

December 2023

# **AEGON INSIGHTS**

# Biodiversity loss and the investment portfolio

Biodiversity loss is a serious threat that is present today. The impacts of biodiversity loss could not only affect our ability to carry out our lives in a normal way, but also impact investment portfolios. This introductory paper explores how the impacts of biodiversity loss could translate into different sectors of the economy, investment portfolios, as well as how investors can manage these risks as part of their investment decision making process.

# **Executive summary**

- Biodiversity loss has been positioned as one part of the triple planetary crises affecting humanity alongside climate change and pollution.
- Most if not all of the drivers of biodiversity loss: overexploitation of resources, loss of habitat, invasive species, pollution, and climate change are contributed by humans.
- More than half of the world's Gross Domestic Product (GDP) is highly or moderately dependent on nature and global environmental change putting nearly \$10 trillion of economic value at risk by 2050.
- Through transmission channels such as impairment of assets and collateral as well as lower corporate profitability, investors within the financial system could be affected.
- There is a funding gap of \$824 billion per year for global biodiversity conservation efforts. It is possible to close half of the funding gap just by redirecting existing capital flows.

This paper is the first in a series of papers in which we aim to present a toolkit to investors for managing the risks of biodiversity loss. As next steps, we will elaborate on how investors can understand, identify, measure and mitigate risks related to biodiversity loss in their portfolios. Further, we are keen to explore how different biodiversity-related scenarios would impact various asset classes.

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# Introduction

Bees have been a part of human life for many centuries now. They have existed for approximately 130 million years with over 20,000 known species present throughout the world. Contrary to their modest body size, the value that these yellow creatures provide for our ecosystem is not negligible. Insects such as bees are highly important due to their roles as pollinators that help provide our food supply as well as ensure the health of the broader environment. There is no doubt that life on earth would not be able to function without the contribution of bees or other insects. Bees are only one part of the vast biodiversity on which we depend on for our survival. Biodiversity refers to all terrestrial, freshwater, and marine ecosystems and apart from providing our basic needs such as water and food, biodiversity is crucial for ensuring the supply of natural medicine, weather resilience and regulating hydrological cycles. The value of these services has been estimated to be at least \$125-140 trillion per year.<sup>1</sup>

Since the start of the Anthropocene, our planet has been put under tremendous pressure to match human needs—and nature, especially biodiversity and climate, have borne the brunt of it. Within the last 50 years alone, the human population has doubled, the global economy has expanded fourfold whereas global trade has increased tenfold, all of which have pushed the demand for raw materials and energy sky high.<sup>2</sup> Given all of this growth, it is no surprise that we are utilizing the equivalent of 1.6 Earths to maintain our current way of life.<sup>3</sup> This unsustainable consumption pattern does not only diminish the health of the planet, but it also hugely affects humanity's prospects.

A common way to describe biodiversity loss is by considering its various causes. These causes - often referred to as drivers - of biodiversity loss can be categorized as loss of habitat, overexploitation of resources, invasive species, pollution and climate change. Loss of habitat due to increased agricultural activities is the largest contributor to biodiversity loss. In fact, agriculture has been identified as a threat to more than 85% of the 28,000 species at risk of extinction. The other driver, overexploitation of resources both on land and in water threatens not only wildlife but also humans, as they are dependent on natural resources for food and income. Invasive species or non-native species arising predominantly from global transport and tourism disrupt the balance of natural systems and threaten the ecosystem and wildlife population in a given region. Pollution arising from chemical waste leads to increase in deposits of nitrogen that massively impacts marine and freshwater habitats. The final driver, albeit the most significant one, is climate change.

Twin crises: Biodiversity loss & climate change

Despite being the strongest natural defense for climate change, discussions on biodiversity do not readily take a front seat when considering climate goals. It is almost impossible to address either climate change or biodiversity loss exclusively without considering the other and these twin crises are regarded as two sides of the same coin since both issues are driven by common factors. From a dependency lens, it is clear that biodiversity is key for the regulation of climate as trees, mangroves and peatlands serve as important sources for carbon capture. Conversely, a well maintained climate is integral to ensure the survival of the abundance of species existing in our environment. To give some context, a 3.2-degree warming scenario could result in range losses of 49% of insects, 44% of plants and 26% of vertebrates. However, this dramatically reduces when warming is restricted. For instance, in a 2-degree warming scenario, 18% of insects, 16% of plants and

Given the global growth amassed over the past 50 years, we are utilizing the equivalent of 1.6 Earths to maintain our current way of life.

