Risk and opportunity in the seafood sector:

The business case for sustainability

Summary report by WWF-US

June 2019

The world's leading conservation organization, World Wildlife Fund works in 100 countries and is supported by more than one million members in the United States and close to five million globally. WWF's unique way of working combines global reach with a foundation in science, involves action at every level from local to global, and ensures the delivery of innovative solutions that meet the needs of both people and nature.

The Gordon and Betty Moore Foundation fosters path-breaking scientific discovery, environmental conservation, patient care improvements and preservation of the special character of the Bay Area. Visit Moore.org or follow @MooreFound.

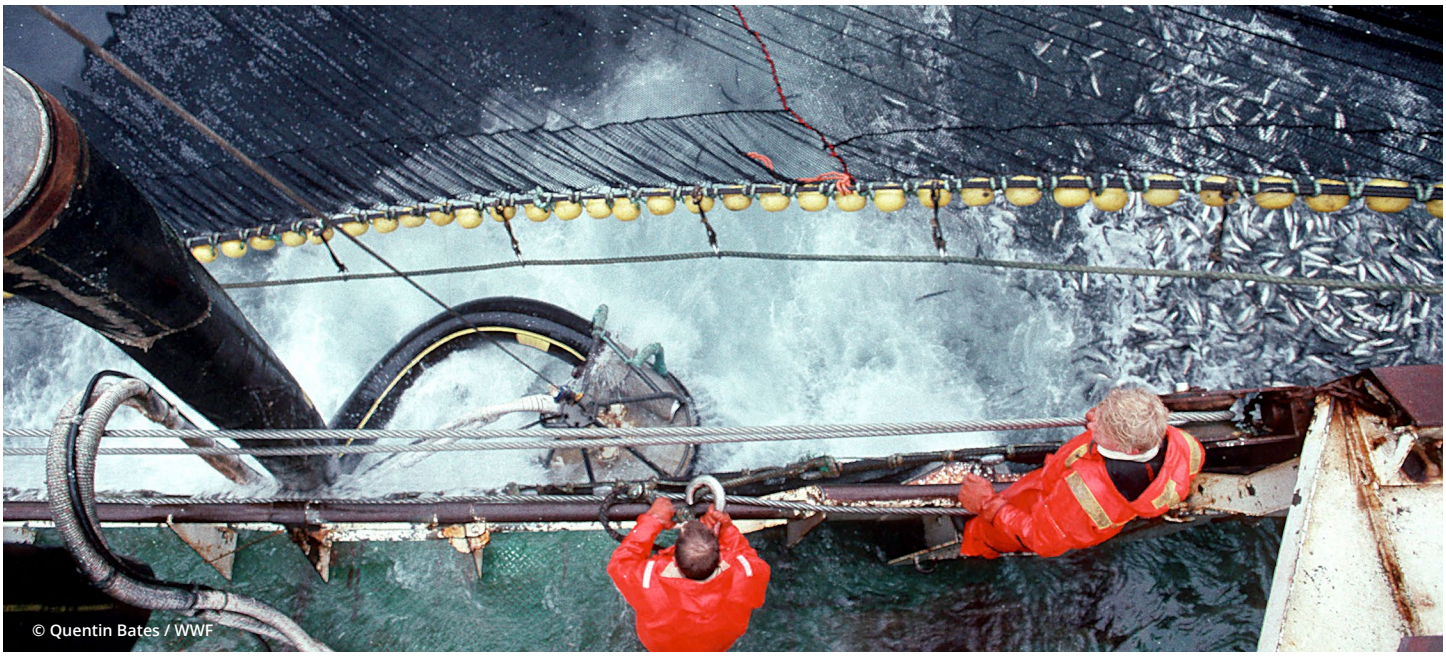
This report was written by WWF US and funded by the Gordon and Betty Moore Foundation.

For more information please see:
www.seafoodsustainability.org/industry/businesscase or contact

Lucy Holmes, Senior Programme Manager, Seafood Finance
lholmes@wwf.org.uk

Raj Kundra, Vice President for International Finance
raj.kundra@wwfus.org

CONTENTS


© Quentin Bates / WWF

EXECUTIVE SUMMARY

Background and introduction

The seafood sector is globally important for its role in food security, income and livelihood security, trade and development and national and regional economies. Growth in production has been rapid over the past few decades with 171m tonnes of seafood produced annually worth around $362bn. However, rapid growth has, in some cases, come at the expense of investment in the long-term sustainability of the industry. Overexploitation of fish stocks, impacts on Endangered, Threatened and Protected species caught as bycatch, destruction of marine ecosystems such as coral reefs and mangroves and pollution have been some of the impacts associated with the growth of the seafood industry in the last few decades. These impacts not only affect the environment and people, but also create risks for industry that ultimately affect its long-term viability by, for example, impacting on the availability and affordability of supply, threatening reputations, and changing market and regulatory conditions. As examples, World Bank estimates that the global economy foregoes approximately US$83bn a year in revenue due to over-exploitation of fisheries, and disease and pollution in aquaculture have cost the industry billions of dollars in lost revenue.

The interlinkages between environmental impacts and economic performance are increasingly clear and it is critical for businesses and their investors to understand the value of sustainability to their continued performance and the risks of continuing along a business as usual pathway. This report draws on a number of studies undertaken by WWF and our partners to understand the economic and financial landscape in which the seafood sector operates and outlines the interventions needed to achieve more sustainable outcomes for companies, financiers and seafood producing nations.

Seafood sector landscape

The broad policy and commercial landscape in which the seafood sector operates can create systemic risk for the industry. Certain dynamics inherent in the seafood sector create barriers to sustainability which can lead to high levels of perceived and actual risk for industry players. These barriers include:

- Lack of effective resource management, despite the high dependence of the sector on shared natural resources and ecosystems.
- Weak governance due to a mis-perception of the socio-economic importance of the sector and a lack of political willingness to address the underlying issues leading to under-investment in the enabling environment, illegality and subsidies.
- A diffuse, small scale and fragmented production base that is hard to reach, finance or insure.
- A lack of transparency and robust data to inform, measure and manage the sector in an equitable, sustainable and profitable way.

Risk and cost in the seafood sector

These high levels of risk not only impact the environment and communities, but also the businesses that depend on them; affecting the seafood sector's ability to continue to operate in a sustainable and profitable way unless they are clearly understood, identified, managed and mitigated.

Operational risk

A lack of sustainable management in fisheries and fish farms affects the accessibility and affordability of raw material. Specifically, through new evidence commissioned by WWF, the financial impacts of resource degradation due to weak management are beginning to materialise for seafood companies in the form of supply and price volatility. For example, in the U.S. market for Blue Swimming crab, rising wholesale costs as a result of over-exploited crab stocks in South East Asia are leading to price shocks, erosions of margin and market share, and in some cases demand destruction where product is taken off shelves or menus. In one scenario it was estimated that 19% of the US importing market would be expected to lose between 32% and 47% of their margins and between 21% and 38% of their market share if prices went up by 15%. In the Western Central Pacific Ocean Bigeye tuna fishery, the overall biomass has been so heavily overfished historically that despite healthy stocks today, there are strong indications that current fishing effort will lead to the longline fleet becoming unprofitable in the next ten years, and by 2030 the supply of tuna to the Japanese sashimi market is predicted to be 25% less than it is today.

In aquaculture, unsustainable management of farms and farming regions has led to disease outbreaks that can decimate harvests. In shrimp farming, disease can spread quickly leading to harvest loss across whole producing regions. Some estimates suggest that disease in shrimp farming has cost the industry more than US$20bn over the past decade. In addition, the constraints on supply of feed from wild caught fisheries, many of which are poorly managed, puts farmers at the mercy of price fluctuations in global feed markets.

All actors in the supply chain rely on raw material being available and affordable to maintain profitability. A supply and demand crunch for seafood products underpinned by weak management of the production base will continue to create cost shocks and price volatility for buyers and suppliers of seafood.

Reputational risk

Issues such as illegality, human rights abuses and seafood fraud are rising up political agendas and gaining ground in the media and, as such, present increasing reputational risks for seafood companies, particularly those with complex supply chains. Recent high-profile reports have created unprecedented awareness of issues such as slavery on fishing vessels and in supply chains or instances of seafood fraud associated with a number of specific global brands and retailers. For example, forced labour has been found in seafood supply chains in 55 countries on 5 continents. And another study has estimated that 20% of seafood has been labelled incorrectly exposing companies selling mislabelled products to reputational risks around health and safety and illegality.

Market risk

End markets for seafood are also changing in response to heightened consumer awareness of environmental and social issues in the seafood sector. One indicator of this trend is the growth in sales of certified seafood which is now ten times that of conventional seafood, driven almost entirely by end-buyer commitments to sustainable sourcing. This is equivalent to 23m tonnes of certified seafood in 2016 compared to just 500,000 tonnes in 2005. This means that producers, processors and distributors of seafood will be at a disadvantage if they are not able to supply seafood products that meet market requirements.

Regulatory risk

Governments in key seafood consuming markets are also responding to growing concern over issues in the seafood sector such as illegality and labour and human rights abuses. Regulatory measures in both the E.U. and U.S., two of the most important export markets for seafood are tightening and producing or exporting countries are being penalised if they are not compliant with new measures. For example, at the beginning of 2017 the US, a major seafood importing nation, introduced new measures under the Seafood Import Monitoring Program (SIMP) which requires more stringent reporting and record keeping for seafood entering the U.S. Countries such as Belize, Thailand, Vietnam and India, amongst others, have suffered due to export restrictions from both US and EU regulatory changes, which in some cases have been rapidly introduced. Companies that are not able to trace products and show that they are produced legally and sustainably will continue to be at a disadvantage.

© AG-ChapelHill / Getty Images

Risk mitigation tools

Managing and mitigating the increasing risks to businesses from a lack of sustainability is critical and there is an emerging suite of tools available. Businesses need to scale up existing activities, as well as take a more transformational approach to risk mitigation. The new 'business as usual' must go beyond an incremental or piecemeal approach and move to a mainstream, holistic and collective effort. It is recommended that the following tools are applied:

1. **Implementing best practice**
   Initiate and support best practices at the base of the supply chain where sustainability risks are concentrated. This can include the implementation of improvement projects and certification standards which will mitigate key production risks and help to ensure access to market is maintained for both producers and suppliers.
2. **Full-chain digital traceability**
   To meet market requirements, move to full-chain digital traceability to unlock rapid-access data on supply chains in order to monitor compliance, reinforce management rules and credibly substantiate sourcing claims.
3. **Long-term contracts**
   Introduce long-term contracts into relationships with suppliers/producers in order to increase security of supply of sustainable seafood, lower costs and support producers through the transition.
4. **Aggregation and integration**
   Support sustainable and inclusive models that aggregate and scale up operations, particularly for producers, to lower risk, increase value and transparency and facilitate access to finance for the transition.
5. **Collaborative industry platforms**
   In recognition of the range of collective risks that exist in the seafood industry, proactively collaborate with peers, where appropriate to scale and speed up the changes that are required to transition to a sustainable seafood sector.
6. **Advocacy for good governance**
   Given how critical good governance is to the viability, sustainability and ultimate profitability of the seafood sector, engage regulators to swiftly put in place the enabling frameworks to transition this sector to sustainability.

Aligning capital

The risks outlined in this report are also relevant for the financial institutions (FIs) that own or lend to seafood businesses. As such, businesses should expect to be engaging their shareholders or creditors more and more on these issues. As the risks become more evident for companies, banks and investors will begin to ask more questions and develop robust policies for sustainable seafood investment. There are emerging tools and principles, such as SCRIPT, the Sustainable Blue Economy Finance Principles and the Principles for Investment in Sustainable Fisheries, that can help FIs to understand the risks they might be exposed to in the seafood sector through their portfolios and begin to ask the right questions to the companies they finance.

