



AIGCC
ASIA INVESTOR GROUP
ON CLIMATE CHANGE



Nature at a Tipping Point

A guide and case studies for Asia Pacific investors on managing nature-related risks

Prepared by PwC in partnership with the Asia Investor Group on Climate Change (AIGCC).

Foreword

The Asia Pacific region is experiencing an alarming degree of nature loss, and there is currently a considerable shortfall in the amount of finance that is being directed to halting and reversing these losses.

The Kunming-Montreal Global Biodiversity Framework adopted at the 2022 Conference of the Parties to the Convention on Biological Diversity estimated that there is an existing “biodiversity finance gap” of US\$ 700 billion per year that must gradually be closed.

Institutional investors have an important role to play in addressing nature degradation, and in scaling up the amount of finance that is directed to nature-positive approaches. In addition, financing nature protection and restoration can present significant and profitable opportunities for companies and investors.

For this reason, the Asia Investor Group on Climate Change (AIGCC) and PwC are collaborating to build investors' understanding of their exposure to nature risks, and their capacity to contribute to achieving a nature-positive future.

Through our partnership, AIGCC and PwC hope to build awareness, encourage action, and drive more action towards the protection and restoration of the region's natural environment. This report offers guidance to investors in Asia Pacific region on identifying and addressing nature-related risks.

It also includes six case studies that illustrate how Asia Pacific investors and companies are assessing, disclosing, and managing nature-related dependencies, impacts, risks, and opportunities.

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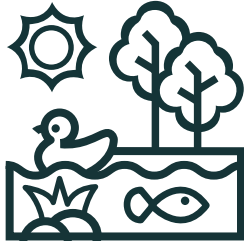
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Highlights

Nature-related risks in Asia Pacific

Poses a serious risk to companies' operations



Asia Pacific ecosystem health has declined by

55% since 1970



53%

of Asia Pacific economic gross value added are moderately or highly dependent on nature



58%

of Asia Pacific stock exchanges' market capitalisation are moderately or highly dependent on nature

Companies and investors dependent and vulnerable to nature-related risks



Agriculture, construction and food & beverage

are among the key sectors in Asia Pacific with a higher dependency on nature. It's important for companies in these sectors, and investors with assets in these sectors, to assess and manage nature-related risks.



Large companies & financial institutions

including institutional investors, will increasingly be required to assess, manage, and disclose nature dependencies, impacts, and risks in their operations, value chains, and portfolios, partly in response to the Kunming-Montreal Global Biodiversity Framework (GBF).

Checklist for investors on managing nature-related risks



Understand expectations and identify relevant information



Gain commitment from top management and the board



Clarify **priorities** and develop a **policy** on nature



Identify existing initiatives relevant to the management of nature-related risks



Actively engage companies to foster mutual understanding



Use the TNFD* framework and adopt good disclosure practices

*TNFD = Taskforce on Nature-related Financial Disclosures

Executive summary

Nature provides ecosystem services that are essential for maintaining human life and well-being, and these services are the bedrock of all economic activity. The extensive loss of biodiversity, which is occurring at a faster rate than at any other time in human history, poses systemic threats to our planet, our society, and our economy. There is a growing recognition among companies and investors that nature degradation could pose a material risk to their activities, and PwC research confirms this.

PwC analysis shows that companies comprising 58% of the market capitalisation of major Asia Pacific stock exchanges are in sectors exposed to significant nature-related risks, and that 53% of Asia Pacific gross value added (GVA)¹ – US\$ 18 trillion – is highly or moderately dependent on nature. Some companies and investors have taken action to assess nature risks and integrate them into their business and investment strategy, as shown by the six case studies in this report.

We have developed a checklist for investors that serves as a building block and guide to help them identify and effectively manage nature-related risks:

1. Understand expectations and identify relevant information required to assess nature-related risks in an investment portfolio.
2. Gain commitment from top management and board.
3. Clarify priorities, taking into account sector dependency and geographical locations, and develop policy on nature to help guide action.
4. Identify existing initiatives relevant to the management of nature-related risks including industry and market-related initiatives and collaborations.
5. Actively engage with companies in the portfolio, including those within the priority sectors, or within their supply chains.
6. Use the Task Force on Nature-related Financial Disclosure (TNFD) framework and adopt good disclosure practices to help manage nature-related risks. Another framework to consider the Science Based Targets Network's (SBTN) science-based targets for nature.

This checklist can help investors have a more influential role in addressing the degradation of nature and can drive much-needed finance into nature-positive activities.

¹ Gross Value Added (GVA) is value for goods and services that have been produced, minus the cost of all inputs that are directly attributable to that production. Thus, GVA adjusts gross domestic product (GDP) by removing the impact of subsidies and taxes (tariffs) on products.

1. Introduction



The Asia Pacific region is home to a diverse natural ecosystem that is essential for supporting human life, sustaining economic development, and providing quality living across the region, through its provision of ecosystem services, such as clean air and water, fertile soil, and flood, drought, and disease control. This report shows that 53% of Asia Pacific economy is highly or moderately dependent on nature. Yet, the state of nature in this region is deteriorating at a rate unprecedented in human history, with an estimated 55% decline in ecosystem health since 1970.²

Nature has a crucial role to play in achieving the climate goals of the Paris Agreement, which are priorities for governments, investors, and companies globally. The degradation of nature could further exacerbate the impact of climate change and, at the same time, the impact of climate change could further degrade the health of the natural ecosystem.³

Nature-based Solutions (NbS)⁴ constitute one of the most effective strategies for climate change adaptation and mitigation. NbS could contribute around 30% of the global mitigation required by 2050 to achieve the goal of limiting temperature rise to 1.5°C.⁵ However, there is still a considerable shortfall in the amount of funding provided for nature protection and restoration. The Kunming-Montreal Global Biodiversity Framework estimated that there is an existing “biodiversity finance gap” of US\$ 700 billion per year that must gradually be closed.⁶

Inaction in preventing nature degradation could therefore lead to significant direct and indirect material economic and financial risks. In recent years, there has been increasing pressure to address nature loss.

1. Target 15 of the Kunming-Montreal Global Biodiversity Framework (GBF) requires governments to ensure, by 2030, that large companies and financial institutions monitor, assess, and disclose risks, dependencies, and impacts on biodiversity in their operations, portfolios, and value chains.

2. The Task Force for Nature-Related Disclosure (TNFD) recommendations provide a risk management and disclosure framework for the private sector to identify, assess, respond to, and disclose nature-related issues.
3. Mandatory requirements are being introduced that address nature-related risks, such as the EU Deforestation Regulation (EUDR), the UK Environmental Act on the due diligence on forest risk commodities, and the US Forest Act of 2023.^{7,8}
4. Government policies that support nature-relevant activities are being introduced, such as Singapore’s carbon tax, Indonesia’s carbon trading scheme for forestry and land use sectors, and Malaysia’s recently announced tax incentives for reforestation and conservation activities.⁹

There is a growing expectation from regulators, shareholders, consumers, and civil society for investors in Asia Pacific region to take responsibility and ensure that investments are not causing detrimental impacts on nature and to properly assess and manage nature-related risk.

This report is intended to provide investors with a strategic view of the potential risks associated with nature loss in Asia Pacific from the economic and stock exchange dependency perspective. It provides case studies and general guidelines for investors in the region to enable an understanding of how to begin assessing and managing nature-related risks. The report comprises three sections:

- The ‘**Nature-related risks in Asia Pacific**’ section provides an introduction to the topic of nature, and provides an overview of economic dependency on nature by sectors and stock exchanges in the region.
- The ‘**Case studies in managing nature-related risks**’ section presents case studies from the private sector in Asia Pacific, including from the investment community, showing how nature-related risks are being identified and managed.
- The ‘**Checklist for investors on managing nature-related risks**’ section provides a checklist on how investors can get started in assessing and managing nature-related risks within their portfolios.

2 [WWF, 2022, A Deep Dive into the Living Planet Index.](#)

3 [NGFS, 2023, Nature-related Financial Risks: a Conceptual Framework to guide Action by Central Banks and Supervisors.](#)

4 Nature-based Solutions are “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits” (IUCN 2016).

5 International Union for Conservation of Nature (IUCN), 2022, IUCN position paper for UNFCCC COP27.

6 [Kunming Global Biodiversity Framework, 2023, 2050 Goals.](#)

7 [UK DEFRA, 2020, Due diligence on forest risk commodities.](#)

8 [Library of Congress, 2023, S. 3371 – FOREST Act of 2023.](#)

9 [PwC Malaysia, 2023, Centre stage: Budget 2024 overview.](#)

2. Nature-related risks in Asia Pacific



TNFD defines nature as occurring in four realms – land, ocean, freshwater, and the atmosphere. Within each realm, there are different types of natural ecosystems or ‘biomes’, such as tropical forests, rivers, and streams. Ecosystems are natural assets that provide ‘ecosystem services’ on which the world depends, such as freshwater for drinking and irrigation and pollination of crops by insects, birds, and other animals.¹⁰

Nature provides the ecosystem services that contribute to the availability of food, energy, freshwater, and feed for livestock, and that play a crucial role in regulating the climate. For this reason, almost every sector of Asia Pacific economy is directly dependent on nature to a varying degree. This dependency on nature and ecosystem services could translate into economic and financial risk if nature degradation and the impacts of this on economic actors are overlooked, and not properly considered in strategy, risk management, and capital allocation decision-making.

To estimate nature dependency, we analysed the information from the Exploring Natural Capital Opportunities, Risks, and Exposure (ENCORE)¹¹ tool that is used to assign dependence ratings to sectors. Each sector was assigned an overall

dependence rating based on the multiple ecosystem service dependencies it contained, and the strength of these dependencies. The sector-level dependency ratings were then aligned with gross value added (GVA) which is the economic value of goods and services that have been produced, minus the cost of all inputs. This was used to estimate the amount of GVA generated with a higher, moderate, and lower nature dependence.

Sector dependence measures the degree to which the economic value generated by business activity is exposed to the risk of nature degradation and ecosystem disruption.

- **Higher dependence** means that economic value comes from business activities that could fail financially as a result of particular ecosystem disruptions.
- **Moderate dependence** means that economic value comes from business activities that are likely to experience a material reduction in financial returns because of particular ecosystem disruptions.
- **Lower dependence** means that economic value comes from business activities that are likely to experience limited material financial effects from ecosystem disruptions.

¹⁰ TNFD, Why nature matters.

¹¹ **ENCORE** is the first knowledge base tool linking nature to the economy. It is designed for financial institutions to assess their exposure to natural capital risks according to economic sector and geographical location. The database is developed and maintained by the Natural Capital Finance Alliance (NCFA) and UN Environment World Conservation Monitoring Centre. NCFA is a finance sector led initiative, providing expertise, information and tools on material aspects of natural capital for financial institutions.

