Mainstreaming Nature into World Bank Macroeconomic Models

7th Natural Capital Global Policy Forum

Kigali, Rwanda

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Key Messages

1. Macroeconomic models inform policy dialogue & operational engagement

2. World Bank macroeconomic models are climate aware

3. And are now becoming nature aware too

4. To assess GBF-relevant policies and investments

5. But it is a challenging endeavor, requiring long-term commitment.

Macroeconomic Models Inform
Policy Dialogue & Operational Engagement
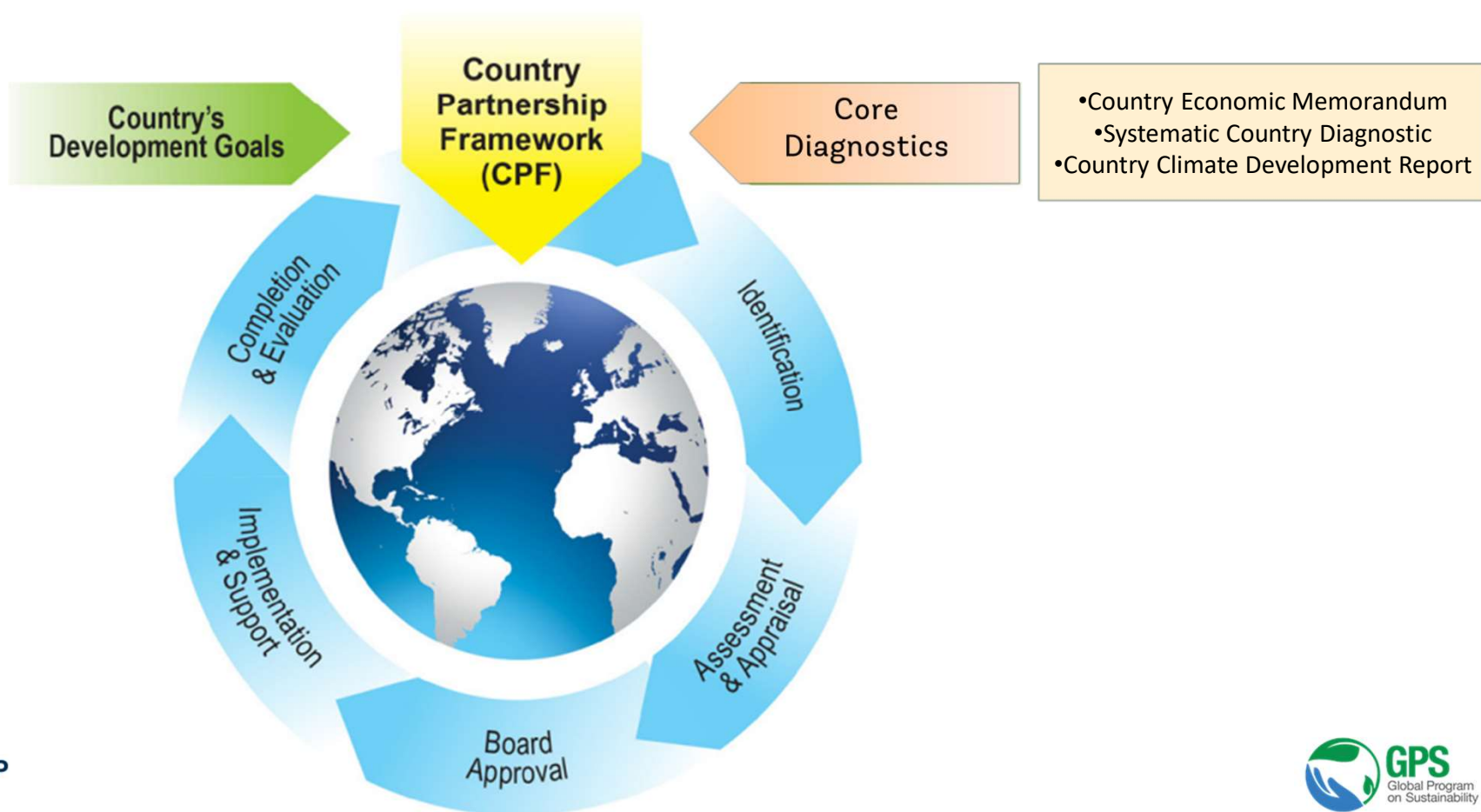
# World Bank macroeconomic models are climate-aware

