IPR: Forecast Policy Scenario + Nature (FPS + Nature)

Preparing financial markets for climate- & nature-related policy & regulatory risks

January 2023

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Executive summary: The decline of nature is beginning to lead to policy action, which could impact investors and financial institutions

X1,000

The natural world has been impacted to levels unprecedented in human history. Global extinction rates are 1,000 times higher than under natural conditions, with three quarters of Earth's land ecosystems significantly altered

90%

Land use change is the primary cause of nature loss due to conversion of land to agriculture, with 90% of tropical deforestation driven by expansion of agriculture

$3trn

Nature loss could pose material threats to the economy and to the financial sector, with an estimated global GDP loss of USD 3 trillion annually by 2030 if ecosystem tipping points are crossed

Government action on nature is increasing and a range of policies and regulations are being introduced to accompany action on climate. Over 190 countries agreed to adopt a global biodiversity framework at the COP 15 summit in Montreal in December 2022. Policy action to achieve these commitments may create new risks but lead to new opportunities for companies and investors.

Companies and investors are being asked to understand their impacts on nature and disclose these. Emerging frameworks, such as the Taskforce on Nature-related Financial Disclosures (TNFD), will encourage investors to take a forward-looking view on nature-related risks and report on how they are exposed to nature and biodiversity

FPS + Nature is the first integrated nature and climate scenario for use by investors. It fills a crucial gap that is required to conduct robust risk assessments, providing investors with an exploratory forward-looking view on how policy, technological and social trends could impact key value drivers. It represents a 'beta version' scenario of what might happen when nature-related policy is incorporated into a climate-related scenario.

Executive summary: FPS + Nature builds on assessments of climate-focused land use policy, incorporating protected areas, land restoration and emerging nature markets

IPR's FPS + Nature summaries global policy on nature and climate in the land use sector

It updates the previous IPR Forecast Policy Scenario (FPS), focused on climate policy and its interaction with land use, by including emerging policy action on nature

In FPS + Nature, key nature-related policy trends are explored in relation to three areas, along with climate drivers:

1. Protected areas. Governments could act to safeguard nature by strengthening regulation to protect land. **Current trends suggest 20% of total global land area of high biodiversity and carbon value could be protected by 2030**

2. Land restoration. Governments may consider significantly increasing efforts to restore degraded ecosystems through national programmes, supplemented by private sector action. **This could involve restoration on 4% of global land area by 2030**

3. Nature markets. Formalisation of nature-related targets, creation of market infrastructure and corporate demand could **support emergence of voluntary biodiversity credit markets initially at the local and regional scale, developing both independently and integrated with NBS-based carbon markets,** with more focus on nature outcomes also having the potential to increase the "quality" of nature-based carbon credits

4. Climate drivers. The scenario also **covers six other policy areas at the nexus of land use, climate and nature** (carbon pricing, bioenergy, diets, deforestation, sustainable agriculture and food waste) and **produces value drivers for investors to consider**

International goals established at COP 15 to protect 30% of land and sea by 2030 are not directly comparable to these figures given the precise nature of these targets has not yet been specified

Note: Statements are based on FPS + Nature scenario policy assessment and modelling outcomes. Modelling is performed using MAgPIE.

Executive summary: Nature-related risks and opportunities overlap with but are also additional to climate-related considerations, with implications for commodities, new products and markets

Key outcomes from the FPS + Nature scenario, representing initial indications of nature- and climate-related impacts:

Food: The price of deforestation-linked commodities increases, with sustainable yield improvements potentially keeping prices for staple crops stable over time. Policy action and the development of alternative proteins could bend the demand curve for ruminant meat, with production peaking by 2035, also influencing production of animal feed

Energy: Transition to low-carbon energy together with nature-related goals supports a shift to second-generation bioenergy that changes the countries and specific locations of biomass production. Increased demand for metals and minerals and some infrastructure expansion may need to be reconciled with increased land protection

Nature-related goods, services and assets emerge as a new source of economic and financial value, driving the expansion of certified products, nature-based solutions and the emergence of new markets for biodiversity-rich land. New technologies designed to eliminate waste, reduce negative nature impacts and foster sustainability also emerge in tandem with the deepening of nature polices

Supply chains: Deforestation policies impact the production of tropical soft commodities as reputational, market access and liability risks could be passed down the value chain

Global environment: Planned policy action by governments would halt and reverse global biodiversity loss, potentially achieving 2000 levels of biodiversity intactness by 2045. Climate-related policies alone would be unlikely to improve biodiversity at a global scale and may only stabilise existing biodiversity loss

Note: Statements are based on FPS + Nature scenario policy assessment and modelling outcomes. Modelling is performed using MAgPIE.

The IPR helps the financial sector navigate the climate and nature transition by publishing policy forecasts, scenarios and value drivers

Markets face an unprecedented climate and nature transition

Policies combined with new technologies and consumer preferences continue to affect established industries and economies

Increasing understanding of this unfolding environment can help financial institutions manage their assets effectively

The IPR helps investors understand transition risks and opportunities by filling important gaps in scenarios currently available to investors for portfolio analysis

The IPR produces:

- **Policy projections** that account for emerging and forecast **policy action** to address climate change
- **Scenarios** that incorporate the energy sector and the **land use sector** in the context of the whole economy
- **Value drivers** that provide intelligence about the realistic **risks and opportunities** most critical to the financial sector

Nature is in crisis: Natural habitats continue to shrink and levels of biodiversity reduce day by day

Nature underpins all life on Earth

Nature is in decline

Nature provides essential goods and services required to maintain life and productive economies

These include pollination, carbon capture and storage, soil formation, air quality, fresh water and raw materials[1]

-23%

Land degradation has reduced **productivity in** 23% of **global terrestrial area**[1]

1.6

Approximately 1.6 **Earths** are needed to maintain current levels of **resource consumption**[5]

Nature encompasses all animals, plants and organisms across land and aquatic areas.[2] It also includes geology, soil, air and water

Nature is sometimes measured in terms of stocks, **referred to as natural capital**[6]

-40%

The world's **stock of natural capital** declined by nearly 40% between 1992 and 2014[5]

3/4

Three quarters of **Earth's land ecosystems** have been **significantly altered** by human activity[1]

Biodiversity refers to the variety of life on earth that enables nature to function effectively

It is often used synonymously with nature but refers to the diversity within and between species & of ecosystems[1]

-69%

Global **wildlife populations** have decreased by 69% on average since 1970[3]

1,000x

Global **extinction rates** are 1,000 times higher than under natural conditions[4]

1. IPBES 2. More broadly, nature includes all non-human living entities and their interaction with other living or non-living physical entities and processes (SBTN, based on IPBES). 3. WWF 4. Pimm et al. (2014) 5. Dasgupta Review 6. CBD
Note: More information on the ongoing sixth mass extinction can be found in Ceballos et al (2015). The most recent previous mass extinction event occurred when the Chicxulub asteroid wiped out the dinosaurs 66 million years ago (Chiarenza et al. (2020)). Research suggests that the world has already exceeded the planetary boundary for genetic diversity, a measure of biosphere integrity that accounts for extinction rates (Steffen et al. (2015)).