At the same time, insurance or blended finance mechanisms can also support the transition to sustainability by facilitating the flow of capital towards that aim. It is thought that only about 3% of seafood production is insured exposing the supply chain to a significant unmanaged risk. However, given the clear links between sustainability and risk mitigation, there is huge potential to create new insurance products that align best practice with discounted premiums and provide an incentive to transition. Blended financial products that make the most of different risk/rewards profiles of capital providers will also be critical to create new sustainable business models in the seafood sector or allocate funds to the transition.

Conclusions

It is clear that environmental and social concerns are inextricably linked to the financial performance of the seafood sector and to individual businesses up and down the supply chain. Whether managing risk at the farm or fishery level, or throughout the supply chain, the licence to operate for seafood companies is rapidly changing. Companies need to scale up existing efforts and embrace new ones in order to manage risk and create a sustainable, both environmentally and financially, sector for the future.

© Antonio Busiello / WWF-US

INTRODUCTION

Seafood is one of the most important food commodities in the world. With total production at around 171m tonnes, seafood is worth $362bn annually and employs nearly 60m people worldwide[1], mainly in low or middle income countries. It is also one of the most highly traded commodities globally with exports worth $152bn in 2017[2]. Wild caught tuna alone contributes $40bn a year to the global economy[3] and farmed shrimp is worth around $21bn[4]. At 90m tonnes a year, wild capture production is more or less flat, whilst aquaculture now accounts for over half of all seafood produced and is the fastest growing global food system at a rate of 5.8% a year[5].

Seafood production and sales have high growth prospects and strong supply/demand fundamentals due to human population growth and a rapidly growing middle class adding further demand for protein. In fact, consumption of seafood continues to outpace both population growth and growth in meat consumption from all terrestrial sources[6]. In short, the seafood economy, from production to processing, and from export to retail, is critical for food security, livelihoods, local and national economies, export revenue generation and, if undertaken sustainably, is a key contributor to a sustainable blue economy.

However, the seafood sector has suffered from chronic under-investment in the conditions that will enable it to continue to grow, create economic value, and feed and employ people. Historic growth has been at the cost of increasingly severe environmental and social externalities. Long-term sustainability, stability and, ultimately, viability of the industry have therefore been overlooked in favour of short-term gains. These conditions challenge the sector's resilience and future profitability. For example, over a third

[1] FAO, 2018. The State of World Fisheries and Aquaculture 2018 – Meeting the Sustainable Development Goals. Rome.

[2] Ibid.

[3] Pew, 2016. Netting Billions; A Global Valuation of Tuna. Pew Charitable Trusts, Washington D.C.

[4] Pontos Aqua, 2018. White Paper: Value Propositions for Sustainability Improvement in Global Shrimp Aquaculture.

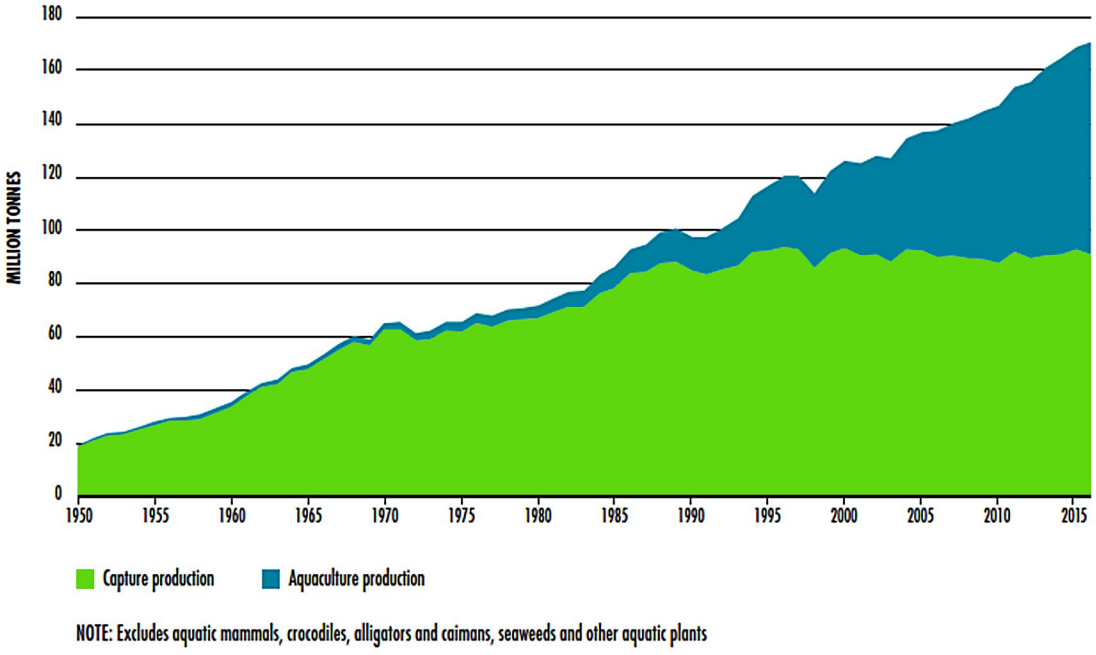
[5] FAO, 2018. The State of World Fisheries and Aquaculture 2018 – Meeting the Sustainable Development Goals. Rome.

[6] Ibid.

of global fisheries are over-exploited and are widely considered to be underperforming assets. The World Bank estimates that harvests could be 13% higher if they were managed sustainably and worth an additional $85bn a year[7]. Aquaculture has been riven with disease outbreaks due to rapid growth and mismanagement, costing the industry billions of dollars in lost revenue over the past few decades. These are just two examples, but there is clear evidence emerging that ignoring social and environmental risks cost businesses in the short, medium and long term. At the same time, there are tools, initiatives and opportunities for collaboration that businesses can draw upon to better identify, manage and mitigate these risks, avoiding unnecessary costs and supporting the transition to sustainability.

With economic performance in the seafood sector so inextricably linked to the health of the natural assets and wellbeing of their workforce throughout supply chains, it is imperative that sustainability is seen as material to business longevity and profitability and its value accurately assessed. For this to happen, sustainability issues and impacts need to be re-cast as material risks to company performance and, in turn, to the financial institutions that provide them the capital to operate. This report draws on a number of studies undertaken by WWF and our partners to understand the economic and financial landscape in which the seafood sector operates and the business cases for interventions that lead to more sustainable and profitable outcomes for companies, financiers and seafood producing nations.

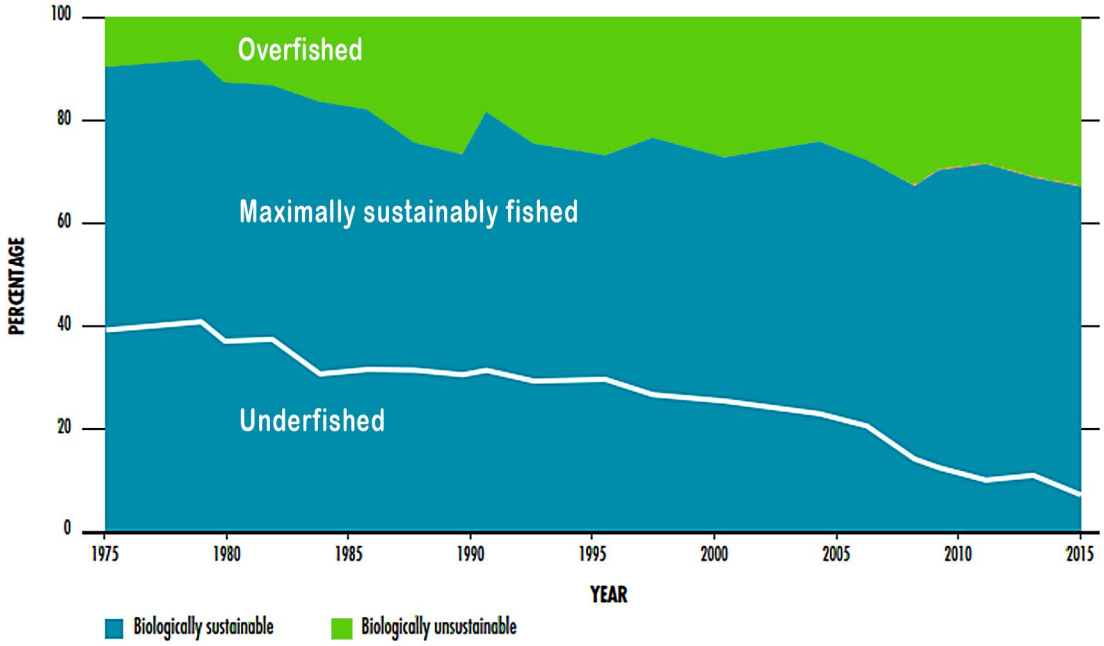
Figure 1. *World Capture Fisheries and Aquaculture Production*



Source: *FAO 2018, The State of World Fisheries and Aquaculture 2018.*

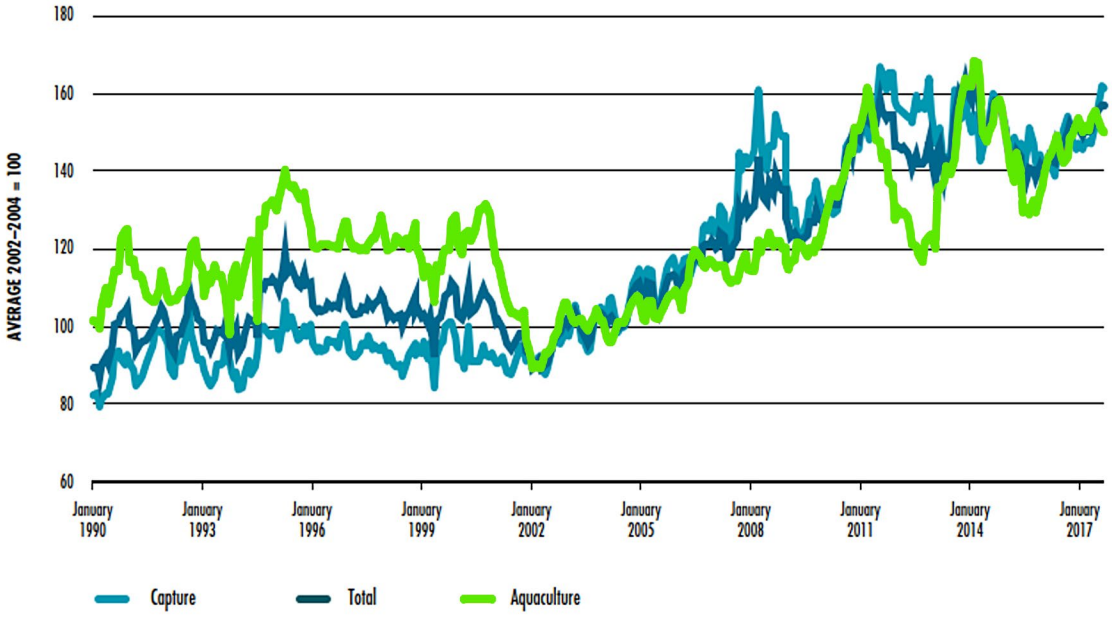
[7] Word Bank, 2018. The Sunken Billions Revisited: Progress and Challenges in Global Marine Fisheries. Washington D.C.