Sector dependency on nature

Sectors that have a higher dependency on nature generate 20% of Asia Pacific GVA (US\$ 6.7 trillion) which is higher than the global figure of 16%, highlighting the importance of nature in supporting the region's economy. This is attributed to the larger share of higher nature-dependent sectors in Asia Pacific's economy compared to the global economy, including sectors such as agriculture (+1.9%), construction (+0.9%), and fishery and aquaculture (+0.8%).

Higher nature-dependent sectors are directly reliant on the extraction of natural resources such as from forests and oceans, or the provision of ecosystem services such as healthy soils, clean water, pollination, and a stable climate. These sectors mainly operate in primary industries such as agriculture, food and beverage, fisheries, forestry, as well as construction.

Sectors with a moderate direct dependency on nature account for 33% of the total Asia Pacific GVA (US\$ 11 trillion). They account for the bulk of the sectors analysed, and include the energy, manufacturing, and services sectors. Combined, sectors with either a moderate to higher dependence on nature account for approximately 53% of Asia Pacific GVA (US\$ 18 trillion).

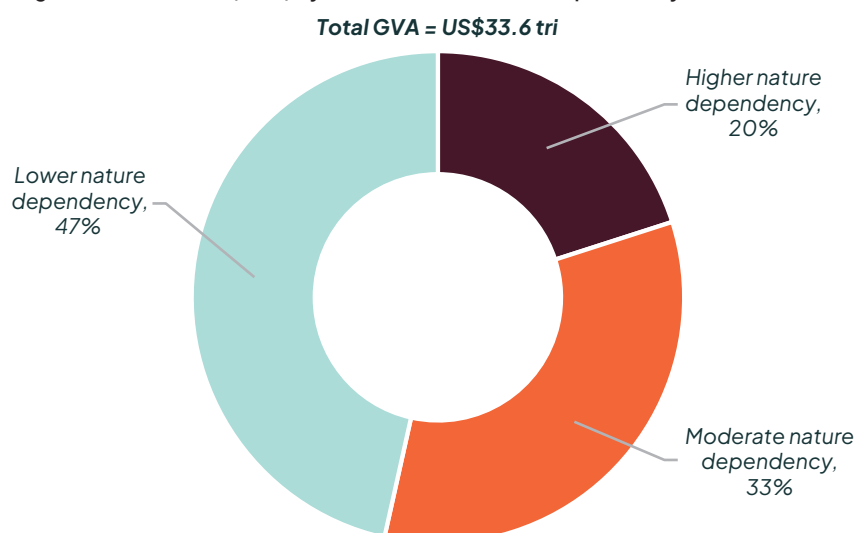
It must be noted that this analysis only covers direct sector dependence on nature and does not include indirect dependence through supply chains. Lower and

moderate-dependent sectors such as retail, consumer goods and lifestyle, real estate, and automotive rely on inputs from sectors with a higher dependence on nature, such as agriculture, food and beverage, and the construction sectors. For this reason, indirect dependencies on nature should also be considered when assessing the nature-related risks associated with each sector, to obtain a more holistic view of its risks.

We analysed 20 individual sectors and found that the economy's higher dependency areas, which include nine sectors (highlighted in dark red in Figure 1), account for 20% of Gross Value Added (GVA) in Asia Pacific. Out of the nine higher dependency sectors, agriculture, construction, and food, beverage and tobacco collectively account for the majority (72%) of the GVA in this segment.

The three major sectors (construction, agriculture, and food and beverage) are all heavily dependent on direct physical inputs from ecosystem services to maintain their production processes, especially the availability of groundwater and surface water. In addition, the agriculture sector also heavily relies on ecosystem services that enable production processes including pollination, soil and water quality, and the hydrological cycle. The degradation of nature will diminish its capacity to provide crucial ecosystem services to these sectors, constituting a potentially significant financial material risk to them.

Figure 1: Asia Pacific 2022 gross value added (GVA) by level of direct nature dependency



Note: Asia Pacific regions covered: Australia, Chinese Mainland, Hong Kong SAR, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Thailand, Taiwan, Vietnam.
Sources: EXIOBASE, ENCORE database, PwC analysis.

2. Nature-related risks in Asia Pacific

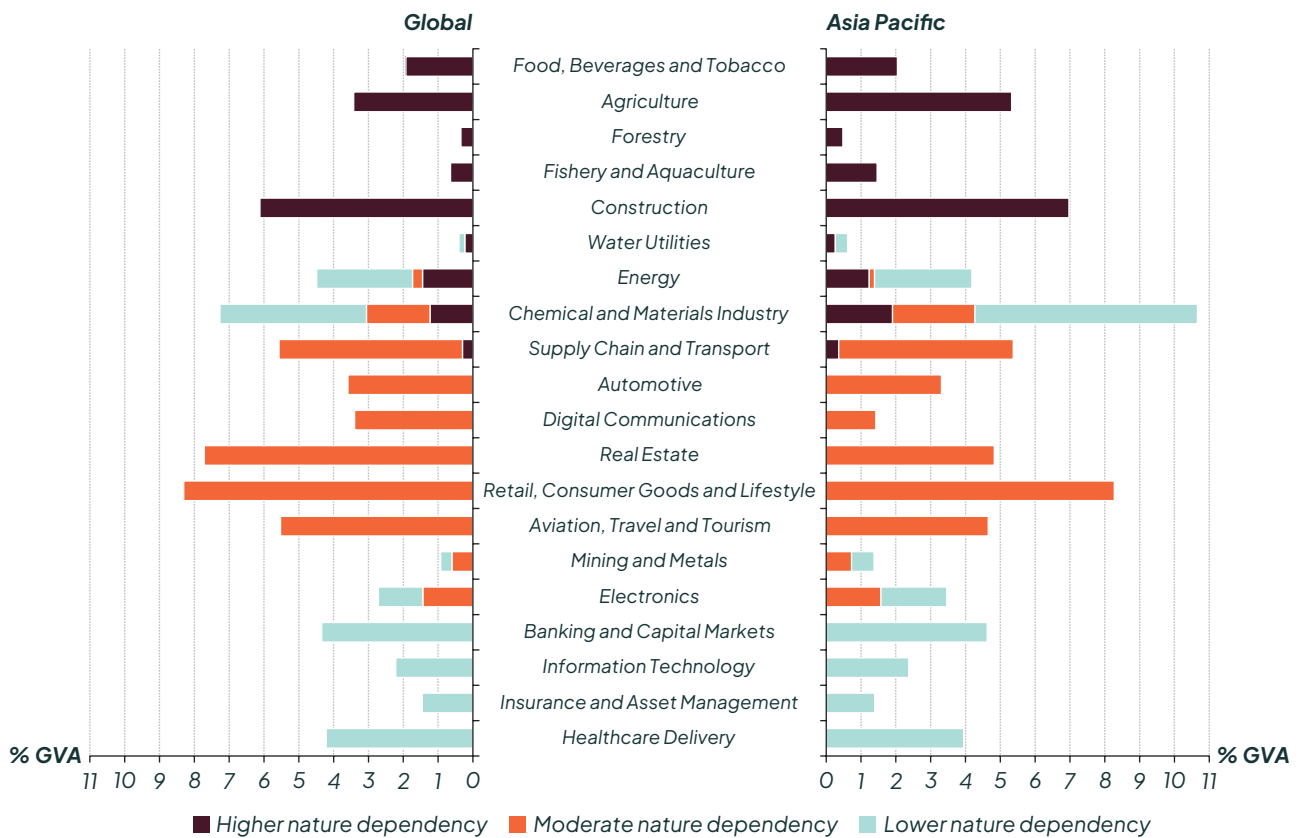
The agriculture sector in Asia Pacific makes a relatively higher contribution to regional GVA, compared to the global average. This may be attributed to the fact that Asia is the main contributor to the global value add of agriculture, amounting to 65% in 2021. Asia Pacific also has the largest share of global cropland (40%), and the sector employs 30% of the region's workforce.^{12,13,14}

Given that the agriculture sector must meet the growing global demand for food, it is important to address the degradation of nature in the region that is linked to increasing demand for agricultural products and sub-optimal farming practices, and which is in turn placing increasing pressure on natural resources, leading to land use change, and contributing to climate change.¹⁵ Disrupting nature's capacity to provide ecosystem services would not only cause the agriculture sector to face significant losses. It could also

threaten the global food supply chain, because Asia Pacific accounts for 19% of all food and agricultural exports.

Among the 20 sectors analysed, the chemical and materials sector contributes the largest share of Asia Pacific GVA, and its contribution regionally is larger than its contribution at the global percentage. This comes as no surprise, as the region's chemical industry represents more than 45% of the US\$ 5.7 trillion global chemical manufacturing business.^{16,17} The sector's dependency on natural capital and ecosystem services is from water supply, land stability, erosion control, and energy sources. Due to the sector's notable contribution to Asia Pacific economy, efforts need to be taken to mitigate its dependency on nature, for example by increasing the efficiency of water and energy use through water recycling and improving heat distribution.

Figure 2: Sector share of total gross value added (GVA) for global and Asia Pacific level, and their direct nature dependency



Notes: 1) Asia Pacific regions covered: Australia, Chinese Mainland, Hong Kong SAR, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Thailand, Taiwan, Vietnam; 2) Sectors in Figure 2 exclude other unassigned WEF industry sectors.
Sources: EXIOBASE, ENCORE database, PwC analysis.

¹² FAO, 2021, Gross Domestic Product and agriculture value add, 2012–2021.

¹³ FAO, 2022, World Food and Agriculture – Statistical Yearbook 2022.

¹⁴ ILO, 2022, Asia–Pacific Sectoral Labour Market Profile: Agriculture.

¹⁵ IFAD, 2019, An Outlook on Asia's Agricultural and Rural Transformation.

¹⁶ Oxford Economics, 2019, The Global Chemical Industry: Catalyzing Growth and Addressing Our World's Sustainability Challenges.

¹⁷ IISD, 2020, Asia Pacific Chemical Industry Discusses Updates to Strategic Framework.

Nature-related risks and Asia Pacific capital markets

Analysing the nature dependency of companies in Asia Pacific stock exchanges provides an additional perspective on the dependency of the capital markets on nature. Understanding the dependency of stock exchanges is especially important for institutional investors that are predominantly invested in public capital markets, to enable a better understanding of their portfolio exposure to nature-related risk. Our analysis found that 58% of the combined market capitalisation of Asia Pacific stock exchanges (US\$17 trillion) includes companies with higher or moderate dependence on nature, as illustrated in Figure 3.

It is worth noting that stock exchange market capitalisation is not reflective of the underlying national economy (or GVA) as it only covers publicly listed companies. Some exchanges have a larger proportion of lower nature-dependent capital-intensive stocks, comprising sectors such as banking, telecommunication, and technology, compared to the national economies within which they operate.