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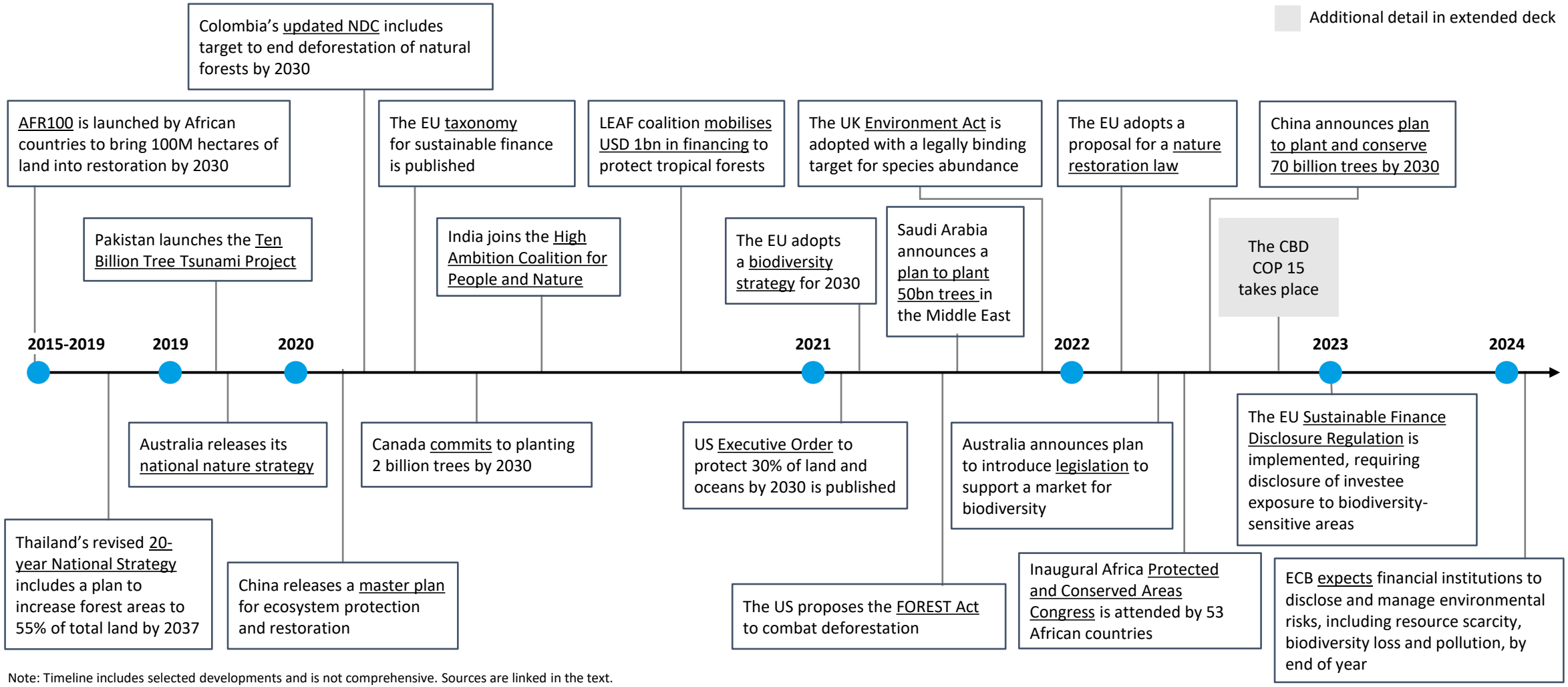
Policy momentum is building to curtail biodiversity loss and address the decline of nature



Note: Timeline includes selected developments and is not comprehensive. Sources are linked in the text.

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Policy action on nature could add additional risk considerations for investors who are increasingly incorporating climate risks into decision making

Potential transition risks can be grouped into four categories:

ILLUSTRATIVE

	Policy risk	Demand risk	Reputational risk	Supply chain risk
Description	Policies may **directly impose costs** on specific activities	Demand may be affected by **changing consumer preferences**, impacting product-specific revenue	Consumer **perceptions of a brand may impact demand** for a company's products	Risks **derived from the supply chain** may impact a company's market access or increase the cost of inputs
Example climate impacts	**Carbon pricing** may increase costs as firms pay a tax or upgrade operations to reduce emissions (e.g., NZ land use emissions pricing proposal) **Reporting and disclosure requirements** may impose data collection costs	Consumer concerns about emissions and health may reduce **demand for ruminant meat** in some regions (e.g., Finland's dietary guidelines for meat consumption) Shifts to electric vehicles may reduce **demand for first-generation bioenergy used for fuel**	Consumers could purchase equivalent products from competitors with **deforestation-free supply chains** (e.g., consumer petition that led to the provisional EU due diligence framework) A company's lack of action on reducing its emissions may lead to **perceptions of environmental-unfriendliness**[1]	Increased costs due to **carbon pricing may be passed on** to downstream companies in the same jurisdiction (e.g., Singapore's carbon tax) Carbon border taxes may **affect costs for importers** of carbon intensive products (e.g., the EU's provisional CBAM)
Example nature impacts	**Additional dimensions to reporting** and disclosure may also increase costs (e.g., TNFD) **Operation in protected areas** may result in additional costs or fines, potentially requiring changes in operating location (e.g., EU expansion of protected areas via biodiversity strategy)	Declines in **ruminant meat demand** may be reinforced by concerns about habitat destruction Concerns about habitat destruction from feedstock production may reinforce reduction in **demand for first-generation bioenergy** (e.g., EU policy action to phase-out palm and soy-based biofuels before 2030)	Consumer **demand for transparency** may encompass additional dimensions like the impact of company operations on biodiversity, especially in sectors with high public scrutiny (e.g., the consumer goods sector) Companies with adverse nature impacts may experience relatively **higher cost of capital**[2]	Relocation costs or disruptions in supply may result from protected areas legislation and could be **passed down the value chain** (e.g., for tropical commodities) A company with **deforestation in its supply chain** may not be able to sell its products on certain markets (e.g., US proposed FOREST Act)

1. An international survey found that most consumers say that it is important for brands to operate with environmental sustainability, incl. cutting carbon emissions (Stifel) 2. Lenders may charge higher interest rates on loans to companies with environmental concerns (Chava (2014)).
Note: Transition risk categories and examples are not exhaustive.

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Tackling the climate and nature transition in an integrated fashion is consistent with the direction of government and private sector action

Climate change and nature loss are interlinked crises

- **Climate change threatens 11,000 species** already at risk of extinction[1]
- **Protecting, conserving and restoring nature and ecosystems is vital for effective and sustainable climate action**, as underlined in agreement text from the UNFCCC's COP 27[2]
- **Habitat loss is estimated to exacerbate climate change** by producing GHG emissions, with deforestation responsible for 10% of anthropogenic emissions in 2019[4]

Many carbon offsets could be required to account for nature

- **Natural climate solutions can deliver one-third of the net emissions reduction** needed for Paris-aligned warming[5] (e.g., through habitat improvement via land restoration, potentially resulting in benefits to biodiversity)
- **Nature-based solution carbon credit guidance and standards are increasingly requiring the safeguarding of biodiversity** as a minimum requirement[6]

Reporting on nature is becoming aligned with climate standards

- **The TNFD will release a framework** for nature-related risk disclosure (in 2023) that may become increasingly mandatory, building on the TCFD framework for climate-related risk[7]
- **100+ financial institutions have committed to** "assessing their own biodiversity impact, setting targets and reporting on biodiversity matters by 2024" as part of the Finance for Biodiversity Pledge[8]

1. IUCN 2. UNFCCC 3. Race to Zero 4. IPCC AR6 WG Deforestation accounts for 45% of AFOLU emissions and AFOLU emissions were responsible for 22% of global anthropogenic greenhouse gas emissions in 2019 5. WEF 6. WRI 7. Geographies like the UK, EU, and US have taken steps to mandate elements of TCFD reporting. 8. Finance for Biodiversity

