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Why Finance Nature?

The economic case for intervention

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WORLD BANK GROUP

The Economic Case for Nature Report: An Overview

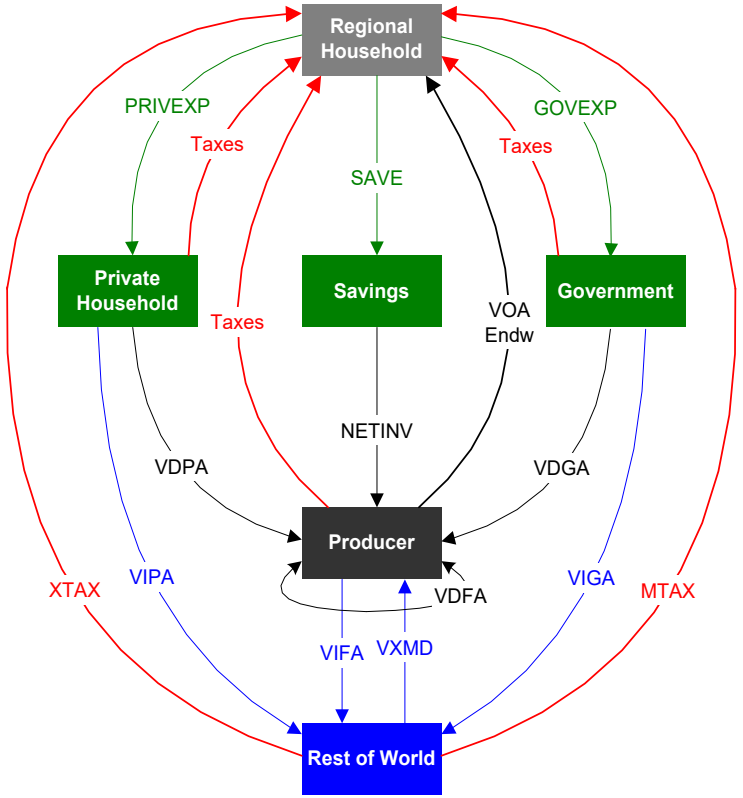
- **A novel integrated modeling effort that demonstrates the macroeconomic importance of nature.** Responds to the fact that while nature underpins all 17 Sustainable Development Goals, 14 of 18 eco-services are in decline (IPBES 2019). **The macroeconomic case has been missing.**
- **Addresses the following key questions:**
    1. What are the economic losses from continued decline in nature?
    2. What are the consequences of ecosystems collapse?
    3. Are there win-win policies to protect nature?
    4. Are the goals to protect nature (30x30) economically viable?

Work developed by the World Bank (led by Gianni Ruta and Raffaello Cervigni) in collaboration with the **University of Minesota** (Justin Johnson, James Gerber, Stephen Polasky, and Chris Nootenboom) and **Perdue University** (Uris Baldos, Erwin Corong, Thomas Hertel, and Angel Aguiar). Recently extended at a country level.

Assessing costs and benefits of ecosystem conservation requires integrated models.

