with exports of 60,280 tonnes, however Trade Map shows no direct trade between West Africa and Norway for fishmeal.



GC Rieber is a private company based in Bergen, Norway, with a number of subsidiaries including GC Rieber VivoMega which produces a range of Omega-3 fish oils for human consumption at its facilities in Kristiansund.¹⁴⁰ In February 2021, Danish investment company Kirk Kapital AS (the family company of the founder of LEGO) acquired a 32% share in GC Rieber VivoMega.¹⁴¹

Tank AS vessels regularly stop in Kristiansund, and AIS ship tracking images show the ships alongside GC Rieber's VivoMega facility. Recent voyages include *Key Sund* which departed Mauritania on 31 December 2020 and offloaded in Kristiansund on 14 January 2021. *Key North* departed Mauritania on 19 January 2021 and stopped in Kristiansund on 31 January, however in this case the vessel's draught increased slightly suggesting it left with more cargo than when it arrived. *Key North* went on to a number of other locations in Norway, discharging most of its cargo in Valsenet, where Mowi's facility (formerly Marine Harvest Fish Feed) is located.



Mowi is an aquafeed company with a highly integrated value chain, with operations across several different activities: FMFO production, aquafeed manufacturing, fish farming and seafood distribution. Analysis of Mowi's (formerly Marine Harvest) annual reports shows that the company has been sourcing its fishmeal and fish oil from Mauritania and Morocco to varying degrees in recent years. Marine Harvest Integrated Annual Report 2017 indicates the company sourced fishmeal from Mauritania and Morocco, and fish oil from Morocco¹⁴² while the following Inte-

grated Annual Reports from Mowi show the company sourced 8,147 tonnes (22,6%) of its fish oil from Mauritania in 2018¹⁴³ and 10,759 (24,2%) tonnes in 2019.¹⁴⁴



GERMANY

Germany is Europe's biggest importer of fishmeal, mainly on a logistical basis rather than for domestic use. Within Germany, Bremen is a hub of fishmeal trade, and most of the country's imports go into aquaculture feed.¹⁴⁵



Köster Marine Proteins (KMP) has been the only FMFO trader in Bremen since taking over a competitor in 2017. It owns the Köster Terminal, with a storage capacity of over 50,000 tonnes, taking 77% of Germany's total fishmeal imports in 2019 which are then re-sold and shipped onwards.¹⁴⁶ KMP also bought out the Dutch fish oil trader and distributor Marvesa in 2017, establishing Köster Marine Oils (KMO) initially as a joint venture and now a wholly owned subsidiary.¹⁴⁷ The company trades fish oil for aquafeed and human consumption, and primarily sources fish oil from Peru. However, Mauritanian shipping data reveals that Marvesa, by this time fully owned by KMP, imported 200 tonnes of fish oil from Mauritania in 2019, via the container ship *Nordmaple*, and landed in Antwerp, Belgium. Thus, parent company Fritz Köster Handelsgesellschaft is linked to recent imports of both fishmeal and fish oil from West Africa through its two subsidiaries.

Certification documents reveal that KMO has utilised two sub-contracted storage facilities in Ghent, Belgium: Sea Tank Terminal and Pantank Terminals.¹⁴⁸ Trade

Map database records 1,724 tonnes of fish oil exported from Mauritania to Belgium in 2019, and the vessel *Key Sund* regularly stops in Ghent on its voyages north from Mauritania, most recently on 10 January 2021 where it unloaded a significant quantity of its cargo.



SPAIN

Spain accounts for significant imports of both fishmeal and fish oil from West Africa, and the southern port of Algeciras serves as a transshipment location for a substantial proportion of all containerised FMFO shipments from West Africa.

Trade Map data shows Spain imported 57,272 of fishmeal in 2019, and African countries were three of its top five sources, including Morocco, South Africa and Mauritania (4,415t). The other two major sources are Chile and Denmark.

Spain imports fish oil mainly from within Europe, however in 2019 Senegal reported 2,116 tonnes of exports to Spain and Mauritania reported 347 tonnes.

Imports of FMFO could increase in the coming years, as Corpfin Capital, main shareholder of Grupo Barna, has invested in a new FMFO factory in Cayar in Senegal.



