› The Hidden Cost of Farmed Salmon

Exploring why Sainsbury's farmed salmon supplier Mowi doesn't live up to its sustainable image and what Sainsbury's needs to do about it

KEY TAKEAWAYS

- Supermarket Sainsbury's describes itself as 'leading the way in sustainable fish'. However, its farmed salmon – one of its major seafood sellers – fails to match up to its own sustainability claims. This is because among other things the feed the salmon is fed has damaging environmental and social impacts.
- Sainsbury's key salmon supplier is the Norwegian-owned Mowi. We calculated that Mowi used 880,000 tonnes of wild fish, sourced from countries such as Mauritania and Peru, to produce just 436,000 tonnes of farmed salmon – more wild fish than the total fisheries capture of Canada, at 720,000 tonnes in 2018. This is an inefficient use of marine resources.
- Both Sainbury's and Mowi have failed to adopt policies to phase out wild fish in salmon feed. Their reliance on wild-caught fish exacerbates pressure on our oceans. We are calling on Sainsbury's to commit to completely phasing out the use of FMFO sourced from whole wild caught fish in its aquaculture supply chain, including setting a date to achieve this target of no later than 2025.

›FEED BACK‹

IN BRIEF

Sainsbury's proudly claims to lead the way on sustainable fish[1]. It states that all of its farmed seafood is sustainably sourced[2] and independently certified as sustainable[3]; it also presents aquaculture as the way to meet growing demand for seafood in the context of the depletion of global fish stocks in the wild[4]. However, analysis by Feedback and the Changing Markets Foundation in March 2020 of UK supermarkets' aquaculture supply chains found that Sainsbury's is failing to ensure the sustainability of the farmed fish that it sells – leaving it trailing behind some of its closest competitors, notably Tesco, who finished top of the ranking.

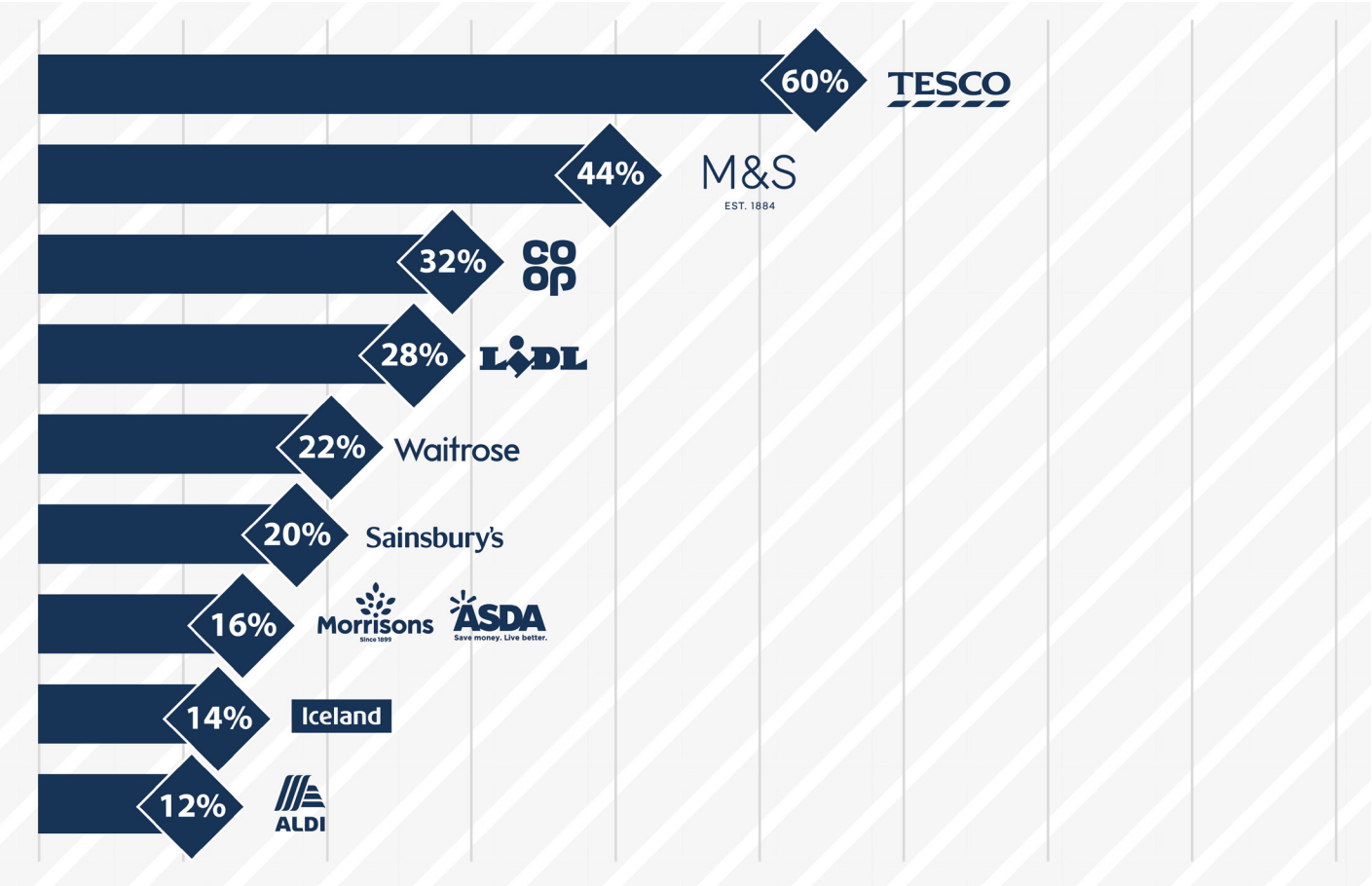
Farmed salmon is one of the UK's most popular seafood products: in the 52 weeks to June 2020, UK farmed salmon sales were worth £1.1 billion[5]. With 14.3% of the seafood retail market share[5], this translates into an estimated **£157 million worth of yearly sales** for Sainsbury's.

