

SHELL SHOCK

MANGROVE DEFORESTATION THREAT TO FARMED SHRIMP INVESTMENTS

BRIEFING PAPER
JANUARY 2020



Planet Tracker





ABOUT PLANET TRACKER

Planet Tracker is a non-profit financial think tank aligning capital markets with planetary limits. It was launched in 2018 by the Investor Watch Group whose founders, Mark Campanale and Nick Robins, created the Carbon Tracker Initiative.

Planet Tracker was created to investigate market failure related to ecological limits. This investigation is for the investor community where other ecological limits, in contrast to climate change, are poorly understood and even more poorly communicated, and not aligned with investor capital.

SEAFOOD TRACKER

Seafood Tracker investigates the impact that financial institutions have in funding publicly traded wild catch fisheries and aquaculture companies.

Our aim is to align capital markets with the sustainable management of ocean resources.

Planet Tracker's aquaculture research focuses on financial risks to aquaculture expansion. As the aquaculture sector is forecast to experience double digit growth through to 2050, capital markets should be thinking about key sustainability issues in their investments.

Seafood Tracker is a part of the wider Planet Tracker group of Initiatives.

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KEY TAKEAWAYS

- ➔ Shrimp is the most valuable traded farmed seafood commodity globally.¹
- ➔ The global shrimp market was worth \$45 billion in 2018² distributed across public, private, smallholder and commercial producers.
- ➔ The marine shrimp industry is forecast to continue growing at a CAGR (Compound Annual Growth Rate) of 3.7% to 5.2% between 2019 and 2025.³
- ➔ Approximately 30% of mangrove deforestation and coastal land use change in Southeast Asia has been attributed to shrimp farming.⁴
- ➔ Historical and future mangrove deforestation is a material risk for the farmed shrimp industry - incorporating land use change into shrimp life cycle assessments places shrimp ahead of beef for GHG emissions on a per kilogram of production basis.⁵
- ➔ Planet Tracker has identified 27 publicly listed companies involved in farmed shrimp with a combined market capitalisation of \$102 billion, of which \$63 billion is held by external investors. Their farmed shrimp segment gross profit and net profit margins are unable to be assessed due to very low transparency on shrimp-related revenues and costs.
- ➔ There is value-at-risk to investors due to known regulatory changes, market shifts and biological constraints that will continue to increase in the mid-term, e.g. by 2025, though the extent of the risk is as yet unknown. The majority of equity (61%) is held by the top 20 investors, primarily Japanese and North American.
- ➔ To date, Planet Tracker has found no evidence of these institutions reporting against historical mangrove deforestation or farmed shrimp emissions in their portfolios.
- ➔ Unless capital markets embrace greater transparency and disclosure, they risk higher exposure to production and price shocks due to nature-related supply- and demand-side constraints, compounding investors' inability to calculate company valuation accurately e.g. EV/EBITDA.^a

MANGROVES THE FORGOTTEN FORESTS

In 2019, 246 global investors controlling over \$17 trillion in assets issued a joint statement calling for urgent government action to stop illegal deforestation and enforce governance commitments to protect the Amazon rainforest.^b While deforestation and fires in the Amazon capture global news headlines, mangrove deforestation has not yet received the same investor or media attention.

Mangrove forests are critical natural capital habitats generating a broad range of ecosystems services, maintaining marine stocks, preventing coastal erosion and sequestering greenhouse gases. Destruction of mangrove forests results in the loss of many public benefits. These include flood and storm protection, providing habitats and importantly nurseries for fish, carbon sequestration and filtering water.⁶

^a Enterprise Value / Earnings before Interest, Taxes, Depreciation and Amortisation.

^b Forthcoming research by the London School of Economics and Planet Tracker highlights financial risks to investors' equity and fixed income portfolios from deforestation and other planetary boundary limits



Mangroves form just 1% of global forest carbon sequestration but, as coastal habitats, they account for 14% of global ocean carbon sequestration at 13.5 Gt per annum.⁷ As a percentage of total habitat, mangroves are being destroyed at five times the rate of rainforests.⁸ 9,736 km² of mangrove forest (7% of total) was lost between 1996 and 2016 - see Figure 1.⁹



Figure 1: Mangrove Deforestation in Southeast Asia, 1996–2016.¹⁰

The 246 investors concerned about the Amazon benefit from turnover generated by publicly listed companies that depend on commodities linked to deforestation including soy, timber, palm oil and livestock.¹¹ To address deforestation concerns, many of these investors utilise the growing suite of tools and resources assessing company and portfolio deforestation risk such as Global Canopy's Forest 500, CDP's Global Forest disclosures and the Rainforest Alliance Accountability Framework.