The company **Inproquisa** trades in both products, fishmeal and fish oil, for animal feed and human consumption. Inproquisa is a Madrid-based company with presence in Italy, Greece, China, Peru and Chile. Mauritanian shipping data indicates the company received 1,337 tonnes of fishmeal in shipments from

¹³⁹ Danwatch (2019) They buy fish meal and fish oil from West Africa. Available at: <https://danwatch.dk/en/perspektiv/they-buy-fish-meal-and-fish-oil-from-west-africa>

¹⁴⁰ <https://vivomega.com>

¹⁴¹ <https://fyens.dk/artikel/fisk-er-sundt-kirk-kapital-k%C3%B8ber-sig-ind-p%C3%A5-fedtsyre-markedet>

¹⁴² Marine Harvest Integrated Annual Report 2017, p.74. Available at: <http://hugin.info/209/R/2177429/840178.pdf>

¹⁴³ Mowi Integrated Annual Report 2018, p.65. Available at: https://issuu.com/hg-9/docs/mowi_annual_report_2018_4e0dacb83168e4?e=19530043/68703955

¹⁴⁴ Mowi Integrated Annual Report 2019, p.65. Available at: https://corpsite.azureedge.net/corpsite/wp-content/uploads/2020/03/Mowi_Annual_Report_2019.pdf


¹⁴⁵ European Commission (2020) The EU Fish Market 2020 Edition. Available at: www.eumofa.eu/documents/20178/415635/EN_The+EU+fish+market_2020.pdf

¹⁴⁶ WSRW (2020) Above the Law. December 2020. Available at: https://vest-sahara.s3.amazonaws.com/skvs/feature-images/File/243/5fc82120abf59_AbovetheLaw2020_web.pdf

¹⁴⁷ Byrne, J. (2017) KMP buys out fish oil interests of Marvesa. Feed Navigator. 3 May 2017. Available at: <https://www.feednavigator.com/Article/2017/05/04/KMP-buys-out-fish-oil-interests-of-Marvesa>

¹⁴⁸ SAI Global (2019) Global Trust Certification certificate of conformity of Köster Marine Oils GmbH. Available at: <https://www.marin-trust.com/sites/marintrust/files/2020-09/MT102A%20COC%20%20K%C3%B6ster%20Marine%20Oils%20GmbH%20Certificate%20Extended.pdf>

Mauritania through 2019, coming from Nouadhibou and Nouakchott by container ships to Vigo. In response to recent inquiries, Inproquisa confirmed that they obtain FMFO containing *Sardinella aurita* from whole fish, citing Morocco as the source, and said they also purchase FMFO from South America, but would not provide further details of other sources. Spanish trade data¹⁴⁹ also indicates Inproquisa may have received fish oil from Mauritania and Senegal between 2014 and 2020, however the database lists only the company location as Madrid. *Trouw Nutrition* (a partner company of Skretting Espana) is also based in Madrid and may account for some or all of those imports. Trade data indicates a 359 tonne shipment of fish oil from Senegal to a Madrid-based company in June 2019, and multiple shipments amounting to 2,175 tonnes of fishmeal from Mauritania to a Madrid-based company (or companies) in 2019 and 2020.

 **Industrias Arpo** (formerly Industrias Afines) is another Spanish FMFO company based in Mos, in the province of Pontevedra, near the port of Vigo in Galicia. Shipping data shows that in 2019, under its previous company name, it sourced 90 tonnes of fish oil from Sino Rim Proteine in Mauritania. Industrias Arpo sells FMFO in various formulations for aquaculture and commercial livestock feed, and in response to a recent inquiry regarding FMFO for pet food use they offered two lines of fishmeal from South Africa and one line of fish oil from Mauritania. Their refinery in Mos suffered an explosion in December 2020.¹⁵⁰ Spanish import data shows multiple shipments of fish oil from Senegal to a company in Pontevedra in 2019 and 2020, amounting to 1,378 tonnes. This may have been received by Industrias Arpo, or by **Agru-**

 **AFAMSA** **pación de Fabricantes de Aceites Marinos, S.A (AFAMSA)** another fish oil company located in the same industrial street in Pontevedra. Additionally, multiple shipments of fish oil, and one shipment of fishmeal, were also imported from Mauritania by a company in Pontevedra in 2019 and 2020.¹⁵¹

 **Skretting Espana** is part of Nutreco, an animal feed company that comprises Norwegian-based Skretting, one of the world's biggest aquafeed manufacturers, and Dutch-based Trouw Nutrition, focused on animal nutrition. Nutreco has production facilities in around 35 countries globally. Located in Burgos, Skretting Espana is listed in Mauritanian shipping records as the consignee for three containerised fishmeal shipments from Mauritania in 2019, amounting to 773 tonnes. Additionally, Spanish import data¹⁵² indicates that a company based in Burgos - likely Skretting Espana - imported fishmeal from Mauritania in 26 shipments of 8,126 tonnes through 2019 and 2020. Two shipments of fish oil were also imported in January 2019 and January 2020, amounting to 366 tonnes in total.