<sup>&</sup>lt;sup>1</sup> Organisation for Economic Co-operation and Development (OECD), Finance and the Economic and Business Case for Action, 2019

<sup>&</sup>lt;sup>2</sup> Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), Biodiversity and Ecosystem Services report, 2019

<sup>&</sup>lt;sup>3</sup> The Economics of Biodiversity, The Dasgupta Review, 2021

<sup>&</sup>lt;sup>4</sup> United Nations Environment Programme (UNEP), Five drivers of nature crisis

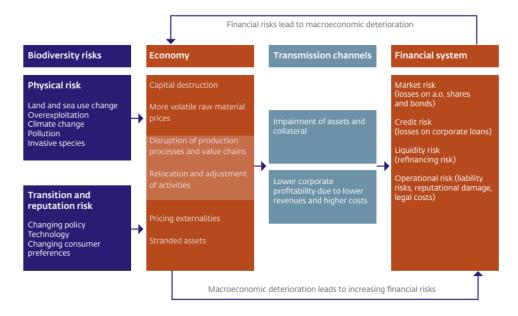


8% of vertebrates would be lost whereas 6% of insects, 8% of plants and 4% of vertebrates would be lost in a 1.5-degree warming scenario.  $^5$ 

From an impact perspective, biodiversity loss drives climate change as deforestation carried out to make way for agricultural land and other broader changes in land and sea use limit nature's ability to absorb carbon dioxide in the atmosphere. On the other hand, climate change would mean that species on land and in water now must adapt to new living environment, all of which would alter the species' climate envelope. Furthermore, the physical restrictions for migration as faced by some species would lead to localized extinction. This causes increase of invasive species which has already been identified as a factor for biodiversity loss. Given these arguments, a solution for the climate crisis should without doubt involve nature and vice versa.

# The relation between nature and economy

The illustration below depicts the interaction of transmission channels between nature, the economy, and the financial system. The economy would be impacted through physical and transition risks posed by biodiversity loss. Due to this, negative repercussions would be present within the economy. Through transmission channels such as impairment of assets and collateral as well as lower corporate profitability due to lower revenues and higher costs, investors within the financial system could be affected. The different interactions between nature and economy as well as the financial system are explored further in following sections.



Source: De Nederlandsche Bank, Indebted to Nature

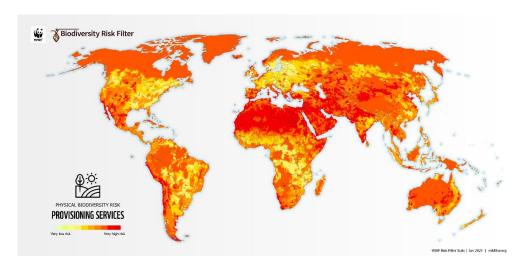
Arguably, comprehension surrounding the extent of impacts due to biodiversity loss on the economy is still growing given that we do not know the complete number of species inhabiting our planet, rendering the quantification of impact due to biodiversity loss all the more complex. But there is already plenty of literature that attempts to affix a financial value of the potential dependency on ecosystem services or outputs of natural systems that we depend on for the survival and smooth running of business operations. The World Economic Forum has estimated that more than half of the world's GDP or \$44 trillion of economic value generation is either highly or moderately dependent on nature.<sup>6</sup>
Additionally, an illustration from The World Wildlife Fund (WWF) gives an insight to the geographical distribution of ecosystem dependencies on a global scale. This figure

<sup>&</sup>lt;sup>5</sup> Warren et al, 2018, The projected effect on insects, vertebrates, and plants of limiting global warming to 1.5°C rather than 2°C

<sup>&</sup>lt;sup>6</sup> World Economic Forum, New Nature Economy Report, 2020



represents the extent to which countries would be impacted should natural resources become unavailable. Therefore, countries marked in a darker shade have high risk or a higher dependency on ecosystem services whereas countries in lighter shades have lower risks.