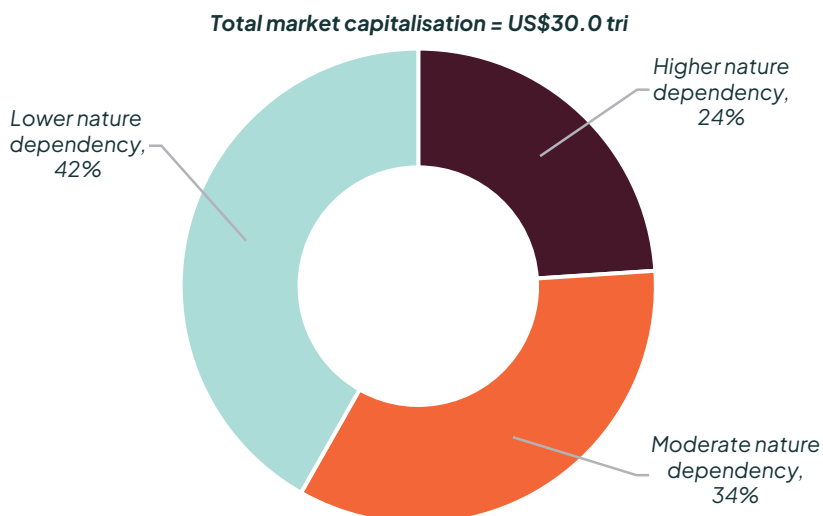
Additionally, significant companies in specific primary and commodity sectors within a number of national economies

are non-listed, and companies in these sectors often exhibit higher levels of dependency on nature.

In the case of Indonesia, for example, only 49% of the market capitalisation of listed stocks on the Indonesia Stock Exchange (IDX) is categorised as having higher or moderate dependency on nature. This contrasts with the broader national economic landscape, where 71% of the territory's economic GVA have higher or moderate dependency on nature.

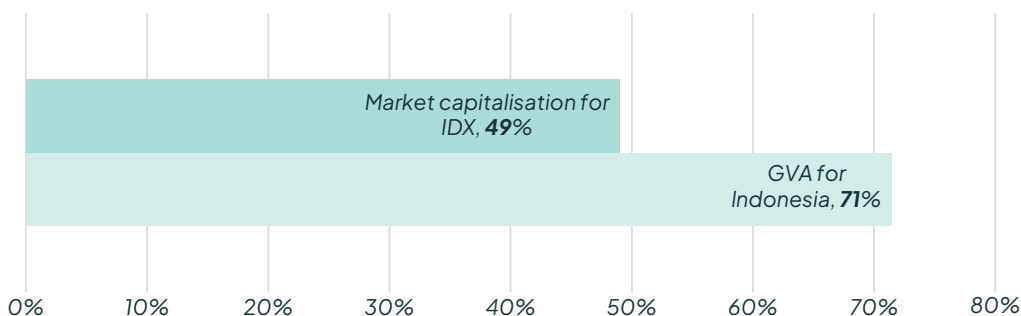
There are three reasons for this difference. Firstly, major companies that operate in higher nature dependency sectors (e.g. primary and commodities) are private companies and are therefore not listed on the IDX. Although these private companies are not publicly listed, they contribute significantly to the GVA of the sectors in which they operate. Secondly, there are companies in Indonesia that operate in sectors that are highly dependent on nature but are listed on other stock exchanges and not on the IDX. Thirdly, the banking sector which has a lower direct dependency on nature, accounts for one-third of the IDX capital market capitalisation.

Figure 3: Asia Pacific stock exchanges' market capitalisation by level of dependence on nature



Note: Asia Pacific regions covered: Australia, Chinese Mainland, Hong Kong SAR, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Thailand, Taiwan, Vietnam.
Sources: EXIOBASE, ENCORE database, PwC analysis.

Figure 4: Share of gross value added (GVA) and market capitalisation for higher and moderate nature-dependent sectors for Indonesia/IDX



Sources: EXIOBASE, ENCORE database, PwC analysis

For individual exchanges in Asia Pacific region, the share of stock market capitalisation comprising listed companies that have higher or moderate dependency on nature ranges widely between 38% (on the National Stock Exchange of India (NSEI)) and 75% (on the New Zealand Stock Exchange (NZX)). The variation is due to differences in sector composition and market capitalisation.

Higher to moderate dependency on nature stock exchanges have a large proportion of listed companies that exhibit a corresponding level of dependency on nature, collectively representing over 50% of the total market capitalisation of these exchanges.

Notably, 11 out of the 14 stock exchanges analysed fall into this category, including the New Zealand Stock Exchange (NZSE), the Taiwan Stock Exchange (TSE), and the Korea Stock Exchange (KOSE) at 75%, 73%, and 71% respectively.

The energy and food, beverage, and tobacco sectors predominantly contribute to this dependency rating across

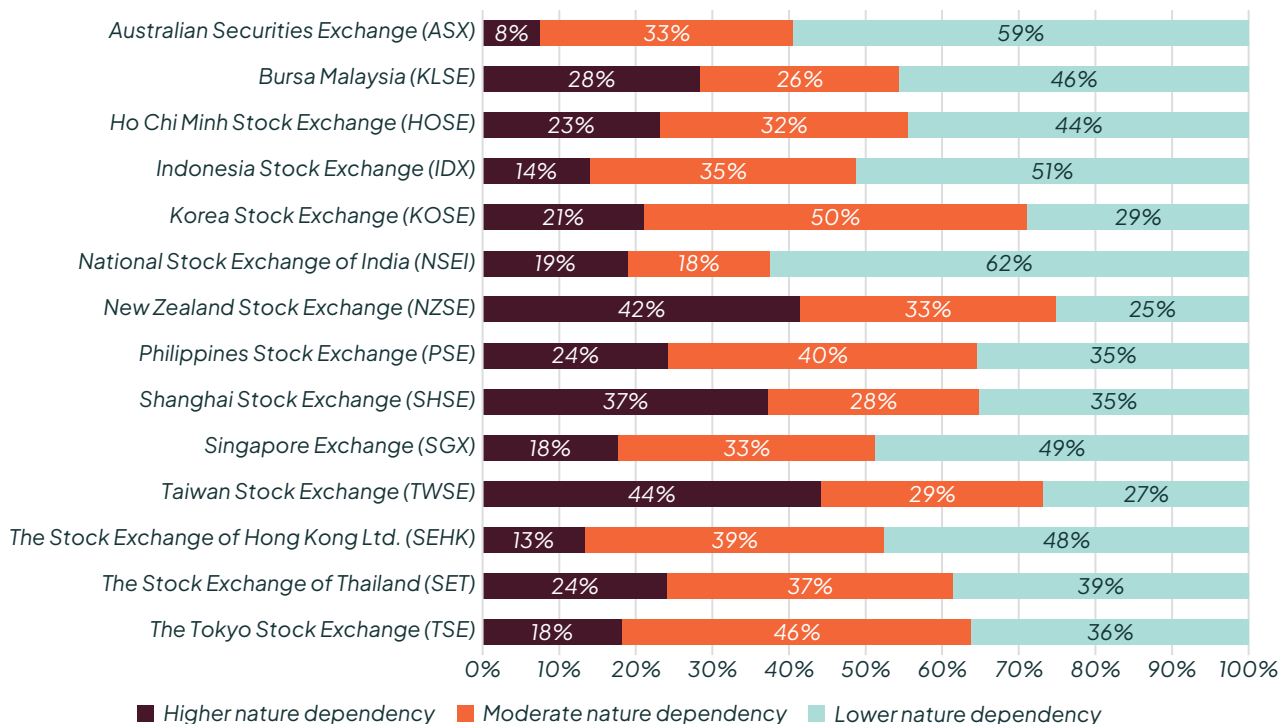
these exchanges. These regions (New Zealand, Taiwan, and Korea) rely on diverse energy sources like nuclear, hydropower, geothermal, solar, and wind, each contingent on natural conditions or imports for electricity generation.

Lower dependency on nature stock exchanges have a large proportion of listed companies that exhibit a corresponding level of dependency on nature, collectively representing over 50% of the total market capitalisation of these exchanges.

Only three stock exchanges fall into this category, namely the National Stock Exchange of India (NSEI), the Australian Securities Exchange (ASX), and the Indonesia Stock Exchange (IDX).

Notably, the information technology, banking, and capital markets sectors emerge as top contributors to lower nature dependency across these exchanges, because these sectors thrive on digital infrastructure, skilled human capital, and technological innovations for their operation, minimising direct reliance on natural resources.

Figure 5: Share of market capitalisation by dependency on nature



Note: Due to rounding, figures for some stock exchanges may not add up to 100%.
Sources: EXIOBASE, ENCORE database, PwC analysis.

Considerations for managing nature-related risks

If nature-related issues are not managed effectively, it could translate into material financial risks for many sectors, and this ultimately affects investors' portfolio return. Therefore, it is imperative for investors to include nature-related risks in their decision-making processes, and for their boards and management committees to have effective oversight over strategies for nature-related risk assessment and management. Important considerations include:

- **Overall exposure to nature-related risk**

This needs to be assessed and managed. Companies in lower direct dependence sectors can also have exposure to companies with higher direct dependence on nature through their supply chains. It is important to note that it would be almost impossible for investors to exclude all highly nature-dependent sectors in Asia Pacific from their investment universe, as they represent nearly a quarter of the combined market capitalisation of the region's stock exchanges - US\$6.7 trillion (see Figure 3).

- **Interconnectedness**

Sectors other than those directly reliant on ecosystem services can be affected by disruption to those ecosystem services. For example, the 2019–2020 wildfires in Australia directly impacted the forestry and agriculture sectors, but also impacted the transport and tourism sectors.

The Reserve Bank of Australia reported that the fires disrupted both tourism and agriculture, two sectors that are important to many of the affected regions.¹⁸ Meanwhile, the Department of Treasury and Finance of the Australian state of Victoria estimated that the accommodation, food services, transportation, and construction sectors might also incur substantial losses due to supply chain linkages with tourism.¹⁹

- **Financial losses from indirect impacts**

The financial impact of natural disasters can be widespread and significant. For example, Indonesia's forest and land fires in 2019 caused over 900,000 people to report respiratory health diseases, 12 national airports to halt operations, and hundreds of schools to close temporarily. The total damage and economic loss in the eight affected Indonesian provinces throughout the fires in June–October 2019 was estimated at US\$ 5.2 billion, equivalent to 0.5% of Indonesia's GDP. These losses mostly arose in the agriculture sector, but also in indirectly affected sectors such as transportation, trade, and industry.²⁰

Investors need to take note of these considerations in assessing and managing their nature-related risks. Material risks can arise from both direct and indirect pathways.



¹⁸ Reserve Bank of Australia, 2020, Macroeconomic effects of the drought and bushfires.

¹⁹ DTF Victoria State Government, 2021, The Economic Impacts of the 2019–20 Bushfires on Victoria.