 **GREECE**

Greece is a significant importer of fishmeal and to a lesser extent fish oil, including from Mauritania, and is an end-user rather than a trader or re-exporter. The FMFO is predominantly utilised in seabass and sea bream aquaculture, as Greece is the EU's biggest producer of seabass mainly for export to Italy, Spain and France.¹⁵³

Greece imported 95,453 tonnes of fishmeal in 2019, rising to 104,453 tonnes in 2020 with Denmark consistently its main source, providing around 30,000 tonnes per year in recent years. Other sources are more variable, with both Mauritania and Morocco featuring as significant, if not consistent, import sources. Trade Map records Mauritanian fishmeal exports to Greece of 9,249 tonnes in 2019.

Greece also imported 29,733 tonnes of fish oil in 2019, most of it from Europe (Norway, Denmark and Germany). Trade Map records Mauritanian fish oil exports to Greece of 1,210 tonnes in 2019.

 **Norsildmel Innovation AS**, a former 50/50 joint venture of TripleNine (Denmark) and Pelagia (Norway), imported 1,002 tonnes of fishmeal from Mauritania into Greece in 2019, 561 tonnes from Mah El Turk SARL and 441 tonnes from Sicop Industries SA. The joint venture was ended in 2019.¹⁵⁴

For an overview of Mauritanian FMFO container shipping data to the EU in 2019, please refer to Appendix 2.

Well-known retailers across Europe are sourcing farmed fish (such as salmon) from companies linked in a supply chain to the big four aquafeed companies – EWOS/ Cargill, Biomar, Skretting and Mowi – which are involved in the trade of FMFO from West Africa. Although we cannot establish a direct chain of custody between the retailers and West African FMFO, the retailers' connection with companies involved in the West African supply chain is problematic, and irrespective of whether there is a direct chain of custody, they should not source from those who source from West Africa.

Our investigations uncovered that some European retailers source from aquaculture and aquafeed producers who, in turn, source from reduction fisheries in West Africa, including:

- UK:** **Tesco, Sainsbury's, M&S, Lidl, Aldi;**
- France:** **Carrefour, Auchan, E.Leclerc, Système U, Monoprix, Groupe Casino;**
- Spain:** **Mercadona, Lidl España;**
- Germany:** **Aldi Süd, Lidl, Kaufland, Rewe, Metro AG, Edeka.**

However, Sainsbury's, M&S and Mercadona have communicated that no FMFO from West Africa was used in their salmon/seafood products.

149 Agencia Tributaria (2021) Foreign Trade Statistics, Tax Agency of Spain. Obtained March 2021. www.agenciatributaria.es/AEAT.internet/en_gb/Inicio/La_Agencia_Tributaria/Aduanas_e_Impuestos_Especiales/_Presentacion/Estadisticas_de_Comercio_Exterior/Estadisticas_de_Comercio_Exterior.shtml

150 Faro De Vigo (2020) Sobresalto en Mos por una explosión en refinería de aceites de pescado. 20 December 2020. www.farodevigo.es/comarcas/2020/12/20/sobresalto-mos-explosion-refineria-aceites-26562938.html

151 Agencia Tributaria (2021) Foreign Trade Statistics, Tax Agency of Spain. Obtained March 2021. www.agenciatributaria.es/AEAT.internet/en_gb/Inicio/La_Agencia_Tributaria/Aduanas_e_Impuestos_Especiales/_Presentacion/Estadisticas_de_Comercio_Exterior/Estadisticas_de_Comercio_Exterior.shtml

152 Agencia Tributaria (2021) Foreign Trade Statistics, Tax Agency of Spain. Obtained March 2021. www.agenciatributaria.es/AEAT.internet/en_gb/Inicio/La_Agencia_Tributaria/Aduanas_e_Impuestos_Especiales/_Presentacion/Estadisticas_de_Comercio_Exterior/Estadisticas_de_Comercio_Exterior.shtml