Figure 2. *Global Trends in World Capture Fisheries*



Source: *FAO, 2018. The State of World Fisheries and Aquaculture 2018.*

Figure 3. *Trends in Fish Prices*



Source: *FAO, 2018. The State of World Fisheries and Aquaculture 2018.*

KEY BARRIERS TO SUSTAINABILITY IN THE SEAFOOD SECTOR

1. Natural resources and management complexity

The seafood sector is highly dependent on the successful and sustainable management of natural resources. Most notably, the wild capture sector is reliant on the continued functionality of marine ecosystems to sustain commercial fish populations. In aquaculture, the health of ecosystems in which farms are located, such as water bodies or mangrove forests, also contribute to the success or failure of farming fish. But dependence on these natural resources can only be indefinite when they are carefully managed. Good management leads to predictability and continuity enabling businesses to have security over the amount of fish they can harvest and sell. Negative actions by a few players in seafood production systems, such as heavy pollution or over-exploitation, can have a negative economic impact on many others and even the industry as a whole. It is still often the case that the 'natural capital' that is the basis of fish production is not accounted for by businesses or authorities and therefore resources are mis-managed, leading to over-exploitation and degradation. Ultimately, this undermines the viability of the ecosystem services provided and therefore the associated incomes and businesses.

2. Weak governance, illegality and subsidies

Due to the management challenges inherent in a sector that is so heavily dependent on natural resources, robust governance is key to sustainability and profitability. In the seafood sector, robust governance includes, at the very least, a clear policy framework that outlines environmental targets and limits and equitable access for communities; implementation, monitoring and enforcement of these policies; and a systematic collection of relevant data on natural assets. However, to date, governance for fisheries and aquaculture has been weak with little enforcement of policies and inadequate data available to make good management decisions. In some cases, these weaknesses have been due to a misallocation of public resources due to historic mis-perceptions of the economic, social and environmental significance of the seafood sector. In other cases, it is simply a function of corruption and vested interests. Regardless of the reason, it is clear that without good governance, the private sector, whether in farming or fishing, have little security to invest in their long-term business interests or an incentive to play by the rules. In many cases, businesses lack an awareness or understanding of the risks they are exposed to due to governance gaps.

Illegality has been one of the particularly egregious side effects of weak governance in the seafood sector. In wild capture fisheries, it is estimated that $23.5bn worth of illegal fishing is taking place each year[8]. This puts the entire supply chain at risk by extracting a resource from the ocean that is unaccounted for. Illegal fishing operations (or Illegal, Unreported, or Unregulated (IUU) fishing) have also been linked to other nefarious activities such as drug, arms or human trafficking. In some South East Asian countries human rights and labour abuses have been found to be rampant on board fishing boats. Some studies[9] suggest

[8] Agnew et al, 2009. Estimating the Worldwide Extent of Illegal Fishing. PLoS ONE.

[9] EJF, 2015. Pirates and Slaves: How Overfishing in Thailand Fuels Human Trafficking and the Plundering of Our Ocean. Environmental Justice Foundation. London.

that one of the drivers of illegal practices is the inability of the industry to turn enough of a profit through legal operations (given overcapacity in fisheries) to sufficiently support livelihoods. In the case of labour issues, marginal profits from fishing due to overfished stocks may have led to an incentive to acquire cheap or free labour.

Another symptom of weak governance leading to economic under-performance has been the historic subsidisation of the seafood industry. The vast majority of subsidies (approximately 92%) for the seafood sector go to fishing operations, with 5% percent going to aquaculture and the rest to marketing[10]. Subsidies in some cases prop up inefficient, high risk or unprofitable parts of the industry distorting markets and creating unfair advantages to subsidised producing markets. As ecosystems degrade and natural capital is eroded, businesses can become un-profitable. But to maintain business operations, exports, livelihoods or food security, governments can give out subsidies for otherwise expensive inputs such as vessel or farm construction, feed, fuel or ice. These subsidies can then lead to over-capacity of production or processing as compared to the ability of the already pressurised ecosystem to support these activities.

3. Scale and fragmentation

The vast majority of seafood production – around 98%[11] – is undertaken in emerging or developing markets where the structure of the industry tends to be small-scale and fragmented i.e dominated by small and medium sized enterprises (SMEs). These producers can range from individual fishermen or single family-run aquaculture ponds, to small traders or processors who buy from a few local fishermen or farms. In these circumstances, capacity is often low in terms of business acumen, access to credit, awareness of natural resource management issues or ability to respond to changing supply chain needs. This often means subsistence and immediate financial needs are the priority, with little ability or willingness to plan for the long-term and invest in sustainability improvements. The diffuse nature of the production base also challenges those tasked with monitoring and compliance in global seafood supply chains to obtain the data and levels of transparency needed with regards to provenance. In addition, the finance sector finds it challenging to provide seafood SME's with capital as the transaction costs are too high relative to the risks. This is also true for the insurance sector and as a result, only 3% of the seafood sector is insured[12]. Small producers often rely, therefore, on subsidies or subsidised credit, informal (high-cost) credit sources or value chain finance, for example. Consequently, the vast majority of the production base of one of the most globally important protein sources in the world have short-term horizons, are hard to access, are informally financed and uninsured, exposing the rest of the supply chain to huge un-managed risk.

4. Transparency and data deficiencies

Lastly, data deficiencies and opacity are well documented in the seafood sector. These data deficiencies materialise at multiple points along the supply chain, but they are perhaps most pronounced at the production level. For example, 80% of fishing takes place in countries with little systematic data collection[13]. These data gaps include the status of fish stocks and marine ecosystems, the number and type of fishing vessels (and gear) permitted to fish in certain areas, fishing access agreements between countries and the total amount of fish harvested and landed (including bycatch and discards), including by species type[14]. IUU fishing is also largely unaccounted for so even where good data exists for legal fishing effort, it can be misrepresentative of reality. In aquaculture, data deficiencies at the farm level are less than in fisheries, but there is still a lack of analysis on ecosystem impacts of fish farming, the impact on wild populations, disease control and prevention etc. Despite being an industry that is highly dependent on natural resource management and scientific data, there has always been a disconnect between science, policy and business. Some see seafood as behind other food commodity sectors in this respect[15]. Much more is known and understood about agriculture, for example. This lack of data leaves the seafood sector behind in terms of the ability to monitor and manage environmental, social or governance risks and in many cases contributes to the misconception that these issues are not fundamental to business performance.

[10] World Bank, 2017. Life Below Water: SDG Atlas 2017. Available at: http://datatopics.worldbank.org/sdgatlas/archive/2017/SDG-14-life-below-water.html

[11] FAO, 2018. The State of World Fisheries and Aquaculture 2018 – Meeting the Sustainable Development Goals. Rome.

[12] Orion Consulting, 2018. White Paper for WWF: Scaling up Financing of Sustainable Seafood Production: Understanding Barriers and Opportunities to Align Capital with Sustainable Seafood Production.

[13] World Bank, 2017. Life Below Water: SDG Atlas 2017. Available at: http://datatopics.worldbank.org/sdgatlas/archive/2017/SDG-14-life-below-water.html

[14] Fisheries Transparency Initiative, 2018. At a Glance: Responsible Fisheries through Transparency and Participation. Available at: http://fisheriestransparency.org/wp-content/uploads/2018/09/FiTI_AtaGlance_EN_20180925.pdf

[15] Orion Consulting, 2018. White Paper for WWF: Scaling up Financing of Sustainable Seafood Production: Understanding Barriers and Opportunities to Align Capital with Sustainable Seafood Production

RISKS AND COSTS IN THE SEAFOOD SECTOR

The dynamics outlined above create systemic risk to the seafood sector and increasingly negative impacts on the environment and communities. In some instances, these risks are highly visible to companies, and in other cases, they are hidden or discounted. Recent evidence is beginning to shed light on the real risks and costs to businesses of ignoring critical environmental and social impacts and continuing along a 'business as usual' trajectory. In many cases, the risks are felt most strongly in emerging markets, where most seafood production and consumption occurs, and where most growth is projected to occur in the future.

1. Operational risk

The most obvious operational risk that supply chain businesses face in the current seafood industry landscape, is that of availability and affordability of raw material. Looking at the market as a whole, production from wild capture fisheries is stagnant, despite variances in species and geographies, and price volatility is high (figures 1 and 2). In aquaculture, growth trajectories are strong, but are also vulnerable to huge fluctuations. At the same time, feed for aquaculture operations is still highly dependent on wild caught fisheries, which are therefore subject to the same constraints and risks as other wild caught species. Companies that source from farms or fisheries that are not sustainable are already facing and will continue to face supply volatility, declining volumes and higher, more volatile prices.

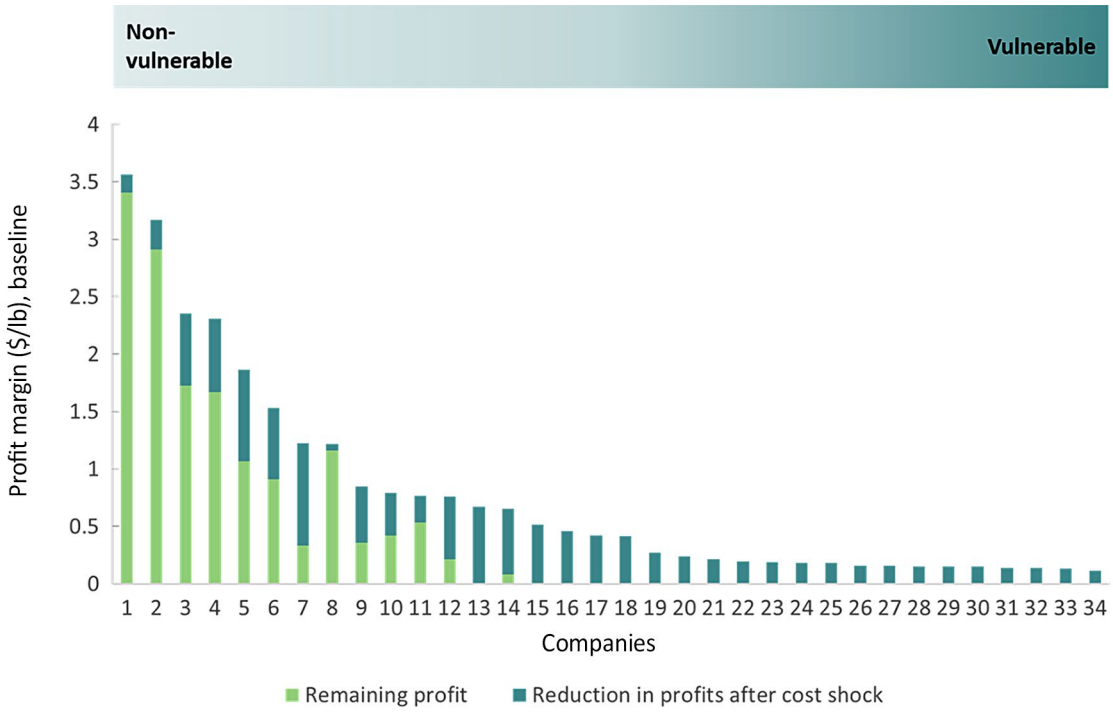
Wild capture fisheries

In commodity markets, supply shortages and price shocks in one region can affect the whole market. One example is the case of the US market for blue swimming crab (BSC). Blue swimming crab is imported mainly from South East Asian fisheries that are typified by weak governance. Analysis suggests that over-exploitation of crab resources puts importing companies at risk of frequent price shocks and erosions of margins and market share. For example, over-fishing of BSC in Indonesia, the largest supplier to the US market, can lead to increased wholesale prices due to lower catches being landed and processed. Modelling suggests that a 15% increase in wholesale prices can expect to increase prices to U.S retailers by a third, leading to potential 'demand destruction' with crab being taken off shelves and menus. When costs increase in a smaller producing market (such as Philippines or Sri Lanka) then prices to retailers adjust less, but the importing companies who absorb these costs have their margins severely squeezed. For example, a company sourcing BSC solely from Philippines (which only supplies 16% of the market) could experience a 42% decrease in margin if a cost shock of 15% is experienced[16]. If prices went up by 15% across all producing countries, almost all small- and medium-sized firms importing BSC would be expected to lose nearly all of their margin and market share. Large undiversified firms, accounting for 19% of the market, would be expected to lose between 32% and 47% of their margins and between 21% and 38% of their market share[17].