Source: World Wildlife Fund (WWF) Risk Filter, provisioning services<sup>7</sup>

# Defining the risks behind biodiversity loss

Recognizing the different types of economic and financial risks that asset owners are exposed to and understanding how these risks are transmitted are key to ensure that the appropriate risk response can be drawn. The table below highlights the risks posed by biodiversity loss.

Physical risks	Acute risk	Nature-related events such as earthquakes or hurricanes would give rise to event-based risks such as degradation of water quality. An impact such as this would lead to supply disruptions at the company level within the portfolio which could cause financial losses to asset owners.
	Chronic risk	The long-term unavailability of natural resources or changes in the state of natural services could translate to companies being unable to produce at full capacity. Therefore, asset owners might not gain maximum potential returns on investments across different asset classes due to the shift in material availability.
Transition and reputation risks	Technology risk	Stringent environmental requirements could force companies to adopt more environmentally friendly production methods. This could lead to substitution of products or services with another product that has lower/improved impact on nature or reduced dependency on nature reflecting a second-order risk for asset owners.
	Liability risk	Stakeholders of institutional investors, for example pension fund participants could negatively perceive

<sup>&</sup>lt;sup>7</sup> This risk category identifies the main categories of natural resources needed for production. It comprises the indicators such as water scarcity, limited timber availability, limited wild flora & fauna availability, limited marine fish availability



		the fund for not integrating biodiversity-related considerations into the investment process.  The same applies at the company level when there are changes in perception. Potential reputational damage caused by specific incidences may also result in liability risk and associated costs (i.e., payment of fines)
	Regulatory, policy & legal risk	Lawsuit implications for failure of abiding by stricter regulations on drivers related to biodiversity loss.  These include deforestation regulations at the company level, and investment exposure at the investor level. Both companies and asset owners are susceptible to potential regulatory actions should they not comply with relevant laws and standards.
	Market risk	Reduced demand due to a shift in customer preferences, repricing of assets which also arises from changing physical, regulatory, technological and reputational conditions and stakeholder dynamics at the company level. This is detrimental to financial returns of asset owners.

Source: Taskforce on Nature related Financial Disclosures (TNFD), Aegon AM

ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure), is an online tool. With this tool, investors can understand the exposure to nature-related risks, assess sectoral dependencies across 21 different ecosystem services (e.g., bio-soil quality, climate regulation, fibers and other materials, pollination etc.) and 11 impact drivers (e.g., freshwater ecosystem use, GHG emissions, marine ecosystem use, soil pollutants etc.). This tool mainly focuses on direct impacts, which investors can use for their portfolios. ENCORE is also helpful to see (some of) their indirect impact on biodiversity loss.

### **Industries**

Through ENCORE, it was found that from a dependency standpoint which refers to the contribution that an ecosystem service makes to a production process, sub-industries of consumer discretionary, consumer staples and materials sectors were potentially most dependent on services provided by the ecosystem. From an impact perspective which shows how the economy impacts nature and the services it provides, sub-industries in consumer staples, energy, industrials, materials, and utilities contribute the most to impact drivers with a high materiality rating.<sup>8</sup>

# **Regions**

Analyses on a geographical level are relevant since asset owners often invest in various regions around the world. From a regional level, it has been found that low-income countries would be most impacted should ecosystems collapse, as nature-related sectors often provide jobs to a large part of the population and also significantly contribute to the country's GDP. Taking the fishing sector as an example, the World Bank shows that for every one job within the sector, 2.5 more jobs are created in the fisheries value chain. A partial ecosystem collapse would translate into a -9.7% change in 2030 real GDP in Sub-Saharan Africa since the region is highly dependent on forestry services such as pollinated crops and forest products. This loss of GDP could also befall other regions around the world.

<sup>&</sup>lt;sup>8</sup> Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) tool

<sup>&</sup>lt;sup>9</sup> World Bank, https://www.worldbank.org/en/topic/biodiversity#

<sup>&</sup>lt;sup>10</sup> World Bank, The Economic Case for Nature, 2021



For example, Latin America and the Caribbean region has lost approximately 94% in monitored wildlife populations between 1970-2018. The same study reported a 66% loss in the African region and an 18% loss in Europe and Central Asia.

