Planbureau voor de Leefomgeving

PBL

Netherlands Environmental Assessment Agency

Government organisation

Strategic policy analysis

Science-to-policy interface

Memories….

University Utrecht

Guyana – Mabura Hill

Bossenoverleg

Biodiversity effects of SFM

Scenario development

Landscape approach

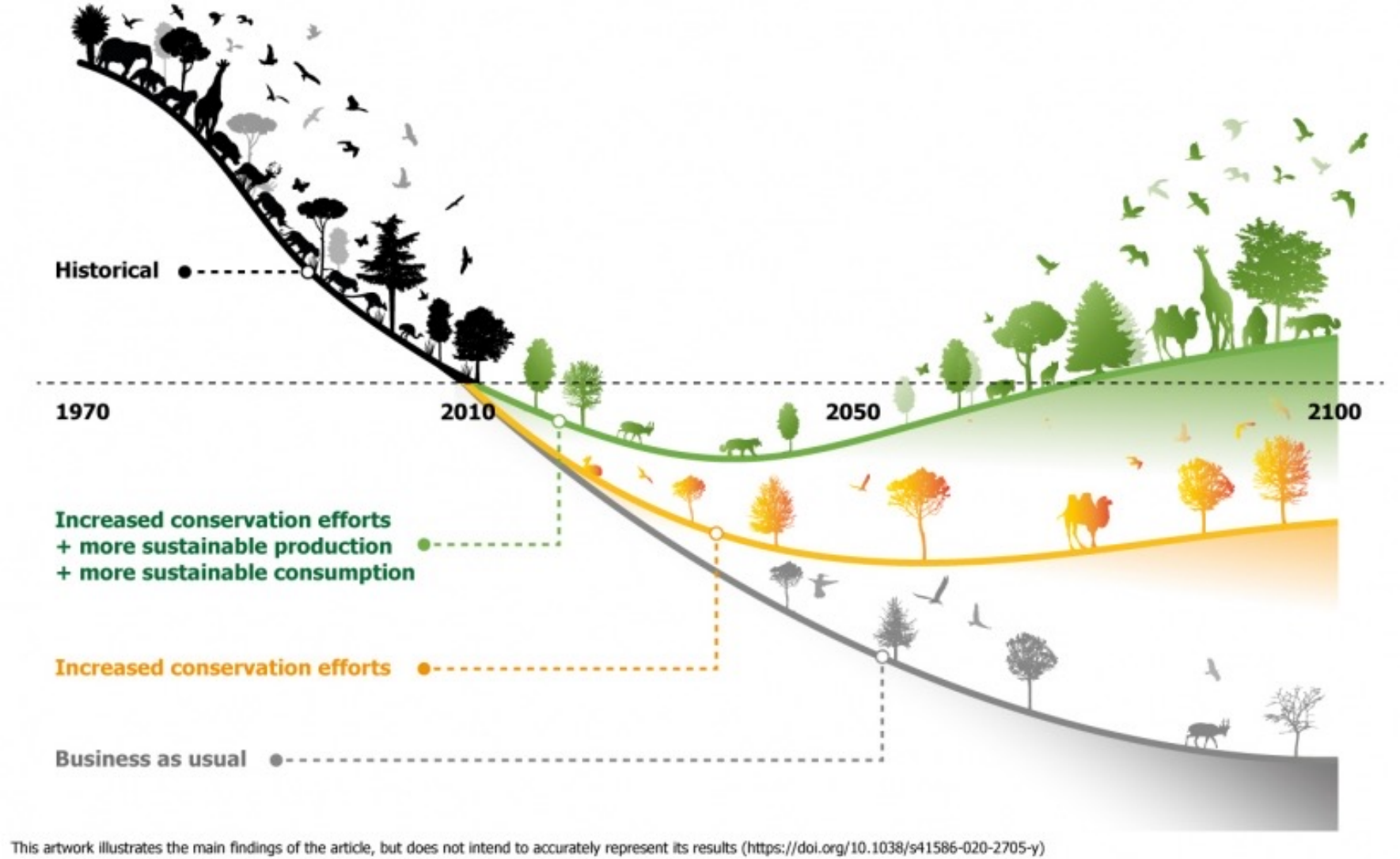
Scenarios for global environmental challenges