[16]WWF, 2019. The Impact of Blue Swimming Crab Fishery Management on the Profitablity of US Buyers. A report prepared for WWF US by Vivid Economics. London. Available at: https://seafood-sustainability.org/industry/business-case/

[17]ibid

Figure 4. *The Impact of Wholesale Price Shocks on Profit Margins of US Buyers of Blue Swimming Crab.*

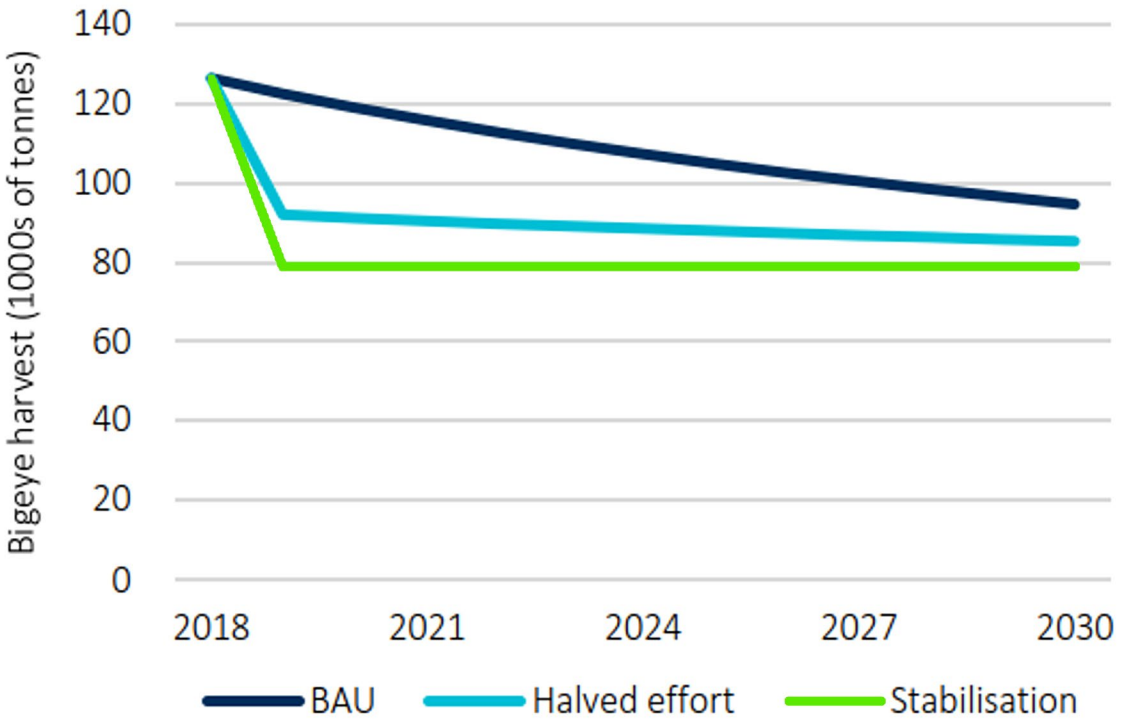


Source: *The Impact of Blue Swimming Crab Fishery Management on the Profitability of US Buyers. A report prepared for WWF US by Vivid Economics.*

Another study found the potential for even more severe impacts on supply chain companies in the Japanese sashimi market due to poor management of tuna fisheries in the Pacific. The Western Central Pacific Ocean accounts for more than half of the global longline tuna catch, and the fishery generated more than $US5 billion in revenue in 2016. However, Bigeye tuna stocks have been so heavily overfished historically that they are less and less resilient to over-exploitation. Despite being considered biologically sustainable at the moment, if current effort continues then stocks will decrease over time, eventually constraining the supply of Bigeye into the Japanese (and other) sashimi markets. Modelling suggests that current levels of longline effort are unsustainable and projected to lead to a 27% decline in bigeye biomass between 2017 and 2030. As the stocks decline, fishing effort will become continually unprofitable and some fleets will have to exit. The remaining fleets will make more money, but the overall supply of fish to market will be significantly less. Given that Japanese traders of tuna rely on high volumes as they have extremely thin margins, a decrease in the amount of tuna available will challenge their business models. Cutting effort to around a third of current capacity today could stabilise the biomass and possibly even lead to recovery, but harvest volumes will still fall in the short to medium term. By 2030 the supply of tuna to the Japanese sashimi market will 25% less than today. Eventually buyers of Bigeye will have to find alternatives to fulfil orders, or switch business models to adjust[18].

[18] Vivid Economics, 2019. Longline fleet in the Western Central Pacific Ocean, London. *Not yet published.*

Figure 5. *The Impact on Bigeye Harvest of Business as Usual and Effort Reduction Scenarios in the Western Central Pacific Ocean.*



Source: *Vivid Economics, 2019. Longline Fleet in the Western Central Pacific Ocean, London. A report prepared for WWF US By Vivid Economics. Not yet published.*

Aquaculture

In the case of farmed shrimp, the main operational risk for farmers is loss of harvest through disease and the risk for the supply chain is availability and consistency of supply. Whilst growth of aquaculture, particularly in Asia, has been impressive, it has been accompanied by an increase in disease prevalence and harvest losses. Shrimp are naturally highly vulnerable to disease due to their weak immune systems, so farming conditions and management practices play a critical role in determining a farm's susceptibility to outbreaks. In farming systems that pollute local water bodies and operate with low levels of bio-security, the risk of disease outbreak is much higher. Outbreaks can affect whole farming regions if they spread from farm to farm; a common occurrence[19]. These sorts of large-scale disease events serve to shorten supply of shrimp significantly and prices rise as a result. One estimate suggests that disease has cost the industry $20bn in losses over the past decade[20]. In Thailand, the disease Early Mortality Syndrome (EMS) caused shrimp production to fall by about 40%[21] between 2011 and 2016, equating to lost revenue of $5bn. In 2013, the share price of one of the world's largest shrimp farming companies decreased to a 12 month low, predominantly due to the EMS outbreak in Thailand[22]. In Vietnam, the same disease was estimated to have resulted in losses of between $796/ha and $3,867/ha[23] in 2015.

[19] Pontos Aqua, 2018. Value Propositions for Sustainability in Shrimp Aquaculture: Interview Analysis.

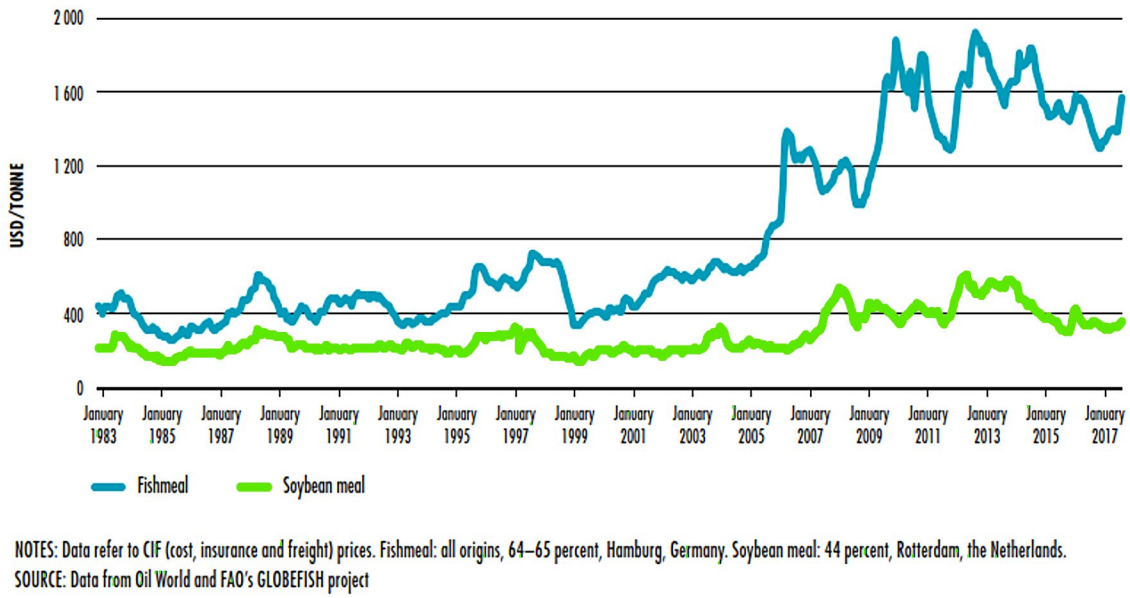
[20] Undercurrent News, 2016. Disease has cost shrimp sector over 20bn. Available at: https://www.undercurrentnews.com/2016/09/09/disease-has-cost-asia-shrimp-sector-over-20bn/

[21] https://www.dw.com/en/thai-shrimp-death-scientists-still-baffled-by-southeast-asian-disease/a-17301496

[22] Undercurrent News, 2013. CP Foods share price hits 12 month low. Available at: https://www.undercurrentnews.com/2013/04/10/cp-foods-share-price-hits-12-month-low-on-china-bird-flu-shrimp-disease/

[23] Shinn et al, 2016. Counting the Cost of Aquatic Disease in Asia. Aquaculture Asia Pacific, Volume 12, Number 1. January 2016.

Figure 6. *Fishmeal Prices Over Time.*



Source: *FAO, 2018. The State of World Fisheries and Aquaculture.*

The other main operational risk for shrimp farmers and the supply chain is the high dependency on volatile sources of feed. Feed formulations contain a high content of fishmeal and fish oil (FMFO), the vast majority of which is still sourced from wild capture fisheries (although alternatives are rapidly being developed). With the huge growth in shrimp and other farmed species that rely on FMFO, prices have gone up to reflect the increasing competition (see Figure 6). But declining overall volumes have also been a factor given that raw material supply is vulnerable to over-exploitation and environmental fluctuations. A large proportion of FMFO comes from the Peruvian anchoveta fishery, for example, the productivity of which can change dramatically depending on whether it is an El Nino year or not. Climate change is predicted to increase the number and severity of El Nino years. Other sources of FMFO are from poorly managed forage fisheries in South East Asia. These fisheries have exhibited huge declines in productivity over the past few decades due to overfishing and weak governance[24]. Analysis suggests that the proportion of production costs that feed represents in shrimp farming vary between production systems, but can be as high as 70% in some cases and on average are around 40%[25]. As a result shrimp farmers are highly exposed to feed price fluctuations. Farmers bear the brunt of these costs as feed companies are able to pass costs on, whereas farmers are constrained by the commoditised nature of the market i.e they are price takers. Farmers can end up harvesting shrimp at a loss when prices drop in a supply glut and input costs stay high, such as was the case in 2018[26].

2. Reputational risk

In an age of increasing levels of transparency, one of the biggest mounting risks for seafood companies is that of their reputations. The key issues in the seafood sector that put companies at risk of reputational damage are: illegality, seafood fraud and human rights abuses.

IUU fishing is estimated to account for up to one third of seafood production valued at between $10bn and $23.5 bn USD a year[27]. In the Pacific tuna fisheries alone, illegal fishing is estimated as a value loss to economies of $616m USD[28]. Illegality can also be linked to other nefarious activities such as drugs or human trafficking. Technologies for tracking illegal fishing through initiatives such as Global Fishing Watch[29] make it more likely for operators to be caught, fined and exposed publicly. Policy tools such as the

[24] Silvestre et al., 2003. Assessment, Management and Future Directions for Coastal Fisheries in Asian Countries. WorldFish Center. Philippines.