An important caveat to be noted here is that, while it may seem that biodiversity loss are more prominent in developing countries or localized to specific geographical locations, this does not suggest that developed countries would not be impacted at all. The global ecosystem is interconnected in more ways than one and a dysfunction of one ecosystem could potentially harm the rest. Taking a scenario of pollinator losses as an example, it was found that industrialized countries would suffer large economic losses even though such pollinator losses only impact a small portion of developing countries. Given that supply chains are globally connected and industrialized countries often source raw materials and soft commodities from emerging markets, we can expect industrialized countries to suffer similar losses.

# Portfolio impact

To have a broader view on the impacts, we can briefly analyze effects of biodiversity loss at the asset level, namely traditional asset classes such as sovereign bonds, corporate bonds, equities as well as alternative investments such as private equity and real estate.

# Sovereign bonds

Biodiversity-related risks impact sovereign creditworthiness, capital costs as well as the probability of default. This is particularly true for countries which largely depend on ecosystem services. A study by Bennett Institute for Public Policy and Finance for Biodivesity Initiative assessed the performance of 26 sovereigns under different biodiversity scenarios. It found that, in a partial ecosystem collapse scenario, 15 out of 26 sovereigns would receive a downgrade of one notch or more since one or more natural ecosystem would have passed its tipping point. This would also have a knock-on effect onto the broader financial market, since consumers would be faced with a higher interest rate on their loans.

# Corporate bonds

In the case of corporate bonds, research by Amundi showed that sub-industries with the largest impact on biodiversity losses were also the ones that were most impacted by biodiversity-related events on their spreads in security pricing.<sup>14</sup> This consolidates the argument that biodiversity loss would impair companies' ability to generate financial returns.

### **Equities**

In the case of equities, understanding effects due to biodiversity loss is straightforward. Companies that are most dependent on ecosystem services would be greatly affected. Loss of key ecosystem services would spell permanent production disruptions for these companies. All of this could potentially lead to a drop in share prices due to transition-related risks and greater exposure to market risk.

# **Private equity**

For private equities, impacts are similar to equities. Companies that are most dependent on biodiversity services would be heavily affected. This could potentially lead to disruption of production processes.

# Real estate

For the real estate sector, based on an analysis derived from ENCORE, it is evident that the sector is heavily dependent on two key ecosystem services; mass stabilization and ecosystem service as well as flood and storm protection. Dysfunction on any of these services would impact valuations and net operating income of properties.

<sup>11</sup> World Bank, https://www.worldbank.org/en/topic/biodiversity#

<sup>&</sup>lt;sup>12</sup> Murphy et al, 2022, Globalisation and pollinators: Pollinator declines are an economic threat to global food systems

<sup>&</sup>lt;sup>13</sup> Bennett Institute for Public Policy, University of Cambridge, Nature Loss and Sovereign Credit Ratings, 2022

<sup>&</sup>lt;sup>14</sup> Amundi, The Market Effect of Acute Biodiversity Risk: the Case of Corporate Bonds, 2022



# Integrating biodiversity considerations into the investment processes

In order to efficiently integrate biodiversity considerations into the investment process, it is vital to understand how companies could be affected by biodiversity-related risks and what measures companies are taking to address these risks. The table below summarizes some generic strategies that investors could consider to mitigate their exposure to biodiversity-related risks.

## Strategies for investors to address biodiversity related risks:

# ESG Integration



Conduct a materiality assessment to identify potential nature-related dependencies and impacts that the portfolio is exposed to due to potential partial collapse of ecosystems (extreme scenario). Assess the associated risks and opportunities presented and integrate these findings into risk management practices.

Establish a dedicated policy to address biodiversity considerations or add biodiversity-related topics into existing ESG frameworks and ESG policies.

Establish sector policies for which an investor has high nature-related risk exposure and dependency (particularly for sectors such as forestry, fisheries, energy etc. due to high negative impact). This policy would spell out the approach towards companies operating in biodiversity-sensitive areas or sectors that contribute adversely to biodiversity.

Make credible, time-bound pledges (for deforestation resulted from soft commodities, exploitation, peat etc.) to signal commitment towards natural ecosystems.

At Aegon AM, we report on the Principle Adverse Impacts of our investments on biodiversity and the measures we take to mitigate these.

# Engagement & Stewardship



Prioritize which companies to engage with and particularly those operating in sectors with highest exposure to nature-related risks. Further determine the scope of engagement to improve nature-related disclosure, around specific controversies in the supply chain, specific business involvement - palm oil, timber, soy, etc.