Mangrove forests are, however, not widely included within these tools, even though shrimp farming has been identified as a major cause of mangrove deforestation and coastal land use change in Southeast Asia. Like the Amazon investors, the top 20 shrimp investors benefit from turnover by publicly listed companies who are contributing to the mangrove deforestation.

Investors with a \$63 billion exposure to the farmed shrimp sector are unable to assess and compare farmed shrimp financial risks across the 27 leading publicly traded farmed shrimp equities. One risk illustration is that shrimp producers are increasingly in the short to medium term facing sustainability-related supply chain demand pressures. Wholesale buyers such as Nestlé are transitioning towards deforestation-free supply chains, meaning they will 'ensure that all its raw materials sourced from forested areas have not led to deforestation and have not led to the loss of high conservation values'.¹² Equally, between 2012 and 2018, the US Food and Drug Administration rejected 984 shrimp import entry requests based on banned antibiotic residues found in shrimp products. Similar demand constraints directly impact company financial performance and therefore investor capital.¹³

With clear comparisons to livestock and soybean deforestation in the Amazon, this briefing paper focuses on the global farmed shrimp market, its role in driving deforestation, the emissions footprint of the sector and why these matter to investors.

SHRIMP IS THE MOST VALUABLE TRADED AQUACULTURE COMMODITY

With stagnant production in the wild-catch seafood industry, investors are increasingly turning to aquaculture to fill the supply gap as evidenced by growing investments into shrimp farming alongside wild-catch shrimp operations.¹⁴

Marine shrimp and prawns are the most valuable traded aquaculture group according to the FAO.¹⁵ The global shrimp market was valued at \$45 billion in 2018 distributed across public, private, smallholder and commercial producers.¹⁶ The marine shrimp industry is forecast to continue growing at a CAGR (Compound Annual Growth Rate) of 3.7% to 5.2% between 2019 and 2025.¹⁷

Because of growth in investment, farmed shrimp formed 54% of global shrimp production in 2016, an increase from 28% of global shrimp production in 2000¹⁸ – see Figure 2.

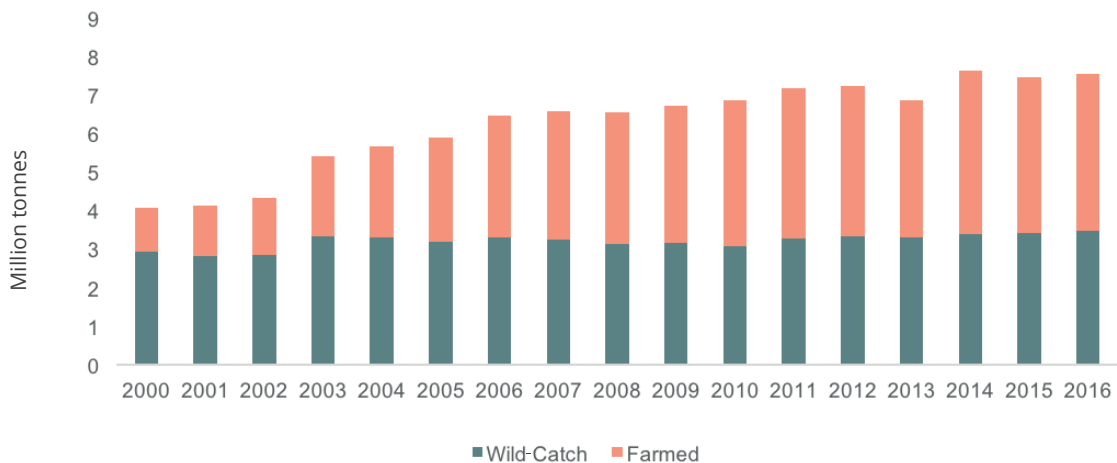


Figure 2: Total Wild-Catch and Farmed Shrimp Production, 2000–2016.¹⁹

Thailand, India, Vietnam, China and Ecuador are the largest exporters of shrimp products. The top 10 exporting nations traded \$248 billion of shrimp products between 2000 and 2018.²⁰ Thailand is the largest shrimp exporter globally by value, exporting \$52 billion of shrimp products between 2000 and 2018.²¹

During the same timeframe, the EU was the largest importer of shrimp products globally by value, at \$119 billion.²² The US is the second-largest importer of shrimp products globally, totalling \$105 billion between 2000 and 2018. Over this period, Japan was the third-largest global importer of shrimp products at \$58 billion.