Sainsbury's has sourced only Scottish salmon for over a decade[6]. It has a very close relationship with the world's biggest salmon producer, Norwegian-owned Mowi, which operates eight freshwater farms and 40 seawater farms across Scotland[7] and produces its own strain of 'Mowi' farmed salmon[8]. Reports suggest Mowi is Sainsbury's sole supplier[9], and a promotional film on Sainsbury's corporate website appears to confirm this[4]. Mowi claims to be a leader in sustainability, with its slogan reading: "Leading the Blue Revolution". However, detailed analysis of Mowi's Scottish operations and global supply chain highlights numerous grounds for concern on the company's sourcing and farming practices.

This briefing outlines key areas where evidence indicates that Mowi is failing to operate responsibly and thereby putting Sainsbury's in conflict with its own commitment to responsibly sourcing its farmed seafood. From problematic sourcing of wild-caught fish for its feed, to environmental damage caused by fish escapes and worrying animal welfare issues reflected in high mortality rates and increasing antibiotic use, it explores the reality of Mowi's operations on the ground and challenges Sainsbury's, as Mowi's biggest UK customer, to call Mowi to account for these issues.

Should Mowi fail to take rapid action to radically reform its farming practices and commit to eliminating the use of wild-caught fish in feed, Sainsbury's must reconsider its seafood sourcing strategy with a view to potentially **removing Mowi from its supplier list.**

FIGURE 1: UK RETAILERS RANKING



Source: Changing Markets Foundation and Feedback 'Caught Out: How UK retailers are tackling the use of wild fish in their aquaculture supply chains' (2020). Available at: https://feedbackglobal.org/wp-content/uploads/2020/03/Caught_Out_Report_FINAL.pdf.

MOWI: THE WORLD'S BIGGEST SALMON PRODUCER IN FIGURES

Founded in 1964[10], Mowi, formerly known as Marine Harvest, is a vertically integrated aquaculture company and the world's biggest salmon producer both by volume and revenue. In 2019, it harvested 435,904 gutted weight tonnes (GWT) of salmon[10], equivalent to 19% of total industry output (2.32 million tonnes). The company claims to fulfill one-fifth of global demand for farm-raised salmon[11] and, in 2020, is set to produce 450,000 metric tons of salmon[12], equivalent to an estimated 90 million fish (based on an average harvest weight of 5kg per salmon in 2016-2018)[13].

Mowi is also a major producer of aquafeed, a substantial share of which it uses for its own farming operations. In 2019, it produced 405,193 tonnes of feed, equivalent to 9.2% of global salmon feed production (4.4 million tonnes)[10]. With the recent development of a feed plant on the Isle of Skye, Scotland, Mowi has significantly invested in its aquafeed production capacity.

Over the past decade, the aquafeed industry has become increasingly consolidated. Four producers now control the majority of salmon feed output: Mowi, Skretting, EWOS Cargill and BioMar. These companies all operate globally[10]. Furthermore, Skretting ceased UK production, citing the development of Mowi's feed factory in Scotland[14] – suggesting the market is becoming more concentrated.

Headquartered in Bergen, Norway, Mowi operates in 25 countries worldwide. It has farms in Norway, Chile, Canada, Scotland, Ireland and the Faroes, and feed production sites in Norway and Scotland which, as of 2020, have the capacity to produce 600,000 tonnes of feed, making it self-sufficient in Europe[12]. In 2018, the Group recorded revenue of €3.8 billion[15]. Mowi is listed on the Oslo Stock Exchange and its shares also trade on the US OTC market[16]. Shareholders are highlighted in Table 1 below[17].

In 2019, Mowi reported its highest ever worldwide farmed salmon harvest of 436,000 tonnes. In its 2019 Annual Report, the company attributes the bounty to: "[i]ncreased smolt stockings in recent years, good farming husbandry, purchases of farming capacity and selected acquisitions." However, these high levels were due, in part, to an infestation of lice at its Scottish sites, which forced the producer to slaughter a large number of fish early, before they reached their maximum size and value[18].