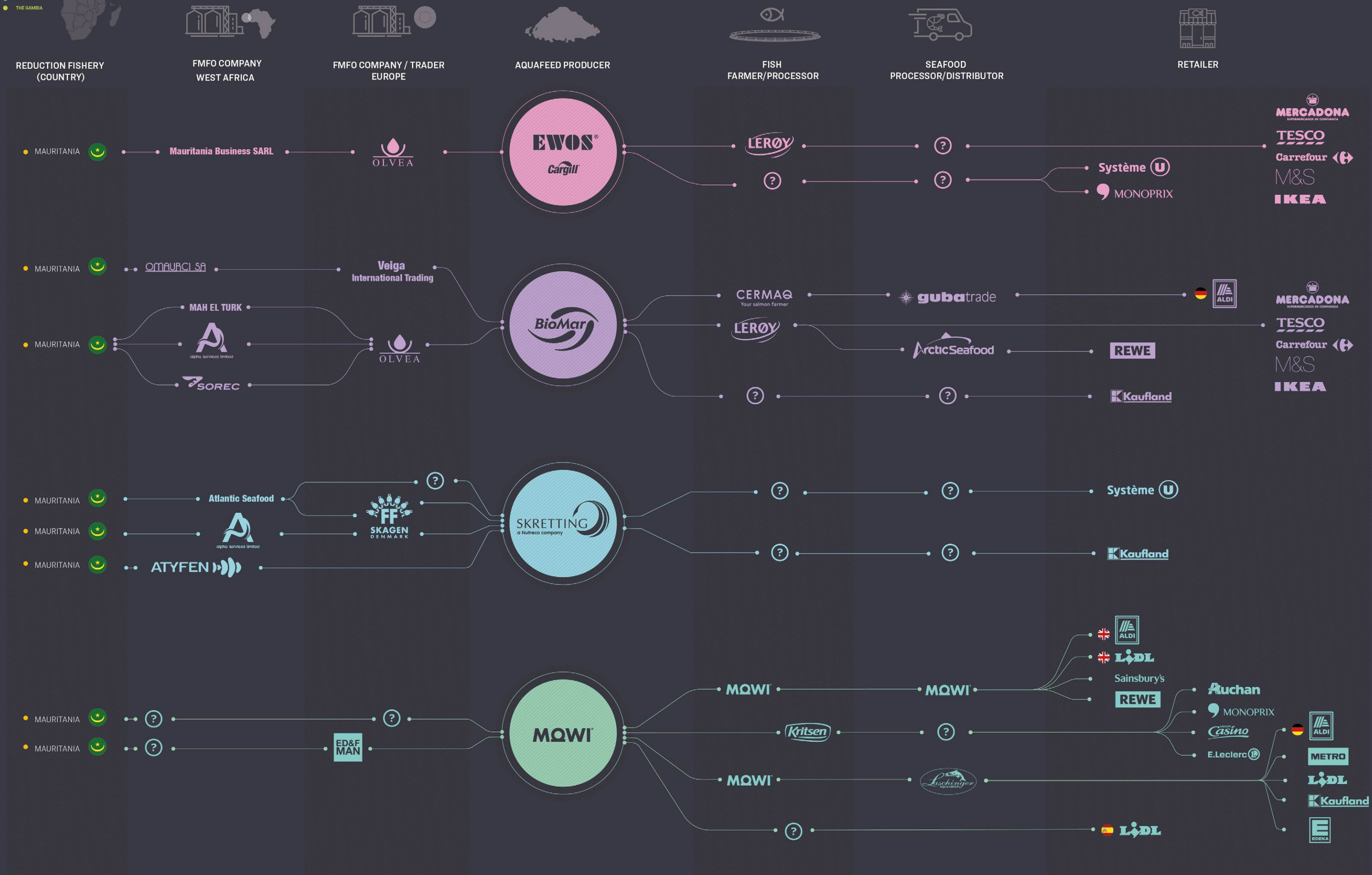
153 EUMOFA (2019) Seabass in the EU. Price structure in the supply chain for seabass. Available at: www.eumofa.eu/documents/20178/121372/PTAT+-Case+Study+-+Seabass+in+the+EU.pdf

154 Pelagia (2019) Norsildmel A/S: <https://pelagia.com/norsildmel-as/>



Trade relationships linking European retailers to reduction fisheries in West Africa