GHG PROTEINS

SHRIMP EMISSIONS EXCEED BEEF EMISSIONS

Approximately 30% of mangrove deforestation and coastal land use change in Southeast Asia has been attributed to farmed shrimp.^{23,24,25,26} Alongside direct deforestation, shrimp farming leads to mangrove degradation through water pollution and sludge dumping, which cause declines in localised wild fishery catches and eventual collapse of the mangrove ecosystem.²⁷

Factoring historical mangrove deforestation into GHG emissions caused by the shrimp farming industry makes the sector one of the highest carbon emitters among all soft commodities.^{28,29,30,31}

! There is a land-use carbon footprint of 1440 kg CO₂e for every kilogram of beef (produced on land formerly occupied by tropical forest) and 1603 kg CO₂e for every kilogram of shrimp produced on land formerly occupied by mangroves.³²

For shrimp farming, historical and future deforestation is becoming a regulatory risk, as import restrictions are being adopted in major import markets such as the EU on products responsible for deforestation. Deforestation also leads to greater coastal instability due to the loss of keystone habitats, allowing more storm damage which exacerbates production and financial losses and is fuelling rising input costs and production volatility at the farm level due to increased incidence and severity of disease.

Industry forecasts for rising demand arguably mean that the biggest environmental shocks are yet to be experienced in the aquaculture sector. Capital markets should be thinking about historical and potential environmental constraint issues in the sector to which investors are financially and reputationally exposed.

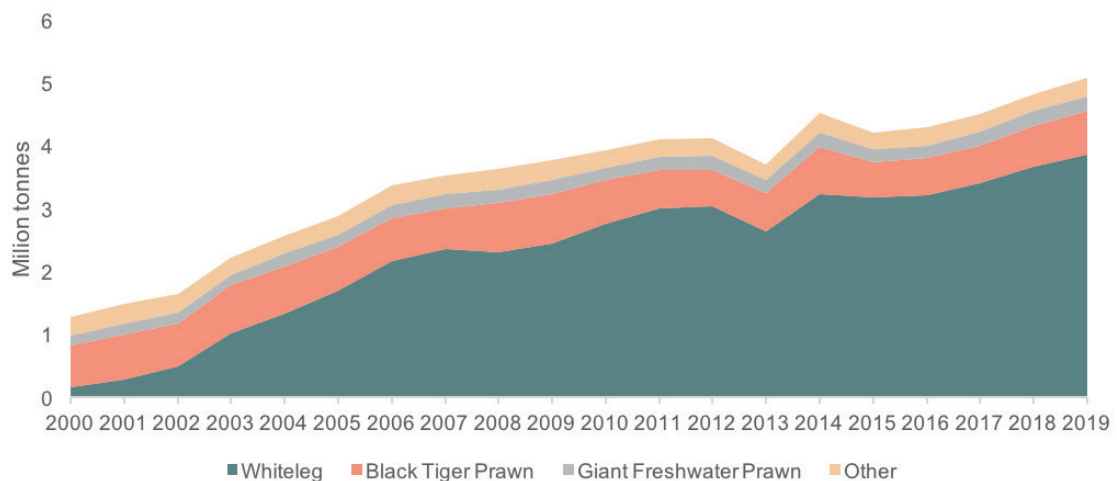


Figure 3: Breakdown of Global Total Wild Catch and Farmed Shrimp, 2000–2019.³³

Shrimp farming has experienced rapid expansion since 2000 – see Figure 3. As demand has grown, production supply and intensity have followed, resulting in market oversupply. In 2018, this resulted in 10 of the top 100 global seafood equities issuing profit warnings specifically due to low shrimp prices following oversupply.³⁴



For example, whiteleg shrimp (*Litopenaeus vannamei*) prices decreased 37% between 2013 and 2016 as global supplies outstripped demand.³⁵ Whiteleg shrimp accounts for 76% of total farmed shrimp production, up from 12% in 2000.³⁶ Since 2000, 99.8% of whiteleg shrimp have been produced via farming.

