Responsible Protein Sourcing in Asia: Baseline Benchmark

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ARE
ASIA RESEARCH & ENGAGEMENT

Asia Research & Engagement (ARE)

ARE's purpose is to bring the voice of investors in support of solutions to Asia's sustainable development challenges. We provide structured collaborative engagement programmes that emphasise dialogue between listed companies and institutional investors. Our current themes are energy transition and its financing, sustainable and responsible protein, and sustainable real estate. ARE is headquartered in Singapore and was founded in 2013.

This work forms part of our sustainable and responsible protein programme. ARE collaborates with institutional investors, collectively representing USD 3 trillion to engage Asian listed companies in protein value chains. Our objective is to encourage a protein transition that strengthens responsible sourcing behaviours and increases consumption and supply of sustainable (alternative) proteins.

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Asia's billions of middle- and lower- income consumers aspire to access affordable, high-quality and responsibly sourced proteins. Yet current animal protein production practices have major sustainability impacts. There needs to be a concerted effort across meat, dairy, seafood and egg value chains to address the negative impacts.

Unfortunately, Asia's listed food buyers are neither acknowledging nor addressing many sustainability challenges when sourcing animal proteins. They are far behind global players that have stronger, more comprehensive approaches to address animal protein risks. This report provides baseline findings for a universe of Asian listed companies benchmarked for responsible animal protein sourcing. The report also details a range of negative impacts and opportunities relating to key risks for buyers and investors.

Out of 158 Asian listed companies across 10 markets, we found 72% have some form of sustainability reporting. This reporting largely focused on reducing waste, water, and climate emissions peripheral to the core business, and labour conditions in sourcing or employment. **Few had acknowledged, let alone addressed core sustainability risks associated with animal protein sourcing.**

While 70% of companies provide some form of food safety management disclosure, only 34% provide any form of food sustainable sourcing policy. **Only 16% of reviewed companies had a sustainable sourcing policy, including for animal proteins.**

Of the 158 companies benchmarked:

- **Only 13% acknowledged antimicrobial use or resistance risks in animal protein sourcing.** Companies mentioned antimicrobial 'residue testing' or 'antibiotic free' products, but few acknowledged antimicrobial resistance (AMR) or presented principles to reduce antimicrobial use.
- **Only 11% acknowledged animal welfare risks in animal protein sourcing.** Some companies mentioned intent for animal welfare, some targets for cage-free eggs or other products. Independent certification for animal welfare was rarely mentioned.
- **Not one company acknowledged deforestation risks in animal protein sourcing.** While 14% of companies mentioned deforestation relating to sourcing certified paper for packaging/accessories or palm oil, none directly mentioned deforestation risks associated with animal feed or farm land use linked to animal protein sourcing.
- **Only 18% acknowledged sustainable seafood sourcing (wild caught and farmed).** Some companies focused on avoiding shark fin, others prioritised 'local' seafood sourcing. Some companies cite sustainable seafood certifications. None reported comprehensively sourcing sustainable seafood.

Not a single company reviewed and listed on the Chinese, Indonesian, or Taiwanese exchanges had a protein sourcing policy. Not a single Malaysian or Indonesian company reviewed, acknowledged antimicrobial use, animal welfare or deforestation risks. The more developed markets of Hong Kong, Japan and Singapore scored somewhat better on average, but had significant gaps. South Korean companies underwhelmed, except for two smaller companies, demonstrating that all listed companies can and must do better. In Thailand and Japan, listed companies scored mid-range, with definite room for improvement. Indonesian companies were the lowest scoring across the board, followed by companies listed in the Philippines.

Figure 1. Market summary by capitalisation and question (consolidated percentages)

	Market	CN	HK	ID	JP	KR	MY	PH	SG	TH	TW	Total / Asia Ave*
No. of companies		9	15	15	22	24	7	14	23	17	12	158
Total market cap (USD bn)		88	66	19	138	39	7	58	41	52	32	542
Average market cap (USD bn)		10	4	1	6	2	1	4	2	3	3	3.6
Average total score (by market %)		**26**	**47**	**15**	**41**	**26**	**27**	**25**	**36**	**35**	**43**	**33**
1	Does the company provide any sustainability reporting?	67%	93%	60%	82%	29%	71%	57%	96%	71%	100%	**72%**
2	Does the company acknowledge responsible sourcing as a business issue?	44%	93%	27%	86%	50%	57%	50%	65%	53%	83%	**62%**
2a	Does the company provide a responsible sourcing policy– including for protein?	0%	40%	0%	23%	13%	14%	14%	17%	24%	0%	**16%**
3	Does the company disclose a food safety management system?	56%	73%	33%	77%	79%	71%	57%	74%	76%	92%	**70%**
4	Does the company acknowledge antimicrobial use or resistance (AMR) risks in protein sourcing?	22%	13%	0%	14%	13%	0%	14%	0%	18%	50%	**13%**
5	Does the company acknowledge animal welfare risks in protein sourcing?	11%	27%	0%	18%	13%	0%	7%	9%	13%	8%	**11%**
6	Does the company acknowledge deforestation risks in animal protein sourcing?	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0%**
7	Does the company acknowledge sustainability risks in sourcing seafood?	11%	36%	0%	32%	11%	17%	7%	23%	25%	8%	**18%**

Source: ARE benchmarking findings, market cap from Factset (2021).
*Asian average is the direct calculation from the 158 companies

Asia's listed protein buyers are clearly falling below stakeholder expectations — with an absence of specific policy, standards, targets and disclosure for responsible protein sourcing. Asian buyers appear almost oblivious to the significant reputational, financial and societal risks and current impacts associated with animal proteins, potentially eroding trust of consumers, shareholders and trading markets. Companies must do more now and future proof themselves.

Recommendations for Asian protein buyers:

We recommend an approach that aligns with modern sustainability and ESG approaches, encouraging transparency, policies and movement towards time-based targets and annual performance reporting. This will enable Asian protein buyers to play their part in the necessary transition to a more responsible and sustainable food system for customers and consumers, with meaningful disclosure for investors.

Asian protein buyers should establish a comprehensive process:

1. Identify and assess all material risks with protein sourcing — including those benchmarked in this report. Develop or update the company materiality matrix.
2. Develop a company sustainability vision towards 2030, involving the top tiers of management and governance. Be outward-looking and aspirational.
3. Ensure traceability of all protein products to underpin sustainability, and also management and disclosure of recalls, quality and provenance.
4. Develop a comprehensive strategy and schedule for producing company policies, targets and specific sourcing standards to mitigate all risks with protein sourcing. Seek best practice examples, expert advice or assistance.
5. Report performance against such targets and standards annually.

Asian protein buyers should also align with global sustainability directions:

- Set sourcing standards that prohibit growth promotion and prophylactic use of antibiotics to optimise public health and address AMR risks. Antibiotics in animals should be restricted to treatment only.

- Set higher welfare standards and targets. Progression towards higher welfare standards is a key part of responsible sourcing. Animal welfare is interconnected with many other sustainability risks.

- Review or develop deforestation and biodiversity policies and sourcing targets, acknowledging risks associated with all proteins. Anticipate changes in consumer sentiment, national pledges, tightening regulatory landscapes and new sustainability disclosure frameworks.

- Set targets for comprehensive seafood traceability and sustainable sourcing, with awareness of certification coverage and limitations. Work towards transparency, articulating company policies with comprehensive sustainability and clear, meaningful targets and disclosure for all seafood sourcing.

Conclusion

All listed buyers should strengthen their sustainability policies, standards and reporting. As competition and consolidation threatens and regulation looms in the region, companies should raise their game, learning from others. Investors and shareholders increasingly look to all parts of a business and value chain for sustainability. Do not let your protein buyer business let you down.

This baseline benchmark offers an opportunity for companies to step up to the plate on responsible protein sourcing. The next benchmark will evolve and review companies from mid 2023 and include diversification of proteins. Please get in touch if you need advice or support. ARE is also collaborating with investors to develop a set of recommended disclosure formats which will help companies better manage and report on critical sustainability issues.

2. Why should Asian food buyers care?

As well as risk reduction, there are many opportunities in greater sustainability disclosure for Asian companies, such as:

- product profile and labelling;
- securing company and brand reputation;
- sustainable revenue generation, expansion or readiness for export; and
- meeting investor expectations and compliance with ESG requirements.

Asian domestic protein buyers often source and sell much larger volumes in their home markets than multinational companies. Consequently, they wield significant influence on regional supply chains and can drive the implementation of responsible animal protein production and supply, via their sourcing policies and standards. There are many reasons they should do so, beyond risk management. The main one is that regional consumers are increasingly demanding more sustainable protein products; this covers animal proteins as well as the new wave of alternatives. Companies have multiple opportunities to serve this growing demand. At the same time a failure to move with tighter standards leaves companies exposed to reputational risks, particularly in the social media age. Opportunities for greater sustainability and disclosure, include:

- Product labelling for increasing sustainability conscious consumers
- Securing company and brand reputation
- Enhancing supply chain resilience
- Sustainable revenue generation and expansion, ready for export
- Meeting expectations from investors and stock exchanges on Environmental Social Governance (ESG) disclosure

The aim of this benchmark is to broadly document the sustainability landscape of Asian listed food (protein) buyers, as a 2020 reporting baseline from publicly available information from the companies. The benchmarked company universe encompassed the largest Southeast and East Asian listed companies (except from Vietnam), categorised into their predominant sectors. The benchmark used a simple framework with low bar questions to capture the limited company sustainability reporting and policy for antimicrobials, animal welfare, deforestation and seafood.

Details of the methodology are in section 7.1 and the complete list of 158 benchmarked Asian companies is in section 7.2.

This baseline benchmark seeks to understand broad trends in sustainability practice, providing market based and sector analysis, rather than scoring individual companies.

Questions 1–3 assess broader sustainability reporting, including climate emissions, water and plastic use, labour and food safety. Questions 4–7 explore four increasingly salient yet often neglected protein sustainability topics; namely, antimicrobial use, farm animal welfare, deforestation and seafood sustainability. These risks are interconnected with public health, climate emissions, social impacts and biodiversity loss, and reflect growing, awareness and concern by investors and consumers globally and in the region. These neglected risks are also related to the United Nations Sustainable Development Goals, a framework mentioned by many companies.

Consumer and labelling trends in Asia

55% of food spending increase in Asia is projected to be driven by 'consumer-conscious' behaviour. Key trends include safe and traceable sources, sustainable consumption and alternative proteins. Less meat consumption in the past 3 years is another trend.

Asian consumers have historically focussed on value, taste, safety and convenience. They are increasingly drawn to sustainable offerings. According to a 2021 PWC and Temasek survey, 'consumer-conscious' behaviour is driving 55% of the increase in regional food spend.[1] Major factors include demand for *safe and traceable sources, sustainable consumption and alternative proteins*. Voluntary meat reduction is an emerging trend even in countries with low or medium levels of meat consumption. One in four Southeast Asian respondents to this survey said they were eating less meat than three years ago. This compares to one in two respondents in China.[2]

Appetites are changing. Quick service restaurant benchmarking in APAC shows wide plant-based offerings. South Korean millennials and Gen Z are influential and positive about alternative meats, for a range of environmental and social reasons.

A 2021 analysis by the Good Food Institute of primarily Asian quick service restaurants (QSR) revealed the majority are now offering at least one plant-based option, noting that marketing, labelling and menu placement are major factors in selection of these options.[3] A February 2022 survey commissioned by Shinsegae Food found strong interest in meat alternatives in South Korea. Seven out of 10 millennial and Generation Z respondents — often the regional trendsetters — replied they were interested in consuming meat alternatives. The most common motivations were the environment (71.4 %), followed by animal welfare (53.0 %), healthy eating (43.5 %) and preparedness for food shortages (36.5 %).[4] Repeat consumption depended on taste. Consumers generally express willingness to pay and the final decision to buy sustainable products depending on the level of information, whether the products are locally available and relevant, and how transparent products are around sustainability.

Protein product labelling is evolving in Asia for consumer and regulatory reasons. Traceability is key.

Animal protein product labelling is also evolving in Asia. Whether for consumer choice or regulatory requirements, the protein industry is starting to gradually disclose more about sustainability factors — including product health, provenance, production system, carbon footprint, animal welfare and antibiotic use. Packaging increasingly displays the country and even district-level origins for raw materials, reinforcing the importance of traceability and sustainability.[5]

Clear labelling of eggs shown above, as part of the growing segmentation of eggs available in Thailand. Credit: ARE

Egg labelling is an example and growing trend in Asia. Clear, transparent labelling enables market segmentation, consumer choice and helps drive sustainability.

Some Asian companies are following global trends with clear product labelling enabling consumer choice, product diversification, and market segmentation. For example, 'cage-free' egg consumption is diversifying with labels including 'cage-free', 'free range', 'pasture raised', possibly also 'organic' and not involving antibiotics or hormones. More transparency and information in labelling will help drive sustainable choice, credibility and consumption.[6] This in turn increases competition and upscaling, which can lead to reduced costs and greater affordability. This cycle ultimately enhances market demand and helps mainstream sustainability.

Reputations are linked to whole of supply chain risks. Protein sourcing must evolve as has palm oil, cocoa and coffee sourcing.

Reputation management

Consumers and investors increasingly expect sustainability across the supply chain, including raw material production to be responsible and more sustainable. Responsible sourcing certification for palm oil, cocoa and coffee have enhanced markets and driven some aspects of sustainability. Protein sourcing also needs to step up to the plate to realise the benefits.

Transparency, traceability and public disclosure are key to reputational management. Avoid green washing.

Transparency, traceability, and public disclosure are all intrinsic to reputation management and help build trust between a company and its consumers, shareholders, and investors. Companies should also beware that efforts must go beyond tokenistic initiatives. Consumers, investors, and employees are also increasingly aware of efforts that look like greenwash.

Supply chain resilience

Business sustainability can also boost profits and share performance, and is critical to supply chain resilience. Good traceability and sustainability will assist company competition.

Sustainability can also strengthen supply chain resilience. The 2021 Sustainable Procurement Barometer reported by Stanford Graduate School of Business, concluded that companies that focused on labour and environmental protections across their supply base weathered the Covid-19 Pandemic better than if they solely focused on profit margins. In fact, 63% of buyers and 73% of suppliers reported that sustainable procurement practices helped them endure the pandemic.[7]

Asia's food buyers often face challenges in exporting manufactured goods or expansion of operations into new regions. They may be unable to meet what are often more stringent regulatory and retailer requirements. These regulations are becoming tighter.

Export, regulatory and social expectations are increasingly more stringent on ESG reporting. Pending EU requirements are discussed in section 4.

In February 2022, the EU adopted a proposal for a Directive on corporate sustainability due diligence in global value chains. Seeking a more just and sustainable economy, the new rules cover EU and non-EU companies (of a substantial size, as defined in the proposal) and their subsidiaries and value chains. The new rules require reporting, prevention and public communication on a series of human rights and environmental impacts (climate, pollution, biodiversity and others) and efforts to bring these to an end or minimise them. The facility for fines for non-compliance and legal action by victims are included, as are rules to hasten better corporate governance in sustainability. The proposal will go to the EU Parliament and Council for approval and will have a range of benefits in and beyond the EU.[8]

Pending EU due diligence requirements will impact Asian companies in export supply chains or operating in the EU.

New requirements in the EU are discussed in section 4 with regard to antimicrobials and deforestation, while there are existing EU minimum animal welfare and seafood sourcing standards, plus European, Australian and American legislation to avoid modern slavery in supply chains.

Disclosure requirements

Most stock exchanges relevant to this report require annual ESG reporting, and ESG as a listing rule, except South Korea and China. However, reporting varies a lot.

Investors are increasingly demanding sustainability information, with more frequent requests of companies to provide information on their ESG strategies and performance. Asian stock exchanges are supporting investors with the trend for disclosure requirements moving decisively to mandatory ESG reporting across the region. In many cases, this includes requiring disclosure of environmental and social risks along the supply chain.

Asian exchanges are certainly evolving yet trail behind other OECD counterparts in ESG reporting – certainly for protein related risks.

Most Asian stock exchanges relevant to this report require annual ESG reporting. ESG guidelines and listing rules however, vary greatly between markets with some favouring mandatory disclosure of certain KPIs and others creating broader duties for directors to address stakeholder interests. Stock exchanges of Hong Kong, Indonesia, Japan, Malaysia, the Philippines, Singapore, Thailand and Vietnam all require ESG disclosures, or will do by 2023.[9] There has been some progress with recent moves to introduce mandatory climate reporting and attempts to harmonise disclosure standards across ASEAN markets. Nevertheless, there is a fair way to go for Asian stock exchanges to match OECD counterparts in sustainability reporting, particularly for protein.

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3. Protein projections and risks in Asia

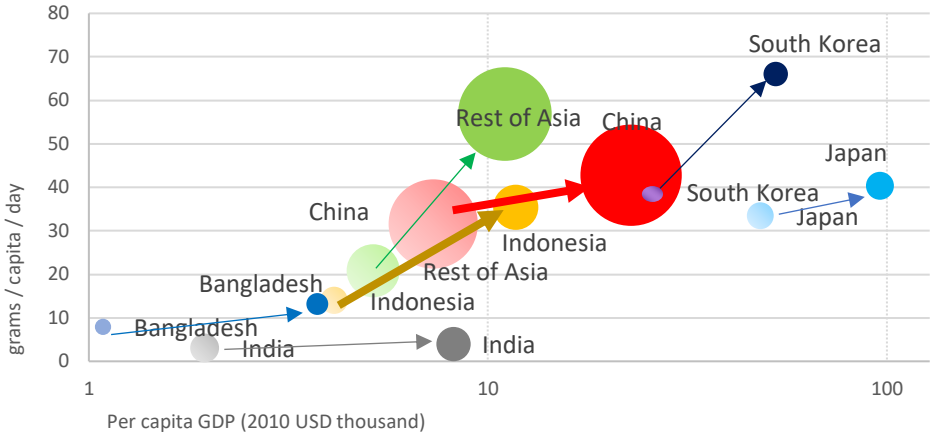
Asia's consumption of animal protein is projected to grow by 33% by 2030 and 78% by 2050, from a 2017 base.

The 2021 *Inevitable Policy Response* research, commissioned by the Principles for Responsible Investment, forecast that meat consumption will peak globally by 2030, as part of the effort to accelerate climate policy.[10] Rabobank had previously predicted that by 2030, 60% of all growth in global animal protein demand will be in Asia.[11] Asia's appetite for animal proteins will continue to grow before peaking, driven by a large and growing population and their rising incomes. In our 2018 report *Charting Asia's Protein Journey* we estimated meat and seafood volumes will grow 33% by 2030 and 78% from 2017 to 2050.[12]

This is increasingly supplied by industrial farming with serious sustainability challenges and threats to several Sustainable Development Goals.