²⁰ The World Bank, 2019, Indonesia Economic Quarterly.

3. Case studies in managing nature-related risks



3. Case studies in managing nature-related risks

In this section, we showcase six case studies demonstrating how investors and companies in Asia Pacific are managing their nature-related risks and impacts.

Three of the case studies, featuring Asset Management One (AM One), Manulife Investment Management, and MFS Investment Management – show how investors are assessing and managing nature-related risks.

We also include three case studies from the private sector to show how companies, some with high levels of dependence, are assessing and managing nature-related risks in their direct operations and supply chains. They can be used by investors to better understand how companies in various sectors approach and manage nature-related risks and impacts. The case studies feature Wilmar International, a company in the agriculture sector, Swire Properties (real estate), and Towngas (energy).

To meaningfully bring down nature risk levels across the economy, companies with existing high nature-related risks would need to manage their dependencies and impacts on nature.

It is clear that multiple approaches and methods can be used to manage risks and impacts on nature. For investors, there are

generally a few common steps that can be taken to effectively manage their nature-related risks. These include assessing portfolio company impact and dependency on nature, identifying and prioritising the financial materiality of the nature-related risks of the companies within their portfolios, and taking action to manage the nature-related risk through stewardship activities such as engagement and proxy voting. Investors can also use publicly available tools and frameworks such as the TNFD Locate, Evaluate, Assess and Prepare (LEAP) approach, ENCORE, and CDP questionnaires,²¹ as well as leveraging proprietary approaches to assess and manage nature-related risks.

For companies, the case studies highlight the use of conservation implementation methodologies developed from forestry and agriculture production sustainability standards, as well as the development of policies, practices, and targets to manage nature risk, and the prioritisation of nature-related efforts using the TNFD's LEAP approach.

All provided case studies highlight the importance of not only understanding the interdependency of nature with business, but also how it can impact business, and how the associated risks can be managed to strengthen the resilience of investment portfolios.

21 [CDP](#), Guidance and questionnaires.

Investor Case Studies

Case study 1: Asset Management One

Initial assessment of portfolio nature-related issues using the LEAP approach

Asset Management One (AM One) acknowledges that having a comprehensive understanding of nature-related risks and opportunities is crucial to assess companies' long-term value creation potential.

This case study describes how AM One, as a first step towards producing their TNFD disclosures, conducted a pilot analysis of their Japanese equity assets using the TNFD's LEAP approach. The scope of the analysis was limited to in-house Japanese equities, the largest asset class among AM One's investments, and the class where they can most influence investee companies.

Using the ENCORE tool, AM One conducted a top-down analysis of their equity assets by industry sector to assess potential dependencies on ecosystem services and natural capital assets. These sectors were also mapped to the 15 transitions for a nature positive economy as identified by the World Economic Forum (WEF).

Locate interfaces with nature

The initial ENCORE analysis indicated that "forests" and "water" were the most important natural capital categories on which their investee companies potentially depend.

- **Forests:** AM One used Trase,²² a tool that maps commodity trade flows, to analyse forest-related dependencies for its investee companies. Palm oil from Indonesia's Kalimantan province and soybeans from Brazil's Cerrado were found to potentially pose significant deforestation risks. They identified several Japanese companies with potential links to these commodities.
- **Water:** Water resource intensity was calculated based on available data for Japanese listed companies and was used to identify the sector with the highest water intensity. Five major Japanese companies in that sector were analysed using the World Resources Institute (WRI) Aqueduct Water Risk Atlas²³ to identify those companies' locations in high-water stress areas.

Evaluate dependencies and impacts

- **Dependencies:** The sectors with high potential ecosystem dependence included industrials, consumer discretionary and services, and materials. The ecosystem services on which companies had the most significant potential dependencies were surface water, groundwater, and mass stabilisation and erosion control. Around 40% of in-scope securities were potentially highly or very highly dependent on at least one ecosystem service. Water, habitats, biology, and genetics were the natural capital assets on which the investee companies were potentially most dependent.
- **Impacts:** Sectors that have a large potential impact on natural capital included industrials, consumer discretionary and services, and information technology. The largest potential impact drivers were water pollution, soil pollution, and solid waste. Around 90% of Japanese equity assets potentially have a high or very high impact on nature due to at least one type of impact. Categories of natural capital that are potentially highly impacted are water, habitat, biology, and genetics.

Assess material risks and opportunities

- **Risks:** AM One's in-scope investees have diverse interfaces with natural capital and are exposed to a wide range of transition, physical, and systemic risks.
- **Opportunities:** The initial scoping evaluation found significant relationships between in-scope investee sectors and nature-positive transitions such as circular and resource-efficient models, productive and regenerative agriculture, and planet-compatible consumption. Over 60% of in-scope investee companies are in sectors related to technologies that enable the realisation of nature positive.

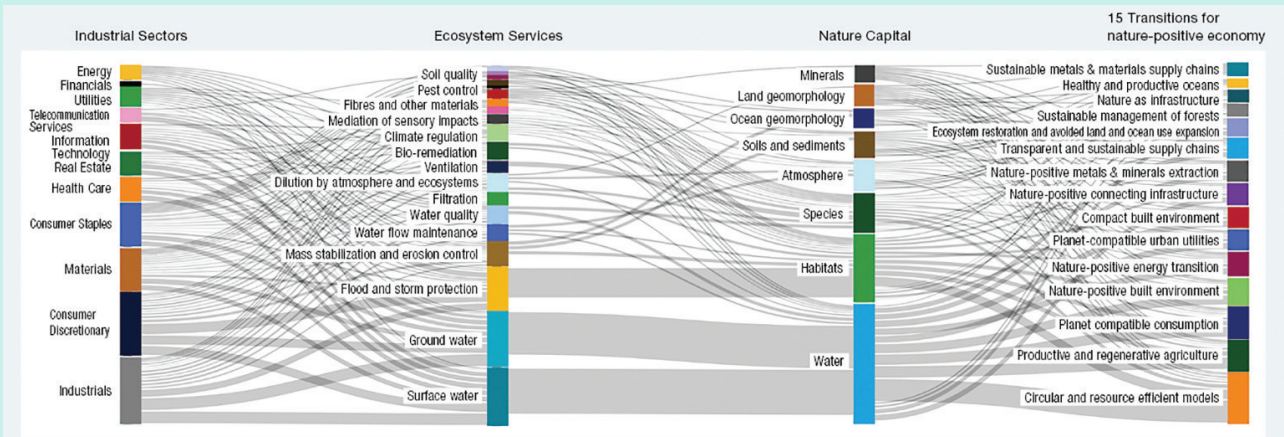
²² Trase, What is Trase?.

²³ WRI, Aqueduct Water Risk Atlas.

Prepare to respond

- **Strategy and resource allocation:** AM One is gaining more insight into the risks and opportunities related to natural capital and integrating them into stewardship and investment activities. It is setting goals and action plans in line with the goals and targets of the GBF as set at COP15.
- **Disclosure actions:** AM One will report biodiversity initiatives in its sustainability report under the TNFD framework.

Figure 6: Flow of ecosystem services, nature capital, opportunities related to AM One’s Japanese equity assets



Source: AM One analysis.

Outcomes of the LEAP framework

By applying the LEAP framework, AM One can encourage portfolio companies to take early action to maintain and restore natural capital. The framework allows AM One to assess initiatives by key companies with high relevance to deforestation, promoting compliance and comprehensive risk assessment. Additionally, adherence to LEAP can add value by attracting environmentally conscious investors, improving investor relations, and demand for company stocks.

Case study 2: Manulife Investment Management

Managing nature-related risks through focused engagement efforts

Manulife Investment Management (Manulife) considers nature-related issues in its investment decision-making and calibrates its approach for each asset class. This case study describes its approach to nature-related issues for public equity and fixed-income assets.

Manulife believes companies that better manage their natural resource dependencies and environmental impacts can offer investors a better risk/reward profile over the long term, while those that fail to account for their relationship with nature could face negative consequences (see Figure 7).

Figure 7: An overview of nature-related risks and how businesses may be affected

Type of risk	How risk materialises	Impact on companies
<p>Physical risk</p> <p>Ecosystem services at risk due to:</p> <ul style="list-style-type: none"> • Pollution • Invasive species • Climate change • Overexploitation of natural resources • Land and sea use change 	<p>Leads to the decline of:</p> <ul style="list-style-type: none"> • Air quality • Water security and quality • Land productivity • Soil health • Pollinator health • Habitat intactness 	<ul style="list-style-type: none"> • Decreased food and raw material production • Supply chain disruption • Raw material price volatility • Reduced land value and stranded assets • Capital destruction • Loss of revenues
<p>Transition risk</p> <p>Resulting from societal response to nature loss</p>	<ul style="list-style-type: none"> • New policy and regulation • Technological obsolescence • Adaptation of business operations • Shift in consumer and investor preferences toward nature-positive products/business models 	<ul style="list-style-type: none"> • New purchaser requirements • Limits on investment activities • Additional reporting requirements • Investment in new technologies or products • Higher operating costs and/or loss of revenues • Stranded assets • Shifts in capital allocation
<p>Liability and reputational risk</p>	<ul style="list-style-type: none"> • Litigation • Payouts and fines • Insurance costs • Reputational damage 	<ul style="list-style-type: none"> • Negative consumer or investor sentiment • Loss of market share/revenues • Ratings downgrade and/or share price losses • Loss of licenses to operate or develop

Source: CISL²⁴

Managing nature-related issues in public equity and fixed-income portfolios

Manulife's strategy includes a variety of actions to manage nature-related risks and opportunities, including asset allocation and selection, investment analysis and research, and stewardship activities (e.g. engagement).

Investment teams have access to a variety of tools, frameworks, and models to assess their portfolio companies' impacts on nature. Proprietary environmental, social, and governance (ESG) industry handbooks and materiality maps capture sector-specific material issues, including nature-related topics such as climate change, exploitation of natural resources, and pollution.

24 Cambridge Institute for Sustainability Leadership (CISL), 2022, Integrating Nature: The case for action on nature-related financial risks.

Proprietary sustainability impact and best-practice models identify best-in-class companies by capturing and analysing sector-specific sustainability metrics. These models help identify nature-related risks (and opportunities) to which investee companies may be exposed.

Custom monitoring tools are built in collaboration with investment teams for material issues within their portfolios, such as land or ecosystem disturbances, or companies operating in areas of sensitive biodiversity or water stress. This process helps identify opportunities to focus engagement efforts on companies that perform poorly in these areas.

Manulife's sovereign ESG risk model is used by the fixed-income investment teams. It captures areas of nature-related risks for sovereign bond issuers, such as water management, levels of pollution, and rates of mineral and forest depletion.

Engaging investee companies on nature-related issues

For publicly traded companies, Manulife expects management teams to consider the nature-related impacts of operations and products to achieve operations that sustainably use natural capital. It may engage mining companies, for example, on the rehabilitation of land after they have closed tailings dams or mines.