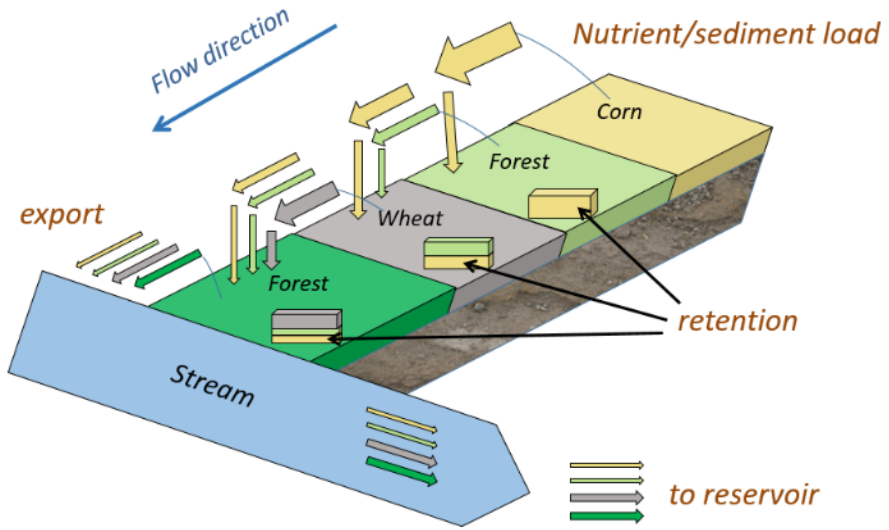
Economic models

e.g., General Equilibrium

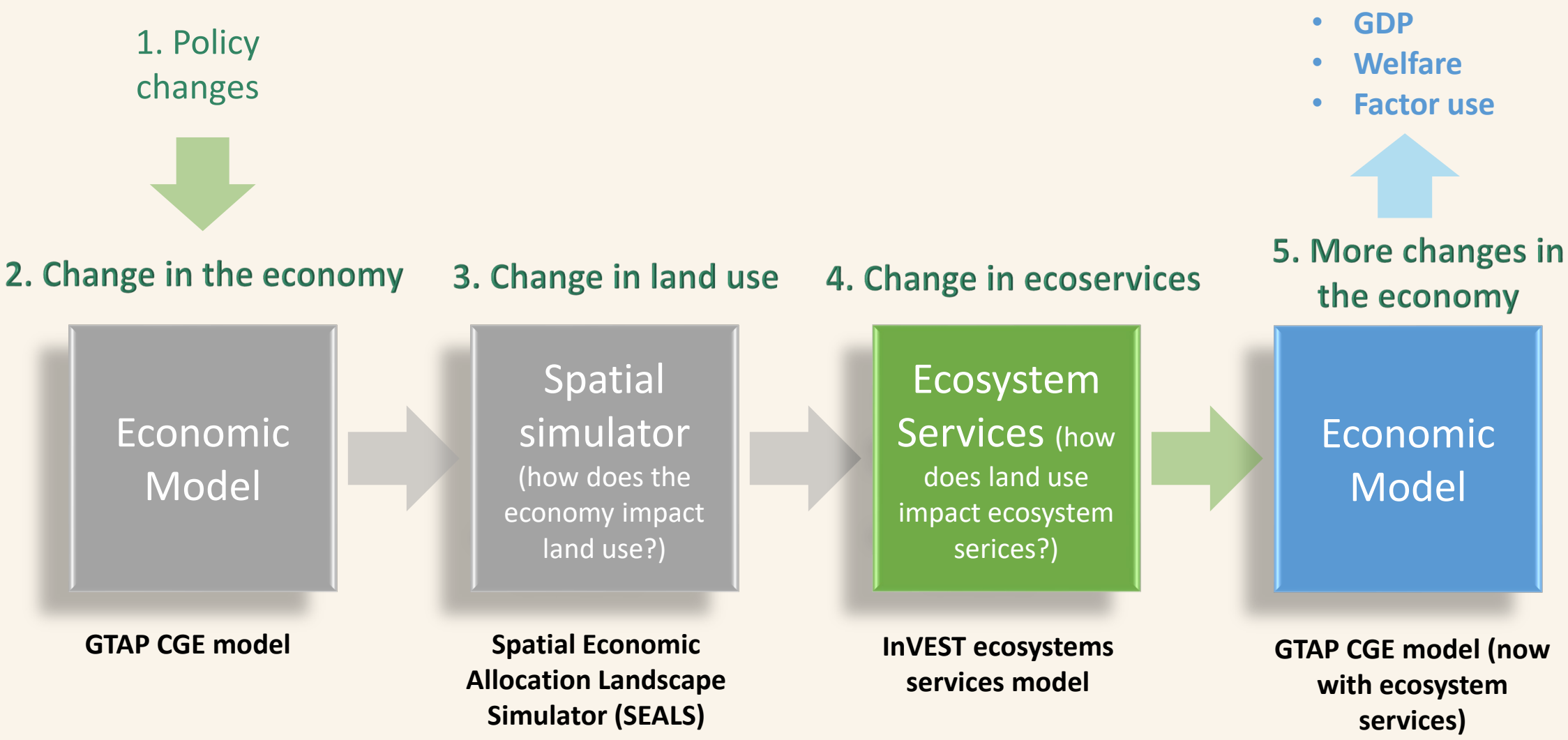


Ecosystem models

e.g., Hydrological Routing of Sediment Retention



A novel approach: An integrated Global Earth-economy Model



The global model includes four ecosystem services

Pollination: reduced wild pollinator habitat adjacent to pollination-dependent crop production leads to lower crop productivity.

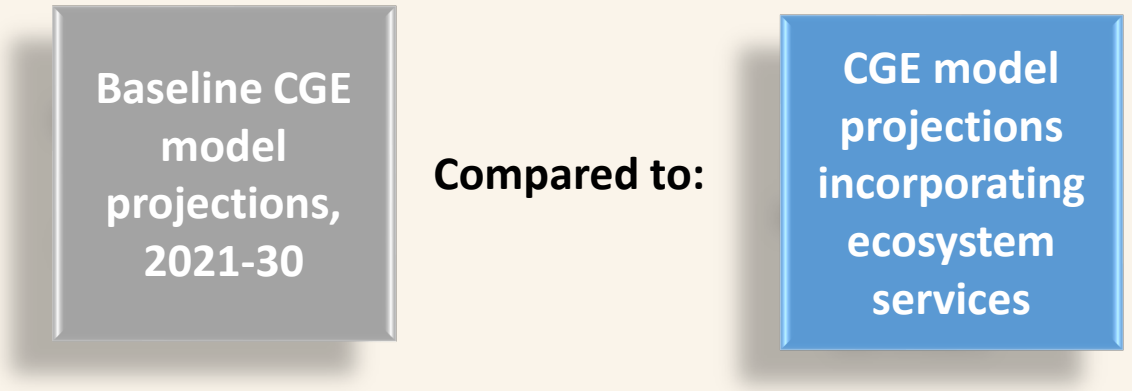
Marine fish provision: reduced fishery biomass leads to lower yield.

Timber provision: reduction in timber stocks leads to lower annual harvests.

Carbon regulation: changes in land-use lead to less carbon storage from which we attribute a value based on the social cost of carbon.

Question 1. What are the costs of continued degradation of nature?

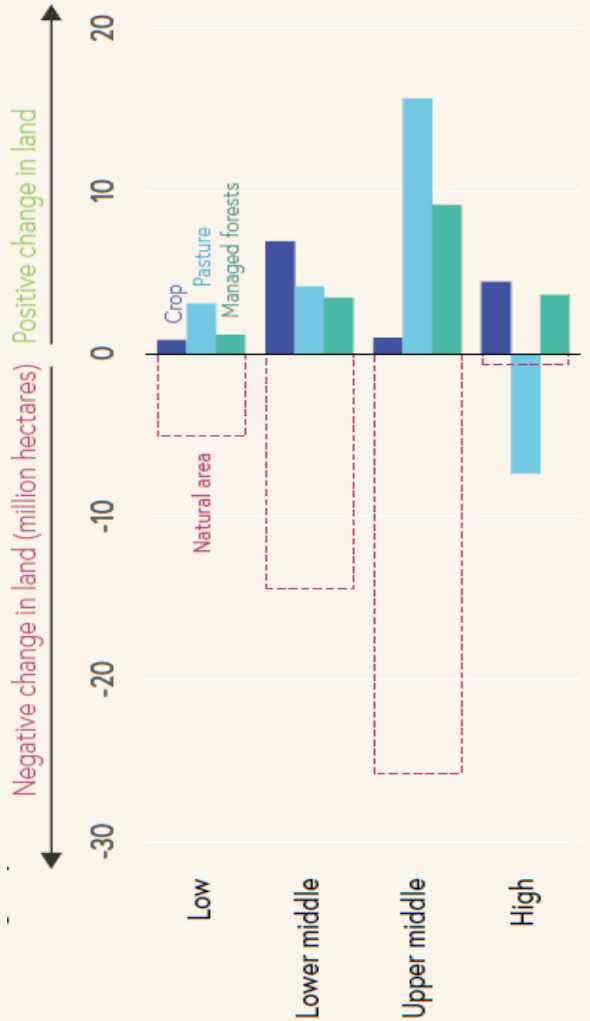
Essential Approach:



Conversion of 46 million hectares of natural land expected by 2030 under current trends.