Rapid increases in wealth and subsequent demand for animal proteins per capita have led to rapid growth and corporatisation of the animal protein industry in Asia. China clearly has the largest total demand for protein, but growth is slowing as per capita consumption is already high and there is an ageing population with less overall growth. Southeast Asia and South Asia will continue to grow considerably, and Indonesia will surpass India's animal protein demand per capita in 2030.

Figure 2. Protein consumption, 2017–2050



Source: Derived from FAOStat data (1961 – 2013), World Bank, OECD, ARE estimates. Figure from McCarron B, Tan S, and Giunti A. *Charting Asia's Protein Journey*. Singapore: ARE; 2018. Available from: https://www.asiareengage.com/reports/2018/9/4/charting-asias-protein-journey

Asia currently produces 88% of farmed fish, 90% crustacea, 58% of pigs, 35% of chickens and 65% of eggs for global consumption.

According to the UN Food and Agriculture Office (FAO), Asia currently produces 88% of farmed fish, 90% of crustacea, 58% of pigs, 35% of meat chickens and 65% of eggs for annual global consumption.[13] The region produces more than 38 billion terrestrial animals annually, mostly chickens.[14] It is hard to obtain reliable estimates for aquatic animals, but analysis of figures from fishcount.org.uk indicates half a trillion fish and crustacea are farmed annually, a figure that does not include the wild-caught fish used for feed.[15]

Industrial animal farming is the leading cause of deforestation and biodiversity loss, water and air pollution, and the second largest GHG emitter, which, if continuing as business as usual (BAU), will not enable containment of a global 1.5°C temperature rise.

Asian markets typically try to meet animal protein demand fast, rather than considering sustainability trade-offs. This has meant intensifying animal production practices, resulting in fast-growing demand for raw material inputs and overlooking social, environmental and animal welfare impacts for productivity, volume and price. The result is massive sustainability challenges. **Industrial animal farming is already the leading cause of deforestation and biodiversity loss, water and air pollution, and the second largest greenhouse gas (GHG) emitter.** FAO estimates for GHGs from animal agriculture have ranges from 14.5% to 18% of global GHGs, while a recent revisit of their methodology asserts 16.5% is the new minimum.[16] Beef production is still the largest GHG emitter overall, but by sheer volume the global chicken industry is still a major emitter and, after aquaculture, is the fastest-growing industry, increasing 310% from 1990 to 2018.[17]

Animal feed production is the biggest GHG emitter (48%), followed by enteric fermentation (41%) and animal manure (11%). We will not meet Paris Agreement GHG targets with BAU animal production.

Meat, dairy, and eggs contribute 18% of the world's caloric intake and 37% of protein intake; yet animal production emits more GHGs than all other edible crops combined.[18] Animal feed production was identified as the biggest emission factor (48%), followed by enteric fermentation (41%), and animal manure (11%). Even conservative projections of global animal farming, growing at business-as-usual (BAU) rates, demonstrate that we will not meet the GHG targets to keep within 1.5^{0}C rise in global temperature.[19] Meat and dairy consumption at current rates — and growing — significantly hamper global decarbonisation with ongoing efforts by the sector serving to only marginally reduce GHGs. This is especially because, broadly speaking, there are no effective mitigation methods for methane and nitrous oxide, which dominate the emissions from the animal production sector.

Carbon emissions from 2017 to 2050 will rise by 88% to supply Asian animal consumption, under BAU.

Our analysis for Asian consumption show that under a BAU scenario from 2017 to 2050, carbon emissions from the clearing of land to produce animal feed plus other feed and animal production practices will rise 88% from 2.9 billion tonnes of CO_2 to 5.4 billion tonnes per year, with land usage rising 81% from 3.9 million km^2 to 7.1 million km^2.[20]

Water footprint will increase by 83% to supply Asian animal consumption, under BAU (excluding animal slaughter and processing).

ARE also estimates the total water footprint relating to supplying Asian meat and seafood demand will increase by at least 35% by 2030 and 83% by 2050, from a 2017 base. Indonesia will have the highest growth in water demand due to increased fish and poultry consumption. The majority of water use, however, is for production of animal feed. These estimates do not include water used in slaughter, processing and transport, which would be additional.[21]

Effluent discharge from a pig farm in Thailand into a public waterway where antibiotic-resistant bacteria and genes were found. Image courtesy of World Animal Protection, Silent superbug killers in a river near you, 2021.

Industrial animal production already breaches the planetary boundaries for nitrogen and phosphorus, causing major pollution, plus land degradation, public health and other social impacts.

Industrial animal production has a range of externalities additional to carbon and other GHG emissions.[22] It contributes to soil degradation and erosion, and already has led to breaching planetary boundaries for excessive use of nitrogen and phosphorus, establishing us in the danger zone of high risk for irreversible and abrupt environmental changes.[23] In particular, primarily due to the intensive application of fertilisers, pesticides and animal manure, major pollution of riverine and marine waters has resulted and caused dead zones devoid of life beyond algae.[24] There are also a range of public health risks from water, land and air pollution originating from industrial farms, and inequality and social impacts on workers and communities.[25]

Collectively, the production of animal proteins threatens the achievement of United Nations Sustainable Development Goals: 2, 3, 6, 8, 12, 13, 14, 15.

Other impacts and risks associated with industrial farming and conventional animal protein sourcing are described in section 4. These topics are often interconnected, yet also frequently neglected — and so form the basis of our baseline benchmark analysis.

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[14] FAOStat data (2019, latest available; accessed 2021, December 9) compiled by ARE for chickens, laying hens, ducks, pigs, beef and dairy cattle for annual slaughter for meat and egg and dairy production. Compiled by ARE considering Asia as East, Southeast and South Asia. Sheep, goats, buffalo and other poultry produced for consumption would be additional.

[15] In 2017, 44–145 billion farmed fishes and 225–540 billion farmed crustaceans were killed for food in Asia. Figures are derived by ARE from fishcount.org.uk (accessed 2021, December 9). We note breeding fish and wild caught seafood for consumption and fish meal/oil for farmed fish diets are additional.

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4. Baseline benchmark findings in context

Our benchmark reviews Asia's food buyers' approaches to conventional animal protein sourcing. It finds that acknowledgement of risks, policies and standards are inadequate to address sustainability challenges and meet current investor and changing consumer expectations. The depth and breadth of reporting vary significantly across companies, with some broad influencing factors discussed in section 5. Detailed methodology is described in section 7.1.

Categories and risks reviewed

The following categories were chosen because they represent reporting of sustainability more broadly and some significant but often neglected risks relating to conventional animal protein — meat, dairy eggs and seafood — that need urgent address in our current food system. Identification of risks is the first step. A food buyer that acknowledges all of these risks to their business would appear relatively 'risk aware' although may not necessarily have included or prioritised these risks in the company's materiality matrix to date. We also looked for whether companies have mitigated these risks in any way, in terms of setting responsible sourcing policy, standards or reporting. Receiving a higher percentage in this scoring system *does not* equate to comprehensive resolution of the specific risks (3) to (7). This baseline assessment covers the acknowledgement and any initial mitigation of these risks where it exists. It is only the starting point for improved risk management.

1. Sustainability reporting
2. Responsible sourcing policy
3. Food safety management
4. Anti-microbial use or resistance risks in protein sourcing
5. Animal welfare risks in protein sourcing
6. Deforestation risks in protein sourcing
7. Sustainability risks in seafood sourcing

Implementation of sustainability reporting across Asia was already known to be inconsistent, partly influenced by market regulations and varying requirements by stock exchanges and other agencies. The key findings demonstrate this inconsistency further. The benchmark process involved review of publicly available sustainability reports, integrated or annual reports, policies, sourcing standards, supplier codes of conduct and webpages. The number of companies varied by market and sector, with an average of 16 companies per market and 18 per sector. There were only seven Malaysian companies, and only four companies in the bakery sector. For these smaller markets and sectors, disclosure by one company could have a disproportionate influence on the overall group score.

4.1 Sustainability reporting

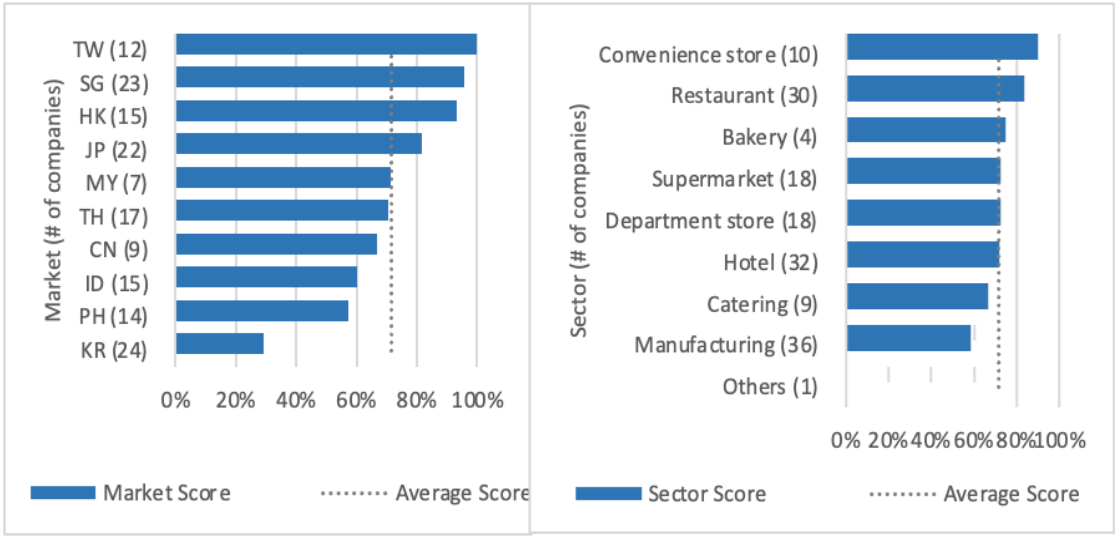
For our benchmark, the following question was posed to broadly assess the presence of company sustainability reporting generally.

Does the company provide any sustainability reporting?

72% of companies had some form of sustainability reporting, though it often did not include proteins.

Overall, 72% of companies had some form of sustainability reporting, either as a dedicated sustainability report or integrated into an annual report. This reporting did not, however, usually include proteins.

Figures 3 and 4. Companies reporting on sustainability (in any form) by market and sector



Source: ARE benchmark findings

While developed Asian markets often scored better, South Korea was a clear exception.

Developed markets generally performed better. The exception was South Korea, where only 29% of companies surveyed had any form of sustainability reporting. We note the South Korean companies we reviewed were somewhat smaller in market capital than other markets. We also believe that a lack of reporting partly reflects business culture in South Korea, as upon engagement they are often doing more than they report. Lack of sustainability reporting does not automatically mean that sustainability risks are not being addressed at all. However, there is a strong inference that lack of policy and disclosure implies a lack of relevant standards and performance.

Despite increased recognition by Asia's companies for the importance of sustainability reporting and the management of ESG-related risks, the depth and breadth of reporting varied dramatically. Some entities provided basic Corporate Social Responsibility (CSR) reports, which focused more on acts of community service than core ESG risks to the business relating to sourcing of raw materials. This may be due to an underdeveloped understanding of sustainability, capacity or limited stock exchange reporting requirements. Most companies referred to sustainability in the context of carbon or emissions, energy, water or waste reduction, but did not consider their core business of protein raw materials sourced (i.e., meat, dairy, eggs, seafood). Several quoted the Sustainable Development Goals for general context, or national legal compliance as a minimum, but did little more.

A few provided quite detailed reports, with disclosure based on an evaluation of the materiality of a robust cross-section of ESG issues. Despite exports to or direct sales in the EU or US, such companies did not publish comprehensive sustainability policies, standards or disclosure.

Sino Hotels, a Hong Kong listed company, was one of the better performers on this question: they provide a sustainability report prepared under HKE reporting standards with reporting specific to the year of their business operations and pertaining to most if not all SASB[26] sustainability topics under F&B.

The variation in sustainability reporting throughout the region begs the question of what drives the presence and quality of sustainability disclosure, generally and in Asia specifically. We know that many stock exchanges in Asia require some form of annual ESG reporting although reporting guidance and standards vary considerably. Are companies leading in ESG implementation and disclosure driven more by internal, company-specific factors such as business strategy, costs management, company culture or the influence of senior management? Or are they driven by risk exposure, peer rivalry, market culture or global trends? Such analysis is beyond the scope of this report but we invite careful reflection with a selected range of opportunities and brief company cases studies.

4.2 Responsible sourcing policies

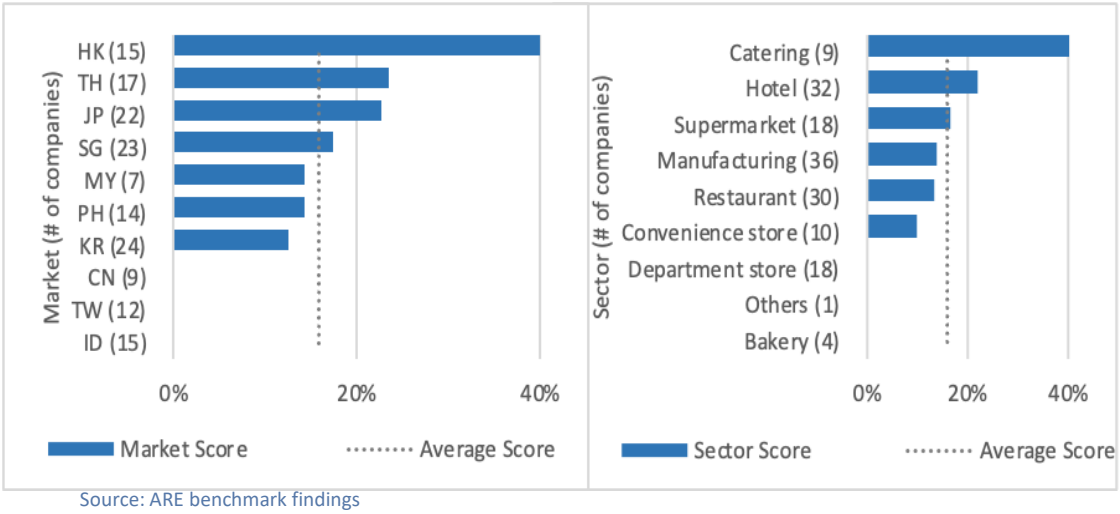
For our benchmark the following questions were posed to broadly assess the level of buyer acknowledgement and policy for sustainable protein sourcing.

Does the company provide a responsible sourcing policy including animal proteins?

Only 16% of companies had a sourcing policy including animal proteins. While developed markets tended to perform better, South Korea was a notable exception.

While 62% of companies acknowledged sustainability in sourcing in some way, 34% provided some form of a responsible food sourcing or supplier policy. **However, only 16% of companies had a responsible sourcing policy relevant to animal proteins (i.e., meat, dairy, eggs, or seafood).** Protein sourcing policies, where available, usually focused on sustainable seafood sourcing.

Figures 5 and 6. Companies publishing a responsible sourcing or supplier policy by market and sector — including any animal proteins



Source: ARE benchmark findings

Hong Kong companies were leading, though fewer than half had protein sourcing policies; and Thailand was surprisingly ahead of Japan. At the time of review, none of the Chinese, Indonesian or Taiwanese companies had a responsible protein sourcing policy. No department store or bakery companies had a responsible protein sourcing policy, exposing the business risk of these sectors.

We note responsible sourcing falls under SDG 12 — responsible consumption and production.

Neither companies listed in Taiwan, China, Indonesia nor in the department store or bakery sector had protein sourcing policies. Responsible sourcing is clearly within SDG 12.

Historically, sustainable food sourcing has been associated with palm oil or seafood. Various risks may be addressed to some degree through global certification schemes. Notably, however, these schemes may not always resolve the risks directly at source, and not all issues are covered by seafood certification schemes (such as animal welfare, antibiotics and deforestation). For these sustainability improvements, consumer expectations, peer benchmarking and stakeholder engagement appear to drive management changes and disclosure, rather than national requirements or disclosure regulations.

What is clear is — with only 16% of companies including protein in responsible sourcing policies — buyer risk exposure remains very high when sourcing meat, dairy, milk and eggs.

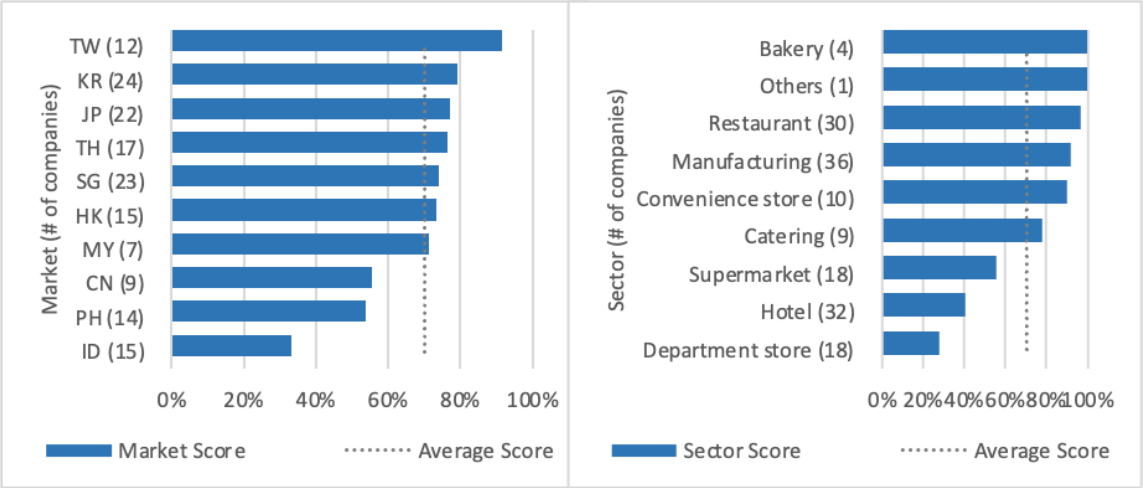
4.3 Food safety management

For our benchmark, the following question was posed to broadly assess the buyer reporting of food safety management in animal protein sourcing.

Does the company provide food safety management disclosures?

While 70% of companies reported on food safety management, disclosures were not necessarily comprehensive of all products sourced, neither did they include all aspects of food safety.

Figures 7 and 8. Food safety management system disclosure by market and sector



Source: ARE benchmark findings

Food safety is a fundamental expectation. Full traceability is key to food safety and to ensure a credible basis for responsible sourcing.

Food safety is a fundamental consumer expectation and should, along with aspects of sustainability, be underpinned by a robust traceability system. Traceability is not only key to managing food safety and sustainability but also supply chain disruptions (e.g., during COVID-19). Traceability also enables transparency, which helps with stakeholder confidence.[27] Digital traceability and transformation are now a must-have for modern food businesses. Failure to assure food safety and reliable traceability presents a direct risk to food companies' legal licence to operate, as well as company and brand reputation, and the ability to recall products or investigate outbreaks of food related illness. Food safety is therefore usually prioritised and also regulated and monitored to varying degrees by national agencies.