ALTHOUGH WE CANNOT ESTABLISH A DIRECT CHAIN OF CUSTODY BETWEEN THE RETAILERS AND WEST AFRICAN FMFO, CHANGING MARKETS HAS REPORTED - THROUGH PUBLICLY ACCESSIBLE SOURCES, IN-STORE VISITS, INTERVIEWS AND INVESTIGATIONS - SUPPLY CHAIN RELATIONSHIPS BETWEEN THE RETAILERS MENTIONED IN THIS INFOGRAPHIC, SEAFOOD PROCESSORS/DISTRIBUTORS, AND FARMED FISH PRODUCERS THAT HAVE BEEN SOURCING AQUAFEED FROM COMPANIES INVOLVED IN THE TRADE OF WEST AFRICAN FMFO IN RECENT YEARS. THE MAINTENANCE OF THESE RELATIONSHIPS IS PROBLEMATIC, AND IRRESPECTIVE OF WHETHER THERE IS A DIRECT CHAIN OF CUSTODY, THEY SHOULD NOT SOURCE FROM THOSE WHO SOURCE FROM WEST AFRICA.





The pursuit of certification

The Food and Agriculture Organization of the United Nations (FAO) reports that sardinella and bonga fish stocks of West Africa are both currently over-exploited.¹⁵⁵ This means that even at current levels of extraction, the fish stocks are not sustainable. Despite this, over the past years, certification bodies and FMFO/aquafeed companies have increasingly been turning their attention to West African pelagic fish, with a view to certifying the stocks as ‘sustainable’ for use for fishmeal and fish oil.

The MarinTrust Standard

Since opening for application in October 2009, MarinTrust has certified over 150 FMFO plants in more than 20 different countries; over 50% of the world’s combined production of marine ingredients is deemed to be MarinTrust compliant.¹⁵⁶ The organisation has its sights set on expansion, and states that its ambition is for 75% of all marine ingredients to be MarinTrust certified by 2025 (including in assessment or in its Improver Program).¹⁵⁷ MarinTrust claims to be ‘supported by NGOs’ and to offer a ‘robust, credible and accessible tool that ensures traceability and eliminates IUU [illegal, unreported

and unregulated] fishing’.¹⁵⁸ However, NGOs have repeatedly raised concerns about MarinTrust certification, and its claim to eliminate IUU fishing is not backed up by the evidence. As the main certification body for the FMFO sector, MarinTrust (known as IFFO Responsible Supply (IFFO RS) until April 2020)¹⁵⁹ is very close to IFFO,¹⁶⁰ the trade organisation that represents the marine ingredients industry for over 55% of world production and 75% of the fishmeal and fish oil traded worldwide.¹⁶¹ IFFO was officially formed in 2001, but its origins as a trade association representing FMFO producers go back to 1959. Since then, it has become the preeminent trade body for the FMFO sector, systematically promoting FMFO in new markets and for new uses while using its influence and lobbying power to defend the industry from years of accusations of unsustainability. Reputation management takes up a significant part of its budget and, according to IFFO, is ‘likely to remain a major priority in the future’.¹⁶² Both IFFO and MarinTrust are industry-funded, the former through membership fees and the latter through certification fees. According to previous Changing Markets investigations, FMFO and aquafeed plants with links to highly unsustainable fishing practices are certified by MarinTrust, or members of IFFO although MarinTrust claims the certification is actually done by an independent certification body and only provided if in conformity with the FAO Code of Conduct for Responsible Fisheries.¹⁶³

155 Summary report of the FAO Working Group on the assessment of small pelagic fish off Northwest Africa 2019, table 1, p.2 Available at: <http://www.fao.org/3/cb0490en/CB0490EN.pdf>

156 MarinTrust (2020) *MarinTrust, independent business to business certification programme for the marine ingredient value chain, achieves full ISEAL membership*, 6 May. Available at: <https://www.marin-trust.com/news/marintrust-independent-business-business-certification-programme-marine-ingredient-value-chain>

157 *New identity for marine ingredients certification program, agenda remains unchanged*. Seafood Source, 1 April 2020. Available at: <https://www.seafoodsource.com/news/environment-sustainability/new-identity-for-marine-ingredients-certification-program-agenda-remains-unchanged>

158 MarinTrust (2020) *Value proposition: Why work with us?* Available at: <https://www.marin-trust.com/value-proposition-why-work-us>