- **Under the business-as-usual scenario, the world is projected to lose about 46 million hectares of natural land** and face a continuous decline in fish stocks, 2021-2030.
  - Natural land is converted to managed forests (+17 million hectares), pastureland (+15 million hectares), and cropland (+13 million hectares).
- **This translates into a decline in ecosystem services**:
  - An **0.3 percent reduction in global forestry** production (despite expansion of managed forests)
  - A **2.8 percent reduction in global marine fisheries** production
  - An **additional 791 million metric tons of carbon dioxide** emitted.
  - A **2.8 percent increase in global pollinator-dependent agricultural** production (due to expansion of agricultural land).

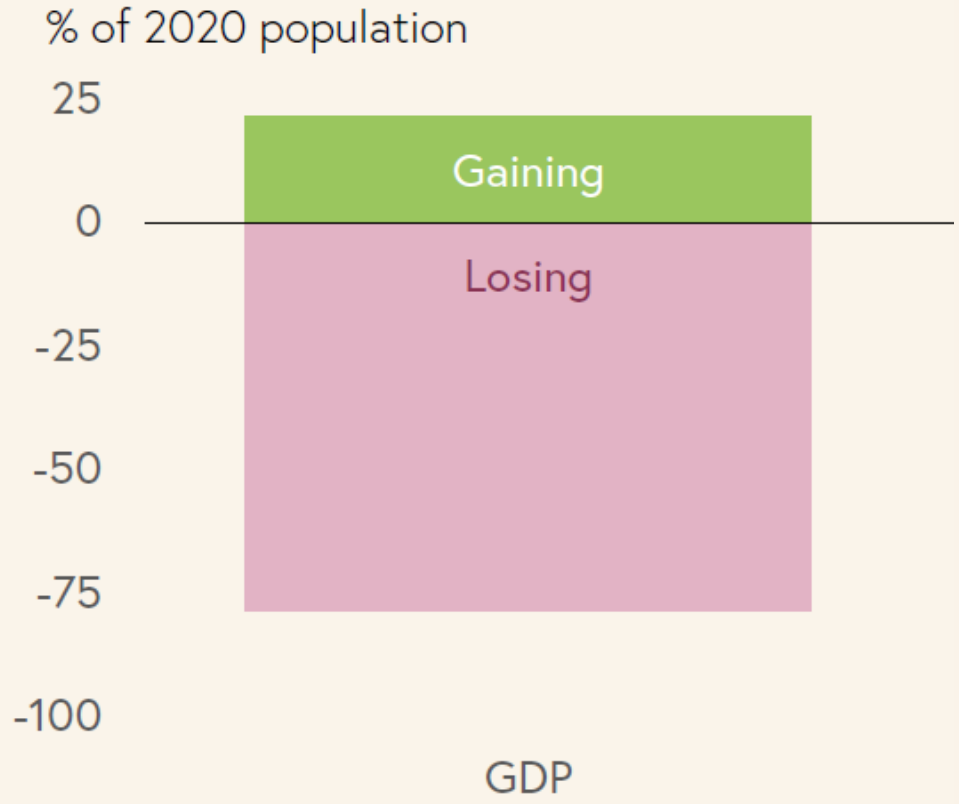
Conversion of nature occurs in all income categories.



This has an estimated cost to global GDP of US$90-225 billion in 2030.

- **the decline of four ecosystem services results in a loss of annual GDP in 2030 of $90-225 billion**, compared with the baseline scenario (in which nature is not considered).
- **These costs are higher if the economy is less flexible towards nature loss** than typically assumed. Stronger assumptions **increases costs of ecosystems loss by 72 percent** (i.e., substitution elasticities at 95th percentile instead of at the mean).

Conversion of nature causes losses for most and gains for some, globally.



Question 2. What happens when nature services collapse? *(a stress test of the global economy)*

Essential Approach:

Baseline CGE model projections, 2021-30

Compared to:

CGE model projections incorporating exogenous shocks to ES

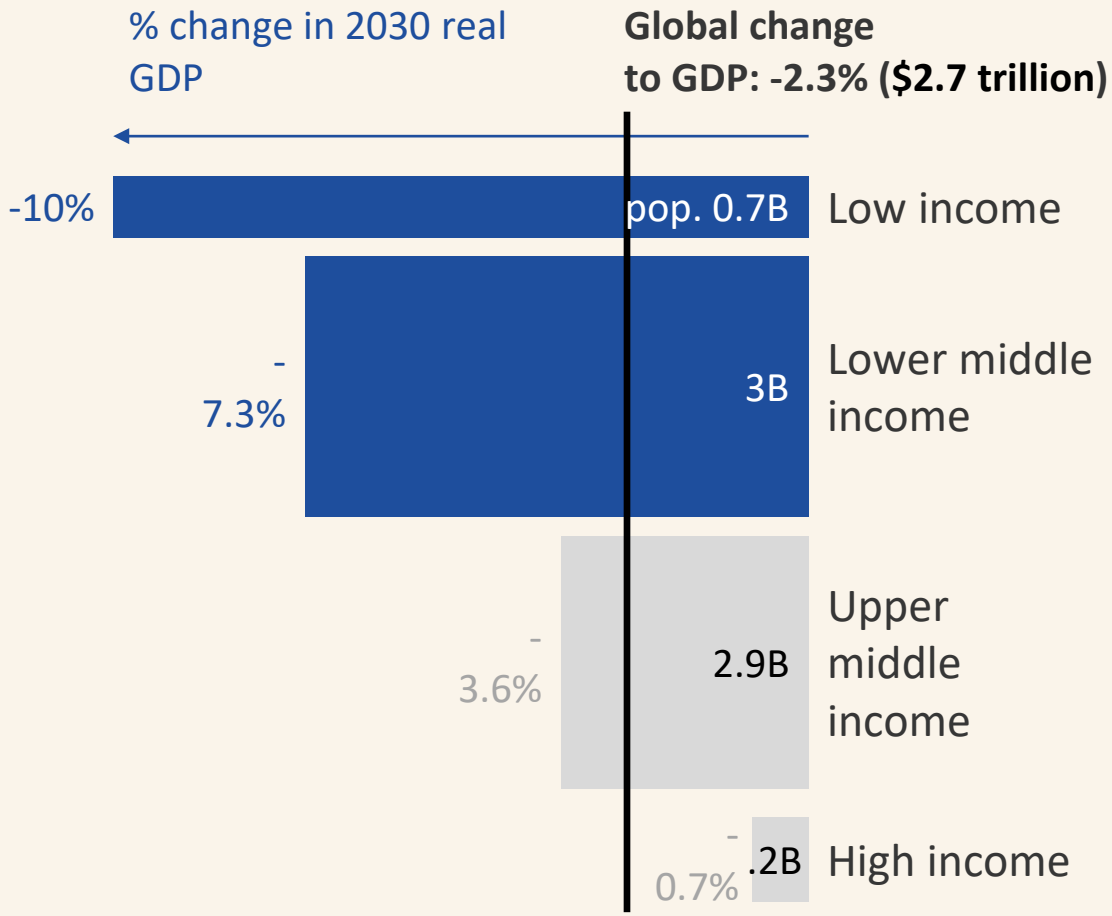
Shocks

- 90 percent loss of pollinator services
- High climate impacts on fisheries
- 90 percent loss of timber production in select agro-ecological zones.

Tipping points have much greater costs and are a setback for the poorest countries.

- **Global GDP in 2030 contracts by $2.7 trillion (2.3 percent)**, compared with the baseline scenario where no ecological tipping points are reached.
- This is equivalent to a decline in 2021- 2030 global GDP growth by 10 percent.
- Reaching selected tipping points **impacts low-income and lower-middle-income countries the most.**
- In 2030, 1.6 billion people would live in countries with declines in GDP of 10-20 percent (mostly Sub-Saharan Africa and South Asia).

Difference in 2030 GDP under collapse scenario vs. baseline scenario, by income group



Question 3. What are the win-win policy options?

Essential Approach:

Baseline CGE model projections, 2021-30

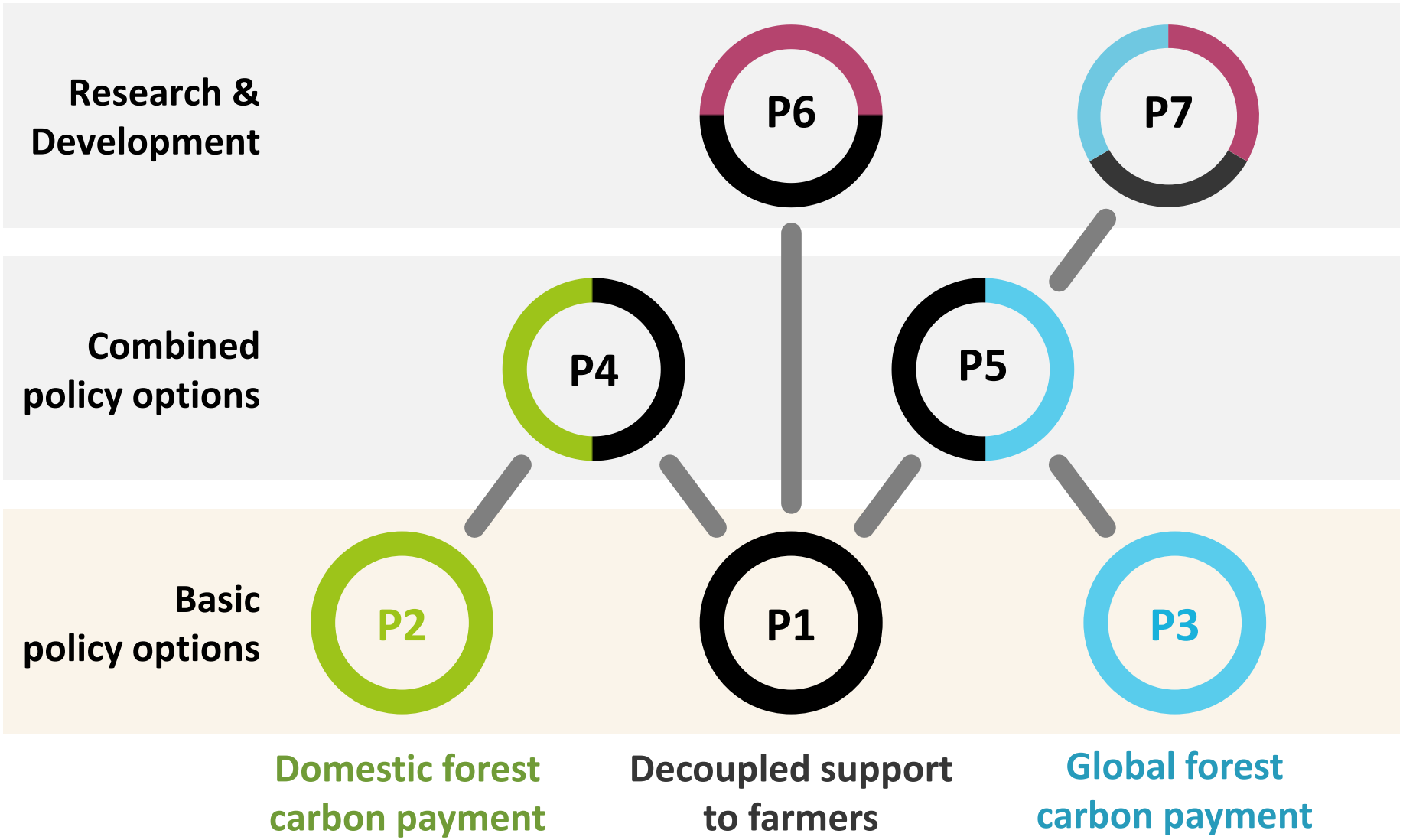
Compared to:

CGE model projections incorporating exogenous policy shocks

Policy Shocks

- Repurpose agricultural subsidies
- Provide payments for forest carbon (nationally and globally)
- Boost R&D in agriculture

Are there policies that are good for the planet and for the economy?