Food safety falls under Sustainable Development Goal 2 (zero hunger) and Sustainable Development Goal 3 (good health and well-being).

More developed markets and larger companies disclosed food safety management to a greater degree. Few companies reported comprehensive traceability however. Indonesia was the highest risk market reviewed.

We typically found that more developed markets and larger companies disclosed more systematic and centralised approaches to food safety management. The majority of larger companies referred to International Food Safety Standards and certifications, and either implemented in their own operations or as a requirement of their suppliers. However, few companies reported comprehensive traceability or food safety management schemes across all products or sourcing. Indonesia scored lowest. While risks and presence of antibiotic residues may be included in food safety, the risk of antimicrobial resistance in or produced by the supply chain was often not a routine part of food safety policy and management (see section 4.4).

Direct food related sectors scored better. Department stores and hotels scored lowest. Leading companies recognised that traceability was key to meet standards and consumer trust, and provided clear policies.

Some sectors that are directly related to food (restaurants, manufacturing) scored higher than those where there was a lower revenue contribution from foods, such as hotels and department stores. We also noted there was increasing recognition across Asia's food manufacturers and some retailers, of consumer awareness on the issue of product safety and quality. Such companies recognised that traceability was intrinsic to ensuring regulatory standards were met and customer trust was maintained, and provided clear policies to demonstrate their commitment to ensuring the safety of their products to consumers.

Leaders — rising tech expectations and company reputations

Leading companies had good digital systems, essential to underscore food safety, traceability and sustainability claims. Young tech generations provide an opportunity with greater sustainability scrutiny.

Companies in developed markets tended to score higher. Taiwan scored highest among our 10 countries, with 92% of the 12 companies scoring positively. Sector again plays a part, with manufacturers constituting nearly half of the companies. We looked to see if any of the Taiwanese companies demonstrated clear market leadership when it came to disclosure.

Uni-President was the largest Taiwan listed company by market capitalisation. It is a food manufacturer with a high share of revenue coming from convenience store operations. The company reports detailed systems, processes, audits and food safety testing for all ingredients and products.

A core focus for Uni-President is to continue its brand-building by developing assets to increase brand value and loyalty. Recognition of 'Gen Z' consumers as the new growth drivers, via Uni-President's new e-commerce and live streaming sales channels, emphasises the strategic focus on product diversification, and striving for better product quality to cater to the demands of younger consumers. Uni-President also recognised there was a 'new middle class that are particular about quality of life' and a 'rising trend of consumption upgrade'.[28]

This case points to an overall trend of increased consumer awareness on health and expectations for higher quality. Interestingly, the socio-economic factors behind this trend are both age and income level. Companies will need to cater to the rising demands of a typically younger, more tech-savvy consumer who may expect QR codes for traceability and access to information at their fingertips, and to be able to quickly disseminate information. It signals increased reputational risk to lagging companies that choose to remain opaque or unresponsive to the needs and expectations of younger consumers.

Do food scares lead to food safety and other opportunities?

South Korea's decisive response to a food safety issue had additional benefits.

Chinese listed companies scored below average, despite a trust deficit from past food scandals. Consumer avoidance and more stringent regulations may result from food safety scandals across Asia. For instance, a 2017 egg scandal concerning pesticide contamination in South Korea resulted in the acceleration of an egg traceability test drive in 2018, with an official launch in 2020. Eggs in South Korea are now stamped with a serial code, which provides information on the egg producer and the production system used (i.e., free-range, cage-free, enriched-cage or battery-cage), and the date the egg was laid.

China has stabilised but is still struggling to regain consumer trust after repeated food safety scandals. Some companies have responded better than others.

According to the United States International Trade Administration,[29] most of the F&B revenue generated in China is by non-franchised establishments, especially in 'smaller' tier 3 and 4 cities. Large franchises, however, have not been immune to food safety issues. McDonald's Corporation China and Yum Brands China (both benchmarked in this report), saw one of their meat suppliers shut down in 2019 amid food safety violations. This was when Yum Brands China was only just regaining some of its lost public approval from the KFC chicken scandal of 2012. Yum Brands China is making concerted efforts to provide greater transparency in its reporting.

Despite the Chinese government's efforts to develop more stringent regulatory measures and strengthen monitoring — partly as a result of past large-scale food safety incidences (such as the 2008 melamine milk and 2011 clenbuterol-tainted pork scandals[30]) and partly due to increased consumer concern about food safety as a result of the COVID-19 pandemic — food safety incidences still occur in China. These range from product contamination and agricultural and drug residues to the use of substandard ingredients and antibiotic resistant bacteria associated with animal proteins. To combat this, China has proposed a national food safety strategy to provide assurance of food safety from 'farm to table' and has been known to dole out severe penalties (even death sentences) to those found guilty of food safety offences that resulted in endangering public security and safety.

As another example of China's efforts, the State Administration for Market Regulations reportedly tested 244,000 random food samples from 31 provinces, regions and municipalities in 2019, for 558 indicators. Their analysis revealed an overall pass rate of 97.6%, the same as the previous year. Their conclusion being that the environment for food safety in China was stable, but many problems still existed.[31]

Stronger corporate commitment to food safety and traceability is needed in China, which could also lift traceability and reporting standards across the region.

If China is to overcome the trust deficit that persists within its food industry — a deficit that has in part resulted in significant growth in Chinese consumer appetite for imported foods[32] — a stronger corporate commitment to traceability to underpin food safety and other sustainability standards and disclosures is required. We believe this could also lift the traceability and standard of reporting across Asia, given China's influence in the region.

Asian food buyers would be wise to ensure traceability of all protein products to underpin food safety, sustainability standards and ultimately consumer and investor trust.

4.4 Antimicrobial use and resistance risks in protein sourcing

For our benchmark, the following question was posed to broadly assess the buyer risk of irresponsible antimicrobial use and resistance in animal protein sourcing.

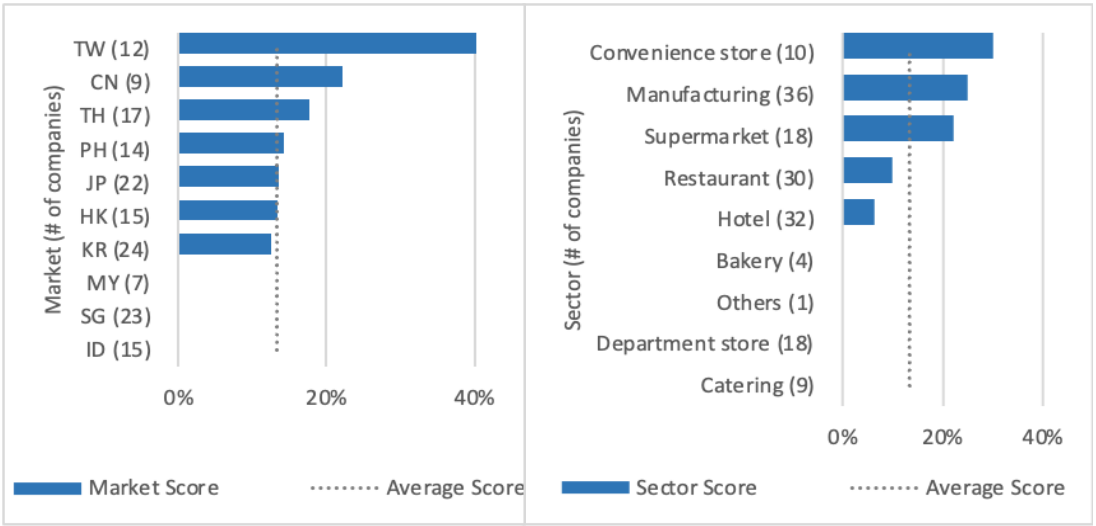
Does the company acknowledge antimicrobial use or resistance (AMR) risks in protein sourcing?

Only 13% of Asian protein buyers acknowledged the risks with antibiotic use and resistance.

Overall, only 13% of companies acknowledged the risks of antimicrobial or antibiotic use in some way. However, most of these companies referred to antibiotic or veterinary drug 'residue' testing or 'antibiotic-free' products. Few referred to AMR risks specifically.

While half of the Taiwanese companies acknowledged antimicrobial or antibiotic use (or 'antibiotic free') products, buyers from Indonesia, Malaysia and Singapore did not acknowledge these risks at all. Several sectors also did not mention such risks (bakery, department stores, catering).

Figures 9 and 10. Company acknowledgement of antimicrobial use or resistance risk by market and sector



Source: ARE benchmark findings

What is the problem with antimicrobials?

The risk of antimicrobial overuse and resistance is partly related to food safety but more broadly to public health. While antibiotic residues in meat, milk or farmed seafood can still be a risk in Asian markets, most countries have some regulation and monitoring to test for antibiotic residues. The pervasive global concern with irresponsible antibiotic use in animal protein sourcing is the presence and spread of *antibiotic-resistant bacteria and genes*. Commonly referred to as antimicrobial resistance (AMR), this currently leads to untreatable infections and over 700,000 human deaths annually.

The World Health Organization (WHO) states that AMR is one of the greatest threats to human health today and if actions are not taken, it is projected that up to 10 million people will die annually by 2050.[33] This is more than the projected annual mortality rates for cancer.[34] The World Bank also highlights risks of a major economic crisis due to AMR with up to 24 million more people (mostly from low income countries) will be propelled into extreme poverty by 2030.[35] AMR also falls under Sustainable Development Goal 3 (good health and well-being).

With 75% of global antibiotics used in animal farming, overuse risks food safety and antimicrobial resistance today with serious public health and economic consequences.

Currently, 75% of the worlds antibiotics are used in farm animals[36] — often mixed in feed or water for mass administration to prevent endemic disease risks. Overuse of antibiotics in farm animals can lead to resistant bacteria, which can then contaminate animals and their products, people and the environment (water, air, soil on and beyond farms). Put simply, antibiotic overuse in farm animals facilitates AMR.[37]

Antibiotic overuse facilitates AMR. Use of any antibiotics for mass prevention of disease is a major risk now.

Overuse of antibiotics in farm animals usually falls into three major risks:

1. Use of antibiotics that are of critical importance to humans (as defined by WHO);
2. Use of any antibiotics for growth promotion;
3. Use of any antibiotics for disease prevention (often administered in feed / water as mass prophylaxis to healthy animals without any signs or disease or diagnosis)

Overuse of antibiotics is perpetuated by industrial farming conditions and poor animal welfare. Disclosure of antibiotic use or AMR risks is poor to non-existent.

Industrial farming conditions perpetuate the high use of antibiotics.[38] Farm animals are routinely overcrowded, caged, mutilated, and housed in stressful, barren conditions that increase the risks of injury and infection. Farmers then use antibiotics to prevent anticipated infections from spreading, rather than resolving underlying issues, minimising and treating sick animals. Pig farming uses by far the most antibiotics per kilogram of meat, with larger farms using more antibiotics.[39] AMR in aquaculture is also a major concern, particularly in low and middle income countries and compounded by global warming.[40] However, most animal protein industries are reluctant to disclose their antibiotic use. Some retailers have committed to reducing antibiotic use in their supply chains after investor and campaign pressure.[41]

A 44% increase in antibiotic use is projected in Asia. China, Indonesia and Philippines are high risk. Greatest use in poultry and pork production. Overuse is perpetuated by poor farming conditions and animal welfare.

Asia consumes the largest amount of antimicrobials. ARE calculated that the use in meat and seafood will increase by 44% by 2050.[42] This use will continue to be overwhelmingly driven by China up till 2050 — where use in farm animals is up to five times the global average — mainly in pork and poultry production.[43] AMR remains a significant issue in these sectors, plus dairy, beef and farmed fish sourced in China. The highest growth rates in antimicrobial use will come from Indonesia, Myanmar, Pakistan and the Philippines (all with expected growth over 200%) due to their rapid increased demand for animal protein.[44] Many Asian countries do not currently report their antibiotic sales or use in farm animals, and do not currently ban or phase out group prophylactic use, which remains a major risk. See figure 11 for status of regulations.

What happens next for regulation?

Europe's ban for group prophylactic use in animal farming (including aquaculture) is leading the way and came into effect recently. Proactive companies have adopted policies that align.

There is a clear direction of travel, with more stringent regulation to address systemic risks from AMR. The EU has led the way, with a ban on group use for group prophylaxis in farm animals (terrestrial and aquatic) that came into effect on 28 January 2022.[45] The EU ban covers EU farming including aquaculture and also requires that imported products do not involve production with antibiotics used for growth promotion.[46] There may be new measures introduced into trade agreements with the EU. Whereas to date, the US regulatory approach has not gone far enough. The Pew Trust reports that since a ban on growth promotion use, antibiotic sales for food producing animals in the US have increased in 2018 and 2019.[47]

Asian countries have taken initial steps. In many cases there are National Action Plans on AMR seeking to mitigate overuse of antimicrobials. Many countries have introduced legislation prohibiting antibiotic use as a growth promoter. However, there are multiple gaps that need to be addressed. These include:

While most Asian markets have banned antibiotic use for growth promotion, routine use for mass prophylaxis remains allowed and common. Data access and accountability are also major gaps.

- Data availability: Many Asian countries do not currently report their antibiotic sales or use in farm animals, and also cannot track changes in consumption.
- Scope of regulations: Many countries have not yet phased out the group prophylactic use of antibiotics, meaning that underlying causes remain unaddressed and volumes remain far higher than justified on animal health grounds.
- Accountability: A 2021 study published in the Lancet reviewed Southeast Asian National Action Plans on AMR. Many of these plans are approaching expiry and the review was timed to learn lessons to apply in successor plans. One major finding was that there was limited accountability for unmet objectives in the national plans.[48]

How should buyers position themselves?

Forward-looking companies have already reviewed their global policies in line with changes in consumer expectations and ahead of regulations. Subway provides a good example in its Global Responsible Antibiotic Use Policy.[49] This document sets out its vision for preserving the effectiveness of antibiotics. The policy scope applies to all franchisee-owned independent purchasing cooperatives and companies. The policy sets out broad objectives in alignment with WHO, and includes a section on measurement, monitoring and learning that covers approaches to commitment, auditing, and updating the policy.

Subway Global Responsible Antibiotic Use Policy (excerpts): *Antibiotics should never be used to promote animal growth or for routine disease prevention purposes. Antibiotics should only be used to treat diagnosed disease in animals…. Suppliers should monitor and report their antibiotics use so that oversight agencies and the public can track progress in meeting use reduction goals and identify resistance risks and trends. Suppliers should continually improve production processes toward minimizing the need for antibiotics use.*[50]

Figure 11. Current regulations on antibiotic use in animal farming

Country/ Region	Ban for growth promotion use (absolute)	Prescription required	Ban or phase out of routine group prophylactic use
China	Yes (Antibiotic Growth Promoters, or AGPs, and colistin from 2017 to 2020, with significant exceptions)	Yes	No
Hong Kong	No (with the exception of selected AGPs)	Yes	No
Taiwan	Yes (avoparcin banned at least as a feed additive from 2000[51])	Yes	No
Japan	No	Yes	No
South Korea	Yes (from 2011)	Yes	No
Thailand	Yes (from 2015)	Yes (for critically important antibiotics)	No (except some antimicrobials banned in feed and water, 2018[52])
Vietnam	Yes (from 2018)	No	No
Philippines	No	No	No
Singapore	Yes (from 2017 or earlier[53])	No	No
Malaysia	Yes (colistin and others, but not all AGPs, from 2012 to 2020[54])	No	Yes (ampicillin, avilomycin and various sulfonomides and some others prior in feed; most human medically important antibiotics permitted[55])
Indonesia	Yes (from 2017; effective 2018)	No	No (only 2019 blanket ban for colistin[56])
India	No (with the exception of colistin in 2019[57])	No	No (though some restrictions for farmed fishery exports[58])
Australia	No (with the exception of some AGPs and some critical antibiotics never permitted for animal use[59])	Yes	No
US	Yes (from 2017)	Yes	No
UK	Yes (from 2006)	Yes	No (approved in 2018, when under EU Directives, but no national legislation to date[60])
EU (plus Switzerland)	Yes (from 2006; Sweden first in 1996; includes imports to EU from 28 January 2022) [61]	Yes	Yes (approved in 2018; EU ban came into force 28 January 2022; ban on antibiotic use in feed / water and ban on group prophylaxis of animals, etc.[62])

Source: Compiled by ARE

The RWA approach does not encourage resolution of the underlying issues, and can increase welfare concerns and consumer misunderstanding.

Another trend, 'Raised Without Antibiotics' (or RWA, 'antibiotic free', etc.) originating in the US and adopted by some Asian animal production companies, raises significant concerns. The RWA approach provides a general disincentive to resolve the underlying issues or treat sick animals. Over 500 American vets and farmers contributed to a recent study noting major concerns with consumer mistrust, poor animal health and welfare and increased costs when implementing RWA certification, for little benefit.[63] Others cite welfare issues arising and again misunderstanding by consumers, who actually want to purchase higher welfare products.[64]

Raising the care and welfare standards of animals has shown to be more sustainable and transparent to reduce antibiotic use than 'raised without antibiotic' schemes.

By systematically improving the conditions and welfare of farm animals, antibiotic use and risks of AMR in the supply chain can be reduced, as shown in Europe in a recent report.[65] It is a potential win-win scenario that several European countries[66] and many companies have demonstrated — by setting clear targets and standards in animal welfare and antibiotic use.[67] Alternatively, others have modelled that antibiotic user fees or significant meat reduction may also be successful global mechanisms to reduce antibiotic use in food animals.[68]

Responsible antibiotic use supports Sustainable Development Goal 3 (good health and well-being), Sustainable Development Goal 6 (clean water and sanitation) and Sustainable Development Goal 12 (responsible consumption and production).

Asian buyers would be wise to set sourcing standards that require avoidance of growth promotion and prophylactic use of antibiotics in the supply chain. Antibiotics should be restricted to treatment use only. By preventative approaches of good animal care and welfare, production companies can minimise these risks to food safety, public health and AMR.