TABLE 1: SHAREHOLDERS

Investor	Number of shares	% of top 20	% of total	Type	Country
GEVERAN TRADING CO LTD	68,345,215	23.77%	13.22%	Comp.	CYP
FOLKETRYGDFONDET	51,482,003	17.90%	9.96%	Comp.	NOR
UBS SWITZERLAND AG	24,755,838	8.61%	4.79%	Nom.	CHE
CLEARSTREAM BANKING S.A.	24,039,710	8.36%	4.65%	Nom.	LUX
STATE STREET BANK AND TRUST COMP	22,148,859	7.70%	4.28%	Nom.	USA
STATE STREET BANK AND TRUST COMP	12,532,501	4.36%	2.42%	Nom.	CAN
EUROCLEAR BANK S.A./N.V.	10,675,136	3.71%	2.06%	Nom.	BEL
STATE STREET BANK AND TRUST COMP	8,392,545	2.92%	1.62%	Nom.	USA
CITIBANK, N.A.	8,294,031	2.88%	1.60%	Nom.	USA
JPMORGAN CHASE BANK, N.A., LONDON	7,451,325	2.59%	1.44%	Nom.	USA
SIX SIS AG	7,233,823	2.52%	1.40%	Nom.	CHE
BARCLAYS BANK PLC	7,000,000	2.43%	1.35%	Comp.	GBR
STATE STREET BANK AND TRUST COMP	6,236,630	2.17%	1.21%	Nom.	USA
GEVERAN TRADING CO LTD	5,444,072	1.89%	1.05%	Comp.	CYP
KLP AKSJENORGE INDEKS	4,972,330	1.73%	0.96%	Comp.	NOR
THE NORTHERN TRUST COMP, LONDON BR	4,601,488	1.60%	0.89%	Nom.	GBR
STATE STREET BANK AND TRUST COMP	3,742,806	1.30%	0.72%	Nom.	USA
STATE STREET BANK AND TRUST COMP	3,609,342	1.26%	0.70%	Nom.	USA
DANSKE INVEST NORSKE INSTIT. II.	3,376,909	1.17%	0.65%	Comp.	NOR
GOLDMAN SACHS INTERNATIONAL	3,200,012	1.11%	0.62%	Nom.	GBR
Total number owned by top 20	**287,534,575**	**100%**	**55.60%**		
Total number of shares	**517,111,091**		**100%**		

Source: Mowi https://mowi.com/investors/share-and-bond/shareholder-analysis. Last updated 06.11.2020

BOX 1: AQUACULTURE'S APPETITE FOR WILD FISH

Almost one-fifth of all global wild fish landings are used to make fishmeal and fish oil (FMFO) to feed fish and other farmed animals, despite the fact that most (90%) of these fish would be suitable for direct human consumption[19]. In salmon farming, fish oil in particular is a key ingredient which creates the Omega-3 content in the final farmed salmon product. Using wild-caught fish to feed farmed fish is an inherently unsustainable practice, destroying fish stocks, compromising food security and threatening the livelihoods of communities in the Global South. Making equitable use of the nutrients available from marine sources is vital to meeting the world population's nutritional needs. Groundbreaking research found that, in 22 countries in Africa and Asia, meeting the dietary requirements for all children under 5 would require 20% or less of current fisheries catches[20]. Yet in many of these countries, a very large proportion of fisheries catch is destined not for local, or even global, human consumption, but to make fishmeal or fish oil[21]. The aquaculture sector's continued reliance on wild-caught fish as a feed ingredient is placing additional pressure on ocean ecosystems, rather than alleviating this challenge, and threatening to undermine the achievement of several Sustainable Development Goals (SDGs). FMFO use in aquaculture feed should be phased out of company supply chains.

UNSUSTAINABLE PRACTICES: SOURCING WILD-CAUGHT FISH FOR FEED

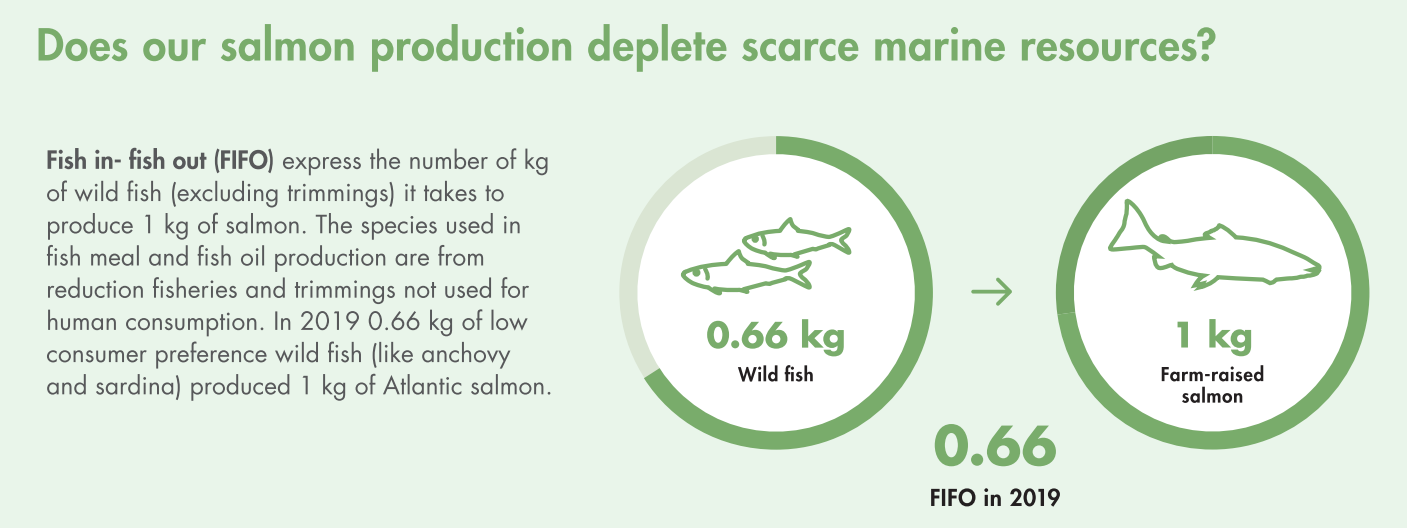
Information provided on Sainsbury's online store states that Scottish salmon sold by Sainsbury's is fed "a bespoke diet designed to protect our natural resources from over fishing and guarantee great taste and nutritional benefit for you." [22] What Sainsbury's omits to mention is that the 'bespoke diet' in question contains significant quantities of fishmeal and fish oil produced using fish caught in the wild.

Like the wider industry, Mowi has lowered its reliance on wild-caught fish as an ingredient in farmed fish diets by including other types of protein and lipid raw materials[8].