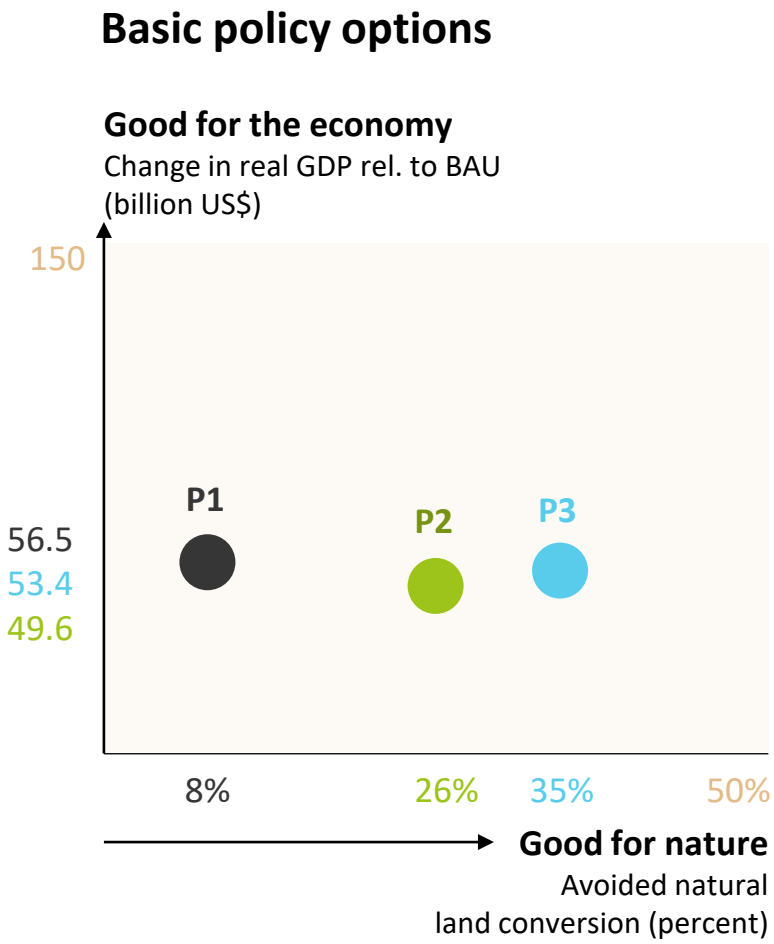


P6: Decoupled Support to Farmers + agricultural R&D;
P7: Decoupled Support to Farmers + agricultural R&D + Global FC payment

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

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

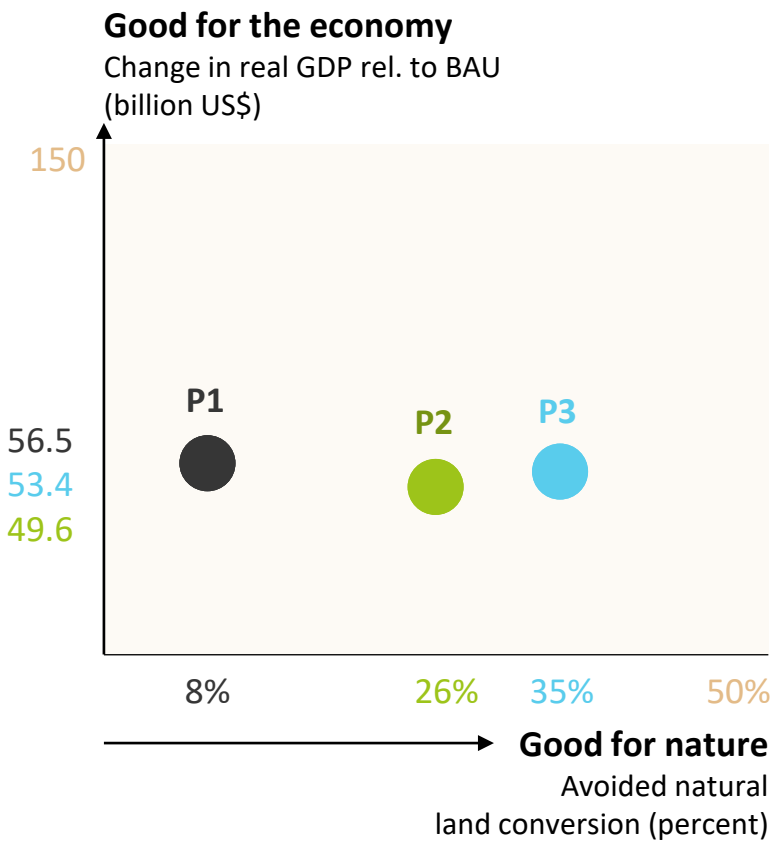
Policies can be both nature- and economy smart