Implications for the future role of smallholders

Mark van Oorschot - PBL Netherlands Environmental Assessment Agency

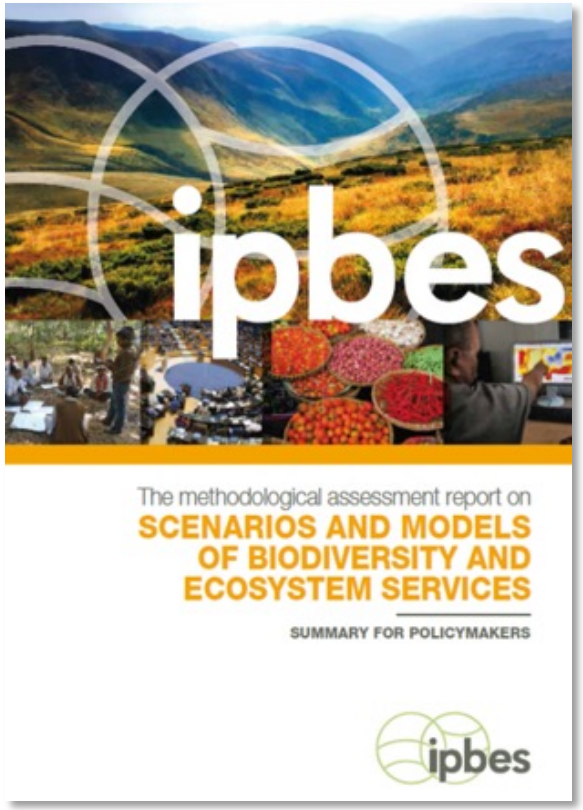
24th march 2022

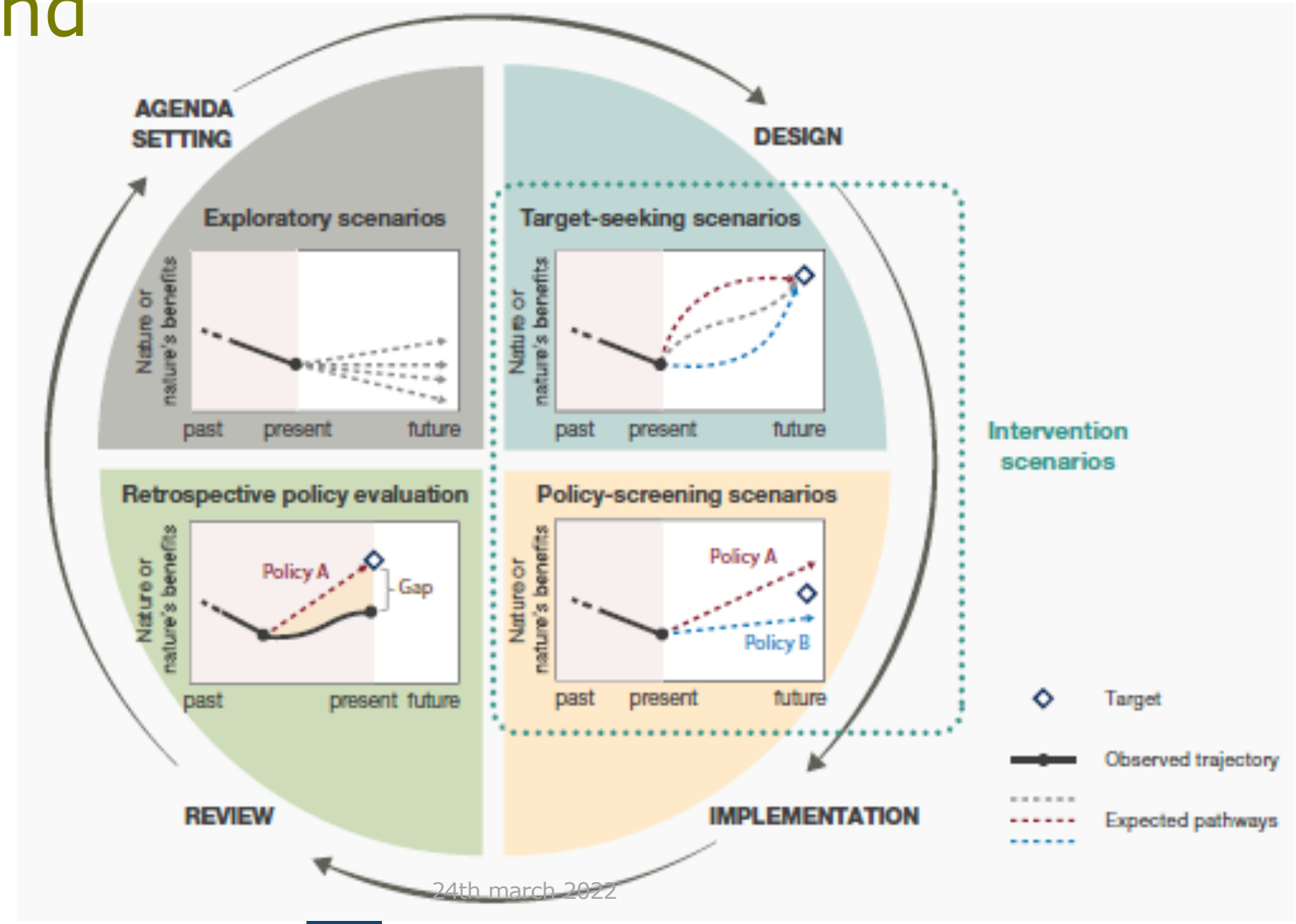
Strategies to bend the curve of biodiversity loss