- **Effects of shocks or policy changes**
  - GDP, sector outputs, fiscal flows, employment and wages, household income, income distribution
- **Sectoral interlinkages**
- **Climate's impact on economy and vice versa.**
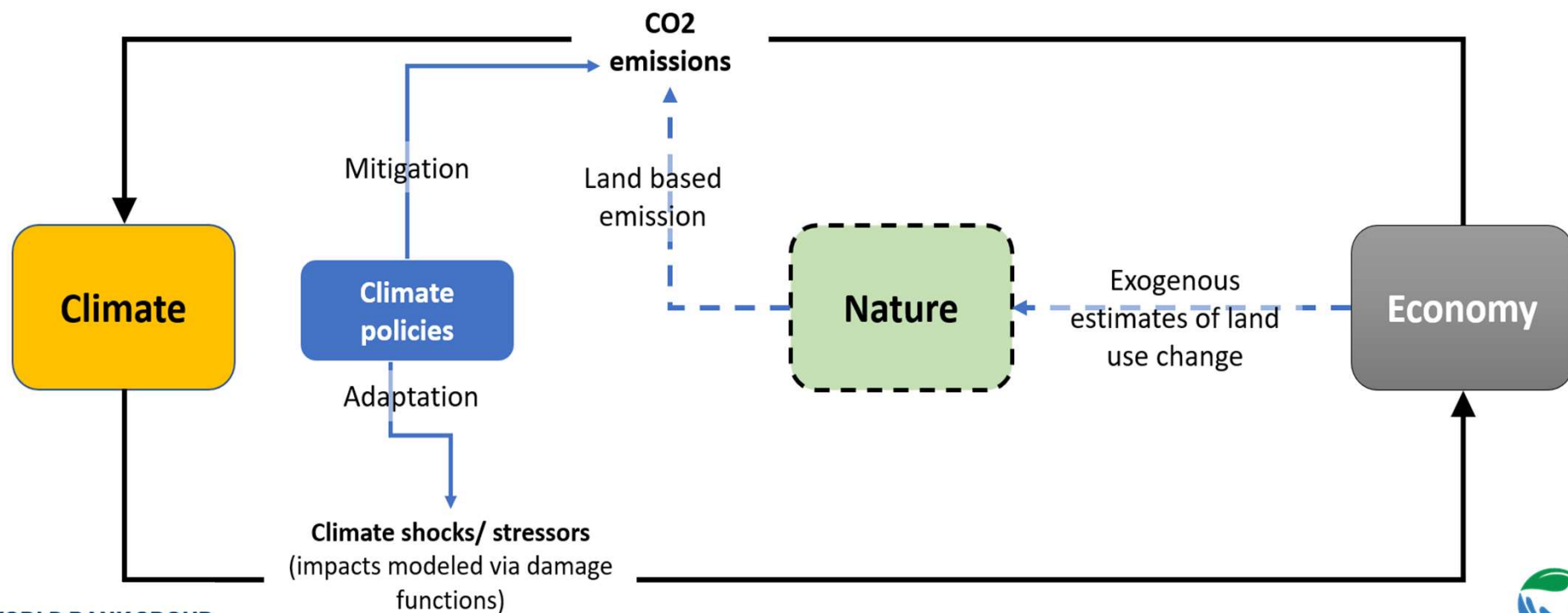
Making the models also nature-aware

- Joint work with ASA with macroeconomic modeler colleagues

- 2-year study

- Objective:

  To integrate natural capital and eco-system services into the Bank's key macroeconomic models and core country diagnostics.

- Pillars:

  a. Preparation of standard protocols based on country pilots
  b. Medium-term strategy mainstreaming nature-aware macroeconomic models into core diagnostics
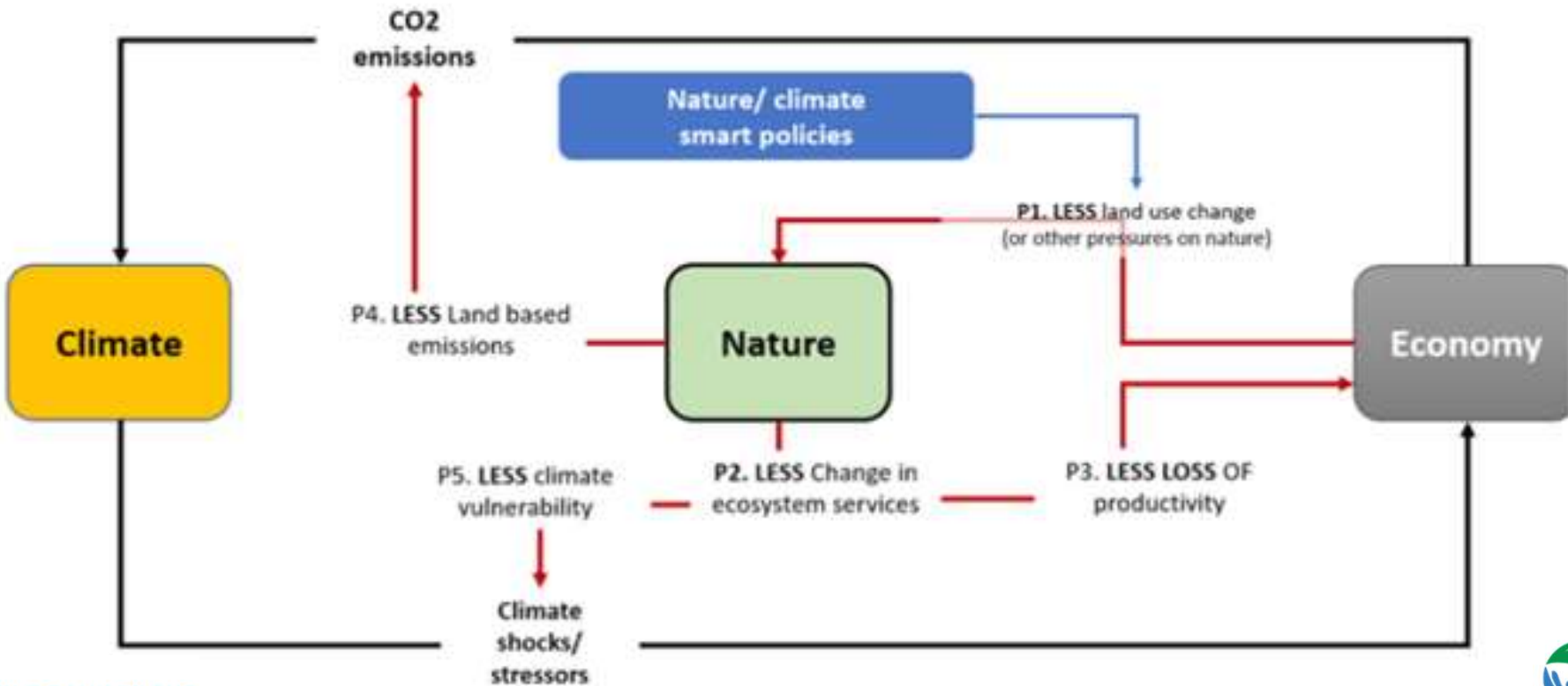
Nature-aware Macroeconomic Modelling
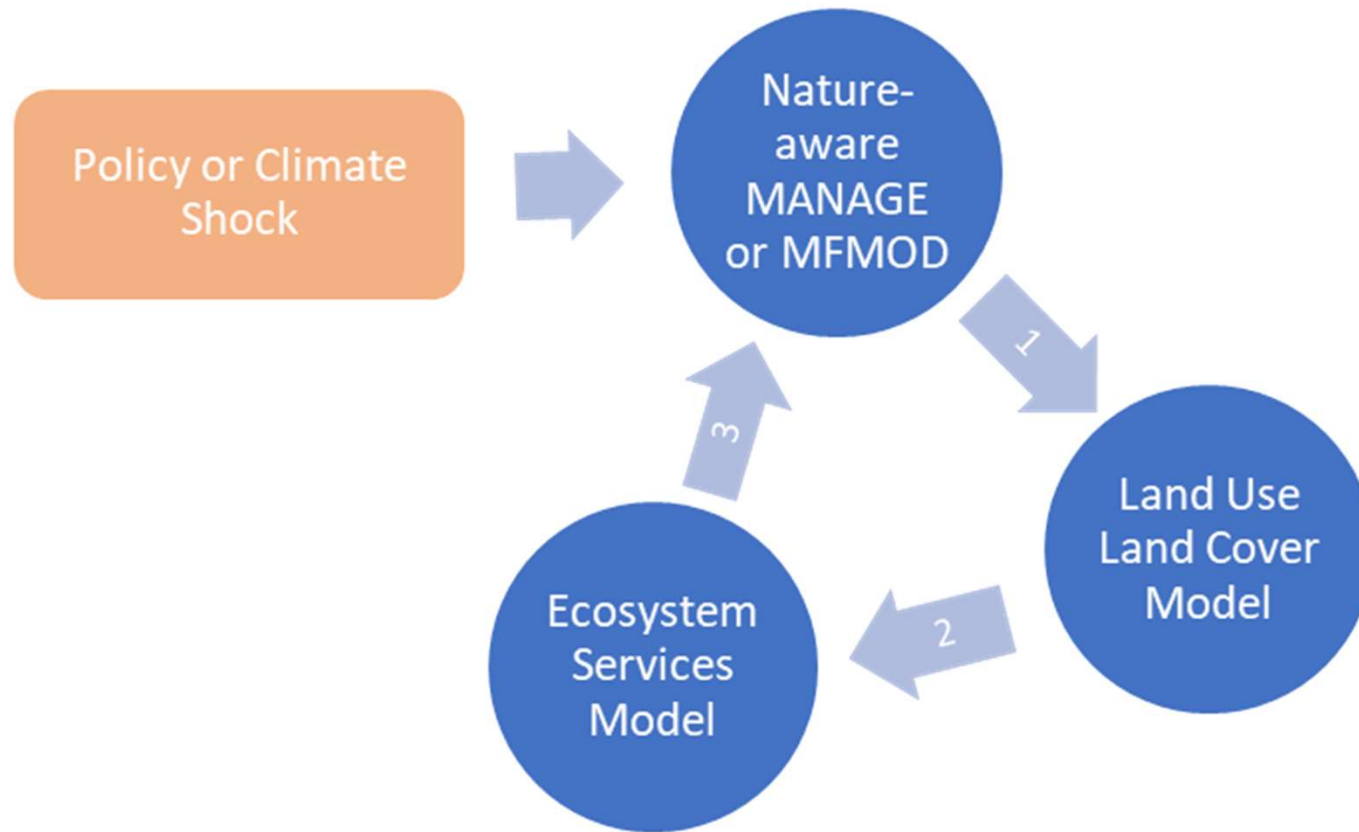
Making the models also nature-aware