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

Policies can be both nature- and economy smart

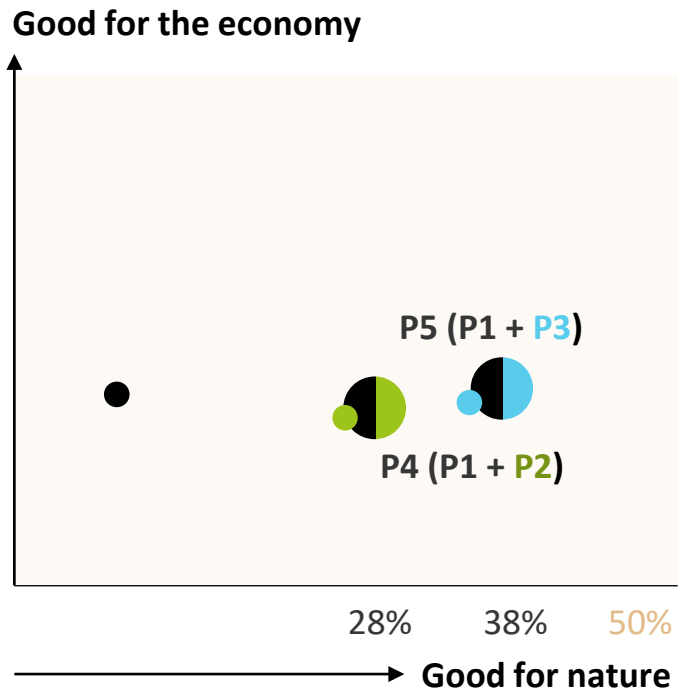
Basic policy options



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

Combined policy options

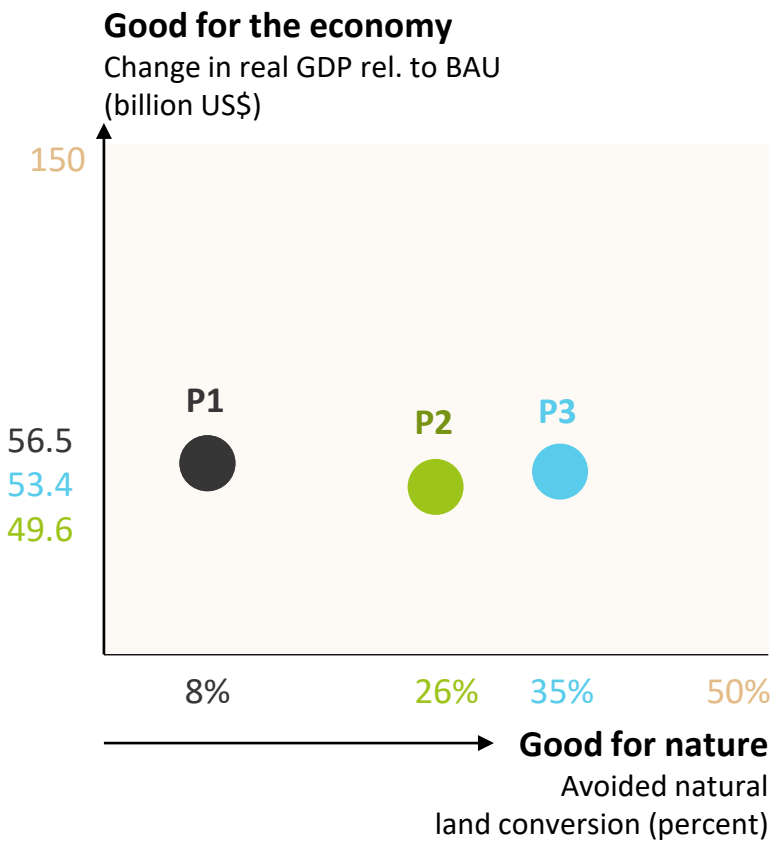
Adding forest carbon payment schemes improves the policy



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

Policies can be both nature- and economy smart

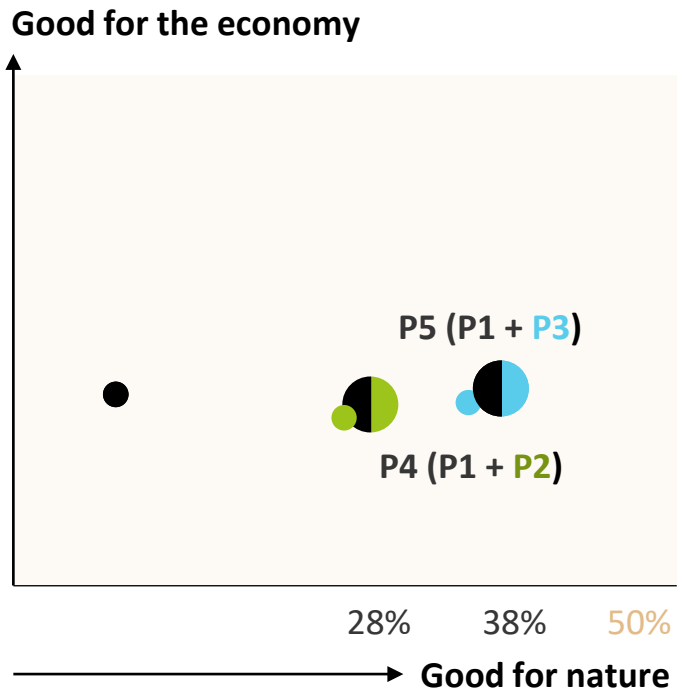
Basic policy options



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

Combined policy options

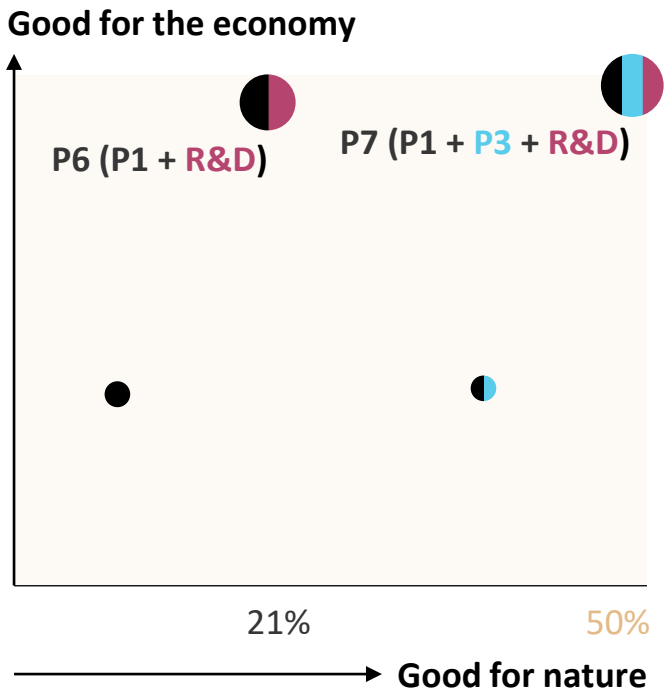
Adding forest carbon payment schemes improves the policy



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

Research & development

Adding research & development improves the policy



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

Question 3: Is 30x30 economically viable?