4.5 Animal welfare risks in protein sourcing

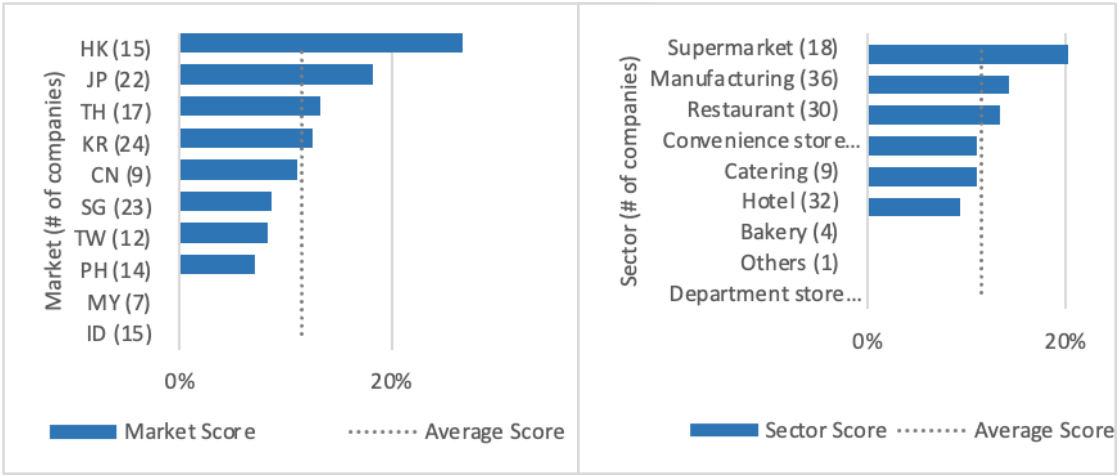
For our benchmark, the following question was posed to broadly assess the buyer acknowledgement of animal welfare in animal protein sourcing.

Only 11% of companies acknowledged animal welfare risks with sourcing animal proteins.

Does the company acknowledge animal welfare risks in sourcing?

Buyer awareness of animal welfare issues remained very low across Asia — **only 11% of companies acknowledged farm animal welfare risks in sourcing.**

Figures 12 and 13. Company acknowledgement of animal welfare in sourcing, by market and sector



Source: ARE benchmark findings

Buyers downstream in the supply chain (e.g., supermarkets, convenience stores and restaurants) generally scored higher than those in upstream sectors (e.g., bakery, catering). This may be due to the multiplied premium that downstream buyers make from higher welfare products, as well as controlling potential emphasis of instore marketing, menu nudging and direct consumer scrutiny. However, company acknowledgement of animal welfare generally remains very low and mitigation measures vary greatly in the region. Nevertheless, opportunities for higher welfare supply at scale are growing.

What are the risks with industrial farm supply and poor animal welfare?

Historically, policy emphasis in Asia has been on providing low-cost protein to consumers, supporting animal industry intensification and consolidation, particularly after major food safety or disease disruptions. The other emphasis has been on conventional food security policies that proclaim to be addressing health, nutrition and malnourishment. Yet, the region hosts over 50% of the global undernourished while obesity is fast rising.[69] In parallel, processed products, low in nutrition and health are often more affordable than vegetables and fruits.

The region is not on track to meet Sustainable Development Goal 2 (zero hunger, i.e., end hunger, achieve food security and improved nutrition and promote sustainable agriculture) and far from Sustainable Development Goal 12 (responsible consumption and production), let alone global Sustainable Development Goal 3 (good health and well-being).

Poor animal welfare is interconnected with risks of disease, public health, supply disruption, company reputation and can also undermine several SDGs.

However, a recent resolution by the UN Environment Assembly of the UN Environment Programme, acknowledges the animal welfare-environment-sustainable development nexus, including *that animal welfare can contribute to addressing environmental challenges, promoting the One Health approach and achieving the Sustainable Development Goals*. (One Health is a well-established principle reflecting the interconnectedness of human, animal and environmental health).

Policy, public funding and subsidy incentives for cheaper meat, milk and eggs, however, neither incorporate the externalised costs and risks to people, planet and animals nor reflect the inefficiency of converting edible grains to animal feed to meat, dairy and eggs. Consequently, it can be a challenge for higher welfare animal proteins and alternative protein products to compete in cost and price with industrial low welfare products. Affordability is then a major concern in less developed Asian markets. Nevertheless, there has been progress in some markets, particularly Thailand where some leading egg and pork producers are introducing cage-free facilities for domestic supply. Momentum is emerging also in China, Malaysia and elsewhere.

A collaborating cage-free egg farm (aviary system) in China. Image courtesy of Global Food Partners.

Animal welfare exposure is increasing in Asia. Asian consumers expect companies to be responsible for good minimum welfare and seek better labelling and disclosure.

Closer to buyers' shelves, menus and manufacturing, it only takes informed consumer criticism or exposure to highlight systemic animal welfare issues in supply chains. Some Asian companies have recently experienced exposure in relation to poor farming or slaughter practices, as well as various multinational subsidiaries or franchises. Moreover, companies have an inherent responsibility for minimum welfare standards for animals that supply their protein. Asian consumers increasingly agree and seek better disclosure and labelling on animal welfare.[70, 71, 72]

Industrial farming causes deforestation, encroachment on wildlife habitat with virus spill over to farm animals that amplify and pass it to humans.

Asian buyers need a steady supply predominantly provided by industrial animal producers. At least until the COVID-19 pandemic and other diseases challenged the supply chains, posing serious risks to trade, public health and retail. While the origin of COVID-19 is yet to be confirmed, overall, 75% of emerging human infectious diseases reported in the past three decades arose and were transmitted from animals to humans.[73] Industrial animal farming is the largest driver of deforestation and biodiversity loss,[74] which commonly lead to habitat encroachment by farms, increasing the risk of wildlife-livestock interfaces. Infection spills over and transfers to humans, as was clearly the case with the original Nipah Virus outbreak from bats to pigs to people in Malaysia.

Epidemics have originated from a rapid increase in poultry and pig populations and intensive conditions, which facilitate the spread, mutation and amplification of viruses like bird flu, swine flu, African Swine Fever (ASF) and many others.

Systemic risks to both animal health and welfare are interconnected and universal across industrial animal farming. High numbers of genetically uniform animals selectively bred and highly stressed are vulnerable to disease. They can transmit, amplify and mutate disease agents rapidly, increasing the virulence of new strains. This has been seen with many infectious agents, particularly those associated with bird and swine influenza, which can also mutate and mix with human influenza. The original bird flu strains occurred on industrial farms, and the transition from backyard to industrial farming has accelerated the conversion of new strains.[75] In 2004, a strain of 'bird flu' halted major trade of chicken across the region, for several years. The movement and trade of chicken and chicken products then facilitated the regional and global spread of this and other bird flu strains.[76] Disease confronts the global poultry industry today.

Asia continues to battle with these diseases, which evolve to new or chronic strains. ASF still rampages in China, disrupting pork supply.

Similarly, 'swine flu' originated in industrial farms (in Mexico). It persists today across the US and parts of Europe, with some new strains again able to infect humans recently detected also in China.[77] Meanwhile, the Asian pork industry is still battling another viral disease that does not infect humans but has greatly disrupted the pork supply. African Swine Fever (ASF) has rampaged across Asia since 2018, leading to the death or destruction of hundreds of millions of pigs. Despite stringent policies and practice, biosecurity approaches do not address the underlying risks and fail to completely contain or prevent these diseases. Industrial farming may actually promote the emergence of more chronic strains and persistent disease, exacerbating risks of another pandemic.[78]

Consolidation of the pig industry, with mega farms has been China's response to ASF. The scale of welfare issues is now greatly amplified.

Case in point is the resurgence of ASF in China in 2021, greatly affecting New Hope Liuhe (China's fourth largest pig producer)[79] and also South Korea.[80] Rapid construction of high-rise mega pig farms in China (up to 13 storeys high[81]) involves deforestation and hasty restocking of pigs, which significantly increase the pig population density. Mega farms built by Chinese companies; Muyuan, New Hope Liuhe and Yangxiang (below) have replaced many smaller farms. Despite recent increased EU investment in some of these companies,[82] it is uncertain if mega farms will even solve the inherent risks of infection and amplification of viruses.[83] Certainly they greatly amplify the scale of pig welfare issues.

Multi-storey mega pig farm by Yangxiang company, China. Image: credit to Reuters via The Guardian. 2020.

Key animal welfare risks:

- confinement in cages or stalls
- overcrowding, barren environments
- excessive genetic selection
- mutilations, like tail docking
- poor handling, no stunning before slaughter

These risks are linked to increased antibiotic use, animal and human disease and poor worker morale, often also reducing productivity, efficiency or company reputation. Mega data, automation and AI can provide opportunities but can also entrench industrial systems.

Fish welfare is greatly compromised, especially with overcrowding, stressful water quality, barren environments and the lack of stunning — all of which impact productivity.

Animal welfare can be defined as the quality of life as perceived by the animal itself.[84] Up to 38 billion farm animals each year are raised in industrial or intensive Asian farms, universally overcrowded, kept in extremely barren environments and often indoors without natural light. Such systems give little consideration for the natural behaviour and basic needs of animals, beyond eat, sleep, repeat.[85] In most farms, egg-laying hens are housed in cages without even a nest, and mother pigs in cages without the ability to even turn around or mother their young. Ducks, dairy calves and increasingly meat chickens also in cages. These animals cannot adequately move, nest, spread their wings, suckle naturally or socialise. These are the conditions the animals endure for their entire adult life.

Farm animals are intensively bred and fed, to be fast-growing and fast-producing. Despite marketing images, dairy and beef cows may be tethered or unable to graze on grass, while poultry are unable to perch, dust bathe, peck or preen. These animals are deprived of basic movement, and treated with no regard for their other physical, social or behavioural needs. They suffer a range of discomfort, injuries, pain and pressure that not only leads to biting and fighting, impacting production, antibiotic use and meat quality; it makes them bored and depressed. As trends of mega data, automation and artificial intelligence emerge, while they can be a distraction or opportunity for monitoring group welfare, they do not solve many of the systemic welfare issues of industrial farming.

Fish farming is also coming under greater welfare scrutiny. The fish are invariably overcrowded, which predisposes them to chronic stress and disease. This leads to productivity costs including lower growth rates, higher antibiotic use and mortalities.[86] Issues in transport and slaughter (across any species) compound low on-farm welfare and directly relate to reduced product quality and losses. Stunning of farmed fish in Asia is essentially non-existent, causing great suffering, losses and reduced fillet quality.[87]

Overall, low animal welfare predisposes animals to more regular disease and antibiotic use, higher risks of animal and human epidemics, and creates poor worker conditions. Even with mitigating technologies, industrial animal farming produces climate emissions and pollution at scale from animal waste, feed and production. Any or all of these impacts generate risks to a buyer's reputation.

Opportunities — what can food buyers do to reduce risk and drive higher welfare?

Key opportunities, benefits include:
- commitments towards consumer expectations, which drive scale
- value adding, product segmentation, premiums
- reputation in leadership and global benchmarking
- remaining competitive with other Asian companies

Increasingly, higher animal welfare is integrated as a protein sourcing consideration and reflected as a sustainability indicator, as seen in the World Benchmark Alliance's 2021 Food and Agriculture Benchmark of 350 companies.[88] Some Asian companies are responding with policies, practices and reporting against higher welfare standards. As an example, the list of cage-free egg commitments made by companies in or for Asia is extensive.[89] These commitments are well received by customers, stakeholders and shareholders. They initially lead to value-adding opportunities such as product segmentation and premiums. However, with scale of supply and supportive protein buyer policies, higher welfare eggs and pork, for example, can become the default as seen in several western markets.

Many higher welfare initiatives do not necessarily cost a lot more, e.g., phasing out pregnancy cages for mother pigs, avoiding some piglet mutilations.

There is a mistaken view that higher welfare always involves higher cost. In general, higher welfare leads to less stressed and more contented and comfortable animals that eat better, producing more meat or milk. Improving animal handling and selecting for suitable stockperson attitudes costs little and can boost productivity, generating up to 11% more milk in some cases.[90] Improved fish welfare also has a range of economic benefits also, improving growth rates, survival and profits.[91] Many policies and standards to avoid caged housing of pregnant pigs can be cost neutral.[92] In Asia, management that avoids piglet mutilations (teeth reduction, tail docking, surgical castration, ear notching) usually pass no added cost to the consumer, while delivering other sustainability benefits — including reducing feed, veterinary and antibiotic use and costs, GHGs and carbon footprint.[93] With a range of supply chain benefits, leading Asian and Latin American pig companies incorporate and work towards higher welfare changes as part of doing business.[94, 95]

Companies are increasingly committing to welfare improvements, responding to positive Asian consumer attitudes and actions. Asian farmers signal interest and support needed for cage-free egg transition.

Globally, companies are signing up to the Better Chicken Commitment[96] and Cage-Free Egg Commitments, with policies that extend to Asia.[97] Some EU[98] and US sourcing opportunities are also emerging in Asia. To encourage Chinese suppliers, some are awarded for 'good' egg, pig or chicken production in China.[99] Positive attitudes are also increasingly correlated to actions in China and India, including towards chicken and fish as a 2022 global survey concludes.[100] A 2021 survey across six Asian countries (China, Thailand, Indonesia, Malaysia, Japan and the Philippines) found egg farmers are also seeking assistance with technical support to transition to cage-free eggs and improving sales.[101] To accelerate opportunities, Asian food buyers can set higher welfare standards, commit to targets and drive change.

BBFAW is designed as an investor tool. The 2021 report is now available. Investors can also request detailed assessments from the 21 Asian companies (the majority from Japan and China currently rank in the lowest BBFAW tier).

Finally, the Business Benchmark in Farm Animal Welfare (BBFAW)[102] ranks 150 of the world's largest food companies (producers, retailers, restaurants) annually. BBFAW creates a rising bar of conventional protein companies, requiring detailed disclosure towards higher animal welfare. The benchmark is designed as an investor tool, based solely on information published by the companies. It currently includes 20 major companies from China and Japan, plus some Thai-headquartered companies. The latest report, for 2021, is now available and most Asian companies are in the lowest tier.[103] Companies can comment and receive the detailed reports, which can be forwarded to investors at their request. As of April 2022, 35 investors, representing almost USD 3.3 trillion assets under management, have signed a Global Investor Statement on Farm Animal Welfare, which is publicly available.[104]

What should higher welfare look like?

Higher welfare needs adoption at scale and should be supported by all stakeholders along the value chain. Higher welfare needs mainstream standards. The following section recommends welfare standards and certification schemes, and includes examples of some Asian company initiatives.

'FARMS' standards are readily available to demonstrate what good animal welfare should look like in mainstream farming plus tools for investors.

FARMS, an initiative designed for investors and food companies, sets out Farm Animal Responsible Minimum Standards for industrial farming of beef, dairy, pigs, chickens and egg-laying hens, to date. These are specific, science-backed standards that provide clarity and risk reduction for companies and investors, based on International Finance Corporation guidance principles. FARMS sets out responsible standards that can be internally monitored or audited.[105] For financial institutions, FARMS also provides further information,[106] and a summary of major investor and bank policies,[107] which signal current and future direction for capital allocation.

Sustainability-linked bank loans can incentivise welfare improvements such as transition to cage-free eggs.

Asian investors and banks are under-represented and finance institutions have a long way to improve their sustainability policies. One positive example occurred in 2019, when DBS bank, provided a sustainability linked loan, linking lower interest rates to animal welfare standards for certified cage-free egg farming in Singapore.[108]

Progressive companies are setting targets or commitments, which support higher welfare systems or allow time for transition. Organic standards do not always mean good welfare in Asia.

Progressive Asian food buyers and producers are leading the way by identifying animal welfare as a material risk and integrating higher welfare into their sourcing standards. By setting animal welfare targets, companies signal commitment to consumers and investors while enabling time for phasing in change. There are also other forms of high welfare farming, which are not industrial and may involve regenerative or ecological principles. It should be noted that organic standards in Asia do not always translate to higher welfare. Some large Asian companies have set key welfare targets (see the 'Thailand to Taiwan' story in the subsequent text box). Others are neither large nor listed, yet farming based on sustainable principles and proving higher welfare can be viably practised when prioritised.

Small sustainability centred companies are achieving welfare certification.

Farm Fresh® is a sustainability centred fresh milk company and the first Certified Humane® dairy company in Asia[109] — sourcing from regenerative farms, extending shared farmer value, growing female entrepreneurs and serving unadulterated fresh milk in Malaysia.[110] This is one of a growing number of smaller sustainable Asian companies with independent welfare certification.

Dairy cows at Farmed Fresh® Malaysia. Daily access to pasture can reduce lameness by 50%[111] — reducing the need for antibiotics and veterinary costs. Bedded systems or daily access to an exercise yard are also beneficial and accepted by Certified Humane. Image courtesy of Certified Humane®.

Certification schemes are emerging in Asia. Technical support is available regionally for transitions to cage-free egg production or group sow housing. Aquaculture recommendations and industry reports are also available for Asia.

Certified Humane certifies a growing range of farms in Asia, with standards in a range of Asian languages.[112] Global Animal Partnership standards can also be certified in Asia.[113] Global Food Partners is regionally based and works with Asian food businesses to connect buyers with cage-free suppliers or those wanting to convert, with business and technical support.[114] They also have a VR experience and training site, including for development of corporate policies.[115] Aquatic animal welfare standards are emerging[116] and will become increasingly important given the projected increases in aquaculture in the region. An existing range of seafood certifications are reviewed for welfare.[117] Country aquaculture scoping reports and fish welfare recommendations are available.[118] See section 4.7 for humane slaughter methods for fish.

Sows in enriched group housing. Sows are also not tail docked or ear notched. For more information: https://www.asian-agribiz.com/2021/06/14/its-not-just-another-pig-farm-at-betagro/. Image courtesy of Betagro Ltd.

Thailand to Taiwan — supply chain changes in the region

Many company commitments and initiatives towards higher welfare have occurred in the past five years — especially in Thailand and Taiwan, but also in South Korea and China and gradual emergence in Vietnam and Japan. Consumers appear to welcome these commitments and product choices available.

In 2017, Thai company Betagro Ltd committed to phasing out pregnancy and birthing cages for mother pigs by 2027.[119] In 2018, CP Foods followed, committing to a phase out of pregnancy cages in Thailand by 2025 and in their 'overseas markets' by 2028.[120] Both companies have since pursued a range of animal welfare improvements. By September 2019, two major Thai-based retailers had committed to sourcing such higher welfare pork by 2027[121, 122] involving group housed rather than caged mother pigs. Companies in China also started to make similar commitments.[123] This transition is slowly emerging now at least in Japan, South Korea and Vietnam and would be greatly accelerated by clear sourcing standards and targets by more Asian buyers.

CP Foods also makes public reports on their progress and has already achieved 100% cage-free egg production in Thailand, albeit this is only 1% of their global egg production.[124] Locally sourcing Thai retailers have little excuse not to progress their animal welfare policy and standards, and ask for 'cage-free' as a minimum in their sourcing. Thai consumers seem to be appreciating the choice of eggs and the price difference is relatively modest. As Nikkei Asia reported in 2020[125]:

> *At a supermarket in Bangkok, 10 regular eggs sell for 50 to 60 baht ($1.60 to $1.90) while cage-free varieties go for 75 baht. Despite the higher price, Thai consumers seem to be warming to the idea. 'I believe chickens must live happier lives, and be free from cages,' said Thitiya Muinying, a Bangkok freelance worker in her 30s. 'If the quality and size of the eggs are the same, the price difference is OK.'*

However, general consumer awareness of the welfare of animals from farm to plate and demand for higher welfare products remains low, in Asia. A lack of choice and clear labelling confuses consumers, compounded by a lack of national definitions and unrealistic farming depictions in product labelling and promotion. With only 3 to 8 seconds for point-of-sale consumer choice, retailers can assist in offering higher welfare choices and instore information.