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The newest IPR scenarios and value drivers have been released

Please visit the **PRI website** here for more information

IPR FPS + Nature and FPS 2022 value drivers can be found here

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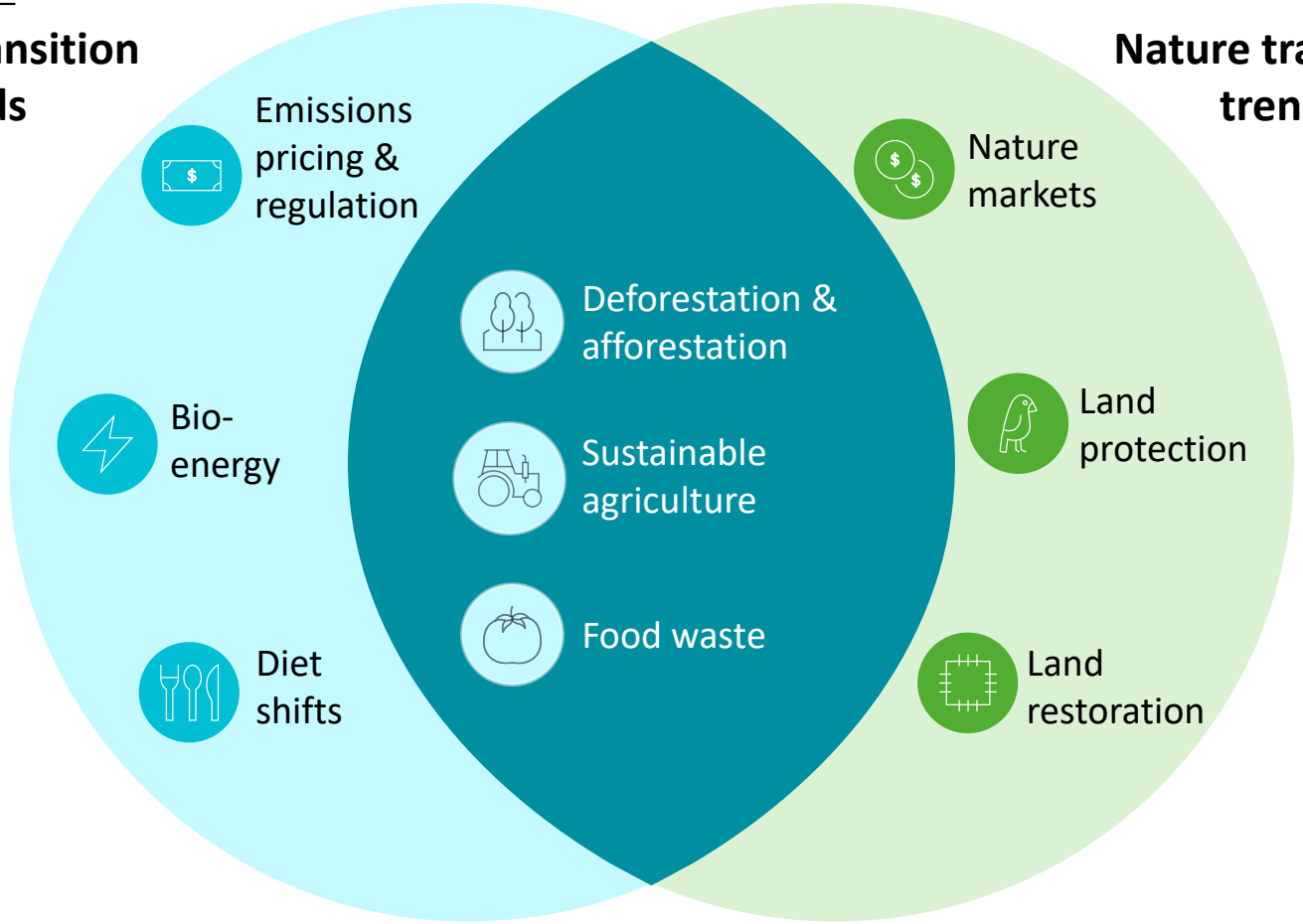
FPS + Nature incorporates interrelated, policy-supported climate and nature trends that could be material to investors

NOT EXHAUSTIVE



Assessed trends are:

Driven by policy action to address both the climate and nature crises

Underpinned by technological development and readiness indicating plausibility

Supported by market shifts demonstrating complementary action and support by firms, consumers, and citizens

Note: Because climate and nature are highly interrelated, the distinction depicted in this diagram is a simplification.

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FPS + Nature follows a rigorous approach to assess emerging trends, underpinned by policy development as well as technological and market shifts

Geographic variation is considered throughout the process, with research and parameterization occurring at the regional level

1 Compile existing legislation and announced commitments

Collect information on nature-related legislation, commitments and initiatives related to **protected areas, land restoration, and nature markets**

Incorporate climate-related information from the IPR's ongoing policy tracking (summarised in Quarterly Forecast Trackers), focusing on **agriculture and forestry**

2 Evaluate credibility of announced commitments

Collect **source** of announcements

Account for **track record** of previous environmental action

Account for **historical trends** to ensure announced changes are realistic

Evaluate geography-specific **quality of governance**

3 Assess development of technology and market shifts

Evaluate progress of **technology** development

Examine emerging **markets** for sustainable goods and services

Account for direction and magnitude of **citizen attitudes** towards environmental action, suggesting civil society support for new policies

4 Define policy-related trends and trajectories

Use **existing and future policy** to define trajectories of policy development

Consider development of technology and market shifts to ensure that assessed trends are **realistic and supported** by citizens

5 Parametrize key trends for scenario modelling

Incorporate assessed policy trends along with technological and market trends to **estimate change** in the value of modelling levers

Assign a **quantitative value** to key modelling levers

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FPS + Nature assesses possible policy trajectories based on existing and future commitments, influenced by technology and market shifts

↑ Expected positive impact
↓ Expected negative impact

NOT EXHAUSTIVE	FPS + Nature trend	Indicative impact on nature
Emissions pricing and regulation	**Emissions regulation and reduction policies could emerge in the land use sector**, with some developed countries implementing forms of carbon pricing in the land use sector before 2030	↑ I**ncentivises habitat preservation and restoration** in carbon-rich natural environments through NBS
Bioenergy	Governments could regulate the use of less sustainable first-generation bioenergy and shift towards **production of second-generation bioenergy**	↓ **Reduces land available for habitats and species** due to increased demand for land
Diet shifts	Government action in developed countries could increase the **cost of ruminant meat production** in comparison to other protein sources, through emissions regulation and support for alternative protein development	↑ Reduces demand for ruminant meat consumption, which **reduces pressure on land available for habitats**
Deforestation & afforestation	**Increased policy stringency on deforestation-linked commodities in importing countries** could increase international momentum to halt deforestation in exporting countries	↑ Reduces production of deforestation-linked commodities, which **reduces habitat destruction**
Sustainable agriculture	Government funding for sustainable agricultural practices underpinned by commitments to reduce fertiliser use could **increase nitrogen uptake efficiency in crop production**	↑ **Reduces habitat degradation** resulting from fertiliser run-off and overapplication
Food waste	Governments could act to **scale and augment initiatives to reduce consumer and private sector food waste**, resulting in a smaller proportion of food being wasted	↑ Reduces demand for agricultural land, which **reduces land conversion** caused by agricultural expansion
Nature markets	**Increasing formalisation of biodiversity targets and nature-related regulation** could support the emergence of voluntary biodiversity credit markets	↑ Increases implementation of **market-based incentives to improve biodiversity** outcomes
Land protection	Government action to safeguard biodiversity could involve introducing and **strengthening regulation to protect land**, including biodiversity hotspots	↑ Increases quantity of land that is safeguarded with **increased protection of vital ecosystems**
Land restoration	Governments across the world could **increasingly act to restore degraded ecosystems** through public restoration programmes, supplemented by private sector financing (e.g., through carbon credits for afforestation)	↑ Increases number of land restoration initiatives to **improve quality of degraded habitats**