[25] Pontos Aqua, 2018. Value Propositions for Sustainability in Shrimp Aquaculture: Interview Analysis.

[26] Rabobank 2018, Keeping up with the Crustaceans: Prices Crash in the New Season – What happens next? Available at: https://research.rabobank.com/far/en/sectors/animal-protein/keeping_up_with_the_crustaceans.html

[27] Agnew et al, 2009. Estimating the Worldwide Extent of Illegal Fishing. PLoS ONE 4(2): e4570. https://doi.org/10.1371/journal.pone.0004570

[28] MRAG Asia Pacific (2016). Towards the Quantification of Illegal, Unreported and Unregulated (IUU) Fishing in the Pacific Islands Region. 101pp. https://www.ffa.int/files/FFA%20Quantifying%20IUU%20Report%20-%20Final.pdf

recently ratified Port State Measures Agreement (PMSA)[30] and increased regulatory measures (such as those described below) are also making it increasingly hard for illegal operations to go undetected. As a result, it is increasingly risky for companies operating in global supply chains to not track and trace products to ensure that they are not sourcing illegal seafood. Companies that have been found to be in breach of legal compliance have suffered financially and reputationally. As examples: a UK scandal involving multiple vessel owners and processing companies were fined over £1m GBP in 2012; ten companies operating illegally in Ghanaian waters were fined $3.1m USD in 2013; and Pacific Andes was fined $800,000 for illegal transhipment activity in Peruvian waters in 2014[31].

Linked to illegality is the widespread use of seafood fraud or mislabelling of seafood products. The potential for seafood fraud is enormous with one recent investigation showing that 20% of seafood in the U.S. is labelled incorrectly exposing companies selling mislabelled products to health and safety risks and illegality[32]. According to research, 87% of fish labelled as 'red snapper' in the U.S. was found to be incorrectly labelled and in some cases was a much less valuable species. The consumer is therefore paying for a product over and above its real value. Seafood fraud also means that 'red-listed' (or endangered) species can be sold to consumers under different names. For example, 36% of grouper species are considered at risk of extinction but without the right checks and balances could be sold as a non-endangered grouper species[33]. And perhaps most concerning, there are considerable risks to consumer's health associated with selling seafood products under false names where trace elements of mercury or other toxins are an issue. As awareness of these issues grow, so does the reputational risk for the companies involved.

Increasingly, markets are responding to grievous social issues in the seafood sector, informed by widespread media and NGO campaigns. Recent reports and investigations have found forced labour in seafood supply chains in 55 countries on 5 continents. Issues on board fishing vessels and in seafood processing units include unsafe working conditions, physical abuse, bonded labour, and human trafficking[34]. Unsurprisingly, consumers and markets have had a strong reaction to these findings. The Guardian newspaper's investigation in 2014 on seafood slavery named many top retailers such as Tesco, Costco, Walmart and Carrefour as selling shrimp that had slave labour in the supply chain. It also implicated big seafood companies further upstream such as CP Foods who supply the shrimp to retailers[35]. Other investigations have named top US seafood brands such as Chicken of the Sea and Fancy Feast[36]. One wholesaler, Costco, has faced a lengthy lawsuit brought by consumers in California who accused the company of selling them shrimp that had been produced through slave labour[37].

3. Market risk

Continued access to end markets is a growing risk for seafood providers. As described above, levels of awareness of environmental and social issues in consumer markets for seafood, particularly in Europe and North America have risen over the past decades. As in other food sectors, convenience, health, transparency and sustainability are the main trends shaping global consumption[38]. An indicator of these trends is the growth of the global sustainable seafood market; worth $11.5bn in retail sales in 2016 with 14% of seafood now certified under a credible label. Growth in sales of certified seafood is ten times that of conventional seafood, driven almost entirely by end-buyer commitments to sustainable sourcing. This is equivalent to 23m tonnes of certified seafood compared to just 500,000 tonnes in 2005[39].

Despite this growth, corporate commitments to sustainability are often outpacing the supply of suitable raw material. This creates a highly competitive market for sustainable or certified seafood and potential market barriers for companies selling products that cannot meet requirements. For example, in the tuna industry, data shows that market demand for high quality fresh or frozen

[29] https://globalfishingwatch.org/

[30] FAO, 2019. http://www.fao.org/port-state-measures/en/

[31] BBC, 2012. Skippers and firm fined almost £1m for part in £63m 'black fish' scam. Online; Seafood Source, 2013. Ten companies fined for IUU fishing in Ghana. Online. Undercurrent News, 2015. Pacfic Andes reportedly fined $800,000 for IUU-listed vessel. Online.

[32] Oceana, 2019. Casting a wider net. More action needed to stop seafood fraud in the United States. https://usa.oceana.org/publications/reports/casting-wider-net-more-action-needed-stop-seafood-fraud-united-states#

[33] Oceana, 2015. One Name, One Fish. Why Seafood Names Matter. https://usa.oceana.org/sites/default/files/onenameonefishreport.pdf

[34] Lewis and Boyle, 2017. The Expanding Role of Traceability in Seafood: Tools and Key Initiatives. https://onlinelibrary.wiley.com/doi/full/10.1111/1750-3841.13743#jfds13743-bib-0048

[35] Guardian, 2014. Revealed: Asian slave labour producing prawns for supermarkets in US, UK. https://www.theguardian.com/global-development/2014/jun/10/supermarket-prawns-thailand-produced-slave-labour

[36] Associated Press, 2015. AP report on slave-peeled shrimp spurs calls for boycott. https://www.ap.org/explore/seafood-from-slaves/ap-report-on-slave-peeled-shrimp-spurs-calls-for-boycott.html

[37] Reuters, 2017. Retail giant Costco wins dismissal of prawn lawsuit over Thai forced labor.

[38] Rabobank, 2018. A demand-driven seafood market – Impressions from the Brussels Seafood Expo Global. https://research.rabobank.com/far/en/sectors/animal-protein/a-demand-driven-seafood-market.html

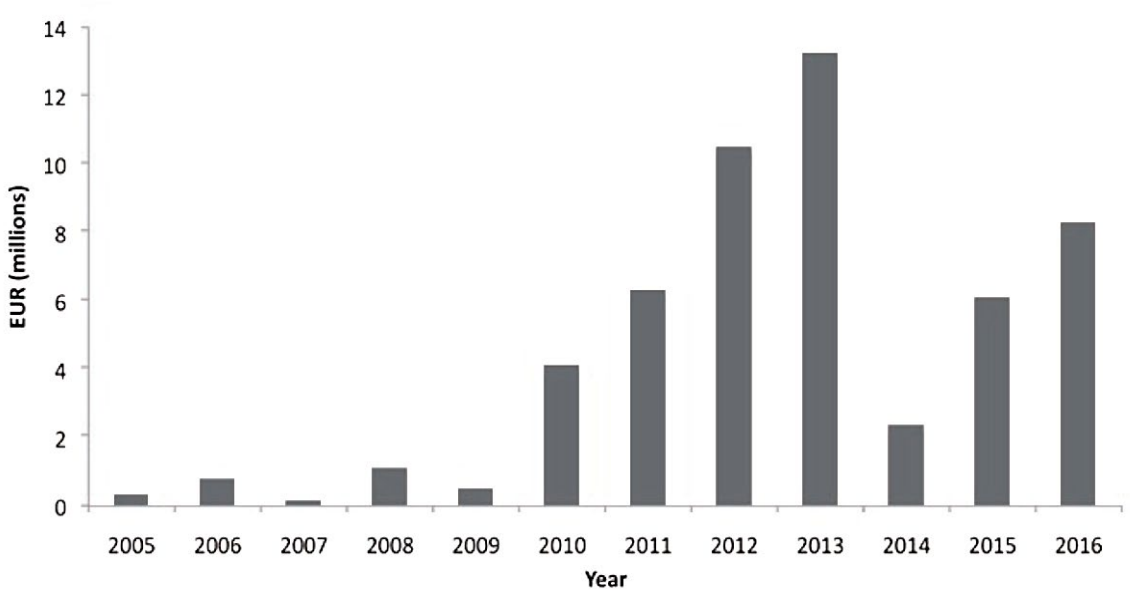
[39] IISD, 2016. State of Sustainability Initiatives Review. Paris, France.

tuna products (such as yellowfin) is increasing whereas demand for shelf-stable products (like canned skipjack) is declining[40]. However, a large portion of fresh/frozen tuna comes from South East Asia where governance of tuna fisheries is weak and quality inconsistent due to a lack of vessel and dock-side infrastructure; so the ability for producers to meet increasing market demands is constrained. Without targeted efforts to scale up sustainable fisheries, this supply/demand crunch may lead to increased high and differentiated prices for high quality, sustainable tuna.

4. Regulatory risk

End markets for seafood are also tightening due to regulatory changes. Two of the biggest seafood importing markets, the EU and the US, have introduced regulations to improve transparency and traceability of seafood, particularly as it relates to illegal (or IUU) fishing. The EU is the biggest importer of seafood in the world and in 2008 it introduced regulation to prohibit entry of illegal fish into EU countries[41]. Effectively, this means that all imports of seafood into the EU must provide a Catch Certificate, issued by a competent regulatory authority, that shows when, where and how the fish was caught. The Catch Certification scheme also allows the EU to follow a 'carding' procedure where certain exporting markets can be warned or black-listed if they are not compliant with IUU regulation. Countries that have been given yellow or red cards include Belize, Ghana, Panama, Philippines, Sri Lanka, Taiwan, Thailand and Vietnam. Figure 7 shows the impact on the value of imported seafood from Belize into the EU over time showing a major crash in imports in 2014 once Belize had been blacklisted[42]. Thailand, a major processing hub for seafood, has also been heavily affected by an EU issued yellow card given the value of the European export market. The value of fishery products exports to the EU dropped sharply by over 50% from U.S. $995.9 million at the recent peak in 2013 to U.S. $429.2 million in 2018 before starting to slowly recover[43]. In a recent turn of events in Vietnam, the government has responded to the EU's yellow card by issuing new policies regarding catch certification for importers and exporters of tuna. However, regulations were introduced quickly and companies have not had time to respond, leading to cargoes being turned away from port and processors having to cancel contracts to buyers. Exporters have also seen their shipments piling up in Vietnamese ports as they have not been able to get the now required certification of origin required to export to the EU[44]. The value of exports to the EU is thought to have dropped by 22%[45].

Figure 7. *Estimated Value of Seafood Imports into EU for Belize Pre- and Post- Blacklisting*



Source: *Mundy, 2018. The impact of the EU IUU Regulation on seafood trade flows: Identification of intra-EU shifts in import trends related to the catch certification scheme and third country carding process.*

[40] WWF, 2019. The business case for long-term contracting: A key tool to leverage sustainability in the seafood sector. Report prepared by Marine Change.

[41] EU, 2008. https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/technical_note_en.pdf

[42] Mundy, 2018. The impact of the EU IUU Regulation on seafood trade flows: Identification of intra-EU shifts in import trends related to the catch certification scheme and third country carding process.

[43] USDA, 2019. Thailand and EU Seafood Yellow Card Will Lead U.S. Exports to Rise. GAIN Report - TH9028. Bangkok.

[44] Seafood Source, 2019. New government rules threaten Vietnam's tuna sector. https://www.seafoodsource.com/news/supply-trade/new-government-rules-threaten-vietnam-s-tuna-sector

[45] Government of Netherlands, 2019. EC's yellow card for Vietnam seafood remains in place. Ministry of Agriculture, Nature and Food Quality, News Bulletin, February 2019.