However, as the world's largest producer of farmed salmon, it still uses significant quantities of what are euphemistically referred to as 'marine ingredients.' According to its 2019 Annual Report, Mowi sourced 52,391 tonnes of fishmeal and 44,490 tonnes of fish oil for use in its aquafeed. Based on data on the volume and sources of fish oil used by Mowi, this means that Mowi's feed production operations relied on an estimated 880,000 tonnes of wild-caught fish[a], in a year when the company produced 436,000 tonnes of harvested farmed salmon. To put this in context, 880,000 tonnes of wild fish is more than the 2018 global marine capture for the whole of Canada[23].

Salmon is no different from other farm animals in that it is an inefficient way of putting protein on our plates: growing feed to produce farmed fish or animals is less efficient than growing or catching food to feed humans directly. Only 28g of every 100g of protein included in salmon feed makes it to our plates[88].One reason to eat oily fish like salmon is because of its micronutrient content, including key micronutrients like vitamin D and Omega-3.

FIGURE 2: MOWI 'FISH IN FISH OUT' RATIO



Source: MOWI. Integrated Annual Report 2019 [Internet]. 2019. Available from: https://corpsite.azureedge.net/corpsite/wp-content/uploads/2020/03/Mowi_Annual_Report_2019.pdf

a This figure is calculated based on publicly available information and data communicated in a formal response by Mowi to Feedback in September 2019. The volume of fish used to produce fish oil was calculcated using the average yield of 4.8% of fish oil from whole fish, according to the global industry body IFFO.

Wild fish catches, once processed, deliver more fishmeal than fish oil. Fishmeal is used to feed other farm animals such as prawns or pigs rather than salmon reared by Mowi. However, the estimated 880,000 tonnes of fish *must* be caught to produce the volume of fish oil used in Mowi aquafeed.

These micronutrients are present in farmed salmon because of the wild fish content of their diets. Through nutritional modelling, Feedback has shown that directly consuming a wide variety of small, oily fish, commonly used for salmon feed, would provide the same level of micronutrients as through current levels of Scottish farmed salmon consumption, while avoiding the capture of 59% of fish currently used in Scottish salmon feed[24].

One way companies can reduce their reliance on wild-caught fish to produce fish oil is through greater use of fish oil made from trimmings, or by-products, of fish caught for direct human consumption. We were unable to find data on proportions of trimmings use in Mowi's annual reports; however, in a communication to Feedback, Mowi stated that their by-product use in Scotland was 4.9% of total fish oil. If Mowi were to bring its usage of fishery trimmings and by-products in line with industry average of around one third of fish oil coming from trimmings, then the volume of wild-caught fish needed to produce fish oil in Mowi's aquafeed would still be an estimated 620,000 tonnes. This is equivalent to the total landings of fish and shellfish by the UK's fishing fleet in 2019[25].

PROBLEMATIC SUPPLY CHAINS

Mowi's policy on sustainable salmon feed states that "[m]arine raw materials processed from whole fish shall be sourced from suppliers who adhere to responsible fishery management practices. This entails sourcing fishmeal and oil from fisheries that are certified as sustainable according to the MSC standard and/or the IFFO RS scheme and/or achieve Fish Source scores ≥6 in all categories and ≥6 in the biomass category."[26]

BOX 2: HOW RELIABLE IS THE IFFO RS STANDARD?

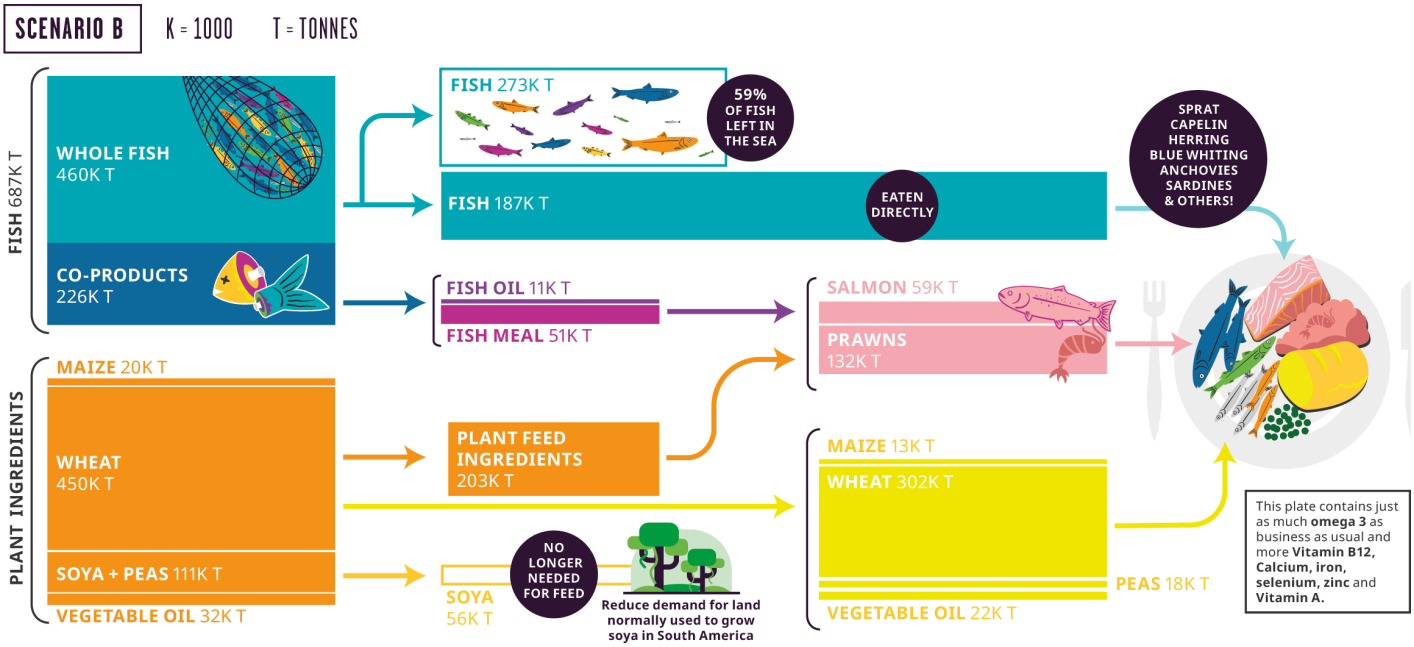
The IFFO RS Standard (recently renamed MarinTrust[27]), which aquafeed companies and retailers rely on as a guarantor of the FMFO sector's sustainability, is fatally flawed, principally because fisheries for 'indirect human consumption' are inherently unsustainable and therefore uncertifiable. What is more, while MarinTrust claims to offer a "robust, credible and accessible tool that ensures traceability and eliminates IUU fishing"[28] Changing Markets' investigations have shown that FMFO and aquafeed plants with links to highly unsustainable fishing practices are certified by MarinTrust[29]. MarinTrust is closely linked to IFFO, the trade body that represents FMFO producers, 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"[30].