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FPS + Nature estimates changes in key policy-related trends at the global and regional level

In comparison to FPS 2021:
Update[1] Addition

		FPS + Nature		
		2020	2030	2050
Climate **Update:** Diet shifts are adjusted to better account for regional variation, consumer responses to prices, and slower-than-initially-anticipated alternative protein market growth	**Emissions pricing and regulation**[2] USD/tCO_2 in the land use sector, implicit[3]	<1	54	105
	Bioenergy EJ production of second-generation bioenergy	8	17	90
	Diet shifts Ruminant meat production (Mt DM/yr)	38	40	37
Overlapping climate and nature **Update:** Sustainable agriculture levers account for emerging policy ambition to improve nitrogen fertiliser use efficiency while food waste reduction ambition increases	**Deforestation and afforestation** Forest land (Mha)	4,000	4,100	4,300
	Sustainable agriculture Nitrogen uptake efficiency (%)[4]	56	60	65
	Food waste % of food wasted	26	24	20
Nature **Addition:** New modelling levers are added to account for nature-related policy action	**Nature markets** USD/ha/yr for a biodiversity credit	<1	12	45
	Land protection[5] % global terrestrial protected surface area	15	20	24
	Land restoration % global terrestrial surface area under restoration[6]	0	4	6

1. Updated levers are aligned with the most recent release of FPS (FPS 2022 – see Appendix) 2. Weighted average of modelled implicit carbon price 3. Implicit carbon prices proxy for a range of policies/regulations targeting a reduction in land use emissions 4. Average across regions 5. FPS 2022 accounts for current protected areas and protection of biodiversity hotspots only, after 2025 and limited to a subset of countries 6. Additional restored terrestrial land compared to 2020 (intentional restoration only, occurring due to human intervention)

Note: All values shown here are at the global level

Implications for investors: Forecast Policy Scenario + Nature (FPS + Nature)

The following pages describe key outcomes from the exploratory FPS + Nature scenario and outline potential implications for investors. These fall into three categories, elaborated below:

1. Disruption to commodity production and supply chains

- **Deforestation-linked commodities** could experience market access, liability and reputational risks before policy action comes to halt commodity-driven deforestation
- **Some tropical commodities** may see costs and prices increase due to more land protection and action on deforestation
- **Ruminant meat production** could fall in developed regions and at the global level, despite increases in developing country demand due to increasing populations and incomes

2. The development and evolution of new products and technologies

- **Alternative protein production** could increase by 50x from 2020 to 2050, with market share potentially reaching 24% of the market for protein by 2050
- **Second-generation bioenergy production** could increase significantly to 2050, with opportunities distributed globally
- **New technologies to reduce nature and climate impacts** could present opportunities for investment, including sustainable crop production technology, food waste reduction technology, and technology for supply chain traceability

3. NBS-based carbon credits and emerging nature markets

- **The "quality" of NBS** could improve with more focus on nature increasing the potential to support positive biodiversity outcomes, compared to a scenario which focuses only on climate policy
- **Total revenue potential of NBS** could reach USD 204 billion in 2050, with cumulative investment of more than USD 1.1 trillion by 2050
- **Generation of biodiversity credits** could represent USD 18-43 billion in annual revenue in 2050, based on supply side analysis and preliminary assumptions

Note: Impacts are derived from the modelling of FPS + Nature.

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1. Tropical commodity trade could face region-specific market access, liability and reputational risks before deforestation-free production is achieved

Companies producing and procuring commodities in regions with high deforestation rates could face risks related to market access, liability and reputation

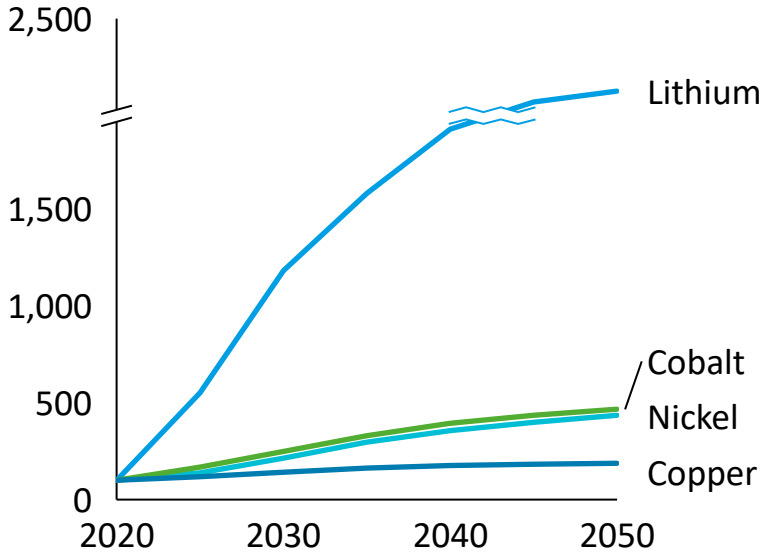
	Market access risk could emerge as regulation develops at different speeds across regions, generating disparity in production and import standards	**Liability risk** could include criminal violations and fines for companies that drive deforestation, with increased costs passed down the supply chain	**Reputational risk** could emerge in the region of procurement where deforestation occurs, and it could flow through the supply chain
Description	Could occur for companies with supply chain deforestation, **when an importing country imposes regulation limiting imports** from jurisdictions that do not sufficiently regulate deforestation	Could occur for upstream companies, with 50% of policies regulating production imposing economic fines and the remaining 50% **imposing fines and criminal violations**[1]	Could occur when downstream companies purchase deforestation-linked commodities at market price, as current **prices do not internalize the costs of deforestation** in most countries
Impact	Could result in **limited access to procurement**, with mitigation options, such as upgrading operations or switching to new suppliers, potentially leading to increased costs	Could result in **higher costs**, and impacts could be passed down the value chain in the form of higher input prices for downstream companies sourcing from non-compliant suppliers	Could result in **decreased revenues** as consumers turn to deforestation-free products, with downstream company risk influenced by volume and region of commodity procurement[2]

1. Of 80+ deforestation-related policies analysed as part of the IPR's Supply Chain Analysis. 2. This risk remains for specific regions of procurement until all commodity production becomes free from deforestation.
Note: For additional information, please see the IPR's Supply Chain Analysis work.