Panel A. Improved understanding of economy/ nature/ climate interactions
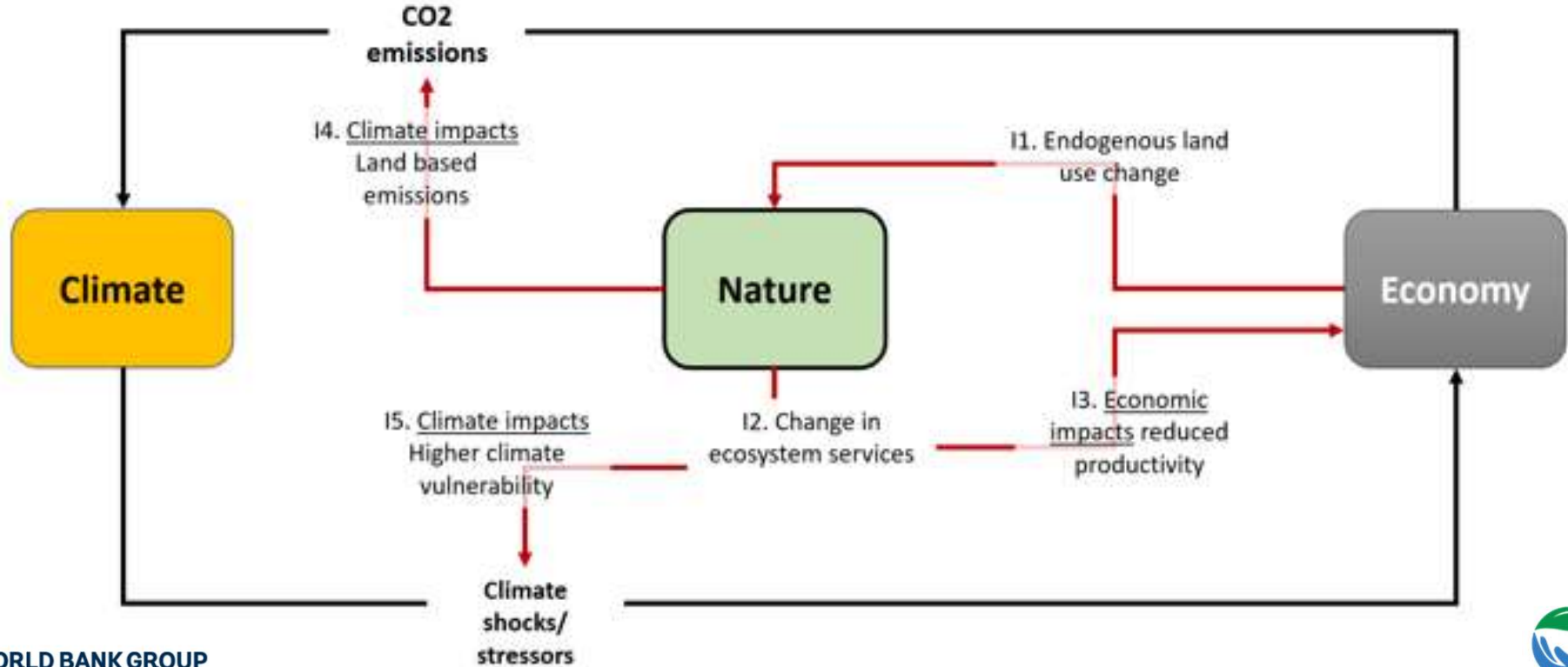
Making the models also nature-aware

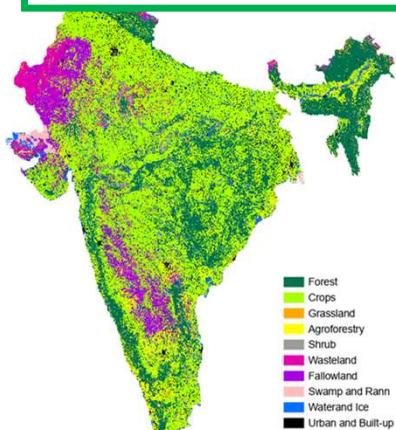Panel B. Assessing climate/ nature smart policies

Assessing policies

- Investments
  - ✓ India afforestation & agroforestry, forest restoration

- Changes in incentive structure
  - ✓ Carbon taxes, elimination of harmful subsidies, payments for ecosystem services
  - ✓ Income transfers to poor to compensate for stricter management

- Improved regulatory enforcement

Preliminary results in India

Policy	Ecosystem Service	Transmission channel in CGE Model
Afforestation & agroforestry development on barren lands	Carbon sequestration	Change in total carbon stock due to land use change translates into a change in net emissions
	Erosion reduction	Improved nutrient retention translates into increased productivity of agriculture activities
	Crop Pollination	Increased pollinator abundance resulting from enhanced habitats translates into increased productivity of pollinator-dependent crops.