The US Seafood Import Monitoring Programme that came into effect on January 1st 2018, is a similar regulatory effort to prevent the entry of illegally-harvested seafood by monitoring data on seafood imports with regards to legality and authenticity. It requires importers to keep track of all data relating to the provenance of the seafood being imported for a number of high risk species. This regulation was established in response to mounting concerns about the amount of illegal seafood being sold on the US market, distorting legal markets and unfairly competing with legal and sustainable seafood[46]. For those companies, whether importers or exporters, who were not already implementing traceability or data collecting efforts, compliance costs increased and in some cases export volumes were affected. For example, the Indian shrimp industry, a major exporter to the US anticipates having export volumes affected by up to 50%[47] in the immediate term.

Companies with significant market shares in countries affected by new regulatory measures, such as Thailand, Belize or India, can lose their export markets or have the tariffs increased overnight, severely affecting profit margins and revenue streams.


© Edward Parker / WWF

TOOLS FOR RISK MITIGATION

Risks relating to the environmental and social impacts of the seafood industry are many and varied and have the potential to be financially material to companies. However, the good news is that there are many existing and emerging tools that companies can use to identify, manage and mitigate social and environmental risk. The following section outlines ways that companies can individually and collectively manage risk and reap the benefits of a sustainable seafood sector.

1. Best practice standards, improvement projects and certification

The vast majority of environmental and social impacts are concentrated at the base of the supply chain. As a result, best practice guidelines and standards can support producers to identify, understand and manage impacts, reducing overall operational, market, regulatory and reputational risks for the whole supply chain. A recent report by WWF and ISEAL concluded that businesses can benefit from certification schemes through efficiency gains of improved management practices; improved transparency and traceability of supply chains; and improved supply chain relationships[48]. For example, the Marine Stewardship Council (MSC) standard requires fisheries to be managed to environmentally sustainable and legal harvest levels, minimise by-catch of non-target or endangered species and minimise impacts on wider marine eco-systems. The Aquaculture Stewardship Council (ASC) standard requires farms to operate with low levels of anti-biotic and chemical usage, minimise escapes of farmed species into the wild, and deal with contaminated and waste water usage, for example. The ASC also includes social criteria.

However, as noted above, demand for sustainable products is higher than supply, as the 'low hanging fruit' for certifiable seafood has largely been picked. As such, improvement projects (Fishery Improvement Projects or Aquaculture Improvement

[46] NOAA, 2018. https://www.iuufishing.noaa.gov/RecommendationsandActions/RECOMMENDATION1415/FinalRuleTraceability.aspx

[47] Undercurrent News, 2019. Indian exporters grow nervous as US SIMP laws loom. https://www.undercurrentnews.com/2018/12/11/indian-exporters-grow-nervous-as-us-simp-laws-loom/

[48] WWF, 2017. SDGs mean business: How credible standards can help companies deliver the 2030 agenda.

Projects[49]) that involve working with stakeholders on the ground and in the supply chain to improve fishing or farming practices and management are an important way to increase the potential availability of sustainable or certified product, as well as secure ecosystems and livelihoods for those who depend on them.

Fishers and farmers not only minimise risk and improve performance through the implementation of best practice guidelines and standards, but also have the potential to gain or maintain access to global seafood markets where buyers and regulators are tightening restrictions. For the supply chain, certification is often an efficient way to meet sustainable sourcing requirements, thereby increasing the appetite to put sustainable products on shelves and giving conscious consumers a way to differentiate between products. Certification schemes also come with 'chain of custody' requirements which serve to increase supply chain transparency. However, best practice standards and certification schemes are not necessarily a 'silver bullet' in risk management terms as they vary in detail and rigour and do not always address the full suite of sustainability issues or deal with systemic risks. As described below, full-chain digital traceability is an increasing necessity for companies to work towards fully de-risked supply chains, and collaborative efforts are required to address broader sustainability-related risks.

2. Long-term contracts

Given the competition for raw material and increasing demand for high quality, sustainable seafood, there is a strong case to be made to sourcing companies to re-think the way they buy raw material to ensure that they are not exposed to shortages or price hikes, as well as illegality, fraud or slavery issues. As well as conducting supply chain risk assessments[50], one tool that is emerging with a strong business case is the use of long-term contracts (LTCs). Engaging with suppliers on a long-term basis opens up opportunities for buyers to secure known quantities of on-spec raw material and broaden their supply base by incentivizing and scaling up the transition to sustainability in fisheries and farms[51]. In addition, quality assurance costs can be lowered. Buyers of seafood that hedge risk by moving from one supplier to another can face increased costs of Quality Assurance (QA), a critical factor in seafood procurement. One buyer of tuna estimates these increased QA costs could account for 2-5 percent or more of raw materials costs. In such a competitive industry, this additional overhead puts spot buyers at a disadvantage[52]. For all actors along the supply chain, long-term contracting also enables long-term forecasting. Producers and suppliers can't know the amount of raw material to catch or grow, or finished goods to produce, if they don't know how much they can sell. This risks either an oversupply, where producers are left scrambling to find a market, selling at a discount or facing inventory costs, or undersupply where producers may forego a market opportunity. Similarly, without long-term contracts, buyers risk having too little or too much raw material, potentially being unable to fulfil contracts or having to store inventory.

With the clear evidence of an increasing supply and demand crunch for high quality and sustainable product, long-term contracting can be leveraged to more directly support fisheries through the transition and effectively increase the amount of supply of high quality and sustainable product available. For example, long-term contracts can be used to catalyze financing

[49] https://seafoodsustainability.org/industry/; https://fisheryprogress.org/

[50] https://www.supplyrisk.org/

[51] https://seafoodsustainability.org/industry/business-case/

[52] WWF, 2019. The business case for long-term contracting: A key tool to leverage sustainability in the seafood sector. Report prepared by Marine Change.

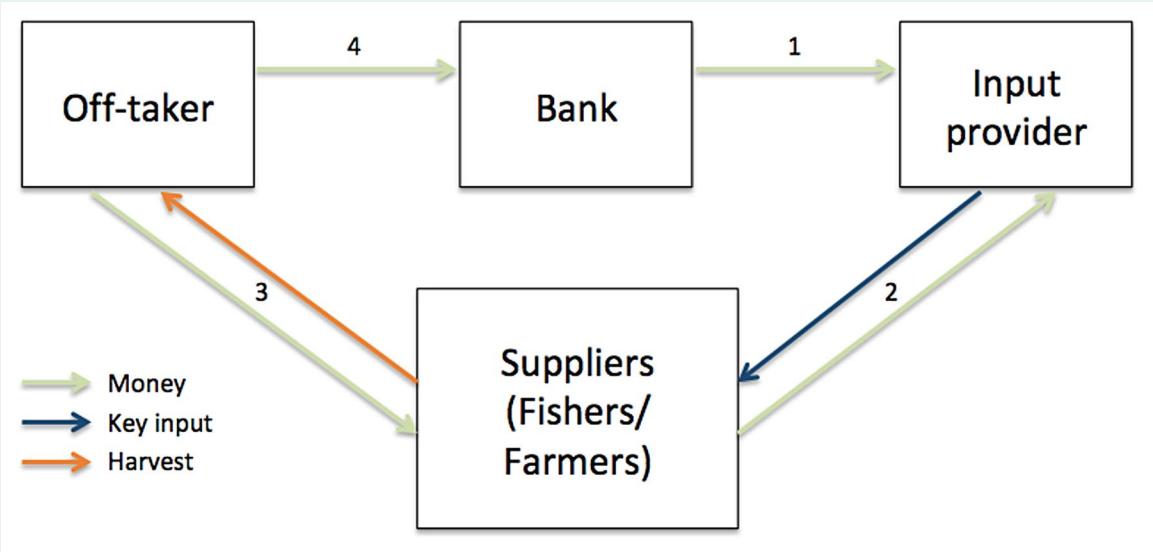
arrangements that help to give access to credit for fishers to improve their ability to produce quality and sustainability-assured product. Off-taker agreements in the form of long-term contracts are often the cornerstone of financing mechanisms that benefit buyers and producers (see Box 1 for more details).

Box 1.

The business case for long-term contracting in small-scale tuna fisheries: facilitating value chain financing

Small and medium scale fisheries often lack access to both international markets and to formal providers of credit, foregoing investments in basic equipment that could improve fish quality and social and environmental conditions and thereby increase their incomes and ensure long-term livelihoods. This perpetuates a cycle of financial insecurity for fishers which can lead to increased pressure on fish stocks. Meanwhile, without lasting agreements with their suppliers, buyers of fish risk security of supply for product that meets market demand and increased quality assurance costs.

Value chain financing (VCF) entails a long-term contract between supplier (fisher) and off-taker (trader/retailer) in which the security of the off-taker agreement allows suppliers to borrow for assets related to production. The structure goes as follows: participating banks lend directly to affiliated supply companies, who then sell production inputs to suppliers, such as ice machines. At harvest, suppliers sell to the off-taker at a discount, effectively repaying the loan with interest. The loan is then repaid by the off-taker. This framework requires testing and refinement in the fisheries sector but has proven effective in expanding access to credit in the agricultural sector.



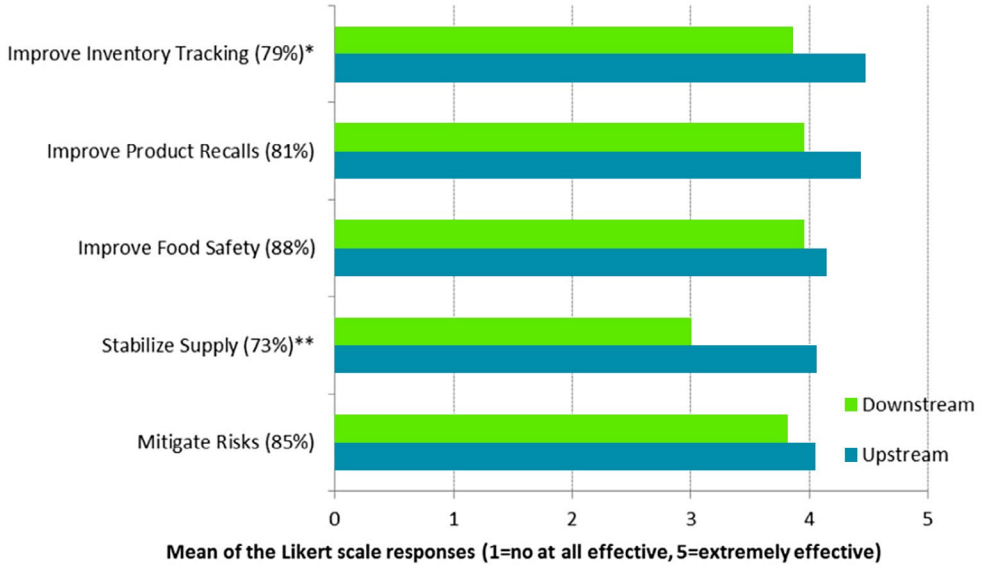
In one case study examined, through long term contract agreements fishers have been able to bank around $100,000 in premiums which they are able to spend on community and environmental improvements. However, the difference in incomes between those fishers selling high quality fish compared to those selling lower quality was tenfold. Overall, 37% of fish is rejected due to quality concerns, equating to a loss in value of over US$8,600, with an additional US$2,000 in foregone premium income. As such, in this example, as elsewhere, VCF could be an excellent complement to a market-based sustainability mechanism, where artisanal fishers are given access to credit to increase the quality and sustainability of fish available for market and are incentivized to reinvest into improving fish quality and sustainability, perpetuating a cycle of higher incomes and environmental stewardship.

Adapted from: WWF, 2019. The business case for long-term contracting: A key tool to leverage sustainability in the seafood sector. Report prepared by Marine Change.