1. As demand for critical minerals grows, production in areas of priority for biodiversity protection could face transition risks that could increase costs or impact company reputations

Demand for critical minerals could grow significantly in response to electrification, particularly in the transport and power sectors

Demand for select minerals in IPR FPS 2021, index (2020 = 100)



Production of some minerals is **concentrated in regions that could see large increases in protected areas** in FPS + Nature. These regions could also introduce measures to restrict deforestation and mining waste, with potential for **reputational risk for companies with non-compliance** in their supply chains

Percentage of terrestrial land protected (%)

Argentina, Bolivia and Chile hold 58% of the world's lithium deposits[1]

Indonesia is the world's largest producer of nickel[2]

Indonesia is home to vital rainforest and coral reef ecosystems

Both the Southern Cone of Latin America and Southeast Asia could see an approximate **doubling of protected areas** by 2050 in FPS + Nature. Extractives companies and downstream purchasers are also exposed to region-specific legislation or norms associated with the nature transition:

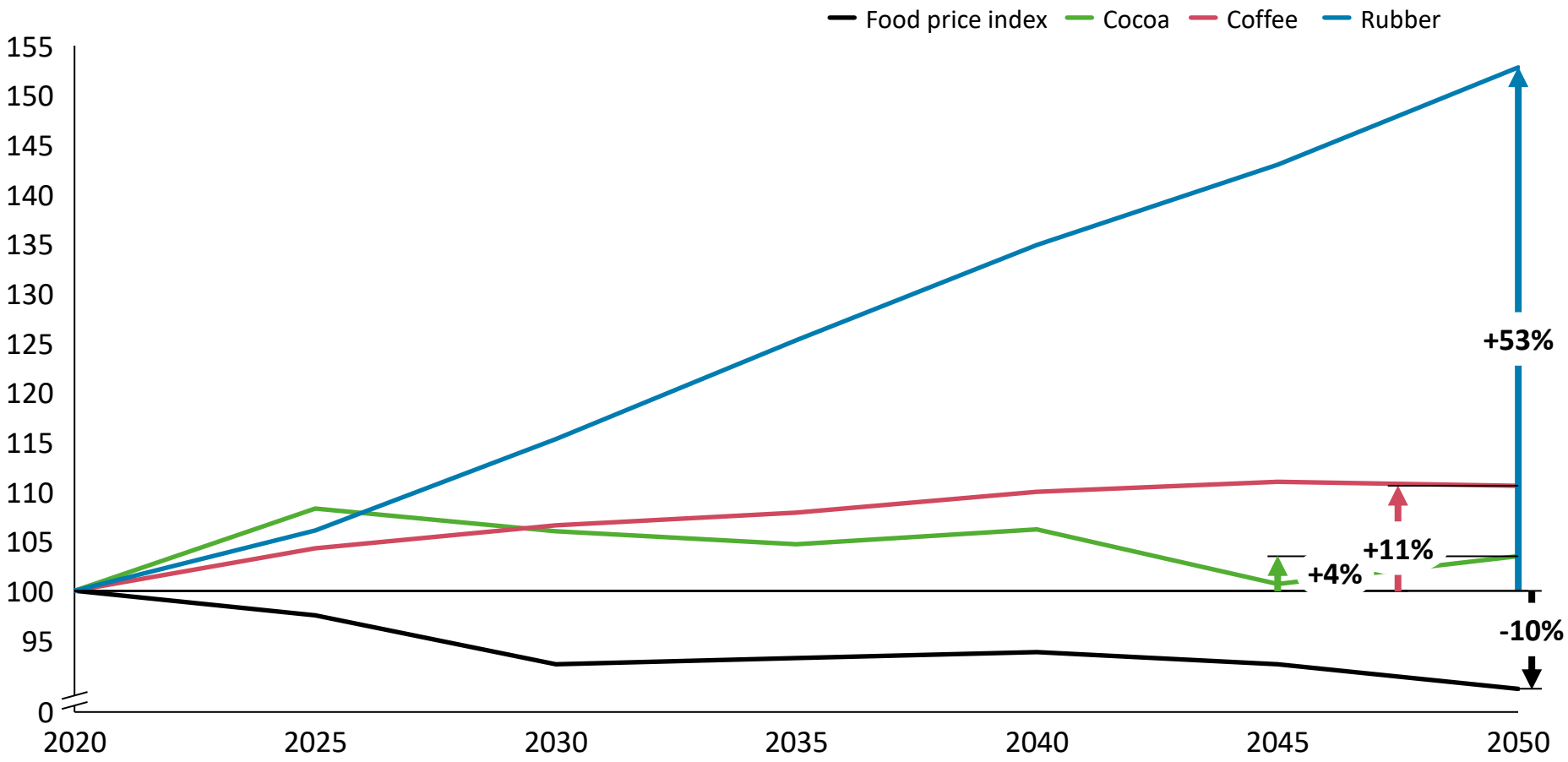
- In Chile, **additional taxation** on lithium producers was recommended by a National Lithium Commission,[3] with higher costs potentially passed down the value chain
- Indonesia, together with Papua New Guinea, accounts for 91% of the world's deep-sea waste mining disposal[2]

1. USGS 2021 2. Morse 2020 3. Gonzalez 2021

Note: Initiatives specifically focusing on mining and biodiversity include the Sustainable Critical Minerals Alliance, announced at the CBD's COP 15.

1. Land safeguarding efforts could contribute to higher costs and prices for deforestation-linked tropical commodities while staple commodity prices could remain stable

Price index in FPS + Nature (2020 = 100)



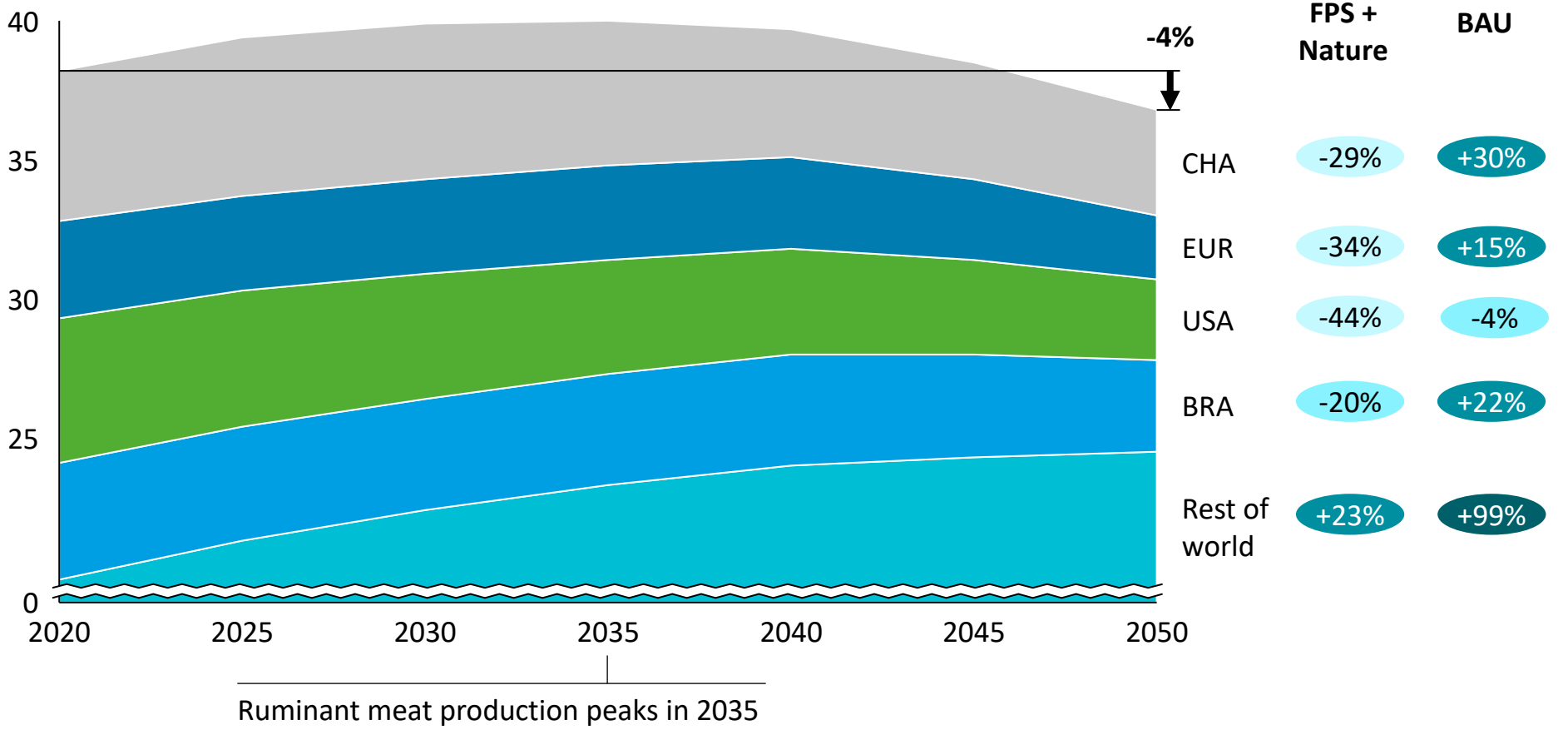
Tropical soft commodities could increase in price as measures to halt deforestation and protect land could drive up land prices, particularly in regions already experiencing high land competition (e.g., Southeast Asia, which is a key producer of rubber)