Forest
Crops
Grassland
Agroforestry
Shrub
Wasteland
Fallowland
Swamp and Rann
Waterand Ice
Urban and Built-up

00 Kilometers
J

Scenario impacts on macroeconomic indicators in 2070 in millions of USD (relative to BASE scenario).

	NDC30	NDC40	NDC40REST
GDP	649,158	406,012	558,044
Cumulative GDP	10,298,404	5,974,467	8,287,971
Private consumption	458,119	285,850	393,204
Private investment	217,518	135,301	185,299
Exports	182,183	111,452	153,449
Imports	163,410	99,870	137,546

Source: World Bank, forthcoming.
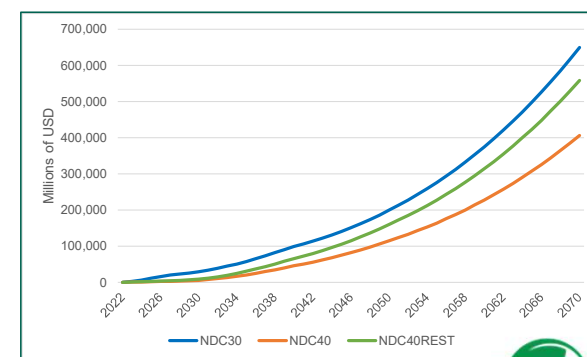
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GPS Global Program on Sustainability

Assessing policies

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Linking with Financial Sector

1. Central bank nature risk assessments

2. Credit rating country risk assessments

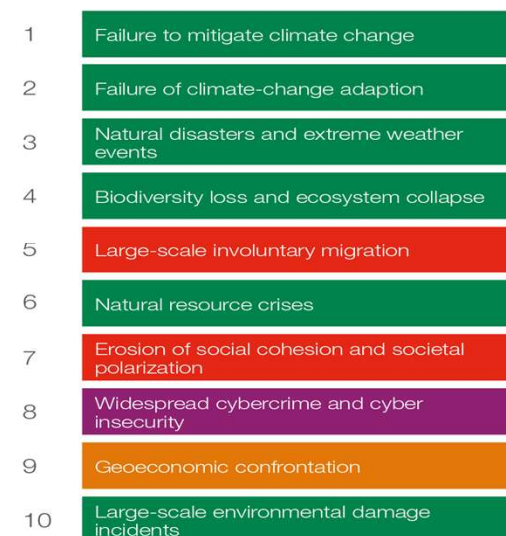3. Financial instruments with performance payouts

Global Risks Report 2023

Top 10 Risks

"Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period"

	2 years		10 years
1	Cost of living crisis	1	Failure to mitigate climate change
2	Natural disasters and extreme weather events	2	Failure of climate-change adaption
3	Geoeconomic confrontation	3	Natural disasters and extreme weather events
4	Failure to mitigate climate change	4	Biodiversity loss and ecosystem collapse
5	Erosion of social cohesion and societal polarization	5	Large-scale involuntary migration
6	Large-scale environmental damage incidents	6	Natural resource crises
7	Failure of climate-change adaption	7	Erosion of social cohesion and societal polarization
8	Widespread cybercrime and cyber insecurity	8	Widespread cybercrime and cyber insecurity
9	Natural resource crises	9	Geoeconomic confrontation
10	Large-scale involuntary migration	10	Large-scale environmental damage incidents

Risk categories

Economic — Environmental — Geopolitical — Societal — Technological

Source: World Economic Forum, Global Risks Perception Survey 2022-2023

WORLD ECONOMIC FORUM

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Medium-term Strategy

Most World Bank country economists routinely include nature in macroeconomic analysis

Nature part of chapter 1 of country diagnostics and program documents

Larger investments in nature conservation

Challenges

- Methodology for integrating ecosystem services still developing.
    - Presently, can only incorporate a few ecosystem services:
        - Forest provisioning services
        - Carbon, sedimentation/flood reduction, erosion reduction, pollination.
    - Integration of other key services still under development

- National level data limited, reliance on global data.
    - Where national data exist, often limited to ecosystem extent,
    - Rarely ecosystem condition,
    - But ecosystem condition impacts level of ecosystem service

- Hence, long term endeavor.

- Medium-term strategy will prioritize countries
    - With highest economic dependence on nature
    - Where new ecosystem services can also be developed.

GPS
Global Program
on Sustainability

Thank you!