3. Transparency and traceability

Many of the risks to companies outlined above occur due to a lack of visibility and transparency in the seafood industry. This issue has been the explicit focus of industry and civil society initiatives over the past few years and the level of sophistication and availability of tools to improve traceability has increased. However, in many or most seafood producing markets current record-keeping mechanisms are paper-based and are therefore inefficient. Where software systems are employed to track seafood products within individual operators, the inability to efficiently exchange data with trading partners prevents free-flowing data exchange along the value chain. The move to full-chain digital traceability systems has the ability to create efficiencies in operations; drastically increase oversight of supply chains to manage and mitigate risk of fraud or illegality; and demonstrably ensure compliance to environmental and social credentials. Whilst the business case for moving towards traceable supply is hard to quantify, a survey amongst seafood businesses on traceability found that companies could expect a payback period for installing traceability systems of between 3 to 5 years and a Return on Investment of around 2 to 5%. In addition, 80% of businesses saw traceability as a necessary investment to reduce exposure to business risk and 60% said that traceability enabled them to be more successful as a business than otherwise would be possible. Figure 8 shows the responses from a survey on the effectiveness of traceability to mitigate risks associated with the seafood industry. Beyond risk management companies also cited additional benefits including the ability to streamline inventory and reduce working capital needs; improved forecasting; and increased product quality by better monitoring storage conditions along the supply chain[53].

Figure 8. *Business Responses on the Effectiveness of Traceability for Risk Mitigation*



Source: *Sterling et al, 2015. Assessing the Value and Role of Seafood Traceability from an Entire Value Chain Perspective. Institute of Food Technologists.*

Given the global but fragmented nature of the seafood supply chain and the volume of traded products across the world, coherence of requirements for traceability are paramount. A critical mass of companies is required to enable the transition full-chain digital traceability. As a result, participating in collaborative efforts around traceability is a prerequisite to realizing full-chain digital traceability across the global seafood industry and derive its risk-mitigation benefits. The Global Dialogue on Seafood Traceability[54] is one such effort that is establishing a voluntary, unified framework for full-chain digital traceability through four key activities:

1. **Aligning and standardising the key data elements (KDEs) associated with seafood products;**
2. **Establishing data verification and quality guidelines to reduce costs and increase reliability;**
3. **Adopting an IT architecture for interoperability to allow easy and secure data exchange; and**
4. **Promoting the harmonisation of emerging national regulations affecting seafood traceability**

This collaboratively designed framework is expected to increase the efficiencies of current traceability efforts and bring more cost-effective solutions to the fore.

[53] Sterling et al, 2015. Assessing the Value and Role of Seafood Traceability from an Entire Value Chain Perspective. Institute of Food Technologists.

[54] Global Dialogue on Seafood Traceability, 2019. https://traceability-dialogue.org/solutions/

4. Aggregation and integration

As noted above, the seafood sector provides employment and food security to millions of people around the world and particularly in developing countries where the majority of seafood is produced and the most number of people are employed. However, the small scale nature of producers in these countries leads to a highly diffuse and fragmented sector and a complex global supply chain, contributing to the risks outlined above. Finding ways to bring producers together or reach multiple small-scale producers at the same time will help to address risks, simplify supply chains and scale up sustainability efforts. Fishers and farmers often group together into local co-operatives or associations, but more can be done to scale these up. For companies with global supply chains that include SME producers finding aggregation points is critical. And for the producers themselves, collaborative business models can help to secure markets and investments, improve quality and marketing, pool costs and address sustainability challenges. One of the benefits of Improvement Projects (FIPs or AIPs) is that they create ways to work with many and multiple stakeholder groups under one initiative. They often entail the creation or identification of a entity to manage the project as a whole and in the case where certification is obtained, a legal entity must to be established to manage the certification. These bodies are natural aggregators of SME producers and can capitalise on opportunities for marketing, branding, traceability and access to finance to pay for continual improvement costs.

Traders and processors are also natural aggregators of product as they are normally the primary entry point for seafood into global markets. In many cases these companies have incentives that are aligned with producers for sustainability and quality improvements in order to mitigate supply risk and create additional value. These aligned incentives can be put to work by supporting producers to implement best practices and market standards, for example through offtake agreements and value-chain finance (see text box). More formal integration models are also a way for companies to mitigate risk and create value. For example, in the farmed shrimp sector, sector risk is concentrated at the farm level but farm margins are constantly being squeezed leaving them vulnerable to market dynamics and unable to invest in sustainable growth. Processors also have narrow margins and rely on consistency of volume to operate. Analysis shows that pursuing integration models with farms and processors can create value, as well as decrease risk exposure to farm volatility, mainly from disease. As Figure 9 shows, the combined margins of an integrated business are higher than the component parts and more resilient to price fluctuation. Integrated operations can also better control branding and marketing of product and increase market value.

Figure 9. *Impacts on Margins of Integration Strategies in the Farmed Shrimp Sector*

EBIT Margin	Farm	Processing Plant	Processing + Farm
@ Current prices	33.2%	8.7%	38.6%
30% Price reduction	4.6%	5.6%	12.3%
30% Price increase	48.6%	10.4%	52.8%

ROCE Margin	Farm	Processing Plant	Processing + Farm
@ Current prices	25.4%	20.8%	32.0%
30% Price reduction	2.9%	9.8%	7.4%
30% Price increase	48.0%	31.7%	56.6%

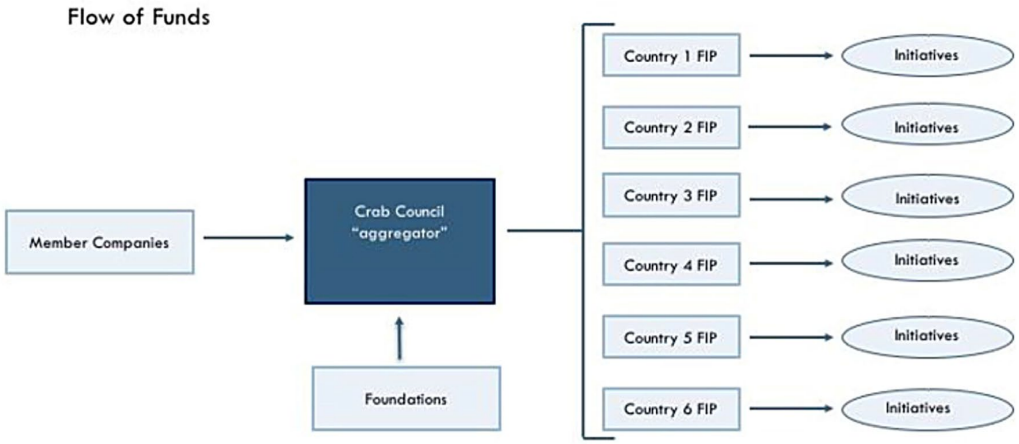
Source: *Pontos Aqua, 2018.*

5. Collaborative industry platforms

There are some risks in the seafood sector that companies can manage and mitigate on their own, for example by having clear and robust sourcing policies, establishing long-term contracts with suppliers and moving towards fully traceable supply chains. However, there are also risks that go beyond the control of any one company. To reach the scale of transformational change required to really bring down sector risks, collective, collaborative action is required and in most cases, will be a more efficient and effective way to make progress. For example, disease management in aquaculture or stock management in wild capture fisheries cannot be fully solved by one actor. Collective commitments to risk management will often be the best course of action. There are a number of good examples of pre-competitive alliances or initiatives that seek to do just this.

For example, the National Fisheries Institute (NFI) Crab Council (CC or Council) is a unique US industry-led association focused on securing the sustainability of supply of blue swimming crab (BSC) from Southeast Asia. Council members account for approximately 62% of all Blue Swimming crab imports to the U.S. so purchasing power is high. With past experience dealing with the fallout from the US crab fisheries collapse, companies recognise the value of this initiative and are prepared to invest in efforts that will ensure the long-term prospects of their business as it allows them to collectively address fishery management issues that no individual company could address alone[55]. Of particular note is their funding model through which they pay a fee of 2c for every pound of crab they import. These funds go to support in-country associations to develop sustainability initiatives. One of the significant results of their support has been development and governmental adoption of national BSC fishery management plans in Indonesia, the Philippines and Thailand.

Figure 10. *NFI Crab Council Funding Model*



Source: *Wilderness Markets, 2018.*

Other industry initiatives include the Global Salmon Initiative (GSI)[56], formed by salmon farming companies to collectively address sustainability issues in the salmon industry, and the Seafood Business for Ocean Stewardship Initiative (SeaBOS). The latter is a coalition of ten of the world's biggest seafood companies who have come together with the ambition of catalysing a global transformation to sustainable seafood production and healthy oceans[57]. Companies are increasingly understanding the business case for collaborative platforms that address collective challenges and risks. However, much more can be done to mainstream this approach across markets and geographies and bring more companies to the table with a common understanding of the importance of sustainability issues and increase the scale and pace of change.

[55] WWF, 2019. The case for pre-competitive engagement. A study of the NFI crab council. March 2019. A report prepared for WWF by Wilderness Markets. https://seafoodsustainability.org/wp-content/uploads/2019/04/WM-BSC-Blue-Swimmer-Crabs-2019.pdf

[56] https://globalsalmoninitiative.org/en/

[57] https://keystonedialogues.earth/#initiative

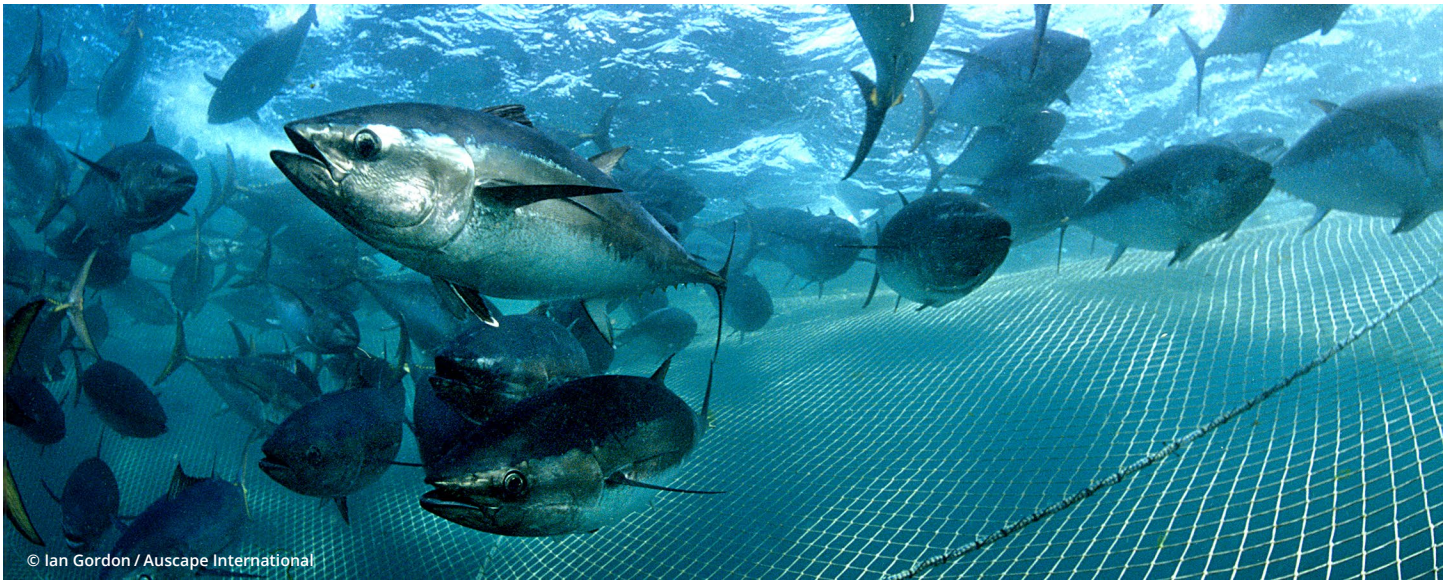
6. Advocacy for good governance

It is increasingly evident that to really address the systemic risks in the seafood sector, global and national governance mechanisms must improve. As such, there is an increasingly important role for companies to play, whether individually or collectively, in advocating for robust policies that result in sustainable management of natural resources. As in other sectors, policies that provide long-term stability over key variables in both wild-capture and aquaculture production are more likely to bring down endemic sectoral risks and by extension the cost of doing business and accessing capital. Development banks have an important role to play in working with governments to understand what the key policies and regulatory frameworks are that will de-risk the sector and support governments financially to implement these. But a strong voice from market actors that rely on either raw material supply or processing capacity in a given jurisdiction can augment the pressure for clear and robust action by governments.