Policy action may not compromise historical trends of decreasing food prices[1] (see extended deck for more information)

1. The food price index is comprised of all food types, weighted by their production. It does not account for changes in food prices resulting from changes to subsidies, nor does it account for acute physical risks related to climate change and nature loss. For more information on food prices, see the next slide.

1. Emerging diet shifts away from meat consumption coupled with complementary climate and nature policy action could lead to decreased production

Global ruminant meat production in FPS + Nature, Mt DM



Change in production, 2020-2050

	FPS + Nature	BAU
CHA	-29%	+30%
EUR	-34%	+15%
USA	-44%	-4%
BRA	-20%	+22%
Rest of world	+23%	+99%

The largest declines in production could occur in regions where production volumes are currently the largest (high or middle-income countries), where policies such as R&D support for alternative proteins accelerate consumer shifts away from ruminant meat consumption

Increases in ruminant meat production could threaten biodiversity improvement in biodiversity rich areas with high expected rates of population and income growth, such as Tropical Africa and South Asia

1. Trends are also influenced by improvements in the taste and texture of alternative proteins, which are a potential substitute for conventional animal meat products.
Note: Decreases in production could be smaller than per capita decreases in consumption in part due to population growth. Shorter-term variation may obscure longer-term trajectories.

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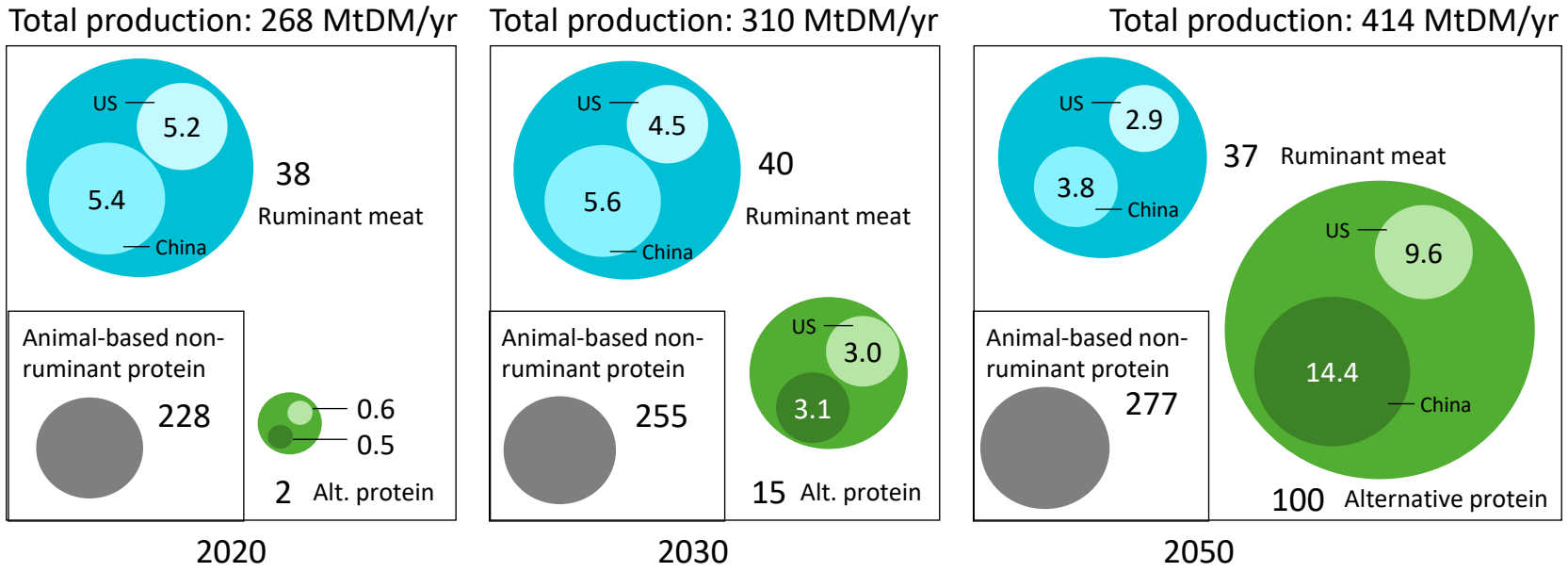
2. Alternative protein production could grow as ruminant meat production declines, in line with shifting consumer diets and technology

Production of protein in FPS + Nature, Mt DM/yr

Ruminant meat — **<1x (decline)**

Animal-based non-ruminant protein[1] — **>1x (growth)**

Alternative protein[2] — **~50x (growth)**



Two main types of policy may contribute to growth in the market for alternative proteins: (1) R&D support for alternative proteins enables improvements in taste and texture as well as price decreases; (2) Regulatory approvals for cell-based meat facilitate production

Reduced ruminant meat production geographically aligns with increased alternative protein production: Regions with strong declines in ruminant meat production and consumption could see particularly pronounced growth in alternative protein production, including the US and China

1. Animal-based non-ruminant protein includes pork, poultry and dairy. 2. Alternative proteins represent a substitute for conventional animal meat. Alternative proteins include plant-based meat (both structured and unstructured), plant-based dairy and cell-based meat.
Note: Shorter-term variation may obscure longer-term trajectories.

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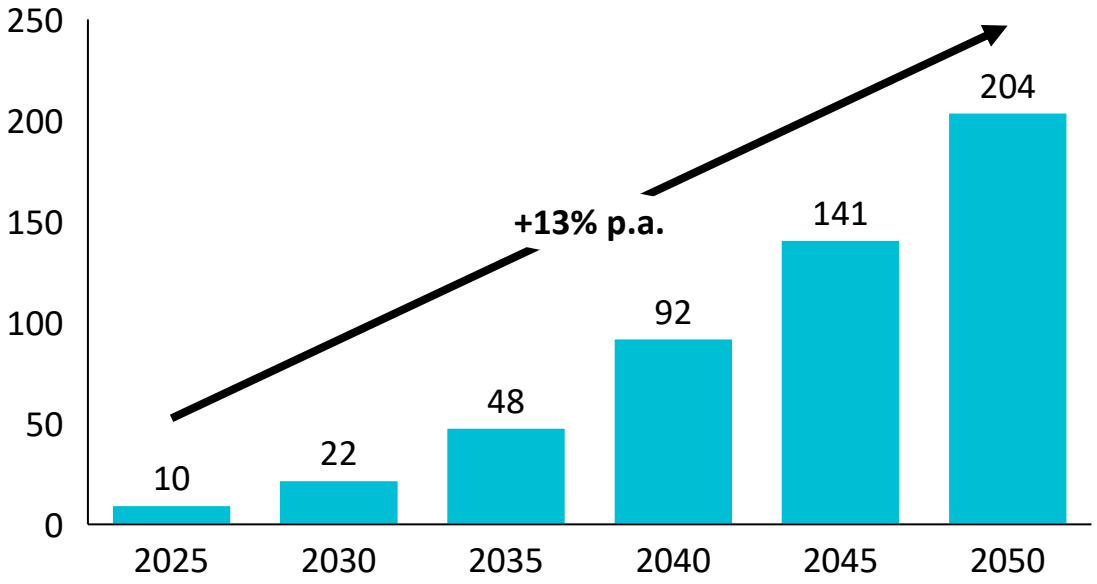
3. In 2030, NBS could directly restore, improve or avoid the conversion of 275 million hectares of land, generating USD 22 billion in annual revenues