Following IFFO RS's rebrand to MarinTrust in April 2020, MarinTrust executive chair Libby Woodhatch said:

> *"We will continue to work closely together with IFFO. We have an MOU and we do a lot with them, particularly around reputation. [...] 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."*[31]

Both the current vice president and former technical director of IFFO sit on the governing body committee of MarinTrust, as does Humberto Speziani (director of TASA, the world's largest FMFO producer).[89–91] These key players in the FMFO industry sit alongside other representatives from the FMFO and aquafeed sector and salmon-farming companies[34]. Several of the firms represented on the governing board of the MarinTrust are also members of IFFO. Given the presence on its governing body of so many individuals with strong vested interests in expanding FMFO certification, MarinTrust's credibility as an independent certification body, free of corporate interference, is implausible.

FIGURE 3: PRODUCING SALMON FEED SOLELY FROM BY-PRODUCTS



Source: Off the menu: The Scottish salmon industry's failure to deliver sustainable nutrition (2020), Feedback. London

Mowi's most recent annual report states that, in 2019, the company sourced 10,759 tonnes of fish oil from round and flat sardinella from Mauritania – equivalent to 24.2% of all fish oil sourced. There are currently no MarinTrust-certified fisheries in Mauritania[35] and sardinella is considered by the UN Food & Agriculture Organisation (FAO) to be overfished throughout the entire West African region[36] as are other important pelagic species[37]. Mowi's adherence to its own sustainable sourcing policy is therefore in doubt.

BOX 3: ZOOMING IN ON WEST AFRICA

Round sardinella (Sardinella aurita) from north-west Africa is a common dish in countries including Senegal and the Gambia, where fishing and fish form an important part of coastal communities' livelihoods and diets. Mauritanian and Moroccan waters are both situated within the FAO fishing area Eastern Central Atlantic, which has seen its overall capture fisheries grow by 17.3% between 2005 and 2014: it is the third fastest growing fishery globally and the fourth most unsustainably fished area worldwide, with 40% of fisheries biologically unsustainable[38]. The round sardinella in this area is listed as overexploited[38]. There is also local evidence that Mauritanian FMFO plants are operating significantly under capacity due to low catches. As the climate changes, fisheries like the West African sardinella will come under increasing pressure from changing sea temperatures and other ecosystem factors. Overall, tropical nations are expected to experience the greatest climate-induced losses, with a projected 40% decrease in fish catch potential as a result of climate change[39]. Fishing by fleets from the European Union, Russia, Turkey, China and South-East Asia – and high fish exports to the EU as well as China – have led to local fish scarcity and price increases that have made fish increasingly inaccessible to local people[40].

Mowi also sourced 17,874 tonnes of fish oil from anchovy from Peruvian and Chilean waters in 2019, equivalent to 40.2% of its overall fish oil requirements[8]. The Peruvian FMFO industry portrays itself as a model of sustainability, with more MarinTrust certified fishmeal plants than anywhere else in the world[41]. However, in reality it is plagued by corruption and scandals, from the underreporting of fish catches and the overfishing of juvenile fish[42], to the diversion of thousands of tonnes of anchovy destined for human consumption to produce fishmeal instead[43].

Peruvian anchovy plays a key role as a prey species in the Humboldt Current System[44–47], one of the most productive marine ecosystems on Earth[48]. In recent years it has been reported that endangered, threatened or protected species have been directly affected by the fishery[32,33,49]. Despite this, and a combination of risk factors which increase the likelihood of overexploitation of the stock, there is no precautionary capture strategy in place that considers the key role of the Peruvian anchovy in the ecosystem[50].

In addition to sustainability concerns, Peru is facing a food security and malnutrition crisis, especially impacting small children. According to the UN World Food Programme (WFP), although chronic child malnutrition has halved since 2007, it continues to affect 13.1% of children under five, with significant differences according to area of residence. This affects areas near the coast where most FMFO production is concentrated, such as the Ancash region where 16.1% of children under five were reported to suffer from anemia in 2017, above the national average[51].