Encourage companies to start recognizing both the dependencies and impacts of their business operations on biodiversity and ecosystem services.

Exercise voting rights in order to take a strong stance on resolutions related to biodiversity or consider filing such resolutions.

Join investor coalitions to practice collective engagement on biodiversity. Aegon AM joined the Nature Action 100 initiative. Other examples are the Finance for Biodiversity Foundation, and Ceres Valuing Water Finance Initiative.

Engage with policy makers and peers to increase traction on issues related to biodiversity loss.

Align internal biodiversity practices with global standards and frameworks for better practices within the wider industry.

At Aegon AM, we conduct norms-based engagement with companies identified for biodiversity-related controversies. Furthermore, we screen our investments periodically on biodiversity-related controversies at companies and/or their supply chain.



#### **Exclusions**



Support exclusion of companies that do not have the right policies to manage their impact and which are identified for having a profound negative effect on biodiversity or are linked to systemic biodiversity-related controversies such as pollution, deforestation, or land degradation. At Aegon AM, as part of our exclusion policy of the Multi Manager funds, we exclude companies active in palm oil production or distribution, and companies active in forestry that do not meet at least 75% FSC certification.

# Action is costly, but opportunities are present

Simply put, halting biodiversity loss is not going to be cheap, as it involves reforming many business sectors to be more sustainable. Paulson Institute show that up to \$967 billion (upper limit, ex-current fund inflow) is needed each year until 2030 to meet the global biodiversity funding needed for conservation efforts and to shift economic activities within sectors most dependent on nature to be more sustainable. This totals to \$6.97 trillion cumulatively until 2030. In comparison, responses for the COVID-19 pandemic have been estimated to be \$11 trillion so far, with a future loss of \$10 trillion in earnings. Based on a study by The World Wildlife Fund, it was found that continuing in a business-as-usual scenario, by 2050, biodiversity loss could result in a GDP loss of 0.67% per year or \$467 billion compared to the GDP baseline scenario of 2011. Cumulatively this amounts to \$9.87 trillion between the 2011-2050 period.

# Task Force on Nature related Financial Disclosures (TNFD) and its implications for investors

After much anticipation, the TNFD was launched in early September 2023. This framework is aimed to provide clarity for companies and organizations towards reporting their performance on nature-related indicators. Similar to the structure of the Task Force on Climate related Financial Disclosures (TCFD), the TNFD encompasses the same four pillars: governance, strategy, risk & impact management and metrics & targets. Under the umbrella of these four pillars, TNFD proposes 14 recommended disclosures, while also capturing TCFD's 11 areas of disclosure in an effort to encourage integrated reporting. The additional three disclosures (on top of TCFD's disclosure metrics) focus on the following:

- Organization's human rights policies and engagement activities
- Locations of assets in an organization's direct operation or downstream value chain that are in priority locations
- Approach of identifying the dependencies, impacts, risk and opportunities in its direct operations and in its upstream and downstream value chain

Financial institutions would be subjected to three categories of disclosure metrics, namely core global disclosure metrics, core sector disclosure metrics and the additional disclosure metrics. The nine core global disclosure metrics are applicable to all sectors on a comply or explain basis whereas the core sector disclosure metrics is more catered. For the financial sector in particular, there are two relevant metrics. The core sector metrics for asset owners include the absolute percentage or amount of invested or owned assets that are considered to have material nature-related dependencies or impacts. Asset owners are also expected to disclose the percentage or amount of invested or owned assets in areas that are of high importance to biodiversity or an area with rapid decline of biodiversity integrity. Beyond these core metrics, asset owners are recommended to disclose additional metrics (TNFD proposes EU SFDR's Principal Adverse Impact (PAI) indicators) wherever relevant to indicate risks and exposure to nature-related topics. Finally, asset owners are also expected to disclose all core global risk and opportunity disclosure metrics at an organizational level as well as in areas of the value chain.

Moving forward, we expect that TNFD could amplify efforts for disclosure within biodiversity-related considerations similar to what TCFD has done for climate. Regulators could also pick up on the framework which would help to formalize discussions on this topic. It is hoped that TNFD together with SFDR's Principal Adverse Impact (PAI) indicators and Corporate Sustainability Reporting Directive will support further standardization of data, metrics and general disclosures within biodiversity considerations.