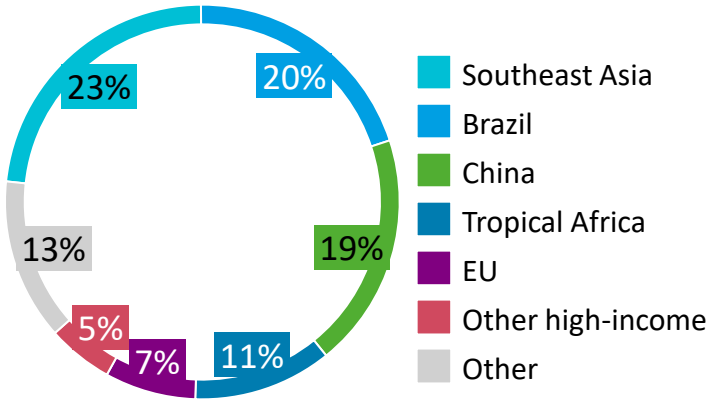
NBS could grow to reach USD 22 billion in annual revenue in 2030, and USD 204 billion in annual revenue in 2050, as corporates and governments pursue cost-effective carbon mitigation options that also produce nature co-benefits

NBS revenues could be concentrated in middle-income regions, with Brazil, China and Southeast Asia together accounting for over half of revenues in 2030. High income regions are likely to generate only 13% of revenues due to higher investment costs reducing the quantity supplied[1]

Annual NBS revenue in FPS + Nature (billion USD)



Share of total NBS revenues in 2030



Regions with low-cost NBS options dominate NBS revenues – NBS could represent a valuable source of climate finance to developing countries

Higher carbon prices help incentivise NBS in regions with higher investment costs

Revenues are calculated as the quantity of emissions sequestered multiplied by the prevailing voluntary carbon price in that year.[2] This does not differentiate between direct government investment, compliance markets, and voluntary markets. This estimate therefore does not represent an estimate of voluntary or compliance market revenues.

1. 13% is composed of the EU (7.5%) + other high-income regions (5.4%): Australia and New Zealand, Canada, Developed East Asia, and USA. 2. Analysis assumes a voluntary carbon market price for NBS-based credits that rises to USD 45/tCO_2 in 2050.
Note: All NBS depicted is additional to levels of NBS in 2020. Annual revenue only accounts for NBS options whose cost is less than the prevailing voluntary carbon price in that year.

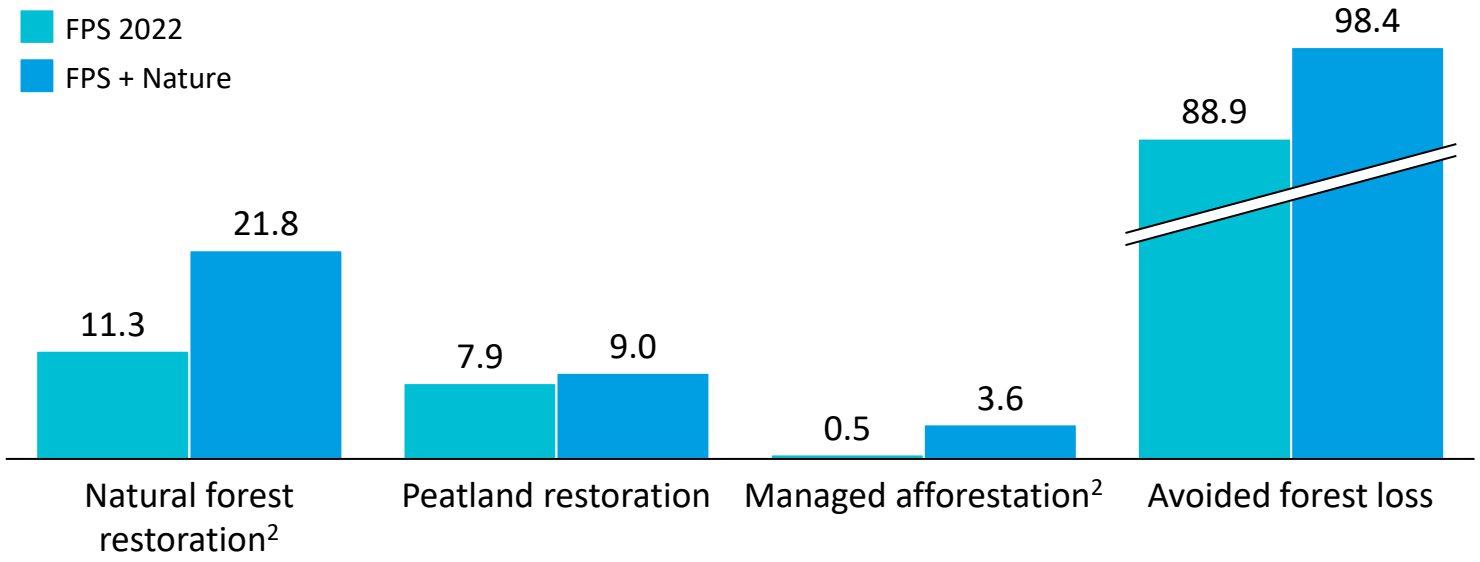
INEVITABLE POLICY RESPONSE

3. Greater quantity and quality of NBS could be supplied if corporates and suppliers place greater emphasis on achieving positive nature outcomes

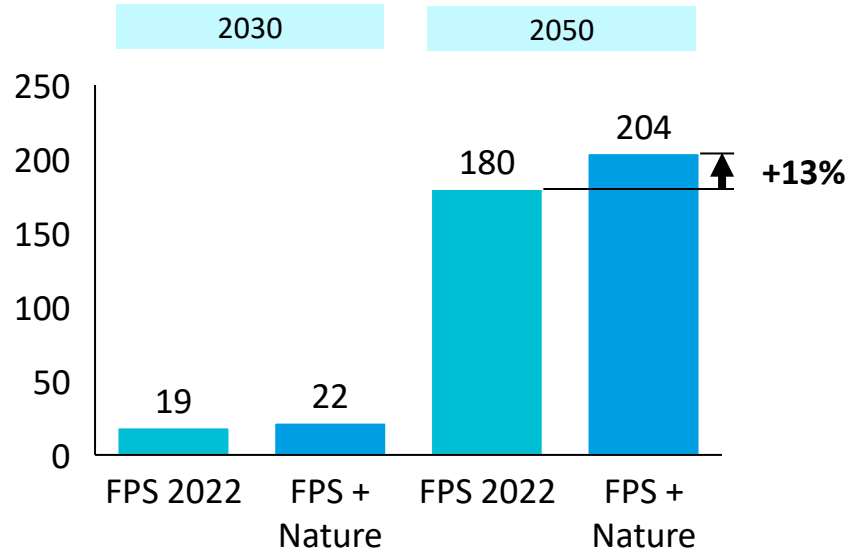
1 **Revenue from higher quality NBS options could increase** (compared with policies only focused on climate) due to greater demand for NBS that produce positive nature outcomes and co-benefits.[1] This includes natural forest and peatland restoration, which could improve habitats to support biodiversity, or avoided loss of biodiversity-rich forests