159 <https://www.marin-trust.com/marintrust-standard>

160 “We will continue to work closely together with IFFO. We have an MOU and we do a lot with them, particularly around reputation. We are also both quite small and often share resources”...“It’s business as usual. Apart from the name, a new single logo, and a new website, everything remains the same, with the same standards. Those don’t change at all.” MarinTrust Executive Chair, Libby Woodhatch, in *New identity for marine ingredients certification program, agenda remains unchanged*. Seafood Source, 1 April 2020. Available at: <https://www.seafoodsource.com/news/environment-sustainability/new-identity-for-marine-ingredients-certification-program-agenda-remains-unchanged>

161 <https://www.iffocom/about-us>

162 IFFO (2009) *International Fishmeal and Fish Oil Organisation 50th anniversary*. Available at: https://www.iffocom/system/files/downloads/50-year-history-booklet_1.pdf

163 Changing Markets Foundation (2019) *Fishing for catastrophe: How global aquaculture supply chains are leading to the destruction of wild fish stocks and depriving people of food in India, Vietnam and The Gambia*. <https://changingmarkets.org/wp-content/uploads/2019/10/CM-WEB-FI>



CONCLUSION

In West Africa, over half a million tonnes of small pelagic fish are ground into fishmeal and fish oil every year, exported to third countries and processed as feed for farmed fish, pigs, chickens, minks and pets. The main species at stake (sardinella and bonga) are essential to the livelihoods of hundreds of thousands of people in coastal communities and to the food security of millions in the region, where they represent the main historical and most affordable source of animal protein. What is more, the resource has been overexploited for years and the scientists in charge of its assessment recommend a 50 % reduction in fishing effort, calling again and again – along with local community organisations – for ‘strong and urgent action’.¹⁶⁴ While artisanal catches are plummeting, fish prices are surging on the local markets, and economic migration is resulting in a heavy toll of lives lost at sea.

The Covid-19 crisis only exacerbates the impacts of this broken food system, and global calls to ‘build back better’ are clearly not reflected in the current situation of local communities in West Africa struggling more every day to earn a living. Fishing out overexploited resources otherwise critical for local populations, and grinding them to supply secondary products for industrial food industries in wealthier countries, is fundamentally wrong. While so many NGOs, local community groups, media, citizens and activists have been ringing the alarm bell for years, the FMFO industry is trying to greenwash its production to international customers, using its own certification standards.

This exposure of West African populations to food insecurity poses a much deeper ethical problem than the dichotomy between poor and rich countries. In reality it is about a resource being overfished from the region and exported to feed animals in third countries which is completely unacceptable considering that coastal com-

munities are deprived of their most essential source of protein. This economic model, based on the short-sighted extraction of resources to serve industrial food supply chains that have run out of control, poses a particular problem. It extends beyond a merely ‘poor versus rich’ narrative, to issues of justice, ethics, and fair trade.

Final consumers of products derived from the fishmeal and fish oil industry should also understand that they are part of the problem, and that, by paying more attention to their choices, they can help turn this broken food model around for the benefit of all.

Primary responsibility for this dramatic situation lies with corporate stakeholders in Asia and Europe, their respective political leaders – who are incentivising their fishing industries with unfair subsidies and concluding inequitable fishing agreements with developing countries – and local governments unable to regulate short-term benefit industries at the expense of local livelihoods and food sovereignty.

All the legal, binding and non-binding, national, regional and international instruments to fix the current state of play have been detailed in previous publications¹⁶⁵ and by several NGOs.¹⁶⁶ As an urgent starting point from a regional perspective, Changing Markets and Greenpeace Africa demand:

- West African governments phase out any fishmeal and fish oil production using fish fit for human consumption, based on its negative environmental, social and economic impacts.
- West African governments grant women fish processors and artisanal fishermen a legal and

.....
NAL-FISHING-FOR-CATASTROPHE-2019.pdf

164 FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa 2019. Summary report available at: <http://www.fao.org/3/cb0490en/CB0490EN.pdf>

165 A Waste of Fish Report 2019 (Greenpeace). <https://www.greenpeace.org/international/publication/22489/waste-of-fish-report-west-africa/>

166 <https://www.cffacape.org>, <https://aprapam.org>, <http://www.adepawadaf.org>, but also PAPAS, REFEPAS, FLPA and others.

- formal status, opening access to labour rights and benefits, such as social security and consultation rights in local fisheries management.

→ Companies and end markets stop trading fishmeal and fish oil produced using fish fit for human consumption from the West African region.