In addition to overfishing, climate change is likely to exert significant pressure on global fish stocks over the coming decades, including on sardine and anchovy populations[52]. Indeed, the Intergovernmental Panel on Climate Change (IPCC) 2019 *Special Report on the Ocean and Cryosphere in a Changing Climate* warned that carbon emissions from human activity are leading to ocean warming, acidification and oxygen loss, with increasing ocean temperatures already having a visible impact on the growth, reproduction and survival of fish stocks[53].

NO POLICY TO PHASE OUT FMFO

Mowi's policy on sustainable salmon feed does not mention the potential of alternatives to FMFO, nor does the company have any concrete targets for reducing its reliance on, or the phasing out of, the use of wild-caught fish in feed in its sustainability strategy[54]. Additionally, in the past two years, Mowi's compliance with its own sourcing policy has dropped, from 100% in 2015, 2016 and 2017, to 83% in 2018 and 84.3% in 2019[8]. Mowi has stated it is increasing the use of trimmings in feed production, but even if it is improving upon the 4.9% rate of trimmings included in fish oil in 2018[55], it is trailing far behind other salmon feed producers, especially BioMar, and has a long way to go to reach the global average of 33%. It is important to note here that even increasing the use of trimmings and co-products in feed has to be managed carefully, as there is a risk they could become a market driver, distorting demand and driving increased wild fish captures. Furthermore, the industry should work towards maximising the use of such co-products in direct human consumption before channelling these into the feed market.

HIGH MORTALITIES ON FARMS

In recent years, Mowi has suffered significant losses as a result of mortalities at its salmon farms. For example, a mass mortality event across several of its Canadian farms in 2019 resulted in the death of millions of fish and led to the suspension of the company's farming licenses[56]. It also had a significant impact on group earnings despite rising revenues[57].

In 2019, the Scottish salmon industry reported 5.8 million fish deaths, equivalent to roughly 14% of production[24]. Recent research by Feedback estimated that, in 2019, the amount of wild-caught fish used to feed farmed Scottish salmon that died before being harvested was around 25,000 tonnes – enough to provide a weekly portion of oily fish to 2 million people for a year[58].

Mowi accounts for a significant share of mortalities recorded at Scottish fish farms. In its 2019 annual report, the company reported that incident-based mortality in Scotland alone cost it €0.2 million in 2019, compared to €2.5 million in 2018[8]. The company states that 21,200 tonnes of salmon died on its farms in 'incident-based' mortalities, which represented 34.8% of all mortalities[8]. Using this percentage, it can be calculated that total mortalities of salmon (both 'incident-based' and non-'incident-based') on Mowi farms would equal 60,919 tonnes. When added to the 2019 production statistics (436,000 tonnes), it can be calculated that Mowi's mortality rate for the year was **12.26%** - more than double, for instance, the mortality rate allowed on chicken farms certified by the Red Tractor label, at 5%[59].

Misleadingly, in its annual report, Mowi's mortality objective of 99.5% salmon survival applies only to its seawater facilities; this leaves a large gap in reporting on survival rates, as freshwater sites account for the first 10-16 months of the salmon's life cycle (with the seawater phase accounting for the next 12-24 months)[8].

Key recent mortality incidents on Mowi farms include:

- Between July and September 2019, 2,600 tonnes of salmon died across 12 Mowi farms in Scotland, equivalent to 700,000 salmon[60]. Overall, in the same year, in Scotland Mowi lost 1.9 million salmon each weighing 3 kg on average.[b]
- In addition, over 1.5 million juvenile fish, 1 inch in size, were lost in one hatchery due to human error resulting in recirculation pump stopping (March 2019)[61].
- Between January and September 2020, Mowi reported over 1.1 million salmon mortalities to the Scottish government fish inspectorate. This is the second highest figure of all large salmon farming companies operating in Scotland, though reporting standards varied between companies[62]
- 2.6 million salmon died at Mowi Canadian subsidiary Northern Harvest Sea Farms (NHSF) in summer 2019 (this was reported to the authorities in September)[63] – attributed to 'unusually warm water temperatures'. **This represented 50% of all salmon in the farm**[64].
- In April 2020, Mowi announced that it would be culling 450,000 salmon at its hatchery in Newfoundland and Labrador due to an outbreak of infectious salmon anemia (ISA)[65].
- In October this year, Mowi reported two suspected detections of ISA on one of its sites off the coast of Newfoundland, owned by NHSF. These outbreaks could affect over 1 million salmon[66].

FISH ESCAPES

In November 2019, the World Benchmarking Alliance (WBA) assessed the 30 'most influential seafood companies', including Mowi, against the SDGs[67]. MOWI came second out of the 30 companies, but with a score of just 2.42/5. In addition, and even though Mowi's Annual Report 2019 states that its objective is "zero escapes",[8] the report flagged fish escapes as an area of concern: "**Mowi reports 783,323 escaped fish in 2018, which is significantly more than any other salmon farming company in the benchmark.**" By comparison, Cermaq (a Norwegian subsidiary of Japanese conglomerate Mitsubishi Corporation) reported 212,562 escaped fish in 2017 and 33,691 in 2018[68]; Norwegian salmon producer Lerøy (a subsidiary of Austevoll Seafood ASA) reported 1,200 and 115 escapes in 2017 and 2018 respectively[69]. Escaped fish are inherently problematic given that they can lead to interbreeding with wild populations or become invasive. Farmed fish are not genetically adapted to the surrounding environment; therefore when they breed with wild fish, their offspring are less likely to survive in the wild[70]. Wild salmon numbers have been hugely declining in the past decades – in 2019, Scotland's anglers reported catching the lowest number of wild salmon since records began in 1952[71].