<sup>&</sup>lt;sup>15</sup> Paulson Institute, Financing Nature: Closing the Global Biodiversity Financing Gap

 $<sup>^{16}</sup>$  World Health Organisation, Annual Report 2020, Global Preparedness Monitoring Board

<sup>&</sup>lt;sup>17</sup> World Wildlife Fund, Global Futures Technical Report, 2020

<sup>&</sup>lt;sup>18</sup> Task Force on Nature related Financial Disclosures (TNFD), Additional guidance for financial institutions



Despite the large amounts of funding that need to be channeled, Paulson Institute highlights that this is very much within reach. When the existing funding of \$143 billion is taken into account, the funding gap shrinks to \$824 billion per year. This would decline further when existing harmful subsidies that incentivize unsustainable practices within the agriculture, fishery and forestry sectors are reformed. These subsidies are considered harmful as current practice within the agriculture, fisheries and forestry sectors are not sustainable. Therefore, continuing subsidies, indirectly, we encourage these practices to continue without the necessary reforms. By doing all of this, half of the financing gap can be closed with no new funding at all. The remainder of the funding would have to flow from both public and private sources. Theoretically, by ensuring that ecosystem services function normally, ceteris paribus, businesses would be able to continue their business processes and investors would generate financial returns on their investments.

# Moving forward

Within the EU, despite uneven pace of progress, global momentum through various regulations and mechanisms add to tailwinds we are witnessing. Biodiversity Strategy 2030 in the EU is part of the European Green Deal and sets out specific biodiversity-related commitments in light of the Global Biodiversity Framework. The adoption of EU Nature Restoration Law as part of the EU Biodiversity Strategy aims for long-term restoration and would overarch existing legislations on ecosystems. Further, EU Regulation on deforestation-free products that comes into force in December 2024 will force producers and operators to prove that products sold within the EU did not contribute to forest degradation. On top of these regulations, investors should also be aware of the upcoming reporting standards such as the European Corporate Sustainability Reporting Directive, which dedicates a section to biodiversity-related matters.

### Post Conference of Parties (COP15), where are we now?

The COP or UN Biodiversity Conference is a biannual international convention dedicated to biodiversity. In December 2022, the world witnessed a significant milestone during the 15<sup>th</sup> COP as 188 countries unitedly took on the most ambitious framework yet in an attempt to put their best foot forward in protecting nature. As part of the Kunming-Montreal Global Biodiversity Framework (GBF), 4 goals for 2050 and 23 targets for 2030 were adopted. Among the targets adopted are effective conservation and management of at least 30 per cent of the world's land, coastal areas and oceans as well as halving global food waste.

We are quickly closing onto a year since COP15 was concluded and while there is clearly much reason to celebrate such a landmark agreement, it also means that plenty of work has to be done, now more than ever. These targets should move into the implementation stage and translate into actions at the national strategy level. Financial actors have a huge role to play in ensuring that collectively, we stand a chance at achieving the GBF targets, and in particular through Target 19. This target specifies the aim to increase the level of financial resources from public and private resources.

There is a lot that we can learn from the past and especially from GBF's predecessor; the Aichi targets given that none of the initial 24 conservation targets as part of Aichi targets were met when they expired in 2020. Given these 'past experiences', the concerted effort between governments and business sectors would be an important success determining factor.

<sup>&</sup>lt;sup>19</sup> Paulson Institute, Financing Nature: Closing the Global Biodiversity Financing Gap



# Conclusion

Biodiversity is certainly one topic that should move to the top of investors' agenda. Without adequate action on biodiversity loss, we are at risk of causing dysfunction of all other functions of the economy. From a portfolio point of view, investors could potentially be affected by biodiversity loss due to the indirect impact and dependency on ecosystem services. Developing countries are more dependent on primary sectors for their economy hence they are more exposed to biodiversity and ecosystem services that sustain these primary economies. More diversified and developed economies are likely less vulnerable as they use input from primary sectors to add value by creating higher-value products. Despite these risks, conserving biodiversity presents many opportunities. These go beyond investment returns and extend to the broader economy such as generating jobs, ensuring health and improving livelihoods.



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