Manulife primarily uses direct engagement with management teams and directors, as well as collaborative engagement and proxy voting to encourage the adoption of best practices and the sustainable use of natural capital.

Engagement with management teams can address topics such as biodiversity, air quality, waste management, water management, sourcing practices, product lifecycle, and other sustainability factors related to nature. These conversations are a part of general monitoring and due diligence activities on behalf of Manulife's portfolios. Engagement may also include requests to adopt certain nature-related disclosures and other best practices to improve an investment's risk/return profile.

Manulife may exercise proxy voting to express an opinion on an issuer's oversight of nature-related risks and opportunities when those are considered material. This can include, for example, support for shareholder resolutions for increased disclosure on water efficiency, efforts to curb deforestation, programs on limiting pollutants, supply chain and sourcing practices, product lifecycle management, etc.

Outcomes of managing nature-related risks

Investors are increasingly looking for companies that can effectively manage environmental risks. Manulife's commitment to these practices can make them more valuable and attractive to investors that prioritise sustainability. Additionally, effective management of nature-related risks can lead to better financial performance by avoiding costs associated with environmental damage and tapping into new market opportunities.

Case study 3: MFS Investment Management

Nature-related risk approach prioritises food industry supply chains

MFS Investment Management (MFS) believes that nature-related issues present material financial risks (and opportunities) to many of the companies in which it invests.

This case study describes the approach taken by MFS to help its investment teams integrate nature-related issues into their work.

MFS developed the following framework to assess nature-related risks in its portfolios. The framework also serves as a useful basis for constructive engagement with investee companies. MFS began with the food industry because its impacts and dependencies on nature are among the highest of all sectors.

Step 1: Identify high-risk commodities in supply chains and understand their impacts on nature

- Natural capital impacts of an extractive commodity depend on a number of factors including the quantity, methods, geography, and other factors that determine the range and extent of negative outcomes caused. Natural capital erosion creates transition risks (e.g. reputation, regulatory, litigation), and physical risks which can create weak links in supply chains and threaten the ability of companies to produce the goods and services that rely on those commodities.
- MFS decided to start with the food sector given its high agricultural commodity dependence and impacts. It began with a heat map of agricultural commodities and their material impacts on nature (see Figure 8).

Figure 8: Impacts on nature for key commodities

	Soil degradation	Pollution	Water scarcity/ salinisation	Biodiversity loss	Emissions from land use
Beef	High	High	High	High	High
Rice	High	High	High	High	High
Corn	High	High	High	Medium	Low
Sugarcane	High	High	High	Medium	High
Palm oil	High	Medium	Low	High	High
Coffee	High	Low	High	Medium	Low
Cocoa	Medium	High	Low	Medium	Low
Pork	Low	High	Low	Low	High

Step 2: Map the supply chain to natural capital hot spots and local resource stress

- MFS developed an internal deforestation risk framework to identify companies with high exposure to deforestation-linked commodities using data from sources such as the CDP. The data is interpreted with a materiality framework and geographically mapped onto supply chains.
- This deforestation framework is used to analyse the emissions reduction pathway of companies in addition to physical and operational risks to supply chains.

Step 3: Identify areas of focus for stewardship efforts based on high-risk and high-impact commodities

- MFS assesses which impacts on nature are most material for individual companies based on the types and amounts of agricultural commodities used in the company's revenue-generating products, and the impacts of those commodities based on where and how they were produced.
- Additional factors can be considered as well, for example, a manufacturer's relationships with upstream suppliers, and whether products made with deforestation-risk commodities will be impacted by the EU's anti-deforestation regulation.

Outcomes of managing nature-related risks

MFS' goal is to develop engagement strategies that focus on disclosure around risk management and governance that can reduce nature-related risks, improve supply chain resilience, and thus support long-term financial returns.

Company case studies

Case study 1: Wilmar International

Nature conservation in oil palm production landscapes

Expectations have long been growing for companies in the palm oil production sector to identify and manage areas important for conservation, and to ensure that the production of palm oil does not cause deforestation, destroy peat, or exploit people.

Wilmar International (Wilmar) launched its No Deforestation, No Peat and No Exploitation (NDPE) policy in 2013.²⁵ The policy requires assessments for High Conservation Value (HCV) areas and High Carbon Stock (HCS) areas, as well as the implementation of Free, Prior and Informed Consent (FPIC) processes. These efforts are aligned with trends in investor and buyer demands and are also aligned with the requirements of the Roundtable on Sustainable Palm Oil (RSPO) and other certification schemes.

Identification and management of conservation areas

In 2022, Wilmar identified a total of 325.44 km² (32,544 hectares) of HCV areas and HCS forests set aside as conservation areas in its oil palm concessions in Indonesia, Malaysia, Ghana, and Nigeria, accounting for 10% of its total landbank. These conservation areas consist of a variety of ecosystems such as lowland and hill dipterocarp, peat, and mangrove forests, with varying degrees of density and quality.²⁶

In addition to biodiversity surveys, the management of conservation areas requires measures to reduce biodiversity threats, which can involve monitoring through regular patrols, socialisation with local communities, boundary demarcation, and the training of plantation staff and managers.²⁷

Because of the isolation and fragmentation of conservation areas in oil palm landscapes, they can become refuges for species of flora and fauna, resulting in a concentration of key wildlife species in a small area. This gives rise to a requirement for vigilance against illegal encroachment and other activities such as poaching and trafficking of wildlife. Monitoring and enforcement are critical, and this involves working alongside local government, rangers and wardens, local communities, and NGOs.

In some specific sites that have adjacent local and indigenous communities,²⁸ the Sekar Imej community-based conservation and multi-stakeholder collaboration are implemented by Wilmar to promote nature conservation and conserve biodiversity within the plantation landscape.²⁹

²⁵ Wilmar International, 2022, Palm NDPE Implementation Annual Report.

²⁶ Wilmar International, 2022, Annual Sustainability Report 2022.

²⁷ Arcus Foundation, 2015, Conservation in an Agriculture Landscape: Wilmar's Experience.

²⁸ HCV Network, 2022, Malaysian National Interpretation for the Management and Monitoring of HCVs 2022.

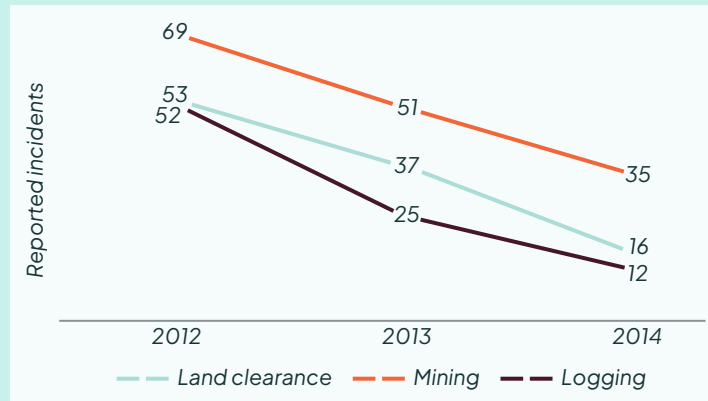
²⁹ Chin, S. Y & Jopony, M. E. M., 2021, Conservation in Plantations: Sg. Segama Riparian Rehabilitation and Sekar Imej Conservation Area in A Bumper Issue to celebrate its Rich Biodiversity - The Wild Side of Sabah. Combined vol. 74-4 & 74-5, Malaysian Naturalist. Malaysian Nature Society 331p.

Outcomes from nature conservation efforts

The combination of these actions has helped reduce the incidence of land clearance, mining, and logging in the conservation areas. The company's conservation effort in Central Kalimantan is one example of this, with the number of reported incidents of land clearing, mining, and logging in HCV areas falling significantly over the years from 2012 to 2014.

From a business value perspective, the company's NDPE policy and approach can be seen as catering to markets that have a strong sustainability requirement and meeting consumer demand for reduced negative environmental and social footprint in products and services, with a view to increasing revenue.³⁰

Figure 9: Land Clearance, Mining, and Logging in Central Kalimantan HCV Areas, January 2012 – August 2014



Source: Arcus Foundation.³¹

³⁰ Wilmar International, 2023, Annual Sustainability Report 2022.

³¹ Arcus Foundation, 2015, Conservation in an Agriculture Landscape: Wilmar's Experience.

Case study 2: Swire Properties

Understand nature-related risks and opportunities using the LEAP approach

This case study shows how Swire Properties' existing management approach to nature and biodiversity aligns with elements of the TNFD LEAP approach. The LEAP approach emphasizes flexibility, allowing for the completion of the 4 core phases in order that suits their business activities.³²

Swire Properties' Biodiversity Policy underpins our commitment to nature and biodiversity, guiding its actions throughout the whole building lifecycle, from consideration of nature-inclusive designs in new developments, sustainable procurement practices to identifying opportunities to promote nature conservation.^{33,34}

Figure 10: Swire Properties' LEAP approach

Locate	<ul style="list-style-type: none"> Conducted asset-level mapping to understand our global portfolio's interface with nature. Identified the ecoregions and biomes with which our assets interface using international and local databases to assess the current integrity and resilience of these areas our assets' proximity to critical habitats and protected areas. Identified priority sites of ecological sensitivity based on their ecosystem integrity, biodiversity importance and water stress level.
Evaluate	<ul style="list-style-type: none"> Mapped out the business activities of the priority sites and identified the corresponding environmental assets and ecosystem services of which we depend on or have an impact on using the ENCORE tool. Evaluated the level of materiality of the identified impacts and dependencies to the environmental assets and ecosystem services on a site-level basis.
Assess	<ul style="list-style-type: none"> Identified and prioritised the nature-related risks and opportunities originating from the dependencies and impacts on nature identified in the "Locate" and "Evaluate" phase. Assessed nature-related risks and opportunities based on their magnitude of impact, likelihood of occurrences, and potential effects to the business, projected on a near-term scale.
Prepare	<p>Ongoing:</p> <ul style="list-style-type: none"> Review the Company's current approach on managing nature-related issues. Integrate findings in the Company's Corporate Risk Register to ensure the issues are effectively managed. Incorporate nature-inclusive design into our portfolio.

Source: Swire Properties.³⁵

Integration of biodiversity and nature-based considerations at Taikoo Place

The company has partnered with the University of Hong Kong to pilot a biodiversity study at the Taikoo Place redevelopment project to assess its interface with nature and impacts on urban biodiversity.

The objectives of the study were to:

- Develop a baseline for urban biodiversity at Taikoo Place.
- Propose measures in the landscape plan to enhance biodiversity.
- Evaluate urban biodiversity after the completion of the redevelopment.

During the study, the company conducted impact analysis by collecting data to measure the redevelopment's potential impact on local biodiversity. It assessed the numbers and types of plant and animal species at the site, whether they were native, and their ecological value.