→ All states involved in fisheries in the region establish an effective regional management regime – particularly for the exploitation of shared stocks, such as small pelagic fish – as required under international law, relevant national laws, pan-African and regional fisheries policies, and other instruments. This management regime should comply with a precautionary and ecosystem-based approach, ensuring the total allowable catch is within safe biological limits.
- Furthermore, we demand that all stakeholders involved in the global fishmeal and fish oil supply chain comply with the following:
- Governments should support the phase-out of wild-caught fish for use in aquafeed and animal feed. They can start by immediately withdrawing subsidies and other public support measures for aquaculture that relies on wild-caught fish.

→ Governments and policy makers should implement stricter regulations on due diligence and transparency in aquafeed and animal feed supply chains.

→ Aquafeed companies should stop using wild-caught fish and switch to more sustainable alternatives, ensuring these alternatives do not give rise to other social and ecological problems. While some companies are taking action to reduce reliance on forage fish in their aquafeed, the use of fishmeal and fish oil needs to be phased out across the entire industry for transformational change to take place.
- Companies should stop using fishmeal and fish oil to feed other animals, such as pigs, chickens, minks and pets.

→ Certification schemes should not certify reduction fisheries. Certifying reduction fisheries gives the false impression that exploiting wild-caught fish for use in fishmeal and fish oil can be sustainable.

→ Retailers should commit to avoiding seafood reliant on fishmeal and fish oil inputs from whole wild-caught fish. They should put in place a roadmap for eliminating the use of fishmeal and fish oil in products, and conduct regular audits to ensure implementation.

→ Retailers should provide full transparency about farmed seafood supply chains – the identity of suppliers, processors, aquafeed companies and fishmeal and fish oil producers, and the location of reduction fisheries.

APPENDIX 1: WEST AFRICAN FISHMEAL AND FISH OIL TRADE TABLES

MAURITANIA: FISHMEAL & FISH OIL EXPORTS

Top 10 importers of Mauritanian fishmeal (in tonnes)					
	2015	2016	2017	2018	2019
World	66,346	74,516	119,745	127,940	110,423
China	244	11,467	49,638	53,066	50,794
Turkey	4,323	12,443	20,429	20,381	22,951
EU	12,458	23,683	10,966	29,196	20,042
Viet Nam	16,802	8,830	22,333	14,800	10,184
Egypt	550		800	520	1,457
Ukraine	1,389	580	962	480	1,400
Nigeria	40	440	100	800	1,094
Saudi Arabia	5,821	2,306		581	741
Tunisia	1,837	1,607	1,264	138	566
Russian Federation	3,993	1,759	4,196	1,582	356

Source: ITC Trade Map / UN Comtrade

Top 10 destinations of Mauritanian fish oil (in tonnes)					
	2015	2016	2017	2018	2019
World	29,825	19,993	34,482	40,430	34,535
EU	24,314	17,144	17,585	23,731	24,458
Norway	1,902	605	4,196	8,414	3,891
Turkey	1,057	496	9,440	4,292	3,635
China	0	493	476	2,435	1,210
Malaysia	0	0	0	293	430
Egypt	423	0	0	355	283
Vietnam	0	189	939	0	186
Tunisia	836	232	138	0	41
Japan	0	38	106	1,580	0
Saudi Arabia	0	0	0	510	0

Source: ITC Trade Map / UN Comtrade

Top EU destinations of Mauritanian fishmeal (in tonnes)					
	2015	2016	2017	2018	2019
World	66,346	74,516	119,745	127,940	110,423
Greece	25	540	1,965	11,973	9,249
Spain	1,200	3,458	3,833	7,904	4,415
Germany	1,033	10,044		7,849	2,322
Denmark	9,297	6,223	3,792	629	1,902
Lithuania	0	232	1,376	691	1,102
France	743	2,175	0	150	892
Latvia	60	1,011	0	0	160
Italy	60	0	0	0	0
UK	40	0	0	0	0
Source: ITC Trade Map / UN Comtrade					

Top EU destinations of Mauritanian fish oil (in tonnes)					
	2015	2016	2017	2018	2019
World	29,825	19,993	34,482	40,430	34,535
France	6,845	7,029	6,691	14,790	15,101
Denmark	11,922	5,803	3,994	2,994	5,955
Belgium	0	0	1,311	1,564	1,724
Greece	967	314	1,338	2,435	1,210
Spain	3,969	1,614	3,332	1,948	347
Germany	602	960	278	0	121
Netherlands	9	1,013	608	0	0
Portugal	0	9	33	0	0
UK	0	402	0	0	0
Source: ITC Trade Map / UN Comtrade					