There are market mechanisms and initiatives on governance for sustainability already in place. The Fisheries Transparency Initiative (FITI) aims to provide greater levels of transparency over governance in fishing nations through a set of principles and a standard to which countries can adhere and make key pieces of data publicly accessible. The Seafood Task Force, a coalition of companies, NGOs and the Thai Government, is an example of where a strong private sector voice in the transition to a more sustainable and legal seafood sector in Thailand can play a critical role.

In a sector so dependent on good natural resource management and with increasing risks to businesses becoming clear, it is incumbent upon seafood companies to play a bigger role in advocating for the types of regulatory and policy frameworks that will enable them to continue to operate sustainably and profitably.


© Olivier Van Bogaert / WWF



ALIGNING CAPITAL WITH SUSTAINABILITY

The risks to companies in the seafood sector outlined above are also of interest to the financial institutions that provide them with the capital to operate. The financing landscape in the seafood sector is fragmented, like the sector it serves. At the larger end of the scale, seafood companies are financed through big international banks and investors. But for the vast majority of the sector, access to affordable and long-term capital for sustainable growth still remains a challenge and a barrier to sustainability. In order to align capital with sustainability, existing financial flows need to be redirected towards more sustainable business models and new opportunities for financing the transition must be brought to the fore. In addition, insurance products must be incentivised to buy down risk and support sustainable opportunities, thereby catalysing investment.

1. ESG and sustainable seafood policies

Ultimately, for existing capital providers, risks that are material for the seafood industry have the potential to become financially material to those invested, whether through corporate loans, project finance or as shareholders. There are around 228 publicly listed seafood companies on stock exchanges around the world, such as Bangkok, London, Tokyo and Oslo[58]. Whilst they only represent between approximately 8 to 23% of global seafood production, they are important in terms of their exposure to the global supply chain. Many of these companies are not invested heavily at the producing end of the supply chain, but in downstream processing, manufacturing, branding and distribution. Global financial players are increasingly aware of their exposure to environmental, social and governance (ESG) risks and in the seafood sector a lack of transparency around business operations and supply chains means investors and lenders may be exposed to many or all of the risks identified above without being aware. Small and medium sized companies, when they are able, rely on loans from local or regional banks who typically pay less attention to ESG issues.

Increasingly, efforts are being made to highlight sectoral risks to global and regional banks and investors that have exposure to the seafood sector in their portfolios. Given that the financial sector has shied away from seafood in recent decades[59], capacity and knowledge on sector specific risks and ESG issues is typically low. These challenges also reflect the lack of company-level data and quantification of the value from de-risking through sustainability. Currently, it seems, financing strategies tend to go one of two general ways: (1) excluding (or "negative screening") the entire seafood sector, or (2) offering more onerous terms and conditions required for their risk-adjusted returns based on a general high risk perception[60]. This points towards the need for companies to be transparent and communicative about their sustainability strategies and clear about the value they bring to the business. Currently, sustainability leaders are not financially rewarded and companies that are not managing risk effectively are in an even playing field with those that do.

[58] Fish Tracker, 2018. Empty Nets: How Overfishing Risks Leaving Investors Stranded. Investor Watch, London.

[59] Orion Consulting, 2018. White Paper for WWF: Scaling up Financing of Sustainable Seafood Production: Understanding Barriers and Opportunities to Align Capital with Sustainable Seafood Production.

[60] ibid

Financiers seeking to draw up robust policies have an emerging suite of tools and principles to draw on. For example, a Seafood Policy Benchmarking Tool[61] was recently launched for banks to analyse their seafood policies and benchmark them against best practice as well as their peers. The main objective of the tool is to guide banks through a process of identifying sustainability risks in the seafood sector, their potential for materiality to their portfolios, and support them to compile a robust policy that reflects the most up to date thinking on sustainability and risk in the sector. Similarly, sets of principles for both sustainable wild capture fisheries and aquaculture[62], as well as the Blue Economy[63] as a whole have recently been established for the finance sector. These provide guidance and assurance for signatories that they are applying best practice to their financing of seafood companies.

As issues become more apparent and financiers become more aware, companies will be increasingly asked about sustainability strategies and risk management plans. A robust financial policy that requires or encourages clients and investees to identify, report and ultimately manage risk, for example by using the tools outlined above, will go a long way to ultimately support better capital allocation decisions between leaders and laggards.

2. Insuring the seafood sector

Arguably, one of the largest hidden risks in the seafood sector is its lack of insurance. Anecdotal evidence suggests that only 3% of the whole seafood producing sector is insured[64]. This exposes the whole seafood supply chain to the risks of disruptive, boom and bust seafood production. For example, if and when harvests fail or are reduced, or if fishing or farming equipment is affected by other external measures, supply chain companies such as processors and exporters will be affected by not being able to secure raw material. The reasons for this lack of insurability are two-fold. Firstly, for many of the small-scale producers world-wide and particularly in developing countries, margins and cash reserves are low. As such, paying for the premium for insurance, despite its potential benefits, is perceived as a luxury rather than a necessity. And, secondly, premiums are high based on the high risk perception that insurers have. However, understanding how sustainability and good management are linked to risk and profitability and coupling risk management with lower insurance premiums, is a promising way to break this cycle and incentivise best practice. In addition, working with groups of farmers or fishers through cooperatives, collaboratives or supply chain companies (like processors) helps to pool premiums and address collective risks such as fisheries management, data deficiencies, or disease management. Ways in which insurance policies can support a sustainable seafood sector include:

- Backstop for losses of equipment, labour or harvest allowing long-term business planning and investment in quality or sustainability improvements
- Insurers require strict risk management policies to be in place and offer training and consulting to support this
- Insurance policies reduce the cost of capital or provide further access to credit for SMEs
- Policies can be tied to sustainability metrics such as best practice management, traceability, bio-security measures, sustainable harvest rates etc.
- Pooled insurance policies can lower costs for participants and encourage sector collaboration across a landscape or seascape to lower overall risks such as over-exploitation of fish stocks or regional bio-security

New insurance mechanisms are opening up ways to tie environmental impact with reduced insurance premiums. One example is the COAST (Caribbean Oceans and Aquaculture Sustainability Facility) programme in the Caribbean which is working with small-scale fishers and governments to offer bespoke insurance products that improve their financial resilience in the face of increasing risks of extreme weather events as a result of climate change[65].

[61] SCRIPT, 2018. Seafood Policy Benchmarking Tool. Global Canopy Proramme, 2018. https://www.script.finance/en/guidance-resources/browse/?fwp_content_types=resources&fwp_commodities=seafood

[62] EDF, 2018. Principles for Investment in Sustainable Fisheries. http://www.fisheriesprinciples.org/; IDH, 2018. Investment Guidelines for Sustainable Aquaculture in Indonesia.

[63] WWF, 2018. Sustainable Blue Economy Finance Principles. https://www.wwf.org.uk/updates/sustainable-blue-economy-finance-principles

[64] Orion Consulting, 2018. White Paper for WWF: Scaling up Financing of Sustainable Seafood Production: Understanding Barriers and Opportunities to Align Capital with Sustainable Seafood Production.

[65] World Bank, 2016. As climate change hits the Caribbean, partners collaborate to boost resilience and rejuvenate coasts.

3. Opportunities and blended capital

In many cases, the high-risk context in which the seafood sector exists means that the risk/reward profiles of opportunities for sustainable growth are mis-matched and capital providers are put off from investing. The transition, therefore, will require creative financial solutions that blend capital in order to make the most of different risk appetites of investors. Lower cost patient capital from impact or public investors can lower risk for more commercially minded risk-averse financiers, for example[66]. Given the importance of seafood for conservation, community resilience, food security and sustainable development, there are many reasons why patient capital providers might be willing to buy down the risk and cost of financing for the transition to sustainability, whether on a project by project basis, or through specialised credit lines or funds. One of the most important roles that blended finance mechanisms can play is to show that sustainable business models in the seafood sector are much less risky and more profitable in the long run. In other words, even though the costs of transition can be high, the costs of business as usual will be higher in the medium to long term; investing now will have a future pay-off.

Blended or risk sharing models in the wild capture sector are still new but there are now models and examples out there to follow. For example, organisations such as the Coalition for Private Investment in Conservation and the Vibrant Oceans Initiative have established models and blue prints for blended investments in fisheries recovery[67]. Funds such as the Meloy Fund and the Althelia Ecosphere Sustainable Ocean Fund[68] are putting these blueprints into practice through dedicated blended funds. Aquaspark in the aquaculture space is a specialised fund that only invests in sustainable aquaculture production or supply chain businesses[69]. However, despite this progress, the scale of the investment required to transform the industry as a whole is substantial and scaling up these financing models will be critical to the overall success of the industry in the future.

[66] Holmes et al, 2014. Towards Investment in Sustainable Fisheries: A framework for financing the transition; Environmental Defense Fund and Nicholas Institute for Environmental Policy Solutions at Duke University. 2018. Financing fisheries reform: Blended capital approaches in support of sustainable wild-capture fisheries. Available at: edf.org/blendedcapital

[67] CPIC, 2018. Blueprints - http://cpicfinance.com/blueprints/; Encourage Capital, 2016. Investing for Sustainable Global Fisheries. Vibrant Oceans Initiative.

[68] https://www.meloyfund.com/; https://althelia.com/althelia-climate-fund/sustainable-ocean-fund/

[69] http://www.aqua-spark.nl/

CONCLUSIONS

The seafood industry is globally important in terms of its size, contribution to food security, jobs and sustainable development. But its significant impacts on the environment and people on which it depends threaten its future viability. Businesses are beginning to suffer the consequences of years of collective inaction, whether through rising costs, thinning margins or market restrictions, and the future is not much brighter, particularly in the face of climate change, unless decisive and collective action is taken.

It is in the fundamental interest of businesses and the financial institutions that invest in them to take a more transformational approach to managing the environmental and social risks inherent in the sector. The new 'business as usual' needs to include individual and collective action towards de-risking the seafood sector with regards to environmental and social issues. Businesses need to make the most of existing tools such as 'on-the-water' improvement projects, certification and full-chain traceability, as well as emerging promising tools such as long-term contracts and collaborative industry platforms. Perhaps one of the most important parts of the 'new normal' for companies that wish to continue to operate in parts of the world where governance is still weak, is to put pressure on governments to invest in a strong enabling environment that underpins a sustainable seafood sector.

Financial institutions are beginning to take stock of the risks associated with poor environmental and social performance of companies. Given the increasingly significant links between sustainability and risk in the seafood sector, there is a clear case for investors and lenders, global and local, to start putting pressure on companies to undertake the types of risk mitigating actions outlined above. Clarity and transparency around risk exposure will start to help financiers to make better capital allocation decisions. And as new insurance and financing mechanisms are established that better match the risk/reward profile of sustainability in the seafood sector, there will be better options for investing in the transition to sustainability.

With sustainability at the forefront of business decisions and clear risk mitigation practices in place, the seafood sector can continue to be an important contributor to the Sustainable Blue Economy and the ambitions of the Sustainable Development Goals, long into the future.