In February 2018, 52,000 salmon escaped from Mowi's Austvika farm in Norway. In its incident audit report, the Norwegian Directorate of Fisheries stated, "Mowi ... did not show much care to prevent the fish from escaping and there [were] insufficient internal controls to ensure that escapes were detected as quickly as possible"[72]. Mowi was fined NOK 1.2 million (€108,000) for the incident, but appealed in April 2020. In July 2018 approximately 690,000

b All mortality numbers calculated from https://www.gov.scot/publications/fish-health-inspectorate-mortality-information/ (downloaded 7 April 2020). The average weight of 3kg is a weighted average based on reported Mowi mortality events alone.

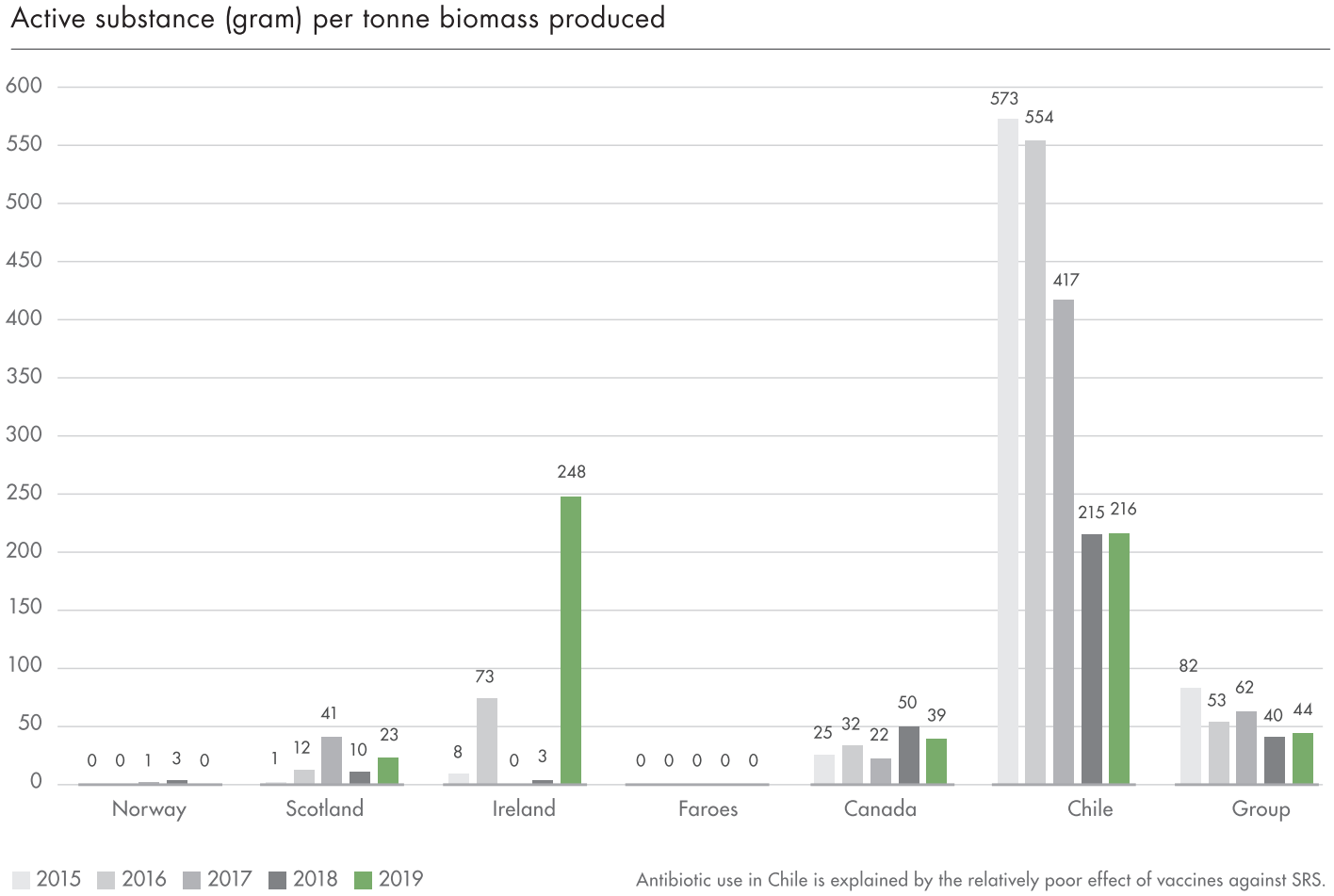
salmon escaped from Mowi's Punta Redonda farm in Chile. The company was fined £5.1m after the country's Superintendancy of the Environment (SMA) ruled that the escape occurred because Mowi had not maintained appropriate security conditions or equipment of optimal quality and resistance[73]. In August 2020, Mowi said that it would legally challenge the decision.

In 2019, 16 incidents of fish escapes were recorded by Mowi in its global operations, amounting to 68,145 fish[8]. This includes four incidents of fish escapes recorded on Mowi farms in Norway in October 2019[74]. This figure, comparatively low compared to the global figure in 2018, had already been exceeded in 2020 by the end of January; in two standalone incidents in Scotland in 2020, in January and August, 74,000 and 50,000 salmon escaped from Mowi farms respectively[75]. Farmed salmon from the August incident have been discovered in rivers in Cumbria, 150 miles away[76].