³² TNFD, 2023, Guidance on the identification and assessment of nature-related issues: the LEAP approach.

³³ World Business Council for Sustainable Development (WBCSD), 2023, WBCSD TNFD pilot use case: Swire Properties.

³⁴ Swire Properties, Biodiversity Policy.

³⁵ Swire Properties, 2023, Sustainability Report 2023.

The study's results showed that the redevelopment allowed for the creation of a substantial urban forestry landscape area, amounting to 35% of Taikoo Place. This provided insights for the creation of our two new green spaces at Taikoo Place, namely Taikoo Square and Taikoo Garden, totalling approximately 69,000 sq ft which will open in 2024. The two gardens will provide lush greenery, water features, quiet pathways, and native trees and vegetation. It will serve as a nature-based solution by reducing the heat island effect, increasing rainwater retention and improving district level air quality. It is also designed to support urban biodiversity through the careful selection of native tree species and vegetation, forming "green corridors" that facilitate the movement of birds, butterflies and other wildlife species between urban green spaces.

Swire Properties used learnings from past projects, including the Taikoo Place redevelopment, to incorporate best practices into future developments. Examples include:

- Development of the Swire Properties Biodiversity Guidelines for Hong Kong SAR and the Chinese Mainland to define the importance of biodiversity and the Company's approach to protecting it across our developments and recommend actions Swire Properties can take to protect and enhance biodiversity across all stages of our current and future properties.
- Developing a biodiversity database with technical data on flora planted or occurring at sites to facilitate long-term biodiversity monitoring across the company's portfolio.
- Leveraging technology to enhance biodiversity awareness and foster conservation behaviours by, for example, using Bluetooth beacons to share facts about plants and animals on tenants' and visitors' mobile devices.
- Strengthening green corridors at new developments to promote habitat connectivity.
- Integrating nature-based solutions into its development strategy and design to enhance biodiversity, improve climate resilience and increase aesthetic appeal.
- Use of animal-waste based organic compost due to its nutrient-rich content, reduced nature impacts over conventional fertilisers.

Outcomes from the LEAP approach

TNFD's LEAP approach provides a systematic framework to help the company to not only manage risks and comply with emerging nature and biodiversity regulations and standards but also informed the development of metrics and targets to track nature-related impact, better integrating nature into business decisions and operations. Swire Properties has published their nature-related impacts, dependencies, risks, and opportunities, in line with the Taskforce on Nature-related Financial Disclosures (TNFD) recommendations in their Sustainability Report 2023.³⁶

³⁶ [Swire Properties, 2023, Sustainability Report 2023.](#)

Case study 3: Towngas

A pilot assessment of nature-related issues using the LEAP approach³⁷

This case study describes how Towngas applied the first three elements (i.e. Locate, Evaluate, Assess) of the TNFD's LEAP approach to assess nature-related issues for 117 of its facilities across China.³⁸

Towngas started with a limited scope, assessing 117 sites, including 100 locations prioritised for Task Force on Climate-Related Financial Disclosures (TCFD)³⁹ reporting, along with an additional 17 projects that were included based on their potential impacts on nature.

The 117 in-scope site facilities include gas pipelines, gas production plants, gas storage facilities, water and waste treatment plants, biomass plants, ports, and industrial parks.

Locate interfaces with nature

The 117 sites were mapped against three key criteria to screen for high biodiversity value locations: proximity to protected areas (PAs), proximity to key biodiversity areas (KBAs), and proximity to threatened species (TS). The screening involved inputting point coordinates of the 117 sites (with a radius buffer applied) into the Integrated Biodiversity Assessment Tool (IBAT).

Evaluate dependencies and impacts on nature

Business activities for the 117 in-scope locations were assessed using the ENCORE tool to identify key potential business impacts and dependencies on nature. The findings were as follows:

- The ecosystem services on which the company's activities have the greatest potential dependencies were water, and mass stabilisation and erosion control. The latter helps prevent degradation of ecosystem assets such as soils and sediments thus mitigating the risk of damages from landslides and erosion.
- The most significant potential drivers of impacts on nature were greenhouse gas (GHG) emissions, terrestrial ecosystem use, and water use.

Assess nature-related risks and opportunities

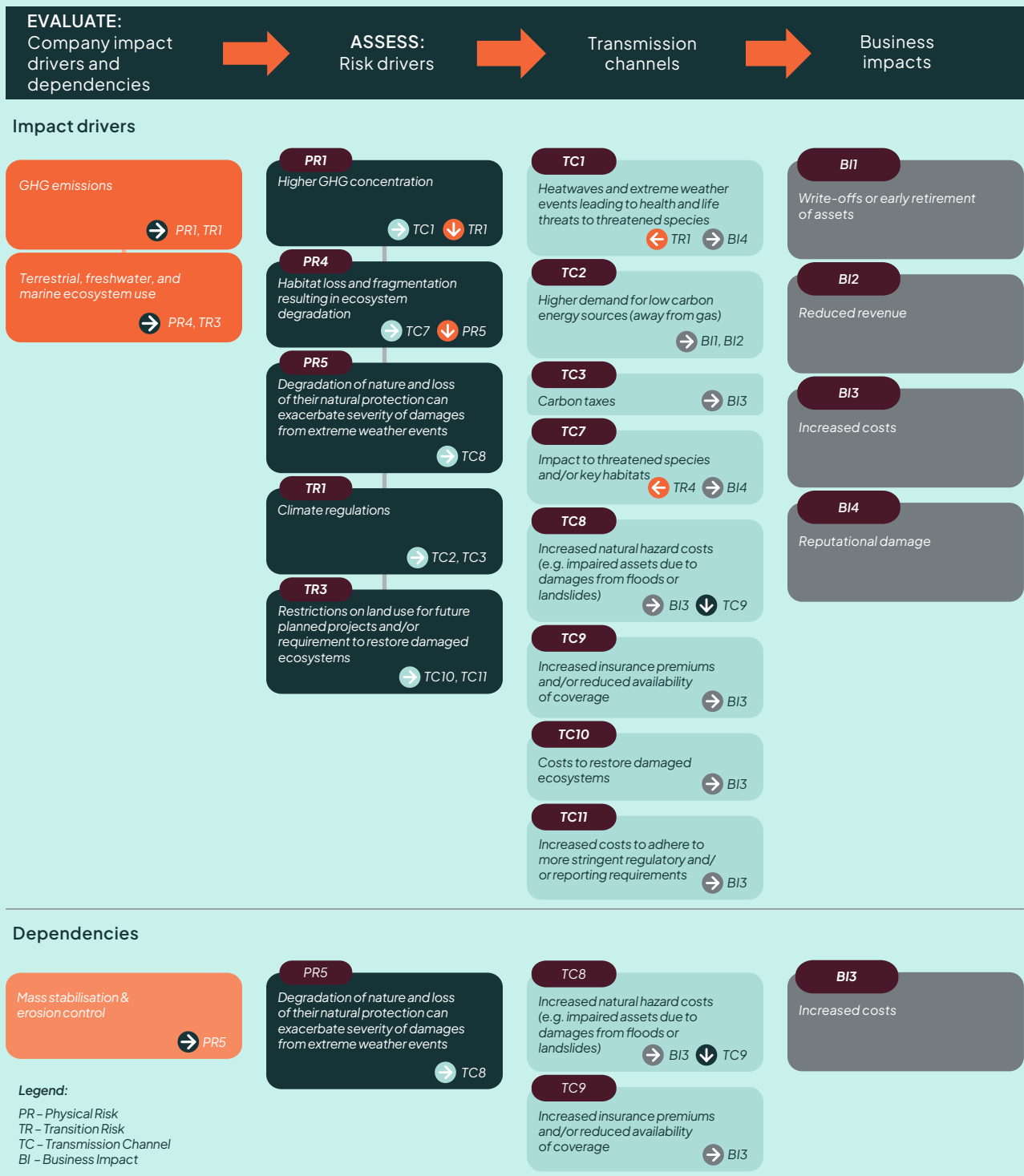
The company has published the assessment results encompassing various business activities. The company has published the assessment results encompassing various business activities. To illustrate, Figure 11 showcases the risk pathways associated with nature-related risks in gas pipeline activities.

³⁷ Towngas, 2022, Towngas Climate-related and Nature-related Directive Guide.

³⁸ Published in 2022, this assessment applied the LEAP process as described in the beta version 0.2 of the TNFD recommendations.

³⁹ The Taskforce on Climate-related Financial Disclosures (TCFD) risk management and disclosure framework is now known as the ISSB's IFRS S2 standard.

Figure 11: Towngas nature-related risk assessment for gas pipeline business activities



Note: Figure 11 illustrates the risk pathways specifically associated with Towngas’s gas pipeline business activities. To explore the risk pathways across its broader business activities, please refer to pages 48 and 49 of [Climate-related and Nature-related Directive Guide](#) of Towngas and Towngas Smart Energy. Source: Towngas.⁴⁰

Outcomes from the LEAP approach

Applying TNFD’s LEAP approach has benefited Towngas in ways other than mere compliance. Being one of the first in Hong Kong SAR to respond to the framework marks it out as a strong market leader.⁴¹ Importantly, the approach has allowed Towngas to better identify, assess, and manage nature related risks and opportunities, allowing resilient strategic planning.

⁴⁰ Towngas, 2022, Towngas Climate-related and Nature-related Directive Guide.

⁴¹ Towngas, 2022, Towngas becomes first HK company to respond to TNFD framework and to evaluate biodiversity risk.