Leclère et al., Nature vol 585 (2020)

Use of models and scenarios





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"Assessing nature conservation strategies in a food secure and 2 degrees warmer world"

(Marcel Kok, Johan Meijer et al 202X)

- AIM
  - Construct scenarios to explore the solution space to 'bend the curve for **biodiversity**', and simultaneously realise the Paris **Climate** Agreement & SDG **food** security
- Two alternative pathways for conserving nature
  - **Half Earth - HE**
    Traditional area-based conservation, sustainable intensification agriculture, land-sparing
  - **Sharing the Planet - SP**
    Nature's contribution to people, ecosystem service values, agro-ecological approaches, land-sharing

‘Half Earth’

- Rationale: nature protection and make room for nature
- Protect 50% of each eco-region in 2050
  - Existing PAs, Key BA and Zero-Extinction Zones
  - Expansion based on ecological criteria for 2800 ecoregions

- Agriculture: land sparing
  - sustainable intensification based on technological innovation, aiming at eco-efficiency and reducing externalities, intensive agriculture is maintained where it exists
- Smallholders as part of the solution
  - Investment for sustainable intensification, closing the yield gap

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‘Sharing the Planet’

- Rationale: connect people to nature in multifunctional landscapes
- Conservation strategy: optimise nature’s contribution to people
  - Existing PAs and KBA and Zero-Extinction Zones
  - Add high carbon forests and peatlands, and riparian zones bordering rivers
- Agriculture: agro-ecology and land sharing
  - Agro-ecological practices aiming at improved ecosystem services, transformation of intensive agriculture to less intensive practices.
- Smallholders at the heart of the solution
  - Shaping the local production landscape, including local values of ecosystem services, human-nature co-existence

Integrating options for sustainability

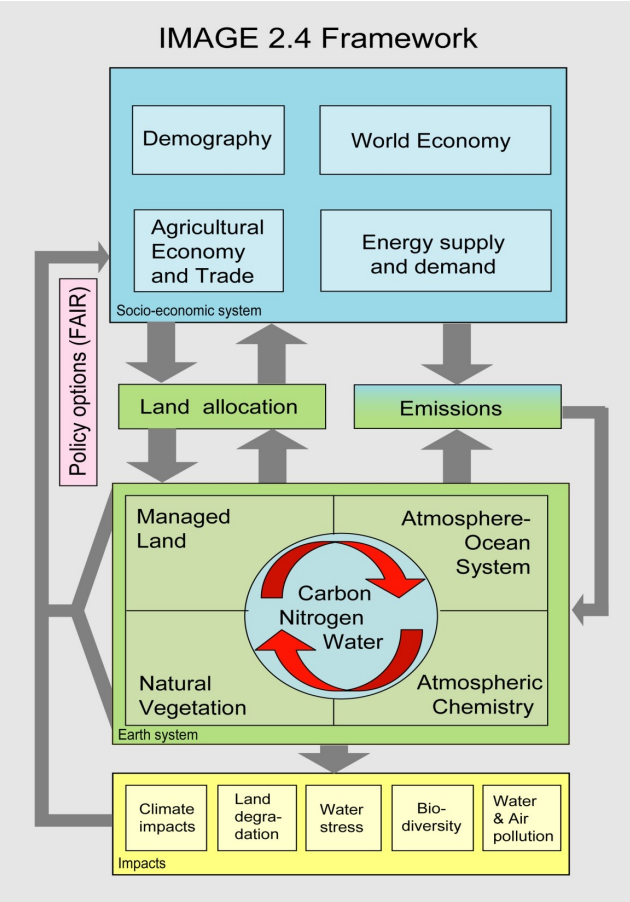
- reduced **meat/dairy** consumption
- **agricultural** system changes
- reduced reliance on **biofuels/hydro**
- **REDD**