Clear labelling and information at QR codes can increase transparency and consumer choice. If buyers set clear sourcing policy and standards, this will help drive scale, further reducing risk.

Changes are emerging upstream and downstream. QR traceability codes are increasing in Thailand and the region, with the potential to show the actual farming conditions while enabling food safety management. This is part of the solution as CP Foods boosts its cage-free egg production.[126] Basic cage-free egg definition and voluntary standards now exist in Thailand, China and South Korea after Taiwan paved the way in Asia. In 2021, Far Eastern Agriculture reported Taiwan's announcement of a ban on new caged duck facilities, while caged hen eggs must be clearly stamped and labelled[127]:

> *Taiwan is said to be following the footsteps of South Korea and the European Union, which both include housing systems in their eggshell stamping requirements. The move is the latest in a series of measures by Taiwan's government that point to an increasingly cage-free future, including strengthening laying hen welfare regulations, reducing the interest rate for low-interest government loans and launching policy evaluation to explore the impact of phasing out conventional battery cages.*

With clear sourcing policy and standards, buyers can reduce their risks and inform customers what the expected added cost for cage-free eggs means to sustainability. The hospitality sector in Asia has led the way in cage-free egg policies, and lessons can be learnt.[128] Thai headquartered Minor International Group was one of the first companies to commit to cage-free eggs covering its international hotels 2020, and extending to its restaurant group (2021).[129] Its website states[130]:

> *We are pleased to announce our commitment to source 100% of our eggs (shell, liquid and egg products) from cage-free sources for all owned, managed and franchised properties in our portfolio by the end of 2027, and are committed to communicating this to all our operations globally. We also commit to report on progress annually and commit to translating the policy into all major regional languages.*

Cage-Free World Asia provides the most up to date list of Asian major businesses committing to cage-free eggs available.[131]

Offering a choice for consumers and reporting company progress towards higher welfare standards are a key part of responsible sourcing, consumption and production. Asian food buyers would be wise to set and report animal welfare standards and targets to ensure progress.

4.6 Deforestation, biodiversity and land use risks

For our benchmark, the following question was posed to broadly assess the buyer acknowledgement of deforestation in animal protein sourcing.

Does the company acknowledge deforestation risks in animal protein sourcing?

None of the 158 companies acknowledged deforestation with regard to animal protein via animal feed. This is inconsistent with 14% of companies acknowledging deforestation risks or responsible sourcing of palm oil and / or paper.

At the time of benchmarking, no companies acknowledged deforestation risk with animal protein sourcing, explicitly related to animal feed. Overall, Asian buyers do not acknowledge deforestation, beyond paper, packaging and palm oil, which were mentioned by 14% of companies. There is a stark inconsistency. CSR approaches of reporting tree planting only play a peripheral role. They do not reduce the sustainability risks of animal protein and industrially farmed pigs, chickens, dairy and beef. Deforestation and resultant biodiversity loss are intertwined and irreversible.

Three out of 158 companies mentioned deforestation with regard to animal protein sourcing, acknowledging an ecological impact from meat, livestock products or sourcing grassland beef. However the deforestation risks mentioned by these companies did not explicitly acknowledge the links to industrial animal feed, particularly soy and corn. While deforestation for beef farming is also a key driver in Latin America and Asia, transitioning to intensive beef feed-lotting, pork or chicken is not the answer, as it shifts the problem to reliance to soy for feed, which also creates pressure for deforestation. Similarly, imported beef, chicken and pork from Latin America may also be driving deforestation.[132]

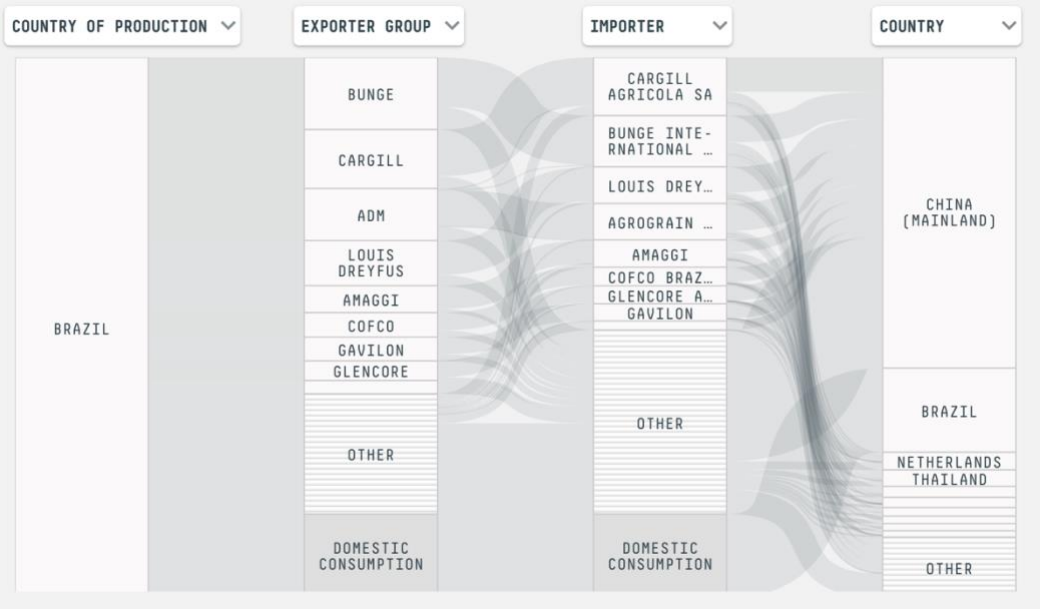
More than 77% of global soy production is fed to animals — poultry, pigs, fish, dairy, beef and pets. Growth in soy production has predominantly been for animal feed — particularly poultry, the largest consumer of soy feed. The steepest growth in soy demand has been by Asia, responding to rapidly growing animal protein demand since 1990s. This increase in soy demand is directly and indirectly driving deforestation, particularly in Latin America.[133]

Deforestation is particularly linked to soy imports from Latin America for animal feed is a major risk, especially for many Chinese and some Southeast Asian companies. Palm kernel meal may also be a risk. Deforestation and biodiversity loss also threaten many SDG targets.

Animal protein related deforestation is flaring in importance and has long-standing relevance to Sustainable Development Goal 15 — life on land. Inter-related, biodiversity loss also threatens the achievement of 80% of Sustainable Development Goal sub-targets related to poverty, hunger, health, water, cities, climate, oceans and land.[134]

Often, distant forests of the Amazon and other biodiverse areas in Latin America are involved in soy, animal feed and animal protein production for Asia. Southeast Asia is also home to nearly 15% of the world's tropical forests, and has one of the fastest rates of deforestation,[135] mostly related to palm oil and timber sourcing. However, Asian forests are still being converted to land for animal feed crops and farms, and palm kernel meal (a bi-product of palm oil) is used in some animal feeds.

Figure 14. Brazil soy production and export to China, Thailand, Indonesia, South Korea, Vietnam, mostly for animal feed



Supply flows are also available for soy, beef, pork and chicken from Brazil and other deforestation-prone countries. Source: Trase Supply Chains (https://supplychains.trase.earth/). Financial institutions can also review Trase Finance to assess deforestation risk in their portfolios (https://trase.finance/).

Deforestation creates a vicious cycle of carbon loss and GHG emissions, land degradation, pollution and land use conflicts.

Deforestation for animal protein is destructive in a vicious cycle. It causes direct loss and threats to biodiversity and while clearing and burning of forests releases massive amounts of carbon and GHGs, the loss of forest cover also leads to soil degradation and the inability to purify and conserve water. Monocropping requires increased fertilisers and pesticide use, which pollute the environment, and results in increasing conflict between the remaining wild animals and communities and farms, leading to further losses.

We are in the midst of an extinction crisis, accelerated by resource-intensive proteins, rapidly reducing the planet's biodiversity, food and water security, and putting pressure on communities and livelihoods before even factoring in the impacts of climate change. The planet's great lungs and carbon sinks are rapidly diminishing along with innumerable species, and ending up as beef hotpot or steaks, pork ribs or rice dishes and chicken noodles or nuggets. Given the urgency and interconnected nature of this issue, it can no longer be ignored by Asia's protein buyers.

Glasgow Leaders' Declaration commitments involve many Asian nations, albeit voluntary, to halt and reverse land degradation and forest loss by 2030.

The 2021 Glasgow Leaders' Declaration on Forests and Land Use saw governments representing more than 90% of global forest areas commit to 'halt and reverse forest loss and land degradation' by 2030. This is certainly an important goal — notably voluntary — that Bhutan, Brunei, China, Indonesia, Japan, Malaysia, Nepal, Pakistan, the Philippines, Singapore, South Korea, Sri Lanka and Vietnam have signed, to date.[136] One Asian animal production company, Charoen Pokphand Foods anticipated these targets and other regulatory requirements and has announced a zero deforestation policy and target as part of its 2030 Strategic Vision.[137]

New EU regulations and reporting requirements will impact Asian companies in relation to full supply chain due diligence on deforestation-free products (beef, soy including animal feed). Biodiversity legislation is also likely.

However, the *Required Policy Scenario* set out by the 2021 *Inevitable Policy Response*, highlights the need for an end to deforestation globally, by 2025, in order to deliver a 1.5C outcome[138]. This would protect and further enable crucial forest and land carbon sink opportunities. The EU also proposed new regulations for deforestation-free products in late 2021. The regulations set mandatory due diligence rules and reporting for companies prior to placing specific commodities on the EU market that are associated with deforestation and forest degradation — soy, beef, palm oil, wood, cocoa and coffee and some derived products, such as leather, chocolate and furniture.[139] The proposal also includes provisions for geo-location and traceability and has some accountability mechanism. In 2022, the Conference of the Parties to the Convention on Biological Diversity, is also expected to release a global biodiversity framework that is likely to prompt further legislation.

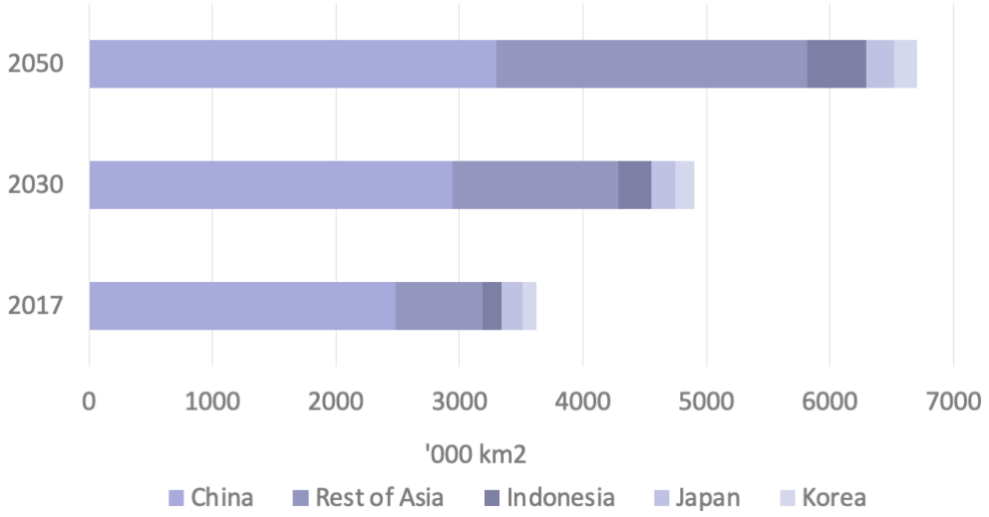
A 2021 BNP Paribas Asset Management report[140] covers a range of risks linked to biodiversity, namely, deforestation as part of land use changes, air and water pollution and climate impacts as part of the planetary boundaries framework:

> *As investors, the planetary boundaries framework is a useful reminder that, alongside earnings before interest, taxes, and amortisation (EBITDA), cash flow, debt, and the seemingly infinite range of factors sophisticated investors use to manage investment portfolios, we must also consider the dynamics of the planet…. The planetary boundaries remind us that we should think about our investments in the Earth system. Let us remember that if the Amazon rainforest becomes a savannah, it could lead to changes in ocean circulation in the Atlantic and to temperature increases in Asia.*

Deforestation and related impacts in Latin America could lead to major climate impacts in Asia. China animal protein producers are extremely vulnerable, as are Asian sourcing companies. Traceability and responsible sourcing policies are key.

With a focus on Chinese protein producers, the Farm Animal Investment Risk & Return (FAIRR) initiative also finds deforestation one of the worst-performing indicators.[141] Currently, 63% of the world's soybean exports are to China, predominantly for animal feed, yet none of the major Chinese protein supplier companies address how they manage deforestation risks linked to soy sourcing. This exposes not only the production companies but also their buyers as 'high risk' when it comes to deforestation and biodiversity loss.[142] All Asian protein buyers must trace and address their protein supply chains with regard to deforestation risks, which are projected to increase substantially to 2050.

Figure 15. Total land area for projected animal protein consumption in Asia, 2017 to 2050



Source: ARE estimates from McCarron B, Tan S, and Giunti A. *Charting Asia's Protein Journey*. Singapore: ARE; 2018. Available from: https://www.asiareengage.com/reports/2018/9/4/charting-asias-protein-journey

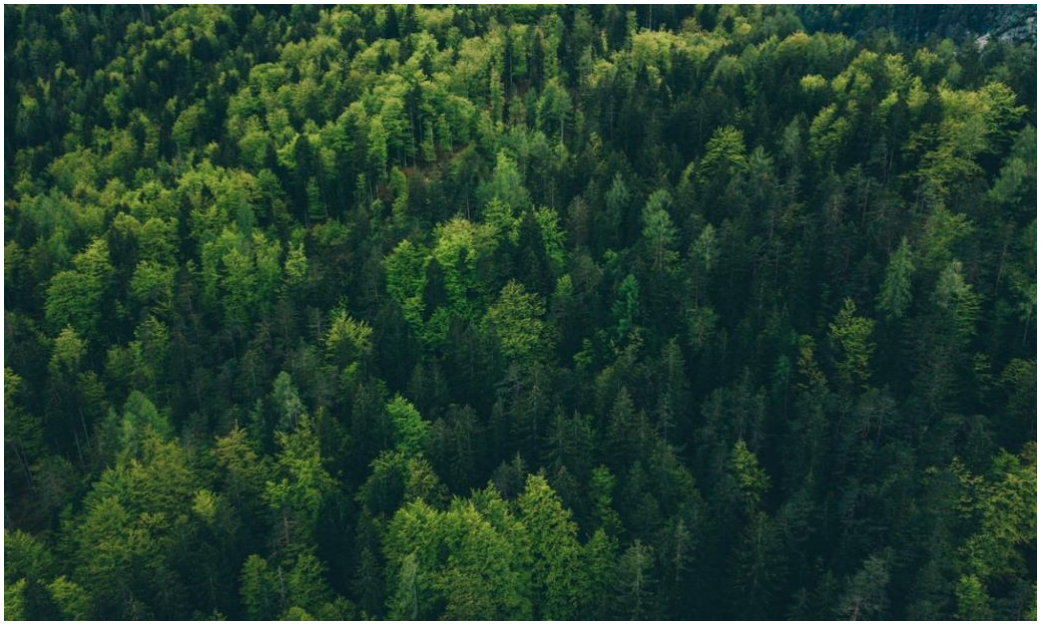
Land footprint to meet Asia's growing animal protein demand will increase by 81% by 2050, equivalent to 70% of the area of China. Pollution impacts undermine Sustainable Development Goals 1, 3 and 6.

The land footprint required to meet Asia's appetite for meat and seafood will increase 81% to 7 million km^2 by 2050 under the business-as-usual scenario shown in Figure 15 This increase is almost equivalent to 70% of the area of China. It includes land use for animal feed (in and beyond Asia) and animal production (including farmed seafood).

Land use changes are equally concerning, with regional land changes impacting the region directly. Air pollution originates in some Asian countries where the burning of feed crop remains, drifting across the Southeast Asian peninsula annually and causing respiratory compromise and disease. Associated land and soil pollution arises from animal antibiotic use and manure, crop pesticides and fertilisers. Meanwhile manure and other effluents from farms continue to pollute soil, public water courses, air and people. All this risks Sustainable Development Goal 3 (good health and well-being), Sustainable Development Goal 6 (clean water and sanitation) as well as to Sustainable Development Goal 1 (climate action).

Beware of some inadvertent impacts from technical solutions and alternative feed materials. Alternative proteins and diet change offer significant benefits, as long as raw material sourcing is also responsible.

Effluent biodigesters have reduced some manure pollution, also providing a recycled energy source to farms, but they still release polluted water including amplified antimicrobial resistant bacteria and genes. While some alternative animal feed sources appear promising, they also need to be scrutinised for their environmental impact. Deforestation is clearly only one risk in the supply chain associated with animal feed and land use changes for industrial farming. Reform of our food system and planet can start with three interconnected levers described in a 2021 Chatham House report: more plant-based diets (also known as 'low carbon' diets, with other benefits); protection and conservation of land and biodiversity; and more nature-friendly farming (less reliance on chemicals, monocultures and supporting biodiversity).[143]



Conserving forest modelled in ARE's report; *Alternative Proteins: Exploring the Asian Appetite and Conservation Potential*. 2020. Image from Square Space.

TNFD targets are expected end 2023 and aim to shift finance and companies towards nature-positive outcomes. TNFD will seek to align with the UN Convention for Biodiversity and its targets.

The Taskforce for Nature-related Financial Disclosures (TNFD) is a global market-led initiative, which aims to deliver a risk management and disclosure framework for businesses to report and act on to shift global financial flows away from nature-negative and towards nature-positive outcomes. Final outputs are expected by September 2023.[144] The TNFD will seek to align with the UN Convention for Biodiversity, which has draft targets including no net biodiversity loss by 2030 and net biodiversity gain by 2050.[145]

Alternative proteins offer an opportunity to reduce many sustainability issues. Raw materials must be responsibly sourced.

Finally, avoiding further deforestation and biodiversity loss is now critical. Along with company commitments for deforestation-free animal proteins, companies can embrace the projected increase in alternative proteins.[146] While plant-based proteins use significantly less land, water, energy, no antibiotics and have a substantially lower GHG and carbon footprint,[147] raw material sourcing also needs to be responsible to avoid reputation risks. Alternative proteins offer a burgeoning opportunity to reset the sustainable sourcing agenda, avoiding deforestation and other sustainability risks.[148]

Asian food buyers would be wise to review or develop deforestation and biodiversity policies and sourcing targets, acknowledging risks associated with all proteins to anticipate consumer sentiment, national pledges, regulatory landscapes and pending disclosure frameworks.