More information available:

The Global Program on Sustainability

3. Performance-related instruments

- Sustainability-linked bonds (SLBs) pay out (interest rate) depends on issuer meeting key-performance indicators (KPIs)

- Uruguay issued 1st SLB with nature KPI (natural forest cover)

- GPS team devised [FAB framework for measuring ambition and feasibility](#) of sovereign KPI targets
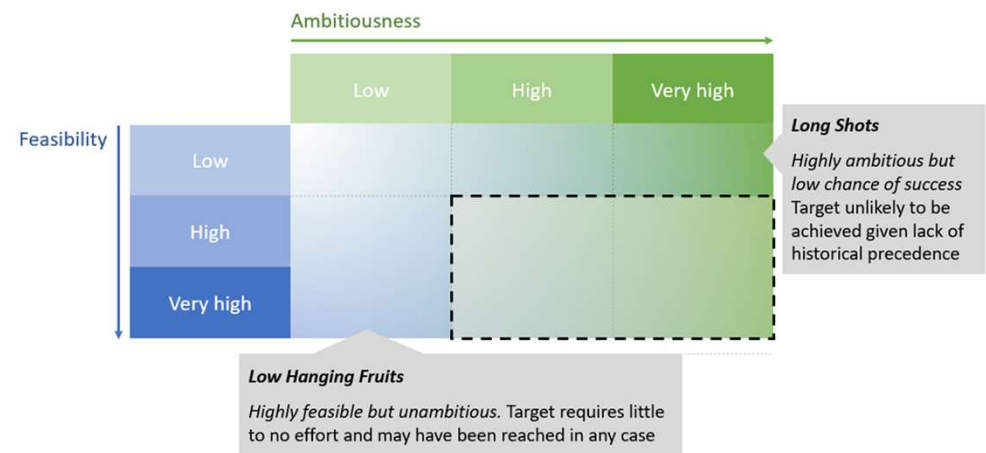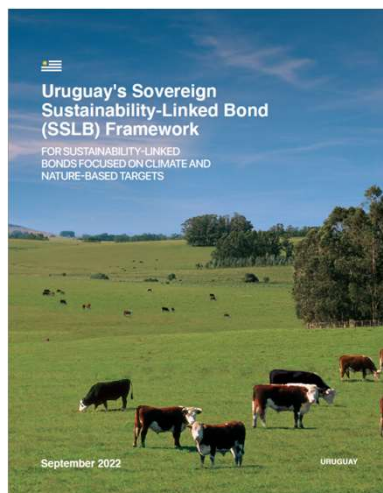
2. Credit Rating Agency Risk Assessments

- Sovereign credit rating agencies starting to incorporate natural assets and nature degradation into their country risk assessments – looking for more data and policy analysis from WB experts

- FTSE Russell – major global index provider with trillions of assets passively invested against their indices – adjusted Sovereign ESG methodology to incorporate WB analysis (income-bias / natural capital) ->$2billion shift funds allocated EMDEs with higher natural capital assets

- Natural capital and wealth data available via widely-used WB Sovereign ESG Data Portal

ESG= Environmental Social and Governance
EMDE – Emerging market and developing economy

Sovereign **ESG**
Data Portal
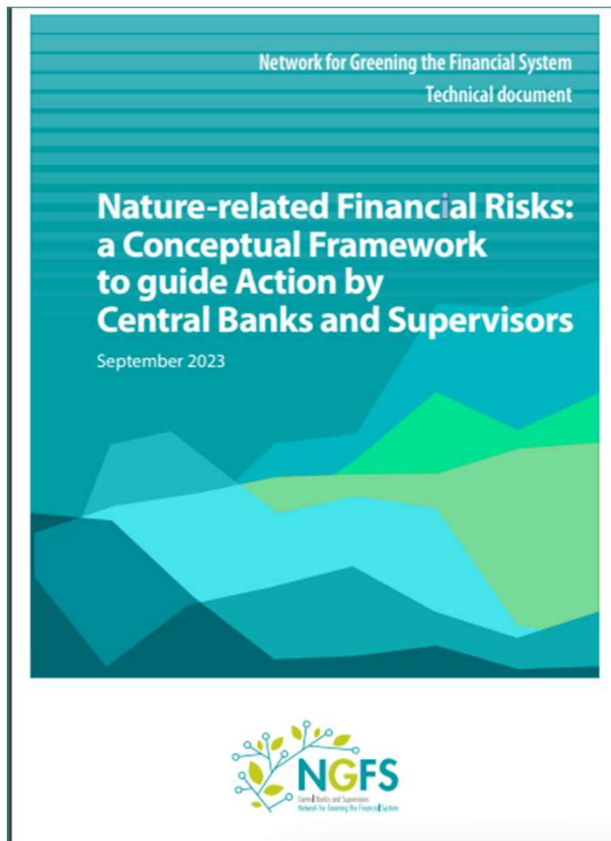
NGFS

- Recognizes risks to economies, financial systems, and firms of environmental and natural resource degradation

- Conceptual framework for nature-related financial risk to help guide policies and action by central banks and supervisors.

- Strong analytical synergies with nature-aware macro economic modelling.