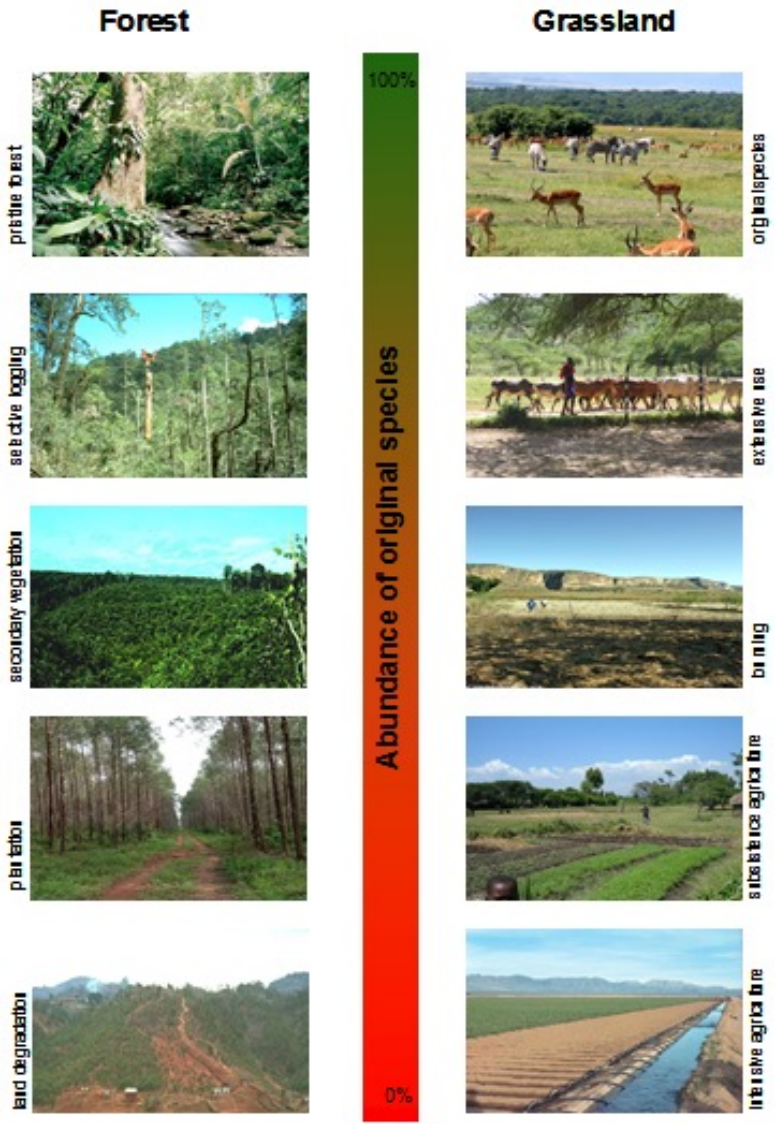
- and many many more …..