4.7 Seafood sourcing

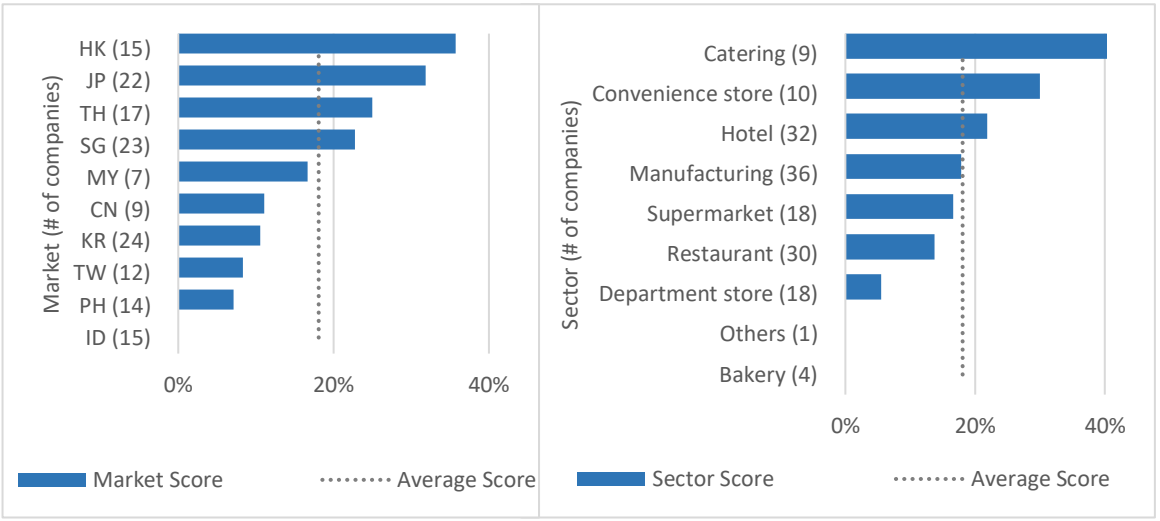
For our benchmark, the following question was posed to broadly assess the buyer acknowledgement of responsible seafood sourcing (wild caught and farmed).

Does the company acknowledge sustainability risks when sourcing seafood?

Only 18% of buyers acknowledge sustainable seafood risks.

Only 18% of Asian food buyers acknowledge sustainable sourcing of seafood, with a combination of prohibition of shark fin and sourcing of some certified seafood. Few companies comprehensively set standards or targets for their entire seafood supply.

Figures 16 and 17. Scores on sustainable seafood disclosure by market and sector



Source: ARE benchmark findings. For countries with no bar or column showing, the score was 0% on this issue (i.e., no company provided disclosures)

Catering (often airlines) and hotels scored better, possibly reflected in a more global outlook. Company sourcing to more farmed seafood, reflects reduced profits in wild caught seafood and other trends.

Catering, convenience stores and hotels scored better. The scores for hotels and catering sectors (including some caterers to airlines) possibly reflected a more global outlook, serving foreign customers or overseas destinations, where seafood sustainability has become a concern over the past decade. Avoiding shark fin is also an established policy of several Hong Kong companies and an emerging policy in other markets. More developed Asian markets consume a relatively higher proportion of seafood as a percentage of all proteins, scoring better than less developed markets. Japan (and other parts of Asia) has seen a partial switch from seafood to meat and from wild caught to farmed seafood. This appears to be a result of convenience, adoption of more western diets, higher incomes, and inability to expand wild catch and reducing profitability.

Seafood sustainability has been a concern in Asia over many years. This is reflected in a slightly higher overall score for this benchmark question than that of animal welfare, antimicrobial use and deforestation. For wild caught fish, ocean depletion interacts with other issues, such as human rights and effects on communities.

Labour risks in fishing persist in the region, often driven by dwindling fishing stocks. Globally, 93% of species are fully or overfished with a 36% decline in marine species, impacting ocean ecosystems.

The Thai fishing and seafood industry was forced to confront and address major human rights abuses in 2015, when the EU posed a yellow warning card threatening to cease all fishing imports from Thailand. While this warning was withdrawn in 2019 after various initiatives, the issues continue there and elsewhere with fishing fleets or supply chains involving various Asian markets and even children on illegal Asian fishing fleets.[149] Significantly contributing to the issue is the rapid decline of stocks in domestic or regional waters, forcing fleets to distant seas. In short, core fish stocks are dwindling, with 93% either fully fished or overfished and a 36% decline in marine species, impacting aquatic biodiversity, food chains and ocean ecosystems.[150]

Sustainability risks with seafood directly impact Asian buyers and are related also to Sustainable Development Goal 12 (responsible sourcing) and Sustainable Development Goal 14 (life below water).

ARE has authored two reports, *Seafood Sourcing Risk in Asia*[151] and *Empty Nets: How Overfishing Risks Leaving Investors Stranded*[152]. Numerous other reports exist of overfishing and destructive fishing in and beyond Asia. The Asia Foundation summarises:

> *Much of the overfishing and destructive fishing in Southeast Asia is attributable to illegal, unreported, and unregulated fishing (IUU). IUU fishing occurs region-wide, with violators ranging from small-scale local fishermen to large-scale enterprises conducted on commercial fishing trawlers. There are many drivers for IUU fishing in the region, not the least of which is that demand now appears to exceed supply… some experts warn that the region's entire fisheries industry will soon collapse. Estimates suggest that in order to prevent this, all countries fishing in the region would need to cease all destructive fishing practices and reduce harvest by nearly 50 percent.*[153]

Companies, investors and SDGs 12 and 14 are at serious risk. IUU (illegal, unreported and unregulated) and destructive methods occur regionally — on small and large scales. The fisheries industry is projected to collapse if seafood harvest is not reduced by 50% or demand is otherwise fulfilled.

If Singapore's seafood-loving appetite is any indication of the situation for aspiring Asian nations, seafood buyers, investors and consumers should be worried.

A 2016 WWF study found 75% of Singapore seafood was unsustainable, such as comprising overfished species or being unsustainably farmed.[154] In 2021, Channel News Asia reported a study conducted by consultancy GlobeScan, which found 75% of people in Singapore felt consumers should protect fish stocks so that others can enjoy them in the future. However, this good intent is not enough:

> *Sustainable seafood is still by far the exception rather than the norm. Walk through the seafood section in a local supermarket and you'll find that only about one in 10 seafood products have any of the three sustainability labels (MSC, ASC, or BAP).*

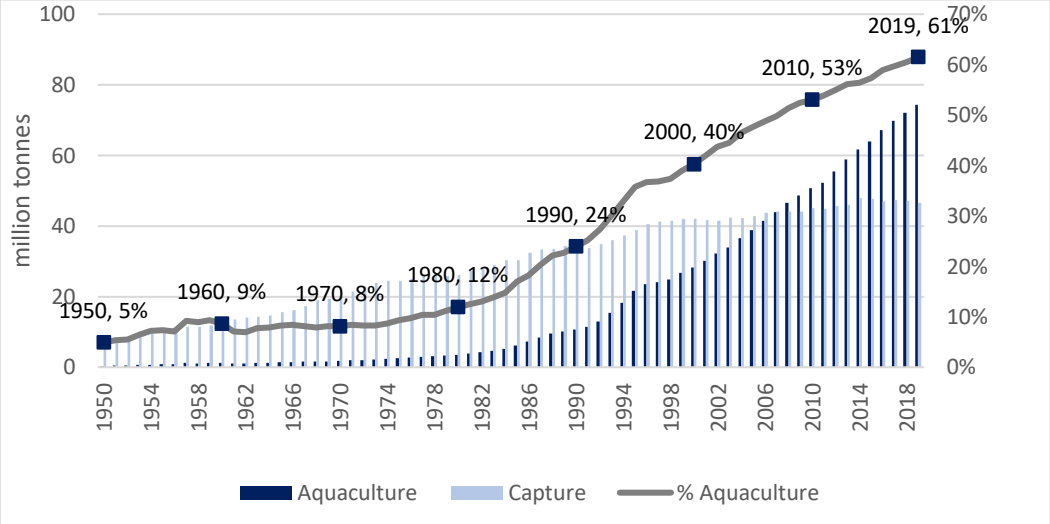
Singaporeans do want to protect fish stocks, but certification schemes are not common and in 2021 26% of supermarket seafood was mislabelled.

Furthermore, eco-business reports in 2022 that 26% of major Singapore supermarket seafood was found mislabelled in 2021, making sustainable seafood shopping even more difficult for consumers.[155] Singapore government has instigated regulations and has some corporate partnerships with WWF; however, there is essentially no evidence of traceability schemes and labelling at wet markets. The variability of seafood certification schemes in retail compounds the challenge. Asian seafood buyers need to do more to protect not only consumers but also seafood as an ongoing raw material.

Overall, seafood demand continues to grow, faster than beef, pork or chicken. To fill the gap, global aquaculture production has tripled in the past two decades[156] and approximately doubled in Asia. Aquaculture is now 61% of the Asian seafood harvest, trumping wild caught supply. Asia produces 88% of the world's farmed seafood; yet it accounts for 52% of global fish consumption. China dominates aquaculture (outproducing the rest of the world combined) but India, Indonesia and Vietnam are major players and growing.[157]

Aquaculture is growing fastest of all the animal protein industries, doubling in Asia recently. Asia produces 88% of farmed seafood — with China, India, Indonesia and Vietnam as major producers.

Figure 18. Asian* seafood by capture, aquaculture production and growth, as a percentage of total seafood from Asia, 1950 to 2019



Source: ARE, based on FAO fishstatJ; https://www.fao.org/fishery/en/statistics/software/fishstatj/en
*ARE have defined Asia as East, South and Southeast Asian countries.

All the same sustainability risks pertain to aquaculture also, especially with mangrove destruction, welfare and overuse of antibiotics. Aquaculture contributes to biodiversity loss also, with an estimated 1 trillion of fish for FMFO, hidden as 'blue loss'.

Farming of fish, shrimp and other aquatic species involves all the sustainability risks noted in earlier sections: antimicrobial resistance, poor animal welfare and deforestation — especially for coastal mangroves — and contributes to ocean biodiversity loss if using fish meal or fish oil (FMFO) in feed. An estimated 1 trillion aquatic animals are used by Asian aquaculture in FMFO and unaccounted as 'blue loss'.[158] Other impacts on biodiversity are via bottom trawling and other methods with excessive bycatch, or escapes from marine farming nets, land salination, increasing disease plus impacts of GHG emissions, water pollution and undesirable algal blooms, among other ESG risks.[159] As aquaculture develops, it intensifies and consolidates, like other animal protein industries. This leads to other business and sustainability risks, with major costs. A 2021 report frames 10 ESG risks in a timeline and also looks at how such risks can be mitigated.[160]

High mortality, diminishing returns, undermining food security

Mortality rates in fish farming are significantly higher than terrestrial farming. Poor welfare and disease contribute to AMR and threaten profitability.

Mortality rates in fish farming are far higher than those in terrestrial farm animal production. The 2021 report *Investing in Troubled Waters* by the Changing Markets Foundation shows threats to profitability from mortality rates in salmon aquaculture as high as 24%, along with poor fish welfare from overcrowding, poor water conditions and uncontrolled disease.[161] Fish farming often involves high levels of antibiotic use and risk of antimicrobial resistance, tipped to increase with the growth of aquaculture and climate change. The report also provides examples where the converse supports lower production costs and increases market value of the company, and cites consumer willingness to pay studies. In summary:

> *The combination of high mortalities on farms, resulting from poor fish husbandry, and growing ecological impacts from the use of wild-caught fish in feed — juxtaposed with consumer demand for ethical, environmentally friendly and high-welfare products — are creating financial and reputational risks to the aquaculture industry.*[162]

These outcomes contradict the ethical consumer expectation with farmed fish.

FMFO demand in Asia (especially China) is undermining food security in West Africa and the achievement of SDG 2 and 14.

Meanwhile, like terrestrial animal production systems and feed raw materials, the FMFO demand is increasing and diverting a valuable food source of seafood, which threatens food security in certain communities. This has partly occurred due to drastic decline in yields of anchovy and sardine. Global demand for FMFO is mainly driven by China's huge aquaculture sector, although export-oriented sectors, such as salmon farming in Norway and Scotland and prawn farming in Asia, are also significant consumers. Every year, over half a million tonnes of fresh fish that could be feeding 3.3 million people in West Africa are being diverted to produce FMFO in order to feed animals in industrial aquaculture and farming, mostly to Asia (Vietnam, Malaysia and China). In fact, Asia's imports of such fishmeal are six times that of Europe and three times the fish oil.[163] This can be up to 40% of these West African nations' fish catch. Similar trends are at play, depriving people of food to support aquaculture in China, rerouted via Vietnam, and for shrimp farming in India.[164] This led the Changing Markets Foundation to conclude:

> *Rather than providing a solution to food-security issues, the aquaculture sector is significantly undermining the achievement of Sustainable Development Goal (SDG) 2 (to end hunger and achieve food security) and SDG 14 (to conserve and sustainably use the oceans).* [165]

Opportunities to do and disclose more

Sustainable seafood sourcing is complex and often based on certification schemes. A range of aquaculture certification schemes are reviewed at a 2021 report.

Seafood sourcing is complex, involving hundreds of species, unique geography, varying national regulations among other challenges. There are many certification schemes, projects and recommendations for seafood sustainability (wild caught and farmed). Some approaches certify the products and supply chains, species and stocks; others offer verification of the vessels and their fishing practices from which buyers can source. Some include fish feed, animal welfare and antibiotic risk reduction, though many do not. FAIRR's 2021 report reviews six major farmed seafood certification schemes against comprehensive sustainability criteria.[166]

Traceability is essential to seafood sustainability and can increase internal rate of return by 39–62% and profit by 100% for processors.

Traceability is fundamental to seafood sustainability. Planet Tracker's 2020 report states that increased seafood traceability can lead to a 39–62% increase in internal rate of return and up to a 100% increased profit for fish processors.[167] For disclosure, it is now widely recommended that a whole supply chain approach is needed and that each species and geography sourced must be reported separately[168] as the fishing methods, vessels, stocks and risks may vary, plus wild caught and farming have different challenges and sustainability needs, though some overlap.

The Ocean Disclosure Project has increasing participants, though does not require species disclosure by global volume or percentage.

The Ocean Disclosure Project[169] has over 20 major company participants, requiring disclosure of species, geography and harvesting method. Species disclosure by total volume or percentage of global supply would be additional valuable context.

Tilapia in aquaculture, moderately stocked. For good fish welfare recommendations, see Cerqueira M, Billington T. Fish welfare improvements in aquaculture. 2020, November 1. Available from: https://files.fwi.fish/Fish_Welfare_Improvements_in_Aquaculture.pdf. Image: istock.

A 2021 report aims to motivate Japanese companies with links of financial indicators to sustainability interventions.

The 2021 report *Against the Tide* from Planet Tracker links various financial indicators with areas of seafood sustainability improvement, focusing on the Japanese sector.[170] There are various commercial case studies for traceability increasing EBIT (i.e., earnings before interest and taxes) margins and sustainability, thereby improving revenue, profits, other economic indicators and of course priceless reputation. The same report covers a range of recommendations for wild caught and farmed seafood. Similarly, the Asian Development Bank sets out practical recommendations for aquaculture in Asia.[171]

Dwindling profits lead some companies to value add through processed products, providing opportunities for alternatives proteins.

Faced with dwindling profits, some companies that source wild caught seafood are also increasingly turning to add value to their catch in processed products and ready meals, which have significantly higher profit margins.[172] There are clear opportunities in this sector for the use of alternative proteins also. Plant- or cell-based seafood development is burgeoning in the region, and offers truly sustainable options for this and other seafood markets.[173]

Aquaculture must make a net contribution to food security. Alternatives to FMFO are being explored, and must be scrutinised. Sustainable management of wastes, welfare and water management are also essential and can improve sustainability and productivity.

Finally, as aquaculture increases, it needs to make a net positive contribution to global food supply. Feed sourcing is increasingly looking towards algae, seaweed and other plant-based materials to replace FMFO.[174] These feedstocks are particularly suitable in Asia as farms are predominantly freshwater and with omnivorous species (e.g., carp, tilapia and catfish). Feed and seafood farming, however, must avoid destructive coastal and marine practices. Terrestrial circular seafood farming systems are key to sustainability, improving efficiency, reducing wastes and pollution.[175]

Improving seafood welfare will improve farm productivity; efficiency and humane killing improves efficiency and fillet quality.

Seafood welfare also needs to be considered because fish, octopus and crustacea are scientifically established to feel pain and other emotions.[176] Improving welfare, particularly via good water quality, environment and avoiding overstocking, will also serve to reduce pests, pathogens, parasites and antimicrobial use, which increasingly plague aquaculture.[177] Humane killing improves processing efficiency and the final product quality. Various civil society and research centres have advice and methods available to support producers.[178] [179]

Asian protein buyers should set targets for complete traceability and sustainable sourcing, while being aware of certification coverage and limitations. ARE strongly encourages Asian buyers to work towards transparency, articulating policies with comprehensive sustainability and clear, meaningful targets and disclosure for all seafood sourcing.

[26] SASB standards are not comprehensive but one of the better standards for general sustainability reporting, requiring key disclosures.

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5. Analysis by market, sector, size

Attempting to explain some reporting differences by Asian buyers benchmarked, we have focused on three factors:

1. The market within which the company is listed
2. The sector in which it conducts its business
3. The size of the company in terms of its market capitalisation (total)

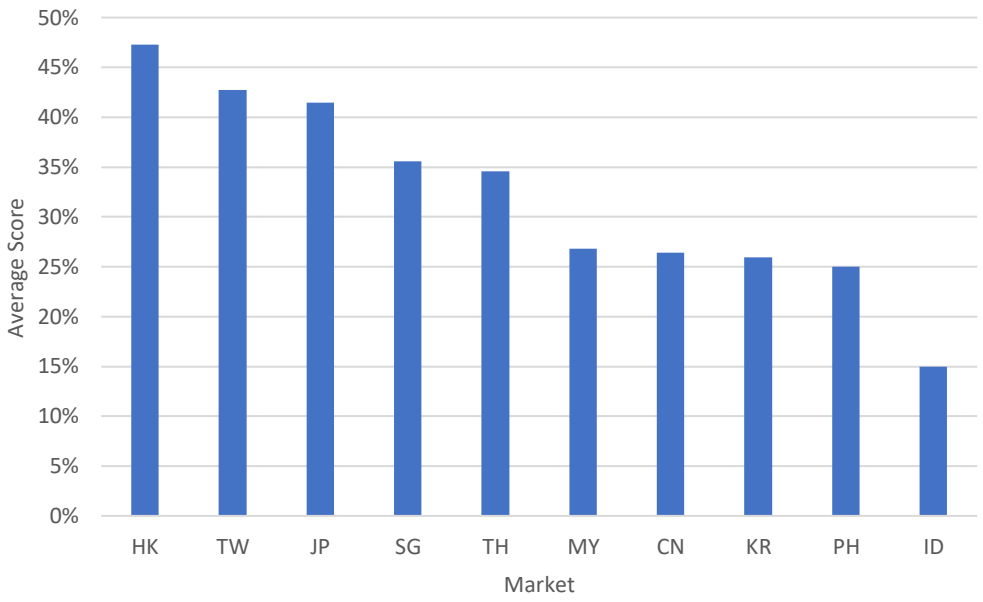
Readers should note that as the study used low bar questions, scores reflect the presence of an acknowledgement and low levels of action. They do not reflect management approaches that fully address the related sustainability challenges.