Essential Approach:

Baseline CGE model projections, 2021-30

Compared to:

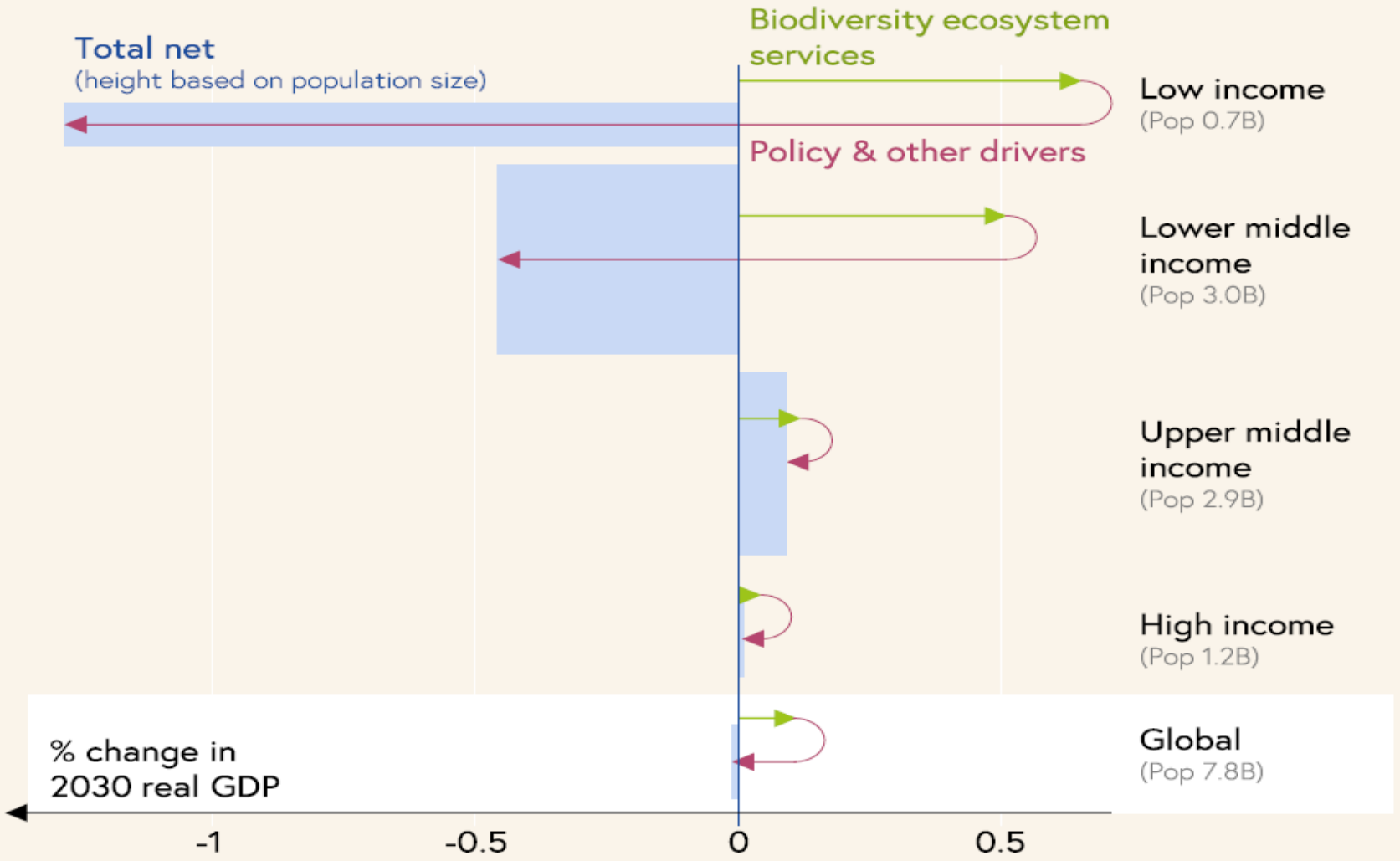
CGE model projections incorporating policies and 30x30 target.

30x30 Shock:

- Increase land for nature by 15.7 percent (adding to existing 14.3 percent conserved), based on priority conservation areas (carbon, biodiversity) within country units.
- Reflects local opportunity costs.

the costs of achieving the 30 x 30 target are largely offset by the benefits from ecosystem service gains.

- **Relatively low cost (net) globally:**
  - **US$ -115 billion** (-0.10%) *without* CC co-benefits.
  - **US$ -13 billion** (-0.01%) *with* CC mitigation co-benefits.
- **But there is a need to mobilize resources in low-income economies.**
- **Increase in the biodiversity index of 29 percent.**



Question 4: Can we identify opportunities at more localized scales?

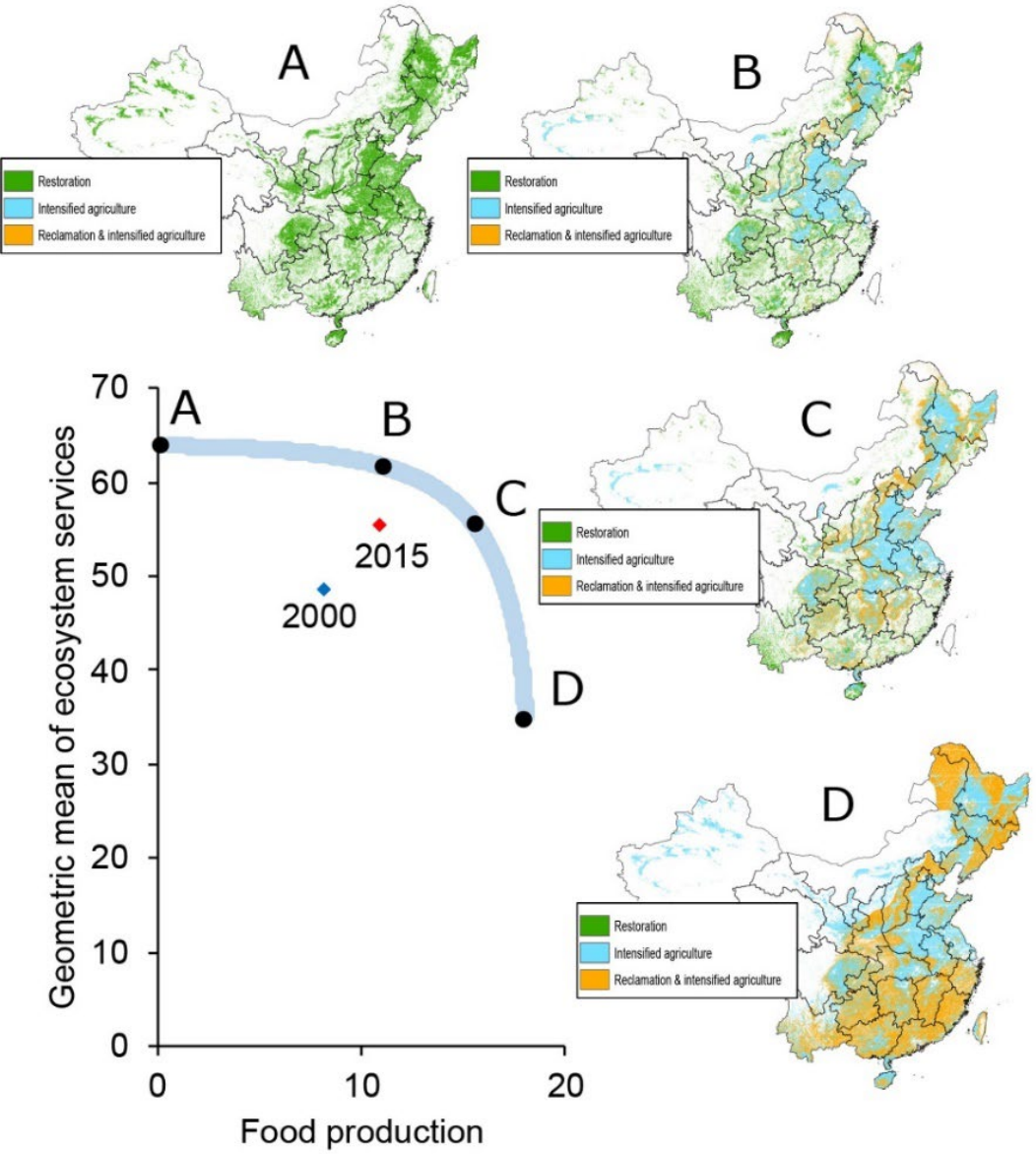
Essential Approach:

Spatial model of China's current landuse

Compared to:

Spatial model of China's optimum landuse

China could increase ecosystem services without compromising agricultural production.

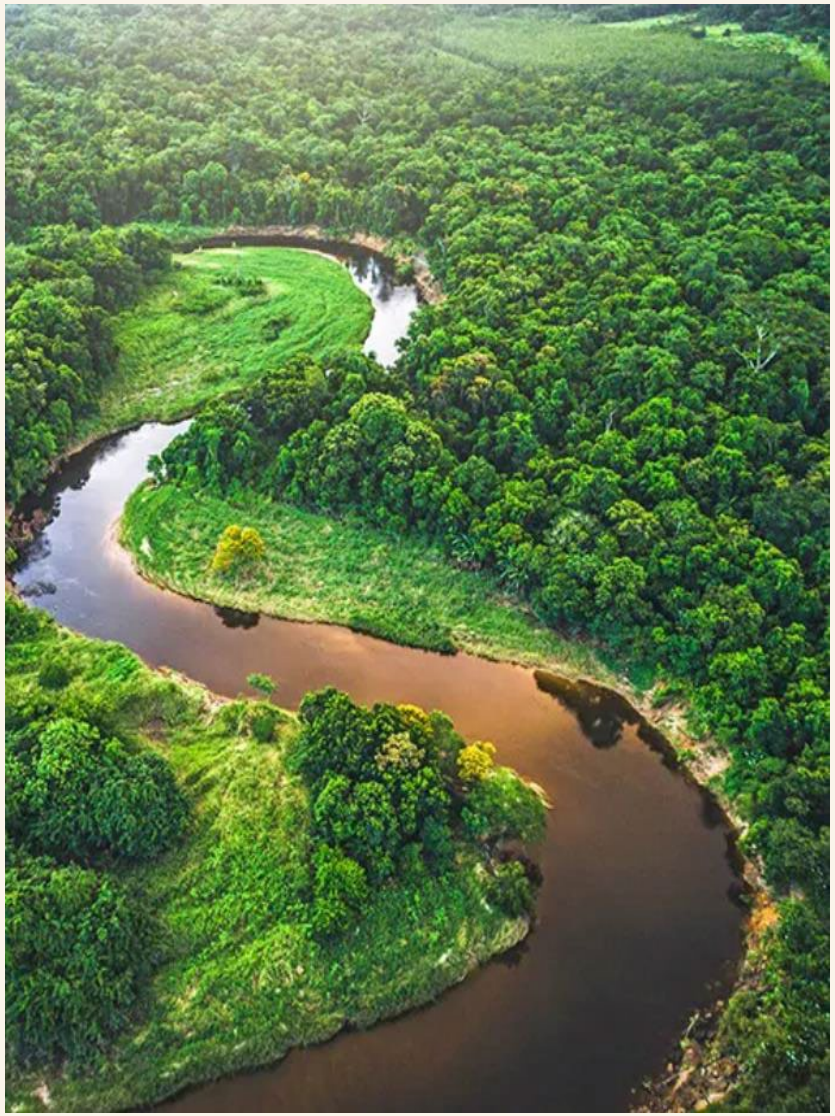


- **Modelling many different land use configurations gives us "nature's Frontier"** This shows what is possible in terms of the tradeoffs between ecosystem services and agricultural production.

- **A shift from 2015 land use to an optimum position (point B) would deliver:**
  - **+25%** of GHG sequestration (280 M tons), or:
  - **+24%** of GHG sequestration (260 M tons) PLUS the **30x30 Biodiversity Target.**

Summary

- **There is a clear (public) economic case for financing nature; this can be quantified in macroeconomic terms.** Continued degradation will cost US$90-225 billion in GDP per year by 2030 via only four pathways.
- **Economies cannot afford the risk of collapse in the services provided by nature.** Costs of US$2.7 trillion under a “collapse” scenario with conservative assumptions.
- **Nature-smart policies can reduce the risk of ecosystem collapse and are “win-win” policies** in terms of biodiversity and economic outcomes (worth US$ 50-150 billion per year).
- **The global decline of biodiversity and ecosystem services is a development issue.** Low-income countries see the greatest declines proportionally.
- **The 30x30 target is economically feasible although requires global transfers.**



Thank you

For more information:

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- Download the report here.