2 Increases in higher quality NBS lead to a **moderate increase in total annual NBS revenues** (compared to a scenario of climate policies alone), in line with carbon sequestration potential

Annual NBS revenue, by NBS type in 2050 (billion USD)



Annual NBS revenue, by scenario (billion USD)



1. High quality NBS projects implemented appropriately can support relatively higher levels of biodiversity, compared to other types of NBS. For example, afforestation using a natural mix of trees rather than monoculture could produce more positive nature outcomes (Hua et al. (2016)). 2. Natural forest restoration and managed afforestation are subsets of the forest restoration NBS category in the value drivers.
Note: Revenues are calculated as the quantity of emissions sequestered multiplied by the prevailing carbon price in that year. This does not differentiate between direct government investment, compliance, or voluntary markets. This estimate therefore does not represent voluntary or compliance market revenues.

Note: All NBS depicted is additional to levels of NBS in 2020.

INEVITABLE POLICY RESPONSE

3. Land used to generate biodiversity credits may overlap with land used to generate carbon credits, offering the possibility of an additional source of revenue for landowners

Emerging standards and best-practice guidance on credit creation may permit generation of carbon credits and biodiversity credits on the same land via land conservation and improvement projects. Land could produce three combinations of credits:

	NBS-based carbon credits	Carbon credits and biodiversity credits	Biodiversity credits
Description	Carbon credits derived from NBS projects involve safeguarding and improvement of land to **avoid and sequester carbon emissions**	There is approximately 40% overlap between high-biodiversity areas and areas with high potential for carbon storage,[1] suggesting that conservation could deliver **positive outcomes for both climate and nature**, e.g., as in the case of REDD+ projects	Land safeguarding and improvement projects that can demonstrate **desirable biodiversity outcomes** could be used to generate biodiversity credits
Process	Generation of carbon credits via NBS could be **incentivised by carbon pricing** and supported by government initiatives to conserve land, which may crowd in private sector funding	Total NBS funded by the private sector could shift towards higher quality NBS that facilitates desirable biodiversity outcomes; this is encouraged by increased nature-related target setting and **emerging carbon credit best-practice guidance that includes biodiversity safeguarding as a minimum requirement[2]**	Not all biodiversity-relevant areas have high carbon sequestration potential, thus a biodiversity credit market could incentivize conservation of **land additional to what is used for generation of NBS-based carbon credits**

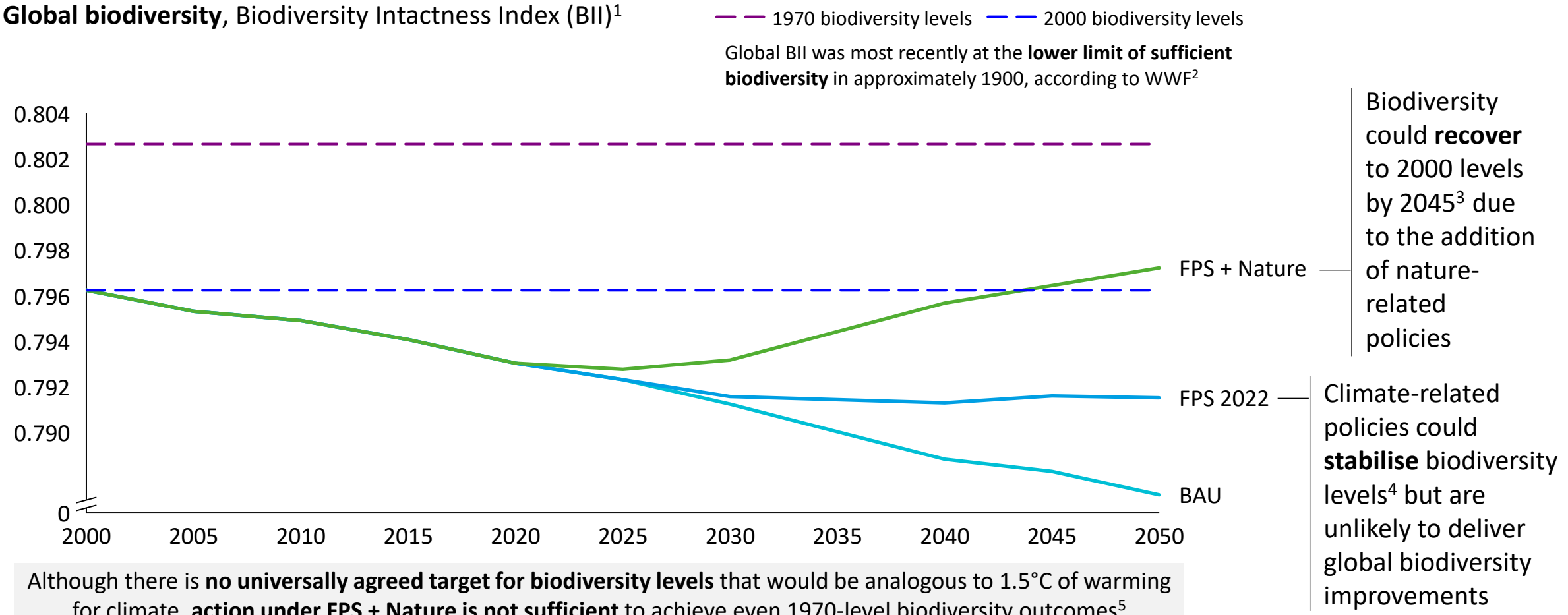
Overlap: Generation of biodiversity credits on land that is also used to generate carbon credits may be possible to facilitate market scale up and increase funding for desirable nature outcomes. Rules and standards to govern this interaction and elaborate on additionality requirements are still being developed.

1. Soto-Navarro (2020) 2. WRI

Note: Biodiversity credits would be bought and sold voluntarily as an investment in the recovery of natural capital. They are distinct from biodiversity offsets, which are generally intended to compensate for damage.

Nature-related policy action could halt and reverse global biodiversity loss; climate-related policies alone are unlikely to achieve this outcome

Global biodiversity, Biodiversity Intactness Index (BII)[1]



Although there is **no universally agreed target for biodiversity levels** that would be analogous to 1.5°C of warming for climate, **action under FPS + Nature is not sufficient** to achieve even 1970-level biodiversity outcomes[5]

1. BII estimates how much of an area's natural biodiversity remains by assessing the average abundance of native terrestrial species in comparison to their abundance in the absence of pronounced human impacts (Natural History Museum; De Palma et al. (2021)). It proxies for global change in ecosystem services or nature outcomes. BII level is extrapolated backwards to 1970, based on the rate of change modelled in BAU here. 2. WWF (2020), p. 29 3. Halting and reversing biodiversity loss is central to the CBD's 2050 vision. 4. Stabilisation could be driven by policies that contribute to reduced ruminant meat consumption, which alleviates land pressure; the end of net deforestation could also play a role. 5. Note also that 'extinction debt' could cause an accelerated rate of extinctions in all scenarios, regardless of BII outcomes.