Different assumptions in both pathways

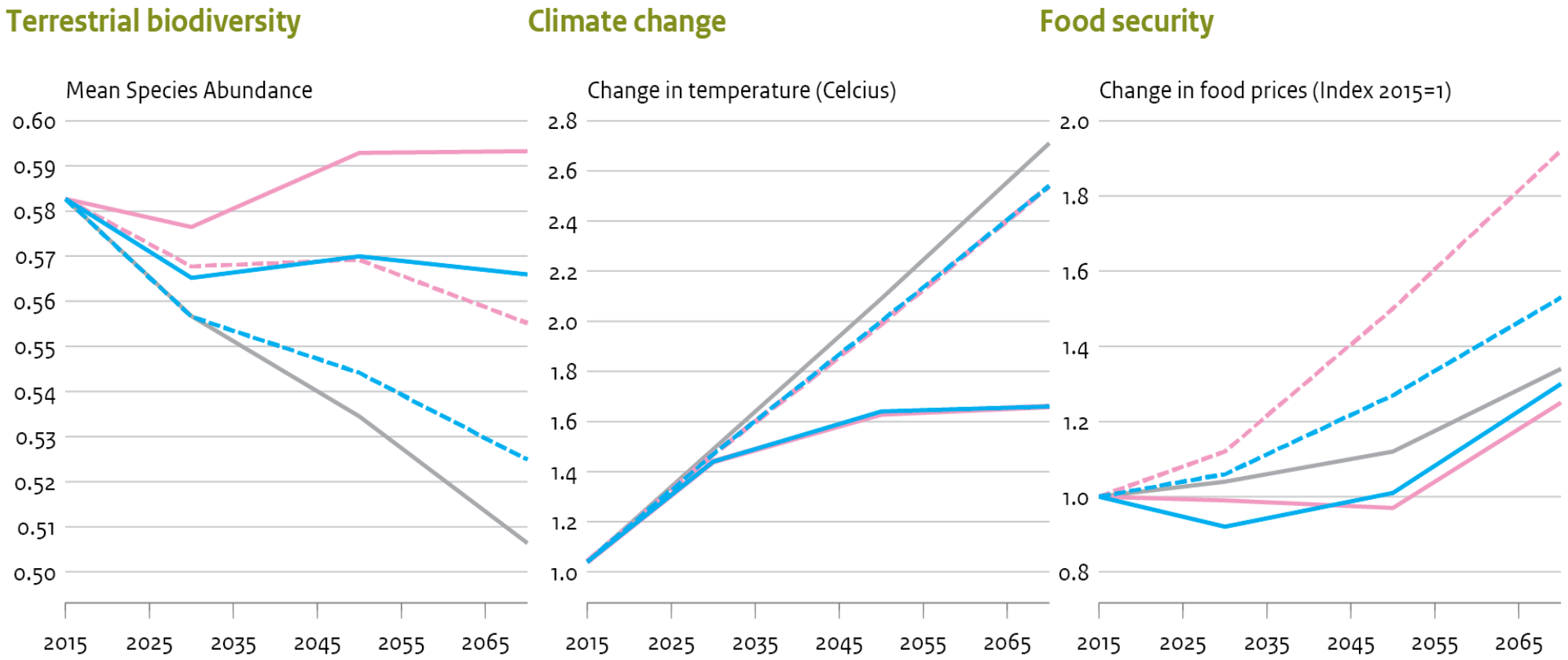
Model and indicator

- GLOBIO/IMAGE model
  - Pressure based approach
  - Coupled to global land-use
  - Direct and indirect drivers
- Biodiversity indicators
  - MSA Naturalness
  - Ecosystem benefits
  - Living Plant Index
  - Red List Index
  - Habitat area