4. A checklist for investors on managing nature-related risks

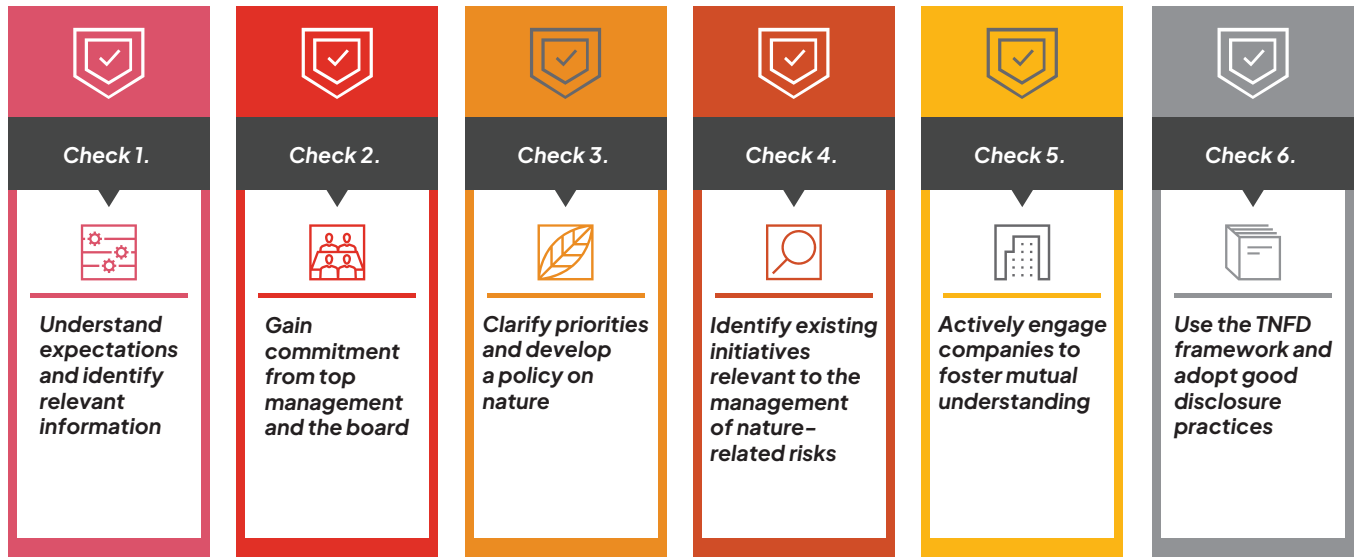


4. A checklist for investors on managing nature-related risks

Assessing direct and indirect dependence is one of the starting points in managing nature-related risks. However, understanding dependence can be difficult when there are multiple assets, or when investment portfolios are spread across multiple sectors of varying nature dependencies in different geographic locations.

The following checklist provides guidance for investors on how to prioritise their efforts to manage nature risks, and on how to initiate appropriate reporting and disclosure practices (see Figure 12).

Figure 12: Checklist for investors to get started on managing nature risks



Source: PwC and AIGCC.

Check 1. Understand expectations and identify relevant information

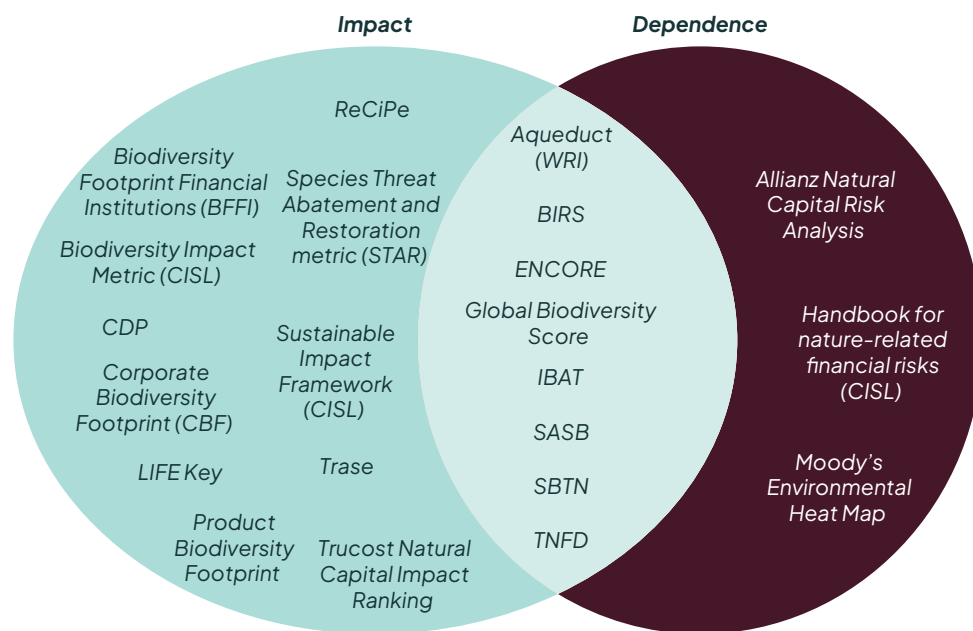
Investors looking to address nature risk can start by identifying areas of nature dependencies and impacts that are relevant and material to an asset or investment portfolio. This helps them to better understand what should be prioritised and how to efficiently allocate their resources.

A good place to get a better understanding of nature-related risks is to examine the current environmental and sustainability issues most relevant for each sector represented in an investor's portfolio (e.g. deforestation, pollution or water, etc). Identifying these pre-existing focus areas can help investors to shortlist the potential nature risk exposure within

their portfolios, and to understand the measures required to address those risks.

The University of Cambridge Institute for Sustainability Leadership (CISL) has summarised some of the tools and frameworks that can be used to identify an organisation's impact and dependence on nature (see Figure 13).⁴² These are useful as a starting point to understand the type of frameworks and tools that are relevant for assessing impacts and dependencies on nature, as well as to identify priority risks and sectors.

Figure 13: Tools and framework to identify a company's impact and dependence on nature



Source: CISL adapted by PwC.⁴³

42 Cambridge Institute for Sustainability Leadership (CISL), 2022, Integrating Nature: The case for action on nature-related financial risks.

43 Adapted from TNFD, 2023, Getting started with adoption of the TNFD recommendations.

Check 2. Gain commitment from top management and the board

Last year, PwC collaborated with the WBCSD to pilot the TNFD with 23 WBCSD member companies from three sectors: energy, land use, and built environment.⁴⁴ TNFD maturity assessments that formed part of the pilot companies showed that the companies generally had to improve internal responsibility and decision-making on nature issues, including by clearly defining board and management level responsibility, and providing clarity on organizational governance on nature-related decisions.

Having board and top management support and buy-in is essential to ensure strategies are well-designed, and that sufficient resources are provided to implement them.

Information collated on nature-related dependencies, impacts, risks and opportunities, can help to build an internal business case to better engage with investors' board and

top management. Building a nature business case should consider the following:⁴⁵

- Potential financial and economic costs and values relevant to nature
- Nature risks management and mitigation relevant to enterprise risk management
- Viability of existing business models compared to impacts relevant to nature, including natural resource availability, changing natural conditions, etc.
- Opportunities from applying nature-related innovation and resilience

It is also useful to highlight links to existing nature-related initiatives within the organisation. For example, many investors already have commitments related to deforestation, or related to specific commodities such as palm oil and timber.

Check 3. Clarify priorities and develop a policy on nature

With investment often spread across a variety of sectors and geographies, identifying nature-related risks may result in a long list of relevant issues or topics. Investors need to prioritise the nature issue and sectors that are most material. Investors should apply the "double materiality" approach when prioritising areas of focus for nature. This means considering not only the financial impact of nature-related issues, but also the impacts that investments may have on nature.

Figure 14 outlines the considerations that should be taken into account to help identify which nature issues and sectors have the highest materiality and should therefore be prioritised.

Investors should also take into account the size of their holding in sectors with the highest potential exposure to nature-related risk. Section 2 of this report provides an overview of economic dependency on nature in Asia Pacific which can be used as a reference to understand which sectors to prioritise. Investors can also leverage the ENCORE⁴⁶ tool to understand how sectors, subsectors and production processes impact and depend on nature.

Once priority sectors and risks are identified, the assessment process should then progressively narrow down to identify where relevant companies and their supply chain partners operate. For investments in sectors that are highly dependent on nature and have land holdings or other nature-based assets, it is recommended that the focus be on the locations

where direct operations occur, rather than on office headquarters or stock exchange listing locations.

The following tools can be used to assess and prioritise locations:

- **The Integrated Biodiversity Assessment Tool (IBAT)**⁴⁷ enables organisations to compare the locations of their activities with the World Database on Protected Areas, the International Union for Conservation of Nature (IUCN) Red List of Threatened Species and the World Database of Key Biodiversity Areas.
- **The WRI Aqueduct Water Risk Atlas** can be used to identify and evaluate the exposure of a company's operations or assets to water risks such as floods, droughts, and water stress.⁴⁸
- **The WRI Global Forest Watch** provides geospatial data and tools to monitor forest cover, which can be used to understand a company's proximity and exposure to areas where deforestation occurs.⁴⁹
- **The Trase tool**⁵⁰ provides supply chain and trade data for commodities related to deforestation, and enables investors to understand a company's supply chain exposure to deforestation risk from high-risk regions.

Through this process, investors can gain a better understanding of a company's nature-related risk exposure.

Investors also need to understand how companies are managing their nature impact and exposure to

44 Ibid.

45 WBCSD, 2022, WBCSD TNFD Pilot.

46 ENCORE, Exploring Natural Capital Opportunities, Risks and Exposure tool.

47 IBAT, Integrated Biodiversity Assessment Tool.

48 WRI, Aqueduct Water Risk Atlas.

49 WRI, Global Forest Watch

50 Trase, What is Trase?

4. A checklist for investors on managing nature-related risks

nature-related risks, which can be done by scrutinising their nature risks assessment and management processes, governance arrangements, policies and commitments, targets, and their initiatives on nature, which can be done by examining their sustainability reports, or using platforms such as the CDP questionnaire, Zoological Society of London Sustainability Policy Transparency Toolkit (ZSL SPOTT),⁵¹ and Forest500.⁵²

It is also important to recognise that some companies may not necessarily have a specifically termed “nature” approach, but might already be doing things that are directly relevant to addressing and managing nature risk, such as reducing environmental impacts or engaging in sustainable production. For example, some companies in nature-dependent sectors have put resources and efforts into setting aside and protecting natural habitats (e.g. forests and peat bogs), reducing air water, and soil pollution, waste management

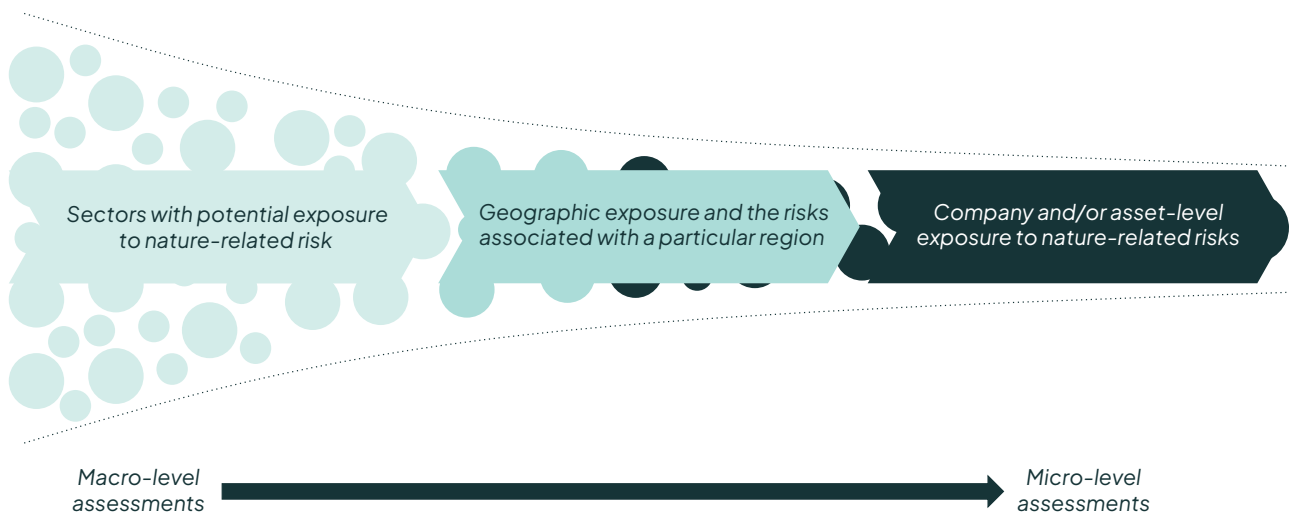
and reduction, reducing chemical and fertiliser use, water stewardship, and introducing plant and livestock diversity.