ANTIBIOTICS USE

Mowi states in its 2019 annual report that it has been aiming for a reduction in antibiotic use from 2015 levels. However, its use of antibiotics across its farms increased between 2018 and 2019, from 40 grams of active substance per tonne produced to 44 grams. This is 149% higher than its average annual use of antibiotics for 2011-2014[8]. This use of antibiotics is not spread evenly across Mowi's country operations, with the majority of use occurring in Chile, Ireland, Scotland and Canada, while no antibiotics were used at the company's sites in Norway and the Faroe Islands[8]. In its 2019 annual report, Mowi states that its antibiotic use in Ireland was the highest out of all of its country operations, per tonne of biomass produced. This is particularly suprising, considering that Mowi Ireland operates under the "Irish Organic Salmon Company" brand, which carries the tagline: "100% certified organic salmon"[77].

FIGURE 4: MOWI'S ANTIBIOTIC USE



[Chart taken from Mowi's 2019 Annual Report – p.67]

Historically, Chile has seen the highest use of antibiotics in its farms and the least transparency. By the end of 2017, Mowi said that it was aiming to cut back on the use of antibiotics across its Chilean locations by as much as 70%[78]. In 2018, Chile's Council for Transparency (CPT) ordered salmon companies in the country to provide information on the amount of antibiotics used by the company and its farms in 2015, 2016 and 2017. However, in February 2018, Mowi refused to provide this data, and in January 2019, Mowi Chile appealed a court ruling that individual salmon farming companies must disclose the amount of antibiotics used per growing cycle[79]. In Mowi's latest annual report, antibiotic use is presented in aggregate with no detailed breakdown per country or site[8]. It is interesting to note that companies report on antibiotic use per country as part of the Global Salmon Initiative – Mowi withdrew from this initaive in 2020 stating:

> *"We acknowledge that cooperation is vital to enhance the productivity and sustainability of the industry, and we will of course continue to cooperate with our peers and colleagues to accelerate progress. However, we do not believe that a global organization is the most effective solution to local and national challenges."*[80]

CHEMICALS USE

In May 2020, the Scottish investigative journalism co-operative *The Ferret* reported that Mowi used 19.6 tonnes of formaldehyde in its Scottish farms between April and December 2019; 11 tonnes were used in just one loch (Loch Lochy)[81]. Since 2016, the EU has classified formaldehyde as a carcinogen[82]. Despite this, the company announced in June 2020 that its Loch Lochy site had been certified by the Aquaculture Stewardship Council (ASC)[83]. Both lochs were audited using the ASC Trout Standard, not the Salmon Standard, on account of the farms being in freshwater. Whereas the Salmon Standard does require limits on parasiticide and antibiotic use per cycle[84], the trout standard has no therapeutant metrics and overall fewer requirements for chemical use[85]. The ASC Trout Standard also does not assess the environmental impacts caused by formaldehyde use by the farms, highlighting a major weakness in the certification scheme that Mowi appears to be exploiting to appear more sustainable than it is.

In October this year, *The Ferret* reported a 72% increase in pesticide discharges from fish farms in Scotland's lochs, from 166 kilograms in 2018 to 286 kilograms in 2019[86]. Mowi's Scottish operations accounted for the five largest discharges of Azamethiphos[87], a pesticide categorised by the Scottish Environment Protection Agency (SEPA) as "moderately toxic to mammals and highly toxic to birds and to aquatic species (particularly larvae)"[87].

MOWI AND SAINSBURY'S SUSTAINABILITY GOALS

The reality of Mowi's business operations seriously undermines Sainsbury's reputation as a responsible retailer, in particular its commitment to sourcing sustainable seafood.

With its vertically integrated supply chain, Mowi should in theory be well-placed to fulfil its claim to be a leader in sustainability. This is in line with a statement made by their Chief Operating Officer for Feed:

> *"Feed is the key ingredient to success in aquaculture, so it makes sense that the world's largest salmon farming company maintains full control of this vital part of the process. This tight control also enables us to create niche feed required for our new premium brands now launching around the world."*
> Atle Kvist[8]

However, as this briefing has shown, the company is plagued by unsustainable sourcing of wild fish for its feed; high mortalities on its farms; unacceptably high levels of fish escapes, endangering the wild salmon population; and high levels of antibiotic and chemicals use. These issues pose both short-term and long-term dangers to both the economic and environmental performance of the company.

We challenge Sainsbury's to act on the findings presented in this briefing and call on Mowi to account for its multiple failures to respect ecological and environmental limits in the conduct of its operations.

As one of the UK's leading supermarkets, Sainsbury's should commit to phasing out the use of wild-caught fish to feed its farmed fish by 2025 at the latest, and use its purchasing power and significant market leverage to ensure that its suppliers comply with this commitment. Should Mowi fail to take rapid action to radically reform its farming practices and commit to eliminating the use of wild-caught fish in feed, Sainsbury's must reconsider its seafood sourcing strategy with a view to potentially removing Mowi from its supplier list.

RECOMMENDATIONS FOR RETAILERS WHICH STOCK FARMED SEAFOOD

- Ensure that natural limits on wild fish populations are not exceeded and commit to completely phasing out the use of FMFO sourced from purpose-caught wild fish in their aquaculture supply chain, including setting a date to achieve this target of no later than 2025.
- Commit to offering a wide range of seafood – including a greater diversity of sustainably caught wild fish, and aquaculture products produced without the use of FMFO, such as mussels – that can deliver the same key nutrients as mass-marketed farmed seafood, such as salmon, sea bass and prawns.
- Adopt high standards of transparency and corporate policy on their suppliers, including full disclosure of suppliers – from source fisheries upwards.
- Reduce reliance on certification as a proxy for sustainability by developing their own robust and transparent standards for sustainably produced seafood, including farmed seafood.

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