As shrimp spot prices fall, larger scale commercial producers are continuing to expand capacity in order to offset declines in wild-catch production and to protect supply chains. They can absorb lower prices with high economies of scale and cost-efficient production methods. Some corporates are also hedging by increasing production in different geographies such as India, Vietnam and China. Smallholders are racing to build new capacity in relatively unsophisticated farming models in order simply to make enough money to survive in the fragmented marketplace. Under this scenario, producers lack market-based incentives to invest in costly sustainable farming and feed systems.

Both scenarios are detrimental to the natural environments in which shrimp are farmed. By increasing the number of farms in the short term, deforestation rates and environmental constraints are expected to spike.

As environmental conditions deteriorate, land-use change causes higher emissions from mangrove deforestation, which undermines farm performance and longevity.

Unmanaged farm growth increases market risk for shrimp farming companies, causing a “race to the bottom” from oversupply and declining prices, which amplifies financial risk for investments in aquaculture farms and increases risks to investors.

In the medium-term, production and new capacity may plateau. For now, it appears the fragmented industry is absorbing price depressions and continuing under business-as-usual. The main question therefore relates to profitability and margin. Are corporates cutting sustainability corners to reduce costs?

If profitability continues to fall, some farms may close, allowing habitats to recover, but at what cost and for how long?



DISCLOSURE CONCERNS

Planet Tracker identified 27 publicly listed companies operating globally in the farmed shrimp sector. Their combined market capitalisation is \$63 billion after adjusting for equity held by the companies themselves – see Table 1.

Table 1: Financial Metrics of 27 Shrimp Farming Companies with Market Capitalization, EV/EBITDA and P/E as of 31 December 2018.³⁷

Company	Country	2018 Revenue (\$ million)	2018 Market Capitalisation (\$ million)	2018 EV/EBITDA (%)	2018 P/E (%)
ITOCHU Corporation	Japan	49,732	34,483	12	6
Marubeni Corporation	Japan	44,155	30,646	12	6
PT Central Protein Prima	Indonesia	519	211	14	1
Mitsui & Co.	Japan	68,057	12,858	16	7
Dongwon Industries	South Korea	2,222	708	7	10
PT Sekar Bumi	Indonesia	137	46	15	87
Seafood JSC	Vietnam	5,126	3,212	18	11
Kien Hung	Vietnam	16,775	7,380	7	4
Maruha Nichiro	Japan	6,113	1,835	13	12
Nissui	Japan	8,293	1,406	12	17
Nichirei	Japan	49	6	10	18
Charoen Pokphand Foods	Thailand	9	5	16	13
Bac Lieu Fisheries	Vietnam	68	3	4	38
Mekong Fisheries	Vietnam	3	2	3	15
Thai Union	Thailand	4,125	2,186	19	20
Cafico Vietnam	Vietnam	21	2	N/A	N/A
Apex Frozen Foods	India	154	138	13	17
Seafresh Industry	Thailand	6,583	4,918	11	103
Seaboard	United States	715	592	10	59
Surapon Foods	Thailand	423	304	8	N/A
Zhanjiang Guolian Aquatic Products	China	157	53	18	17
Zhangzidao Group	China	1,922	1,425	17	65
PP Prime PCL	Thailand	245	25	16	N/A
Marr S.p.A.	Italy	63	16	14	20
TexChem Resources	Malaysia	1,048	234	5	N/A
High Liner foods	Canada	280	11	9	11
Alliance Select Foods	Philippines	97	31	12	20
TOTAL		217,104	102,750		
Equity Owned by the Companies Themselves			40,201		
Investor Exposure			62,549		

Investors should be concerned that only 4 of these 27 companies (15%) disclose shrimp-specific revenue and operating margins in their income statement.

Hence, a company's EV/EBITDA may not be accurate, which limits investors' ability to compare companies' financial performance across the sector, calling into question 12-month forward P/E ratios.

EV/EBITDA enables investors to determine the market value of a company, which is different to market capitalisation, which is based on price. EV is more comprehensive than market capitalisation, which only reflects common equity, because it is adjusted for claims by creditors and shareholders. EV determines the market value of a farmed shrimp business. EV is easily adjusted for external and internal drivers such as the EU Action Plan on Deforestation and environmental conditions such as diseases and eutrophication. Thus, without shrimp segment financial reporting, investors are unable to easily change their valuation models to address industry risks from unsustainable production.