5.1 By market

Companies in more developed markets scored better, on average. Indonesian companies scored lowest overall.

As can be seen in Figure 19, on average, companies in Hong Kong, Japan and Taiwan had the highest total market average scores, while those in Indonesia lowest. This is in line with the expectation that companies listed and operating in developed markets will generally score better as a result of higher consumer expectation, stronger disclosure rules, and tighter industry regulation in developed markets. Malaysia, China, the Philippines, South Korea and Indonesia were below the universe average score of 33%.

Figure 19. Average total company scores by market



Source: ARE benchmark findings

South Korea was an exception. Only 29% of companies provided any form of sustainability reporting. On average South Korean companies scored 26%, compared with Japan's 41%.

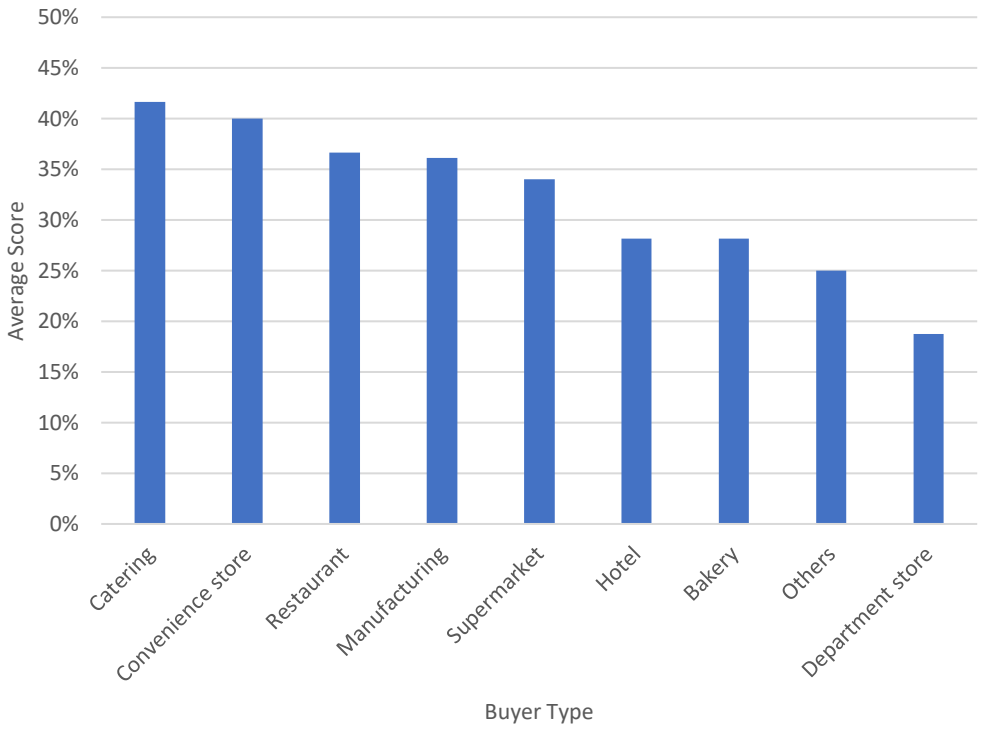
The stark anomaly was South Korea, which we had expected to score similarly to Japan. Despite South Korea's accelerated development over the past decades, only 29% of the companies reviewed provided any form of sustainability reporting. On average South Korean companies scored 26%, compared with Japan's 41%. This appears related to both the average size of companies included in the review and the market itself, as can be seen from Figures 1 and 19. The average market capitalisation of Korean companies reviewed was ~USD 1.6 billion compared to Japan's ~USD 6.3 billion (or the company universe average of USD 3.4 billion at the time of benchmarking). However, the total market capitalisation may not reflect the value and profit generation of its protein buying business.

From ARE's corporate governance review of South Korean companies, sustainability reporting practices by South Korean mid-caps is generally in want of improvement, compared with the rest of the region. Conversely, large capitalisation company practices have been above the regional average. This is indicative of the market structure in South Korea, where a small number of very large corporations (e.g., chaebols) dominate. Yet, some smaller and mid-size companies led while the rest of the market lagged behind. The South Korean companies benchmarked have mostly been mid-cap food companies.

5.2 By sector

Unsurprisingly, sectors whose main business was food service or direct sales to consumers scored better across the benchmarked categories than sectors for which food was not the main or only product. For this reason, overall, convenience stores, food manufacturers, caterers and restaurant chains scored higher than department stores and hotels, the worst-performing sectors.

Figure 20. Average total company scores by sector*



Source: ARE benchmark findings
*'Others' refer to Ryohin Keikaku Co., the company behind Muji, the Japanese specialist retailer that sells household and consumer goods.

Convenience store sector scored relatively higher than most other sectors. This appears to be a factor of large-cap companies.

One sector that scored higher than expected was convenience stores. We had expected convenience stores to score in-line with supermarkets. Delving further, their higher scores can be attributed to the bigger proportion of large cap companies surveyed in this sector. Companies such as Thailand's CP All (which owns 7-Eleven), Japan's Family Mart and Seven & i, and Taiwan's President Chain Store all have market capitalisations of over USD 10 billion and had total average scores above 50%.

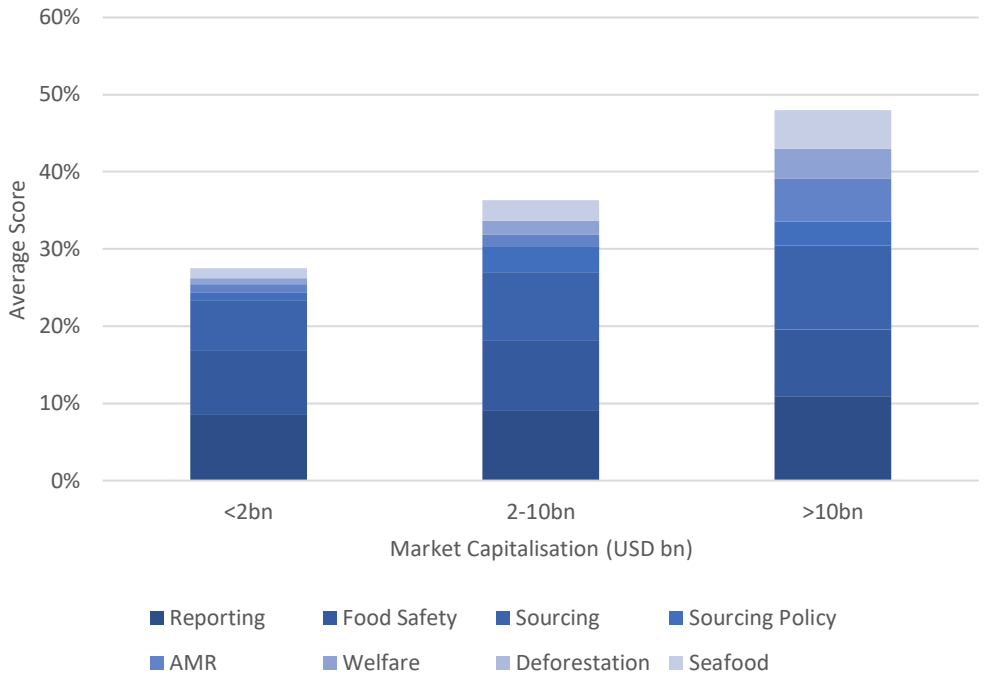
Regardless of sector, these scored the highest: general sustainability reporting, the acknowledgement or policy for sustainable sourcing, and food safety disclosures. Specific sourcing risks related to antimicrobial resistance, animal welfare, deforestation and sustainable seafood were the least acknowledged and addressed, irrespective of sector.

5.3 By size

Large cap companies generally scored better overall, though not necessarily in every market or question.

As depicted in Figure 22, we found that larger company size (based on total market capitalisation) influenced scoring, and higher average company size positively correlated with better scoring sectors. However, average company size *per market* did not always correspond to better scoring. We note the total market capitalisation may not reflect the value and profit generation of its protein buying business.

Figure 21. Average total company scores by company market capitalisation and by question



Source: ARE benchmark findings; Factset.

The highest scoring companies had a collective average market cap of USD 8 bn, noting three smaller cap companies were amongst these.

Of the 158 companies studied, there were few 'mega' food companies of the same scale as China's YumChina (~USD 18.4 billion), Japan's Seven & i Holdings (~USD 30.4 billion), or Thailand's CP All (~USD 25.4 billion). Highest scoring by five companies (3% of the entire list) averaged a market capitalisation of USD 8 billion, including some relatively smaller companies with market cap less than USD 4 billion, such as Pulmuone Co Ltd, CJ Chelledang Corporation and Thai Union. The next scoring tier was achieved by 10 companies (6% of the entire list), averaging USD 7.3 billion. While market cap may influence scoring within a sector, the poorest scores across the company universe were more associated with less developed markets.

Singaporean companies were of similar average market cap as South Korean companies, but 96% of them had some form of sustainability reporting. While this may reflect the lack of exchange requirements, two smaller cap companies in South Korea scored amongst the highest.

Interestingly, Singaporean companies' average market capitalisation was only slightly higher than South Korea's at around USD 1.8 billion, but 96% of them provided some sustainability reporting. We recall that South Korea's exchange only requires the largest listed companies to report, and only on some environmental sustainability criteria. This likely influences sustainability reporting in South Korea. However, we also saw some of the lower market cap companies in South Korea score amongst the highest, while others performed very poorly. Otherwise, we can consider company size to have some influence within the broader context of the market or sector it operates in, when influencing factors such as regulatory regime, consumers and institutions that uphold ESG standards.

Large cap companies are complex and may influence regulatory regimes, consumers and ESG institutions, but may also have more resources to dedicate to sustainability and should take an overall leadership role.

Despite their scope and complexity, larger companies on the whole have more resources to formulate, implement and report ESG policies, standards and disclosure. Many large companies have adopted digital technologies to improve processes, track progress and report outcomes to management. This has been implemented across their day-to-day operations but has flow-on effects to their sustainability reporting. Such schemes are often piloted within certain markets or brands, especially home brands, which they can better control. However, scale is crucial, as is reporting in context of their total supply. The ability to track and trace to source allows larger companies to widen and deepen their sustainability approach, prioritising finance to address sustainability issues at a more root cause and granular level. Given their influence across the supply chain and market, there is an opportunity for large companies to lead by example and help pivot their respective sectors towards more sustainable and responsible practices with greater transparency and reporting, to the benefit of all. Given their influence, these companies could and *should* take leadership in setting sector standards; moreover, all listed companies are of substantial size to meet sustainability reporting expectations.

Listed companies of all sectors and markets are all of relative size and are expected to report on sustainability across their supply chains. Companies in less developed markets must particularly lift their game.

In summary, while company size may infer influence, resources and a responsibility to be sustainable, smaller companies can also positively surprise. Listed companies should be expected to allocate resources to responsible sourcing and would be wise to strengthen their sustainability policies, standards and reporting. As competition and consolidation threatens and regulation looms in the region, companies in less developed markets should lift their game, learning from others. Finally, as sectors may appear distant or diluted by direct food or consumer facing sectors, investors and other stakeholders increasingly look to all parts of a business and supply chains for sustainability. Companies should not let their protein buyer business let them down.

5.4 Alternative proteins — next biennial benchmark

Increasing Asians (as surveyed, one in four in Southeast Asia and one in two in China) have reduced their meat consumption in the past three years.

While 'meatification' has been a strong trend in parallel with increasing wealth and corporate consolidation, emerging trends of Asians actively reducing meat consumption and exploring alternative proteins are on the rise with significant projected increases.[180] A 2021 Euromonitor report states:

> *Meat substitutes have been gaining traction in recent years owing to lifestyle trends. China and Japan lead in total consumption of meat substitutes, followed by South Korea, Malaysia, Indonesia, and the Philippines. Meat substitute brands have been quick to leverage on this increasing demand from consumers. The momentum expands to foodservice growth as well, whether as a way to serve healthy fast food or to reduce the personal climate impact by substituting beef (and other meats, dairy, eggs) with plant-based meat.*[181]

Asian consumers are increasingly consuming alternative proteins and more are willing to try them.

Thailand's market is projected to grow 9.2% CAGR to 2025.[182] Meanwhile, a 2021 consumer survey reveals that 27% of Thai respondents are actively trying to increase the consumption of plant-based meat alternatives, led by 45% of consumers of the Baby Boomer generation.[183] This trend has been accelerated by the COVID-19 pandemic, health and taste more broadly, and influenced by other hubs such as Singapore and Hong Kong.[184] Other surveys of potential consumers from China, India, Singapore and Hong Kong demonstrate acceptance and willingness to try plant and cell based meat and seafood.[185, 186, 187]

With reduced use of land, water, energy and no antibiotics or live animals, alternative proteins truly provide sustainability value. They will be included in the next biennial benchmark.

Regional policy makers are emerging in support of alternative proteins; Singapore's regulatory approval of cell based meat, and China's inclusion of alternative meat in its next 5-year plan. Projections exist for price parity in 2023 for plant-based and 2030 for cellular-based meat. [188]

While our prior report demonstrates the land, climate and conservation opportunities for a transition to alternative proteins,[189] there are also other sustainability benefits including reduced water and energy use and no use antibiotics nor live animals. Alternative proteins offer a truly sustainable component to buyer portfolios and will be included in our next biennial benchmark.

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6. Conclusions and recommendations

The animal protein system has many serious risks. Some of the more neglected yet core risks to protein sourcing are highlighted in this report. **The baseline benchmark demonstrates that the majority of 158 listed Asian protein buyers across 10 markets are not acknowledging, let alone addressing these sustainability risks.** The majority certainly do not have a policy or standards for their protein sourcing and suppliers to address:

- Antimicrobial use and resistance risks
- Animal welfare risks
- Deforestation and linked biodiversity risks
- Seafood sustainability risks

We recommend that buyers align with global sustainability directions on these topics. Asian protein buyers should:

- Set sourcing standards that allow neither growth promotion nor prophylactic use of antibiotics to optimise public health and address AMR risks. Antibiotics in animals should be restricted to treatment only.

- Set animal welfare standards and targets to drive progress towards higher welfare products. Animal welfare is interconnected with many sustainability risks. Reporting progress towards higher welfare standards is a key part of responsible sourcing.

- Review or develop deforestation and biodiversity policies and sourcing targets, acknowledging risks associated with all proteins. Anticipate consumer sentiment, national pledges, regulatory landscapes and pending financial disclosure frameworks.

- Set targets for comprehensive seafood traceability and sustainable sourcing, with disclosure of certification coverage and limitations. Work towards transparency, articulating company policies with a plan to introduce comprehensive sustainability standards with clear, meaningful targets and disclosure for all seafood sourcing.

Asian protein buyers must establish a more comprehensive process. We recommend an approach that aligns with other sustainability and ESG approaches, encouraging transparency and publishing wherever possible. We acknowledge this describes a journey and encourage setting a clear destination, with milestones and targets along the way.

Recommended steps:

1. Identify and assess all the material risks with protein sourcing including all those benchmarked in this report. Ask whether your materiality matrix specify or cover all these risks?
2. Develop a company sustainability vision towards 2030, involving top tier management and with appropriate governance. Be outward-looking and aspirational.
3. Ensure traceability of all protein products to underpin responsible sourcing and also management of recalls, quality and provenance.
4. Develop a comprehensive strategy and schedule of priorities for producing company policies, targets and specific sourcing standards to mitigate all risks with protein sourcing. Get specific. Seek best practice examples, expert advice or assistance.
5. Report performance against targets and standards annually.

This baseline benchmark offers an opportunity for companies to step up to the plate on responsible protein sourcing. The next benchmark will evolve and review companies from mid-2023 and include diversification of proteins. Please get in touch if you need advice or support. ARE is also collaborating with investors to develop a set of recommended disclosure formats which will help companies better manage and report on critical sustainability issues.

7. Appendices

7.1 Methodology

Geographic Scope

The benchmark covers 158 companies listed on the main Southeast and East Asian stock exchanges except Vietnam. It uses as simple low-bar scoring framework anticipating the regional paucity of sustainability policies and reporting for antimicrobials, animal welfare, deforestation and seafood.

Company inclusion and categorisation

We focused on listed protein buyers. We included some larger conglomerates that have significant operations in multiple stages of the supply chain, including production, even if those divisions were small in the context of the overall conglomerate. We excluded companies primarily involved in animal production.

We have tried to canvas a broad range of companies of various sizes across different sectors and markets. Market capitalisation was used in some markets as a cut-off to limit the number of companies reviewed in that jurisdiction, but this was not applied in other markets where there were fewer listed companies. We accept that market capitalisation may not always directly correlate to the revenue or size of the food-buying part of company, but it may infer the broader influence and resources of a company.

We applied our own sector classification, generally based on a company's own categorisation. If the business was diversified, categorisation for the benchmark was based on the largest business segment by revenue. Sector classifications were: manufacturing, supermarket, convenience store, department store, restaurant, hotel, bakery, catering, and 'other' (which includes one specialty retail store). One clear exception on the revenue rule was the airline industry, where our focus was only on the parts of their business that had protein-buying exposure, and hence we classify these broadly under 'catering'.

Questions and scoring

Scoring for each question was based on binary metrics relating to the presence or absence of the sustainability factor in question. A point was potentially allocated for each question. Scoring a point, however, neither qualifies the extent of information nor implies the risk is addressed nor that the disclosure is adequate. It is the first step in acknowledging material risk to the business or where asked, having developed a policy, target or commitment. Total company scores were tallied, per market, sector and size with average scores converted to a percentage. Total percentages were adjusted for relevance or absence of the seafood question but not adjusted for sample size.

Desktop research in 2020, reviewed company websites, policies and reports released during 2020 or two years prior (2018 and 2019). This allowed systematic assessment of company published information in the public domain. The evidence mirrors what investors, shareholders and consumers can generally access and encourages companies to disclose more sustainability information, policies, standards, targets and progress in future.