1. Central bank nature risk assessments

- Founded on nature macro modeling

- A nature-risk exposure assessment for Malaysia was conducted together with Bank Negara Malaysia
  - [An Exploration of Nature-Related Financial Risks in Malaysia](#)
  - 54% of commercial lending from Malaysian banks is exposed to nature-related financial risks and 87% is exposed to sectors that strongly impact ecosystem services

- More countries in the pipeline going forward

- Leading the nature risk scenario working group Network for Greening Financial Sector (NGFS)
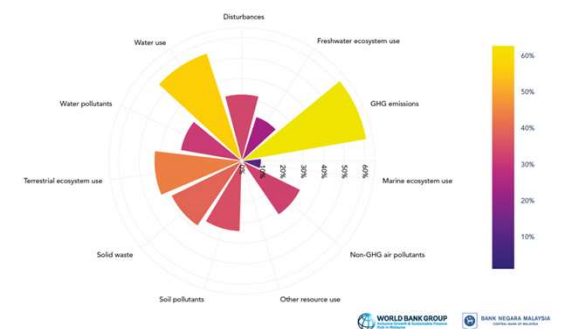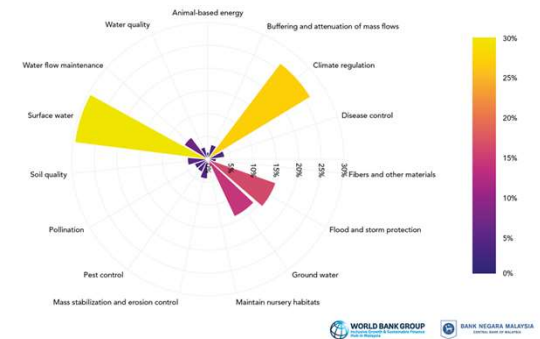
Natural Links to Global Biodiversity Framework

- **Nature-aware macroeconomic models designed to:**

  - Assess the impact of nature-friendly policies on NCES and the economy
  - Value the impact of reversal of loss of ecosystem services in economic terms
  - Assess the impact of different scales of interventions and funding packages
  - Asses the impact on the economy and nature (through feedback loops) of different funding types, ie grants, no/low interest lending, or loans at market interest rates.

Annex slides

3/6/2024

KUNMING MONTREAL GLOBAL BIODIVERSITY FRAMEWORK

2020 UN BIODIVERSITY CONFERENCE
COP15 · CP/MOP10 · NP/MOP4

CONSERVE

1. Biodiversity-inclusive **spatial** planning, «**near-0 loss**»
2. Effectively **restore 30%** of degraded nature
3. Effectively **conserve 30%** of lands and seas
4. Halt human-induced **extinctions**

AVOID

5. Stop unsustainable **use, harvest, trade** of species
6. Reduce **alien species** spread by at least 50%
7. Reduce **pollution** risks, impacts by at least 50%
8. Reduce **climate change** impacts

SAFE-GUARD

9. Sustainably **manage and use** wild species
10. Sustainable **agri/aquaculture, fisheries, forestry**
11. Restore and enhance **nature's goods**, services
12. Increase area, quality of **urban** green/blue spaces
13. Fair sharing of benefits from **genetic resources**

ACT

14. **Mainstream** biodiversity into all policy, practice
15. **Businesses** to monitor, disclose nature impacts
16. Sustainable **consumption**, half food waste
18. Phase out 'perverse' **subsidies**, increase **finance**
17. 23. Strengthen **capacity, participation, IPLC, women**

2030-goals
Not time specific

Four overarching goals
A. Halt loss, restore nature
B. Use lands & seas sustainably
C. Share benefits and services
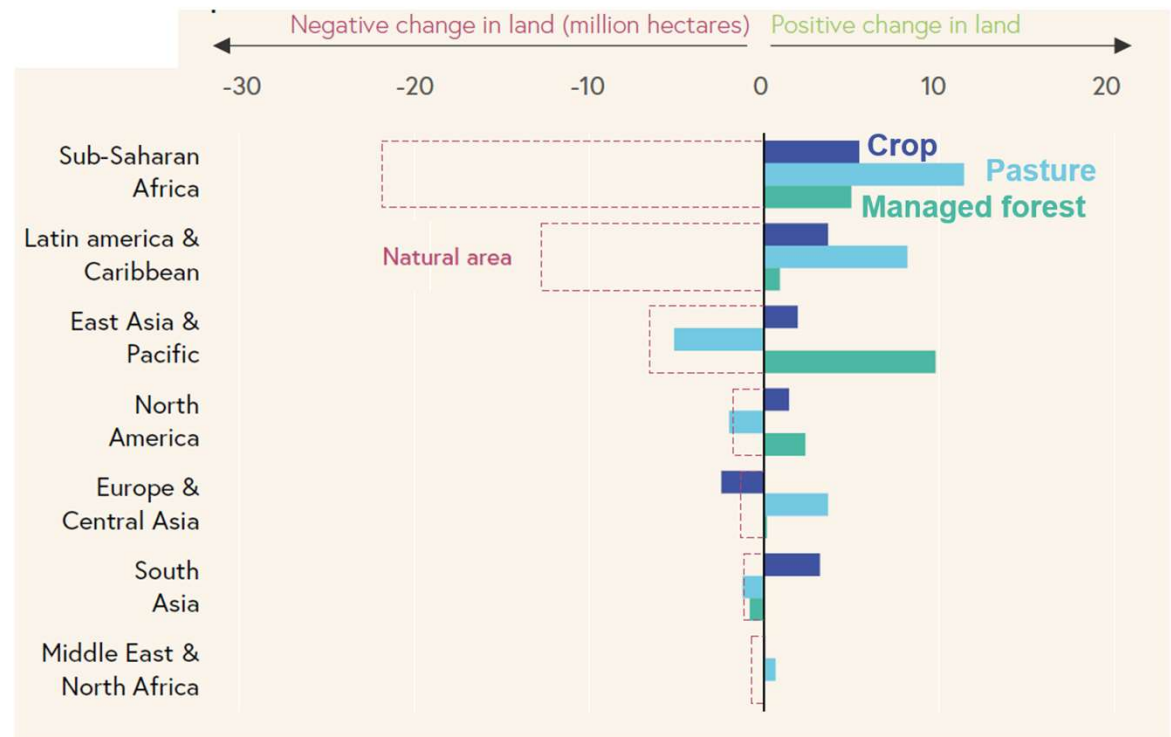D. Mobilize necessary resources
to be met by 2050