With inconsistent disclosure, investors cannot forecast earnings effectively. When companies do not report shrimp segment revenue and costs, gross profit and net profit margins cannot be calculated accurately. Planet Tracker did not find that financial data providers (Bloomberg and FactSet) were factoring environmental constraints into their EV calculations.

Understanding the exposure of these companies to environmental risks is key for investors forecasting revenue, costs, gross profit and net profit margins.

The average market capitalization weighted P/E ratio as of 31 December 2018 was 11.7x for these 27 companies. By comparison, for the same period their International Food and Beverage peer group had a P/E of 19.5x.³⁸ This P/E discount to peers is likely due to the fragmented industry, low scale, high volatility and small net revenue margins.

The 27 companies have 2,200 unique investors with total holdings of \$63 billion.³⁹ The top 20 investors own 61% of these companies' equity with Japanese and U.S. institutional investors disproportionately exposed – see Table 2.

Table 2: Top 20 Investors Exposed to Publicly Traded Shrimp Farming Companies.⁴⁰

Investor Name	Holding Value (USD Million)	Number of Holdings
ITOCHU Corporation	4,645	4
Mizuho Financial Group	4,421	6
Nomura Holdings	2,822	6
BlackRock	2,535	10
Mitsui & Co.	2,483	1
Vanguard Group	2,345	11
Seaboard	1,935	1
State Street	1,805	12
Charoen Pokphand Foods	1,794	1
SFC	1,779	1
Mitsubishi UFJ Financial Group	1,612	6
Nippon Life Insurance	1,466	6
FMR	1,402	12
Nikko Asset Management	1,337	6
CP Worldwide Investment	1,336	1
Daiwa Securities Group	1,225	6
Marubeni	1,147	1
Norges Bank	1,126	8
MS&AD Insurance Group Holdings	1,123	2
Lyxor International Asset Management	1,076	10



To date, Planet Tracker has found no evidence of these institutions reporting against mangrove deforestation or farmed shrimp emissions in their portfolios.

These top 20 institutional investors exposed to farmed shrimp equities must insist upon greater transparency and reporting on farmed shrimp revenue from these companies because they face ongoing environmental shock risks. For farmed shrimp, because of the lack of transparency, investors own revenue and margin risks stemming from, for example, regulatory bans on commodities linked to deforestation and antibiotic use and asset depletion due to disease.

These financial risks are compounded because of disparities between data providers. As an illustrative comparison, Figure 4 presents total global marine shrimp production data from the FAO and from GOAL.

It appears that in 2013, the FAO did not reflect the Chinese outbreak of Early Mortality Syndrome (EMS) in its data set, leading to overreporting of global production by nearly 700,000 tonnes as opposed to the production figures given by GOAL. Industry professionals have speculated that the Chinese industry has not recovered from this outbreak and that production values in 2019 may be 43% lower than reported.⁴¹

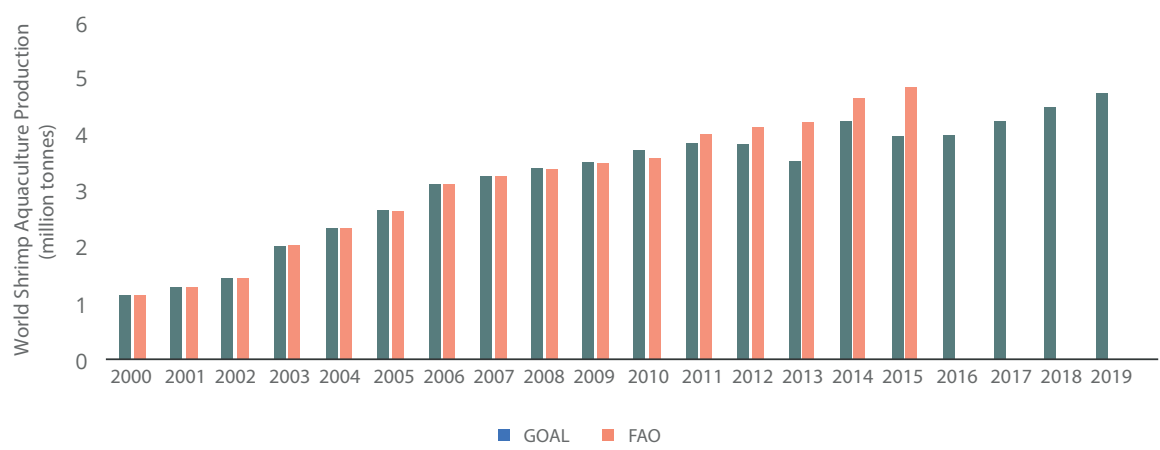


Figure 4: GOAL Data Compared to FAO Data, 2000–2020⁴²



CONSIDERATIONS FOR COMPANIES & INVESTORS

Investors in, and credit lenders to, food and agriculture businesses including farmed shrimp producers are increasingly scrutinising companies on their environmental, social and governance (ESG) performance. Executive management teams of farmed shrimp producers should report on issues important to investor analysis in the sector, including but not limited to:

DEMAND COMPETITIVENESS

With global supply exceeding demand, producers able to distinguish themselves in terms of price, reliability, environmental shock resilience, sustainability and brand value are set to be more competitive in winning wholesaler supply contracts. As an example case, in the wild-catch industry since 2016, Austral Fisheries' firm-wide sustainable seafood pledge, audited carbon neutrality pledge and deployment of consumer product traceability technology has contributed to its Northern Australian harvested Skull Island Tiger Prawn brand achieving a 7% to 10% revenue premium and maximised supply distribution contracts.⁴³

DISEASE RISK

Declining environmental health fundamentally negates the ability for aquaculture farms to operate cost effectively and efficiently. The rapid increase of intensive farming techniques coupled with unsustainable farming practices leads to disease outbreaks in shrimp farms. Disease outbreaks have cost the Asian shrimp sector over \$20 billion between 2006 and 2016.⁴⁴ For example, Early Mortality Syndrome (EMS) outbreaks negatively impacted nearly all whiteleg shrimp production between 2012 and 2016.⁴⁵ In 2012, EMS caused \$148 million in economic losses in India alone.⁴⁶

GOVERNANCE

Implementing measures ensuring greater farm level sustainability can drive both operating cost savings, through lower antibiotic use for example and revenue premiums correlated with strengthened sustainability and consumer brand awareness. Both impact investor returns, engagement and sustainability compliance. Strong management governance is therefore a critical attraction for investors.

Shareholders and credit lenders to listed companies involved in shrimp production should also consider the following risks to their organisations and financial capital:

INVESTOR REPUTATIONAL RISK

Institutional investors have a fiduciary responsibility to consider and report on biodiversity in assessing farmed shrimp investments in their portfolios. For example, the TCFD (Task Force on Climate-related Financial Disclosures) states that there are material financial impacts for food production firms due to deforestation and water risks. Thus, investors who stress test their portfolios for climate risk applying the TCFD framework should engage with farmed shrimp equities to ensure transparent and accurate reporting takes place to better assess their exposure to environmental production shocks.⁴⁷

REGULATORY RISK

Governments are acting to stop mangrove deforestation. Mangroves are found in more than 110 countries globally and 28 countries reference mangroves in their Nationally Determined Contributions (NDC) in alignment with the 2015 Paris Agreement.⁴⁸ In fact, the top five shrimp exporting nations – Thailand, India, Vietnam, China and Ecuador – all mention mangroves specifically in their NDC commitments to uphold the Paris Agreement.⁴⁹ Emerging EU regulations banning deforestation-linked commodities create the potential for demand-side constraints for shrimp exports in import markets. The EU is the largest importer globally of shrimp products by value, totalling \$119 billion between 2000 and 2018.⁵⁰



DEFORESTATION COMPOUNDS WIDER PRODUCTION CONSTRAINTS PUTTING REVENUE AT RISK

Beyond GHG emissions, mangrove deforestation alters the ecological balance of natural habitats which, as a direct consequence, become less resilient to environmental impacts created by shrimp farming. Monoculture shrimp farming in deforested marine areas in particular can lead to:

Eutrophication - which occurs when excessive nutrients cause algal blooms. This results in algal decomposition depleting oxygen supply which increases shrimp fatality and thus decline of stocks. Eutrophication in shrimp ponds can result in harmful algal blooms (HAB) allowing toxic phytoplankton to enter the food chain causing severe illness and sometimes death in humans.

Waste leakage - from untreated waste effluent results in billions of tonnes of waste water being released into near shore fishing grounds, negatively impacting fish health and affecting people who eat fish.