Once an investor has a clear understanding of their portfolio’s nature-related risk exposure, the next step is to develop a nature policy. A nature policy is essential to guide investor action on nature-related risk and impact in their portfolios and provides a basis for engagement on nature risks.

To ensure that the policy can effectively address nature-related risk, investors have to ensure the following:

1. Outline the investor’s commitment to address nature-related risk with a clear, measurable, and timebound target.
2. Define the scope of the investment instruments to which it applies and the nature-related issues that it covers.
3. Communicate investor’s expectation to its investee companies on managing nature-related risks.

Figure 14: Approach to nature risks assessment for investment portfolios



Source: PwC and AIGCC.

51 SPOTT, About ZSL SPOTT.
 52 Forest500, About Forest500.

Check 4. Identify existing initiatives relevant to the management of nature-related risks

In many regions, existing sector-wide initiatives might already be under way to manage significant nature-related risks. By identifying these existing initiatives, investors can quickly establish a knowledge base and a blueprint for targeted approaches, while avoiding the duplication of efforts.

It is also beneficial for investors to understand whether their portfolio companies are participating in these initiatives, as this can be an indicator of their willingness to effectively manage nature-related risk and achieve a wider positive impact on nature.

An example of relevant sector initiatives include the NDPE commitments that operates in the oil palm sector.^{53,54} Due to the implementation of NDPE policies, there has been considerable progress in the oil palm sector towards managing deforestation risks. For example:

- At the end of 2021, major European refineries could trace 100% of palm oil supplied to Europe back to individual mills.⁵⁵
- There is a sector-wide, consistent approach to reporting on progress, called the NDPE Implementation Reporting Framework,⁵⁶ which measures and reports on NDPE,

compliance in refineries' upstream supply chains, and performance is publicly tracked and updated regularly.⁵⁷

- NDPE policy and implementation performance is measured and publicly reported on, for example by benchmark indices such as the ZSL SPOTT.⁵⁸

Another example is the success of the Brazilian Amazon Soy Moratorium (ASM), which is a soy sector agreement under which commodities traders agreed to avoid the purchase of soybeans from areas that were deforested in the Amazon after 2008.

Multi-stakeholder initiatives that bring together multiple organisations either by trade, sector, or topic of concern, are also useful for engagement. Examples include sustainable certification schemes and their associated memberships such as the RSPO,⁵⁹ the Forest Stewardship Council (FSC),⁶⁰ the Consumer Goods Forum,⁶¹ WBCSD's Soft Commodities Forum,⁶² and the Global Battery Alliance (GBA).⁶³ These multi-stakeholder platforms provide space for collective collaboration, which enables them to have an enhanced influence and makes them more likely to deliver wide-scale, significant improvements in environmental performance.

Check 5. Actively engage companies to foster mutual understanding

Engagement is an important tool that investors can use to manage nature-related risks in their portfolios. By engaging with companies, investors can better understand the actions that companies are taking and the challenges they face, and can more effectively monitor their progress. Engagement also helps companies to better understand investor expectations on addressing nature risks, and can provide them with insights on additional approaches to addressing nature risk that an investor has observed through its engagement experience with other companies.

Investors are encouraged to participate in wider collective investor engagement initiatives on nature, such as the Nature Action100⁶⁴ and the Principles of Responsible Investor (PRI).⁶⁵ Collective engagement is a useful and resource-efficient method for engagement, as investors can pool their resources and have more influence on company actions. Companies

also benefit from collective engagement, as it aligns the expectations that they receive from various investors.

It is also important to consider strategic engagements with specific sectoral supply chains, as the risk of exposure to material nature-related dependencies and impacts tends to be via supply chains. This is especially relevant for investments in sectors that rely on raw materials from primary sectors. Larger companies in some of those sectors will face growing demands for nature-related disclosure, and this will certainly include reporting on nature-related issues in their supply chains.

The more knowledge that investors have of nature-related issues and the interdependencies with climate disclosure requirements, the easier it will be to raise awareness and reduce frictions when engaging with portfolio companies and their supply chains. This in turn will enable better investment and business decision-making.

53 [Chain Reaction Research](#), 2020, NDPE Policies Cover 83% of Palm Oil Refineries; Implementation at 78%.

54 [Proforest](#), 2020, Understanding commitments to No Deforestation, No Peat and No Exploitation (NDPE).

55 [Proforest](#), TFA EU Deep Dives Geolocation & Traceability Session - Palm Oil.

56 [NDPE IRE](#), NDPE Implementation Reporting Framework.

57 See section "Refinery List with IRF profiles" section on [NDPE IRE](#), Technical Documents, and download the latest list which is updated periodically.

58 [SPOTT](#), 2023, Palm oil: ESG policy transparency assessments.

59 [RSPO](#), Who we are.

60 [FSC](#), About us.

61 [The Consumer Goods Forum](#), What we do.

62 [WBCSD](#), Soft Commodities Forum.

63 [GBA](#), About GBA.

64 [NatureAction100](#), Driving greater corporate ambition and action on tackling nature loss and biodiversity decline.

65 [PRI](#), SPRING: A PRI stewardship initiative for nature.

Check 6. Use the TNFD framework and adopt good disclosure practices

To effectively use information and data to help manage nature-related risks, investors should consider reporting or disclosing based on frameworks that meet relevant regulatory requirements and stakeholder expectations. There are several frameworks, guidance documents, and standards available that can be the basis for assessing, disclosing, and managing information related to dependencies and impacts on nature, including the associated risks and opportunities. For nature-related disclosure, it is recommended that investors refer to the TNFD as the main guiding framework.

The TNFD provides a risk management and disclosure framework to identify, assess, manage, and disclose nature-related issues⁶⁶ For ease of adoption, it is structured on the same four pillars (governance, strategy, risk management, and metrics and targets) as the TCFD recommendations. The TNFD's LEAP approach is useful for identifying and assessing nature-related issues, and aims to help organisations

conduct the due diligence necessary to develop disclosure statements that are aligned with the TNFD framework⁶⁷

Meanwhile, investors can also consider leveraging existing sustainability disclosure efforts based on reporting standards such as the ISSB's International Financial Reporting Standards (IFRS) S2 (which has subsumed the TCFD framework) and the European Sustainability Reporting Standards (ESRS). These standards have nature-related elements, which if already being disclosed can be adapted for alignment with TNFD. For example, both the IFRS S2 and ESRS standards require the disclosure of greenhouse gas emissions, which is one of the TNFD's core global metrics.

When going beyond disclosure to target-setting, investors should refer to the Science-based Targets Network's (SBTN) science-based targets for nature, which provides target-setting guidance on contributing to an equitable, net zero and nature-positive future.⁶⁸

Figure 15: The TNFD's LEAP approach to assessing nature-related issues



Source: TNFD.⁶⁹

Look beyond risks to nature-related opportunities

The above list of six checks serves as general guidance for investors to identify and manage nature-related risks. Investors that have identified nature-related risks and ways of mitigating or addressing these risks will be better positioned to go beyond just reducing nature loss, by moving towards achieving a nature-positive future.

Understanding nature-related risks can help investors to explore potential nature-related opportunities, through adaptation and innovation, and through the transformation of business models and investments, to support nature restoration and regeneration.

Opportunities include the sustainable use of natural resources, which can lead to a reduction on operational and compliance cost and help to create resilient supply chains. Nature protection, restoration, and regeneration activities

can also support the generation of biodiversity credits, or carbon credits that have biodiversity co-benefits which increases their value. Better nature risk management also can help improve investor returns, because portfolio companies will potentially gain reputational benefits from effectively managing nature risks, which can lead to new sources of finances, such as sustainability-linked loans, and a reduced cost of capital.

Although nature-based investment is still in its early stages, investors can begin to explore investment opportunities in companies or assets that directly provide nature-based solutions or support nature improvements. Investors can also explore alternative structures and investable instruments that support nature improvements, such as blended finance, green bonds, biodiversity credit, and offsets.

66 TNFD, 2023, Recommendations of the Taskforce on Nature-related Financial Disclosures.

67 TNFD, 2023, Guidance on the identification and assessment of nature-related issues: The LEAP approach.

68 SBTN, 2023, The first science-based targets for nature.

69 TNFD, 2023, Guidance on the identification and assessment of nature-related issues: The LEAP approach.

Conclusion

The business case for nature is clear. Nature is crucial for achieving the goal of the Paris Agreement, and nature loss could lead to significant economic and financial risk for companies and investors. This report has shown that 53% of Asia Pacific's economic value added is generated by sectors that are moderately or highly dependent on nature's ecosystem services. There are also hidden risks from the indirect dependence on nature through the supply chain, which will further increase companies' and investors' exposure to nature-related risks.

With 58% of Asia Pacific stock exchanges' market capitalisation comprising companies in sectors that are moderately or highly dependent on nature, investors will benefit from understanding, managing, and reporting nature-related risks within their investment portfolios. Given that every sector has some direct or indirect dependence on nature, nature-related risks cannot be ignored or fully diversified.

As an initial step, it is vital that investors assess the priorities the nature-related issues in their portfolios and asset allocation based on materiality. They should then direct their efforts towards actions that can have the most impact. Engagement efforts should focus on priority sectors, and then on the most important companies within each of those sectors.

The actions and examples described in this report will help increase the financial resilience of investors and will also improve transparency and disclosure in key sectors. This will help investors to address nature-related risks within their portfolios and shift financial flows away from activities that harm nature, directing them instead towards activities that are capable of delivering a nature-positive future. Recognising the broader externalities, investors addressing nature risks not only safeguard financial value but also unlock potential value from nature.

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The Asia Investor Group on Climate Change (AIGCC) and PwC wish to express their deep gratitude to the case studies contributors to this report: AM One, Manulife Investment Management, MFS Investment Management, Swire Property, Wilmar International, and Towngas.

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The Asia Investor Group on Climate Change (AIGCC) is an initiative to create awareness and encourage action among Asia's asset owners and asset managers about the risks and opportunities associated with climate change and low-carbon investing. AIGCC provides capacity for investors to share best practice and peer-to-peer learning on sustainable investment, risk management, corporate engagement and policy

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