Mauritanian FMFO exports volume (in tonnes) - 1st Semester 2020					
	Africa	Asia	Europe	Rusia	Total
Fishmeal	1,121.17	64,105.81	10,131.85	539.52	75,898.36
Fish oil	0	983.09	20,608.69	0	21,591.77
Source: Extracted from the Information and Analysis Bulletin of the Economic and Social Observatory of Fisheries in Mauritania (OESP) - 1st semester 2020					

SENEGAL: FISHMEAL & FISH OIL EXPORTS

Top 10 destinations of Senegal fishmeal (in tonnes)					
	2015	2016	2017	2018	2019
World	17,288	9,974	8,839	11,905	11,251
Viet Nam	140	630	480	1,576	4,079
Japan	1,979	1,618	1,606	1,220	1,609
Cameroon	4,339	1,856	1,884	1,624	1,603
Togo	2,313	1,162	1,307	950	1,125
Turkey	473	0	0	3,134	774
Benin	1,685	700	690	154	536
China	0	0	0	60	372
Brunei Darussalam	320	0	20	250	268
United States of America	0	0	0	0	197
EU	2,094	1,959	1,836	1,365	138
Source: ITC Trade Map / UN Comtrade					

Top 10 destinations of Senegal fish oil (in tonnes)					
	2015	2016	2017	2018	2019
World	2,473	2,551	2,604	1,063	4,836
Spain	268	378	541	370	2,116
Turkey	0	0	0	0	937
Chile	0	126	0	174	918
France	0	1,652	1,055	22	488
Portugal	4	59	34	46	125
Netherlands	345	0	0	0	101
Italy	384	0	660	264	23
Mali	0	0	0	20	13
Latvia	0	0	0	168	0
New Zealand	38	37	0	0	0
Source: ITC Trade Map / UN Comtrade					

THE GAMBIA: FISHMEAL & FISH OIL EXPORTS					
Top destinations of The Gambia fishmeal (in tonnes)					
	2015	2016	2017	2018	2019
World	0	0	1,555	1,969	3,674
Viet Nam	0	0	1,344	373	1,708
Tunisia	0	0	211	1,008	977
Japan	0	0	0	0	493
Chile	0	0	0	0	383
Latvia	0	0	0	588	112
Source: ITC Trade Map / UN Comtrade					

Top 10 destinations of The Gambia fish oil (in tonnes)					
	2015	2016	2017	2018	2019
World	0	870	1378	823	5934
Chile	0	0	0	0	4909
Viet Nam	0	0	0	0	384
Malaysia	0	0	0	0	346
Tunisia	0	101	270	423	253
United States of America	0	0	0	0	42
China	0	0	546	0	0
Denmark	0	729	0	0	0
India	0	40	0	0	0
Switzerland	0	0	562	0	0
Panama	0	0	0	400	0
Source: ITC Trade Map / UN Comtrade					

APPENDIX 2: CONTAINERISED EXPORTS OF FISHMEAL AND FISH OIL FROM MAURITANIA INTO THE EU IN 2019

Country	Company	Product(s)	Shipments	Total weight (mt)
Belgium	UNKNOWN PARTNER(S)	FMFO	3	827
Denmark	FF SKAGEN	FMFO	3	1,755
France	LA LORIENTAISE SOPROPECHE SA	FM	1	416
France	OLVEA SAS	FO	1	72
France	SEAFOODIA	FO	2	36
Greece	NORSILDMEL INNOVATION AS	FM	4	1,002
Greece	UNKNOWN PARTNER(S)	FMFO	3	1,000
Latvia	COMPASS TRANSIT	FM	3	140
Latvia	CONSORT SIA	FM	1	36
Netherlands	MARVESA ROTTERDAM NV	FO	1	200
Portugal	UNKNOWN PARTNER(S)	FO	1	120
Spain	COSVAS ATLANTIC SL	FM	1	20
Spain	INDUSTRIAS AFINES SL	FO	1	90
Spain	INPROQUISA SA	FM	4	1,337
Spain	JUAN CARLOS	FM	1	20
Spain	SKRETTING ESPANA SA	FM	3	773
Spain	UNKNOWN PARTNER(S)	FMFO	51	14,970

Source: Greenpeace investigation

Notes:

- The majority of consignments list “unknown partner” so this is not a complete list of companies
- This data covers only exports by container, therefore shipments by tanker (most fish oil) and cargo vessels (some fishmeal and fish oil) are not included.