These risks can result in subsequent financial loss. For example, in September 2019, fear of disease led to increased antibiotic use which in turn resulted in 8% of US shrimp import refusals from banned antibiotics.⁵¹

INVESTOR QUESTIONS

Environmental risks may cause the farmed shrimp industry to face immediate top line revenue and gross profit and net profit margin risks from production and price shocks. These financial risks are not adequately incorporated into current revenue and income projections.

Investors must address farmed shrimp mangrove deforestation which is spurring environmental damage with dynamics resonant of beef-driven Amazon deforestation. Companies and investors should consider how farmed shrimp mangrove deforestation could drive sector revenue miscalculation, asset mispricing and regulatory risks from imported deforestation policies.

To decrease financial risks that both companies and investors face from farmed shrimp links to deforestation, investors can engage with companies on the following questions:

Accurate income statement reporting and transparency

Request companies to publish species-specific revenue and operating costs in their income statement so that analysts can assess risks to their gross profit and net profit margins from species-specific exposure to supply-side production shocks and demand-side policy risks.

Deforestation accountability

Call for companies to certify their operations to provide independent accountability regarding their efforts to decrease their exposure to mangrove deforestation shrimp (MDS), as a way to mitigate reputation risk to companies and investors from MDS farmed shrimp's GHG profile, which is higher per kg of protein produced than beef.

Addressing regulatory risks

Ask companies to discuss, in their quarterly earnings calls and related financial reporting, the risks that farmed shrimp face from regulations to address deforestation-linked commodities, e.g. the EU Action Plan on Deforestation.

Planet Tracker's Seafood programme is analysing future financial risks to aquaculture expansion. See our upcoming major Seafood Tracker report on aquaculture, *Loch-ed Profits*, being released in 2020.

APPENDIX

Table 3: Publicly Traded Farmed Shrimp Equities, 2019.⁵²

Bloomberg Ticker	Company	ISIN
ITOCHU Corporation	8001 JP Equity	JP3143600009
Marubeni Corporation	8002 JP Equity	JP3877600001
PT Central Proteina Prima Tbk	CPRO IJ Equity	ID1000105000
Mitsui & Co.	8031 JP Equity	JP3893600001
Dongwon Industries	006040 KS Equity	KR7006040000
PT. Sekar Bumi	SKBM IJ Equity	ID1000124407
Seafood JSC	TS4 VN Equity	VN000000TS43
Kien Hung	KHS VN Equity	VN000000KHS0
Maruha Nichiro	1333 JP Equity	JP3876600002
Nippon Suisan (Nissui) Kaisha	1332 JP Equity	JP3718800000
Nichirei Corporation	2871 JP Equity	JP3665200006
Charoen Pokphand Foods Public	CPF TB Equity	TH0101A10Z01
Bac Lieu Fisheries	BLF VN Equity	VN000000BLF8
Mekong Fisheries	AAM VN Equity	VN000000AAM9
Thai Union	TU TB Equity	TH0450010Y08
Cafico Vietnam	CFC VN Equity	VN000000CFC5
Apex Frozen Foods	APEX IN Equity	INE346W01013
Seafresh Industry Public Company Limited	CFRESH TB Equity	TH0359A10Z00
Seaboard Corporation	SEB US Equity	US8115431079
Surapon Foods	SSF TB Equity	TH0159A10Z02
Zhanjiang Guolian Aquatic Products	300094 CH Equity	CNE100000RB7
Zhangzidao Group Co.	002069 CH Equity	CNE000001NR1
PP Prime PCL	PPPM TB Equity	TH0435010Y09
Marr S.p.A.	MARR IM Equity	IT0003428445
TexChem Resources	TEX MK Equity	MYL870200002
High Liner Foods	HLF CN Equity	CA4296951094
Alliance Select Foods Company	FOOD PM Equity	PHY0077T1153



DIS CLAIMER

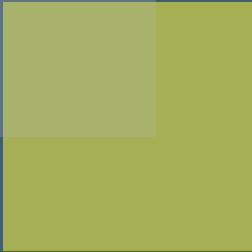
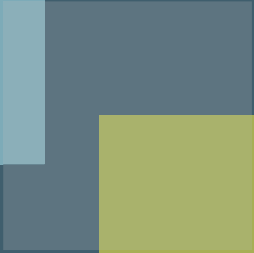
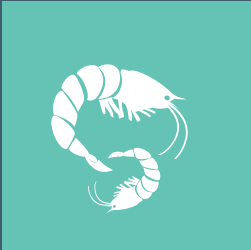
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