The benchmark questions and evaluation will evolve over time, to accommodate more detailed evaluation of policy scope, commitments and performance reporting. Staggered scoring will also be developed, as the region evolves company disclosure of protein sustainability.

The following are notes to the scoring assessment for each benchmark question.

1. Does the company provide any sustainability reporting? Y/N

Sustainability reporting may be in the form of a company sustainability report, integrated with annual reporting, or website disclosure. Discussions on sustainability can relate to any aspect of protein sustainability but must relate to the company's core business operations (i.e., there is no score given for simply providing examples of philanthropic activities or charitable giving by the company, or CSR projects that have no relevance to the company's core business).

Y: It can be in the form of either a standalone report, part of annual report, or website disclosure. The discussion has to be related to their business operation — simply providing examples of philanthropic activities does not count — with some information specific to the year (accepted up to past two years).

N: No sustainability report or equivalent

2. Does the company acknowledge responsible sourcing as a business issue? Y/N

We are looking for whether a company discusses sustainability or responsibility (generally) as a business risk in relation to environmental and/or social considerations in sourcing.

2a. Does the company provide a responsible sourcing policy (or standards or code of conduct) — including animal proteins? Y/N

A responsible sourcing policy is a company document, statement or commitment specifically outlining the position or sourcing requirements of raw materials (including but not limited to animal proteins) that a company sources. Targets or commitments may be additional and may or may not be time bound. (e.g., 'we will only procure eggs produced from cage-free production systems' or 'we will source 100% cage-free eggs by 2025').

Responsible sourcing or supplier standards outline in some detail requirements for product and raw material sourcing. Companies should include a range of sustainability requirements, ideally comprehensive in scope.

Supplier code of conduct outlines how suppliers should behave with some specific standards (e.g., complying with labour standards or regulations, chemical waste management, traceability, transparency, etc.).

Y: Responsible sourcing policy, standards or supplier code of conduct is available and includes animal proteins (i.e. meat and / or dairy and / or eggs). Seafood is noted in question 7.

N: No policy or code, no discussion of sustainability in a policy or code. Policy or code does not include any animal proteins (meat, dairy, eggs).

3. Does the company disclose a food safety management system? Y/N

This question seeks to determine if a company is addressing food safety risks at a company or organizational level. Food safety management is often directly related to traceability and underpins all aspects of sustainability related to the supply chains. No score is given for simply highlighting the importance of food safety without articulating a management system.

Y: Has a food safety management process at a company/organisational-level

N: No discussion or reporting

4. ***Does the company acknowledge AMR (antimicrobial resistance or use) risks in protein sourcing? Y/N***

This question seeks to determine if a company is aware of the routine use of antibiotics, antimicrobials (especially for growth promotion and mass prophylaxis) and/or AMR as a risk. Simply dealing with products with certifications that cover the issue without reference to the risk would not be accepted. (We take note of the latter, however.)

Y: Specific acknowledgement or mention of antimicrobial/antibiotic risks related to resistance. Simply mentioning 'organic products' does not qualify. (We note internally for future engagement if a company provides specific standards or not.)

N: No discussion

5. Does the company acknowledge animal welfare risks in protein sourcing? Y/N

This question seeks to determine if a company is aware of farm animal welfare as a risk. Simply dealing with products with certifications that covers the issue without reference to the risk would not be accepted. (We note the latter, however.)

Y: Any discussion on farm animal welfare that indicates that the company is aware of the issue. (We note internally for future engagement if company provides specific standards or not.)

N: No discussion

N/A: for seafood manufacturers (at present, though will be considered in the next benchmark)

6. Does the company acknowledge deforestation risks in protein sourcing?

This question seeks to determine if a company is aware of deforestation linked to animal feed sourcing in the region or beyond, as a risk. Simply dealing with products with certifications that covers the issue without reference to the risk would not be accepted. (We note the latter, however.) Certification for palm oil sourcing would not be accepted because it is not related to animal protein supply chains.

Y: Any discussion on deforestation relating to raw material sourcing (e.g., deforestation in animal feed sourcing). (We note internally if a company provides specific standards or not.)

N: No discussion

N/A: for seafood manufacturers (at present, though will be considered in the next benchmark)

7. Does the company acknowledge sustainability risks when sourcing seafood?

This question is looking to see if a company is aware of seafood sourcing risks. Simply dealing with (some) products with certifications that cover sustainability issues without reference to the risks would not be accepted. This issue is typically more advanced than the others and there was a slightly stronger emphasis on the company providing specifics for its approach.

Y: Any discussion on sustainable seafood (particularly relating to specific policy, commitment or standards)

N: No discussion

N/A: No seafood sourcing

7.2 Companies benchmarked

Figure 22. Companies benchmarked, categorised by primary market of operation or listing

Company Name	Ticker	Market	Sector
1. Air China Limited	601111-CN	CHINA	Catering
2. BTG Hotels (Group) Co Ltd Shs -A-	600258-CN	CHINA	Hotel
3. Huazhu Group Ltd. Sponsored ADR	HTHT-US	CHINA	Hotel
4. Haidilao International Holding Ltd.	6862-HK	CHINA	Restaurant
5. Xiabuxiabu Catering Management (China) Holdings Co., Ltd.	520-HK	CHINA	Restaurant
6. Yum China Holdings Inc	YUMC-US	CHINA	Restaurant
7. Zhou Hei Ya International Holdings Company Limited	1458-HK	CHINA	Restaurant
8. Shanghai Bailian Group Co. Ltd. Class A	600827-CN	CHINA	Supermarket
9. Yonghui Superstores Co., Ltd. Class A	601933-CN	CHINA	Supermarket
10. Cathay Pacific Airways Ltd	293-HK	HONG KONG	Catering
11. Great Eagle Holdings Limited	41-HK	HONG KONG	Hotel
12. Miramar Hotel & Investment Co. Ltd.	71-HK	HONG KONG	Hotel
13. Shangri-La Asia Limited	69-HK	HONG KONG	Hotel
14. Sino Hotels (Holdings) Ltd.	1221-HK	HONG KONG	Hotel
15. Golden Eagle Retail Group Limited	3308-HK	HONG KONG	Department store
16. Lifestyle International Holdings Limited	1212-HK	HONG KONG	Department Store
17. China Mengniu Dairy Co., Ltd.	2319-HK	HONG KONG	Manufacturing
18. Dali Foods Group Co., Ltd.	3799-HK	HONG KONG	Manufacturing
19. Ajisen (China) Holdings Limited	538-HK	HONG KONG	Restaurant
20. Cafe de Coral Holdings Ltd.	341-HK	HONG KONG	Restaurant
21. Fairwood Holdings Limited	52-HK	HONG KONG	Restaurant
22. Tsui Wah Holdings Ltd.	1314-HK	HONG KONG	Restaurant
23. Dairy Farm International Holdings Limited	D01-SG	HONG KONG	Supermarket
24. Sun Art Retail Group Limited	6808-HK	HONG KONG	Supermarket
25. PT Sumber Alfaria Trijaya	AMRT-ID	INDONESIA	Convenience store
26. PT Mitra Adiperkasa Tbk	MAPI-ID	INDONESIA	Department store
27. PT Plaza Indonesia Realty Tbk	PLIN-ID	INDONESIA	Department store
28. PT Ramayana Lestari Sentosa Tbk	RALS-ID	INDONESIA	Department store
29. PT Hotel Sahid Jaya International Tbk	SHID-ID	INDONESIA	Hotel
30. PT Indonesian Paradise Property Tbk	INPP-ID	INDONESIA	Hotel
31. PT MNC Land Tbk	KPIG-ID	INDONESIA	Hotel
32. PT Garudafood Putra Putri Jaya	GOOD-ID	INDONESIA	Manufacturing
33. PT Indofood CBP Sukses Makmur Tbk	ICBP-ID	INDONESIA	Manufacturing
34. PT Nippon Indosari Corpindo Tbk	ROTI-ID	INDONESIA	Manufacturing
35. PT Siantar Top Tbk	STTP-ID	INDONESIA	Manufacturing
36. PT Fast Food Indonesia Tbk	FAST-ID	INDONESIA	Restaurant
37. PT Sarimelati Kencana Tbk	PZZA-ID	INDONESIA	Restaurant
38. PT Hero Supermarket Tbk	HERO-ID	INDONESIA	Supermarket
39. PT Midi Utama Indonesia Tbk	MIDI-ID	INDONESIA	Supermarket
40. Japan Airlines Co., Ltd.	9201-JP	JAPAN	Catering
41. Family Mart Co., Ltd.	8028-JP	JAPAN	Convenience store
42. Lawson, Inc.	2651-JP	JAPAN	Convenience store
43. Seven & i Holdings Co., Ltd.	3382-JP	JAPAN	Convenience store
44. Isetan Mitsukoshi Holdings Ltd.	3099-JP	JAPAN	Department store
45. J. FRONT RETAILING Co., Ltd.	3086-JP	JAPAN	Department store
46. Marui Group Co., Ltd.	8252-JP	JAPAN	Department store
47. Odakyu Electric Railway Co., Limited	9007-JP	JAPAN	Department store
48. Takashimaya Company, Limited	8233-JP	JAPAN	Department store
49. Kewpie Corporation	2809-JP	JAPAN	Manufacturing
50. Nichirei Corporation	2871-JP	JAPAN	Manufacturing
51. Yamazaki Baking Co., Ltd.	2212-JP	JAPAN	Manufacturing
52. KFC Holdings Japan, Ltd.	9873-JP	JAPAN	Restaurant
53. McDonald's Holdings Company Japan, Ltd.	2702-JP	JAPAN	Restaurant
54. MOS FOOD SERVICES, INC.	8153-JP	JAPAN	Restaurant

55. Skylark Holdings Co., Ltd.	3197-JP	JAPAN	Restaurant
56. Zensho Holdings Co., Ltd.	7550-JP	JAPAN	Restaurant
57. AEON Co., Ltd.	8267-JP	JAPAN	Supermarket
58. Kobe Bussan Co., Ltd.	3038-JP	JAPAN	Supermarket
59. Life Corporation	8194-JP	JAPAN	Supermarket
60. Pan Pacific International Holdings Corporation	7532-JP	JAPAN	Supermarket
61. Ryohin Keikaku Co., Ltd.	7453-JP	JAPAN	Others
62. AEON Co. (Malaysia) Bhd.	6599-MY	MALAYSIA	Department store
63. Parkson Holdings Bhd.	5657-MY	MALAYSIA	Department store
64. Genting Malaysia Bhd.	4715-MY	MALAYSIA	Hotel
65. Malayan United Industries Bhd.	3891-MY	MALAYSIA	Hotel
66. Shangri-La Hotels Malaysia Bhd.	5517-MY	MALAYSIA	Hotel
67. Hup Seng Industries Bhd.	5024-MY	MALAYSIA	Manufacturing
68. Berjaya Food Bhd.	5196-MY	MALAYSIA	Restaurant
69. MacroAsia Corp.	MAC-PH	PHILIPPINES	Catering
70. Philippine Seven Corporation	SEVN-PH	PHILIPPINES	Convenience store
71. Discovery World Corp.	DWC-PH	PHILIPPINES	Hotel
72. Waterfront Philippines, Inc.	WPI-PH	PHILIPPINES	Hotel
73. Century Pacific Food, Inc.	CNPF-PH	PHILIPPINES	Manufacturing
74. San Miguel Food & Beverage, Inc.	FB-PH	PHILIPPINES	Manufacturing
75. Universal Robina Corp.	URC-PH	PHILIPPINES	Manufacturing
76. Jollibee Foods Corp.	JFC-PH	PHILIPPINES	Restaurant
77. Max's Group, Inc.	MAXS-PH	PHILIPPINES	Restaurant
78. Shakey's Pizza Asia Ventures, Inc.	PIZZA-PH	PHILIPPINES	Restaurant
79. Metro Retail Stores Group, Inc.	MRSGI-PH	PHILIPPINES	Supermarket
80. Puregold Price Club Inc.	PGOLD-PH	PHILIPPINES	Supermarket
81. Robinsons Retail Holdings, Inc.	RRHI-PH	PHILIPPINES	Supermarket
82. SM Investments Corporation	SM-PH	PHILIPPINES	Supermarket
83. Bread Talk Group Limited	CTN-SG	SINGAPORE	Bakery
84. SATS Ltd	S58-SG	SINGAPORE	Catering
85. Singapore Airlines Ltd	C6L-SG	SINGAPORE	Catering
86. Metro Holdings Ltd	M01-SG	SINGAPORE	Department store
87. Amara Holdings Limited	A34-SG	SINGAPORE	Hotel
88. Ascott Residence Trust	HMN-SG	SINGAPORE	Hotel
89. CDL Hospitality Trusts	J85-SG	SINGAPORE	Hotel
90. Frasers Hospitality Trust	ACV-SG	SINGAPORE	Hotel
91. Genting Singapore Limited	G13-SG	SINGAPORE	Hotel
92. GL Limited	B16-SG	SINGAPORE	Hotel
93. Hotel Grand Central Ltd.	H18-SG	SINGAPORE	Hotel
94. Hotel Properties Limited	H15-SG	SINGAPORE	Hotel
95. Mandarin Oriental International Limited	M04-SG	SINGAPORE	Hotel
96. UOL Group Limited	U14-SG	SINGAPORE	Hotel
97. Fraser & Neave Ltd.	F99-SG	SINGAPORE	Manufacturing
98. QAF Ltd.	Q01-SG	SINGAPORE	Manufacturing
99. Envictus International Holdings Limited	BQD-SG	SINGAPORE	Restaurant
100. Japan Foods Holding L td.	5OI-SG	SINGAPORE	Restaurant
101. Jumbo Group Ltd. (Singapore)	42R-SG	SINGAPORE	Restaurant
102. Kimly Ltd.	1D0-SG	SINGAPORE	Restaurant
103. Koufu Group Ltd.	VL6-SG	SINGAPORE	Restaurant
104. Old Chang Kee Ltd.	5ML-SG	SINGAPORE	Restaurant
105. Sheng Siong Group Ltd.	OV8-SG	SINGAPORE	Supermarket
106. SPC SAMLIP CO., LTD.	005610-KR	SOUTH KOREA	Bakery
107. Asiana Airlines Inc.	020560-KR	SOUTH KOREA	Catering
108. Hyundai Green Food Co., Ltd.	005440-KR	SOUTH KOREA	Catering
109. Korean Air Lines Co., Ltd	003490-KR	SOUTH KOREA	Catering
110. BGF Retail Co., Ltd.	282330-KR	SOUTH KOREA	Convenience store
111. GS Retail Co., Ltd.	007070-KR	SOUTH KOREA	Convenience store
112. Hyundai Department Store Co., Ltd	069960-KR	SOUTH KOREA	Department store
113. Shinsegae Co., Ltd	004170-KR	SOUTH KOREA	Department store
114. Hotel Shilla Co., Ltd.	008770-KR	SOUTH KOREA	Hotel

115. Binggrae Co., Ltd	005180-KR	SOUTH KOREA	Manufacturing
116. CJ CheilJedang Corporation	097950-KR	SOUTH KOREA	Manufacturing
117. Daesang Corporation	001680-KR	SOUTH KOREA	Manufacturing
118. Dongwon F & B Co., Ltd.	049770-KR	SOUTH KOREA	Manufacturing
119. Lotte Confectionery Co., Ltd.	280360-KR	SOUTH KOREA	Manufacturing
120. Lotte Food Co., Ltd.	002270-KR	SOUTH KOREA	Manufacturing
121. Maeil Dairies Co., Ltd.	267980-KR	SOUTH KOREA	Manufacturing
122. Namyang Dairy Products Co., Ltd	003920-KR	SOUTH KOREA	Manufacturing
123. Nongshim Co., Ltd.	004370-KR	SOUTH KOREA	Manufacturing
124. ORION CORP.	271560-KR	SOUTH KOREA	Manufacturing
125. Ottogi Corp.	007310-KR	SOUTH KOREA	Manufacturing
126. Pulmuone Co., Ltd	017810-KR	SOUTH KOREA	Manufacturing
127. Samyang Foods Co., Ltd	003230-KR	SOUTH KOREA	Manufacturing
128. E-Mart Inc.	139480-KR	SOUTH KOREA	Supermarket
129. Lotte Shopping Co., Ltd	023530-KR	SOUTH KOREA	Supermarket
130. Gourmet Master Co. Ltd.	2723-TW	TAIWAN	Bakery
131. President Chain Store Corporation	2912-TW	TAIWAN	Convenience store
132. Taiwan FamilyMart Co., Ltd.	5903-TW	TAIWAN	Convenience store
133. Far Eastern Department Stores Ltd.	2903-TW	TAIWAN	Department store
134. First Steamship Co., Ltd.	2601-TW	TAIWAN	Department store
135. Ambassador Hotel,Ltd.	2704-TW	TAIWAN	Hotel
136. Formosa International Hotels Corporation	2707-TW	TAIWAN	Hotel
137. Lian Hwa Foods Corporation	1231-TW	TAIWAN	Manufacturing
138. Lien Hwa Industrial Corporation	1229-TW	TAIWAN	Manufacturing
139. Namchow Holdings Co., Ltd.	1702-TW	TAIWAN	Manufacturing
140. Uni-President Enterprises Corp.	1216-TW	TAIWAN	Manufacturing
141. Wei Chuan Foods Corp.	1201-TW	TAIWAN	Manufacturing
142. President Bakery Public Co., Ltd.	PB-TH	THAILAND	Bakery
143. CP All Public Co. Ltd.	CPALL-TH	THAILAND	Convenience store
144. Robinson Public Company Ltd	ROBINS-TH	THAILAND	Department store
145. Central Plaza Hotel Public Co. Ltd.	CENTEL-TH	THAILAND	Hotel
146. Dusit Thani Public Co. Ltd.	DTC-TH	THAILAND	Hotel
147. Erawan Group Public Co. Ltd.	ERW-TH	THAILAND	Hotel
148. Minor International Public Co., Ltd.	MINT-TH	THAILAND	Hotel
149. U City Public Company Limited	U-TH	THAILAND	Hotel
150. Taokaenoi Food & Marketing Public Company Ltd	TKN-TH	THAILAND	Manufacturing
151. Thai President Foods Public Co. Ltd.	TFMAMA-TH	THAILAND	Manufacturing
152. Thai Union Group Public Company Limited	TU-TH	THAILAND	Manufacturing
153. After You Public Co. Ltd.	AU-TH	THAILAND	Restaurant
154. MK Restaurant Group PCL	M-TH	THAILAND	Restaurant
155. Mudman Public Company Ltd	MM-TH	THAILAND	Restaurant
156. Oishi Group Public Co. Ltd.	OISHI-TH	THAILAND	Restaurant
157. S&P Syndicate Public Co. Ltd.	SNP-TH	THAILAND	Restaurant
158. Siam Makro Public Co. Ltd.	MAKRO-TH	THAILAND	Supermarket

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