https://www.cbd.int/doc/c/e6d3/cd1d/daf663719a03902a9b116c34/cop-15-l-25-en.pdf

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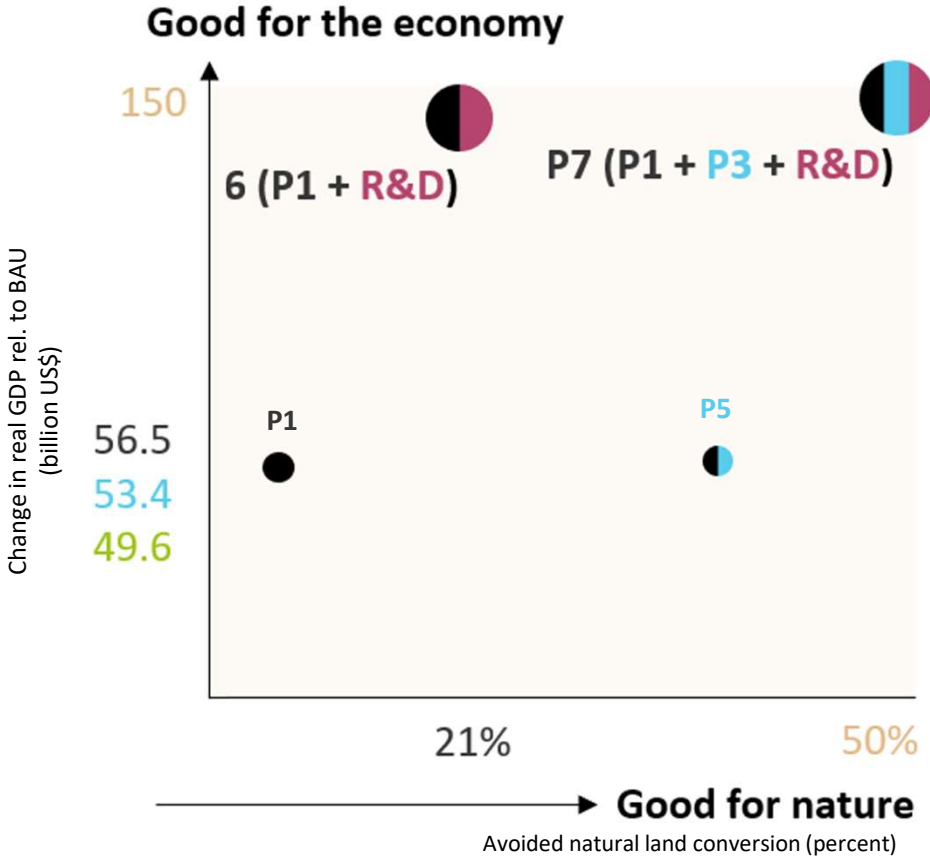# Assessing the macro-economic impacts of nature loss and opportunities for policy reform at the global level

Under business as usual, by 20230 there would be a loss of 46 Million hectares of natural land

Source: Johnson et al. 2021

Nature-smart policies can deliver net GDP gains

Good for the economy

Change in real GDP rel. to BAU (billion US$)

150

6 (P1 + R&D)   P7 (P1 + P3 + R&D)

56.5
53.4
49.6

P1   P5

21%   50%

Good for nature

Avoided natural land conversion (percent)

P1: Decoupled Support to Farmers;
P2: Domestic forest-carbon (FC) payment;
P3: Global FC payment

P4: Subsidy reform + Domestic FC payment;
P5: Decoupled Support to Farmers + Global FC payment

P6: Decoupled Support to Farmers + RD;
P7: Decoupled Support to Farmers + RD + Global FC payment

Kunming-Montréal Global Biodiversity Framework

Protect and Restore

- Restore 30% of degraded areas
- Protect and manage 30% of the planet

- Economic case for action
- Cost-effective restoration / conservation

Sustainably use

- Enhance ecosystem services
- Integrate biodiversity in policies

- Measure / value ecosystem services
- Costs / benefits of policy reform

Mobilize capacity and finance

- Make quality data accessible
- Phase-out harmful subsidies
- Leverage private finance, promote financial innovation

- Statistical capacity
- Outcome-based finance for nature