Bending the curve: results



Risk of hunger

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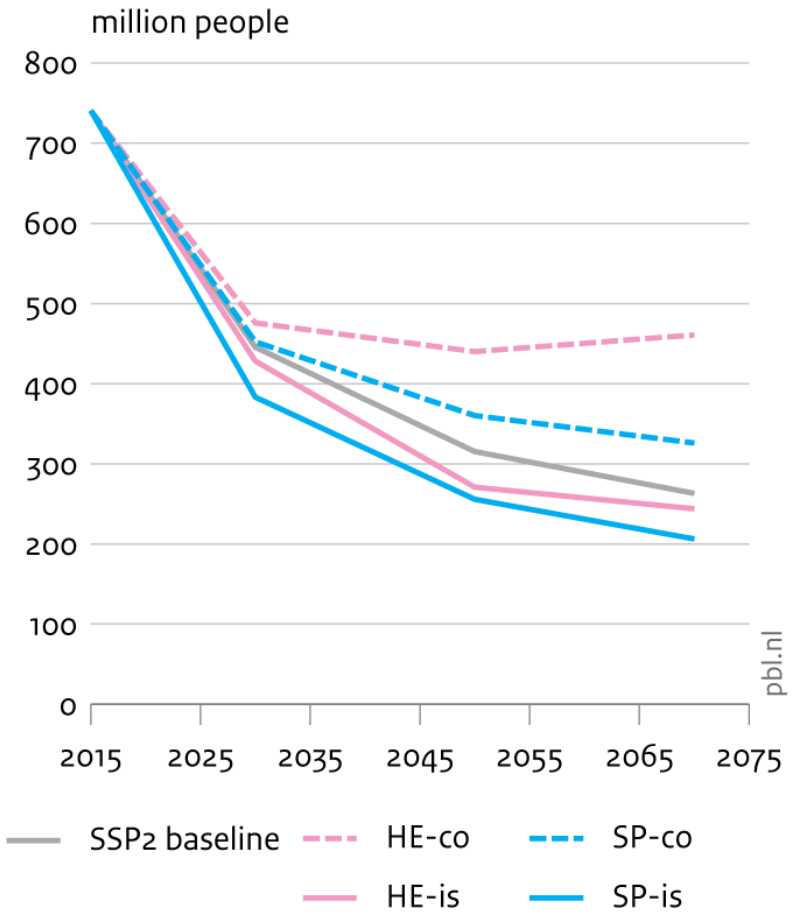
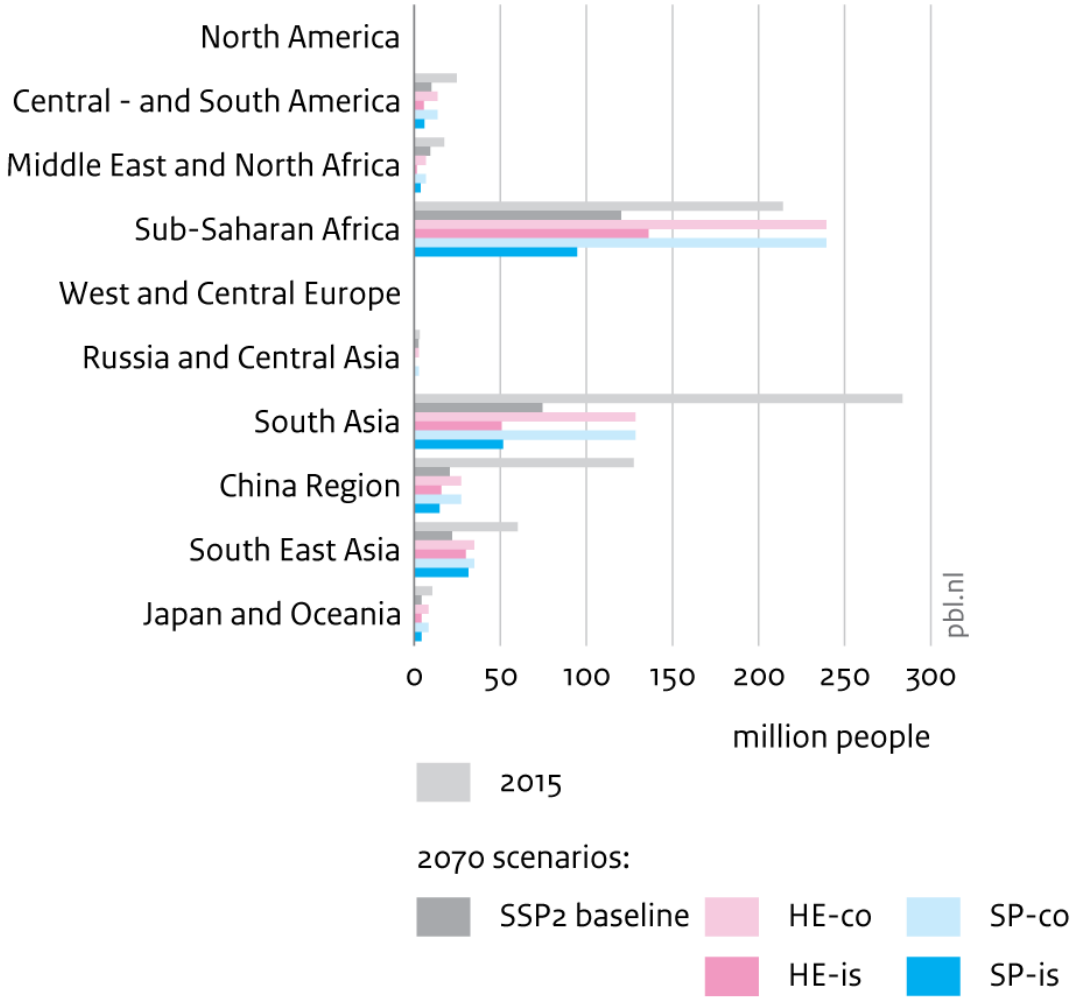
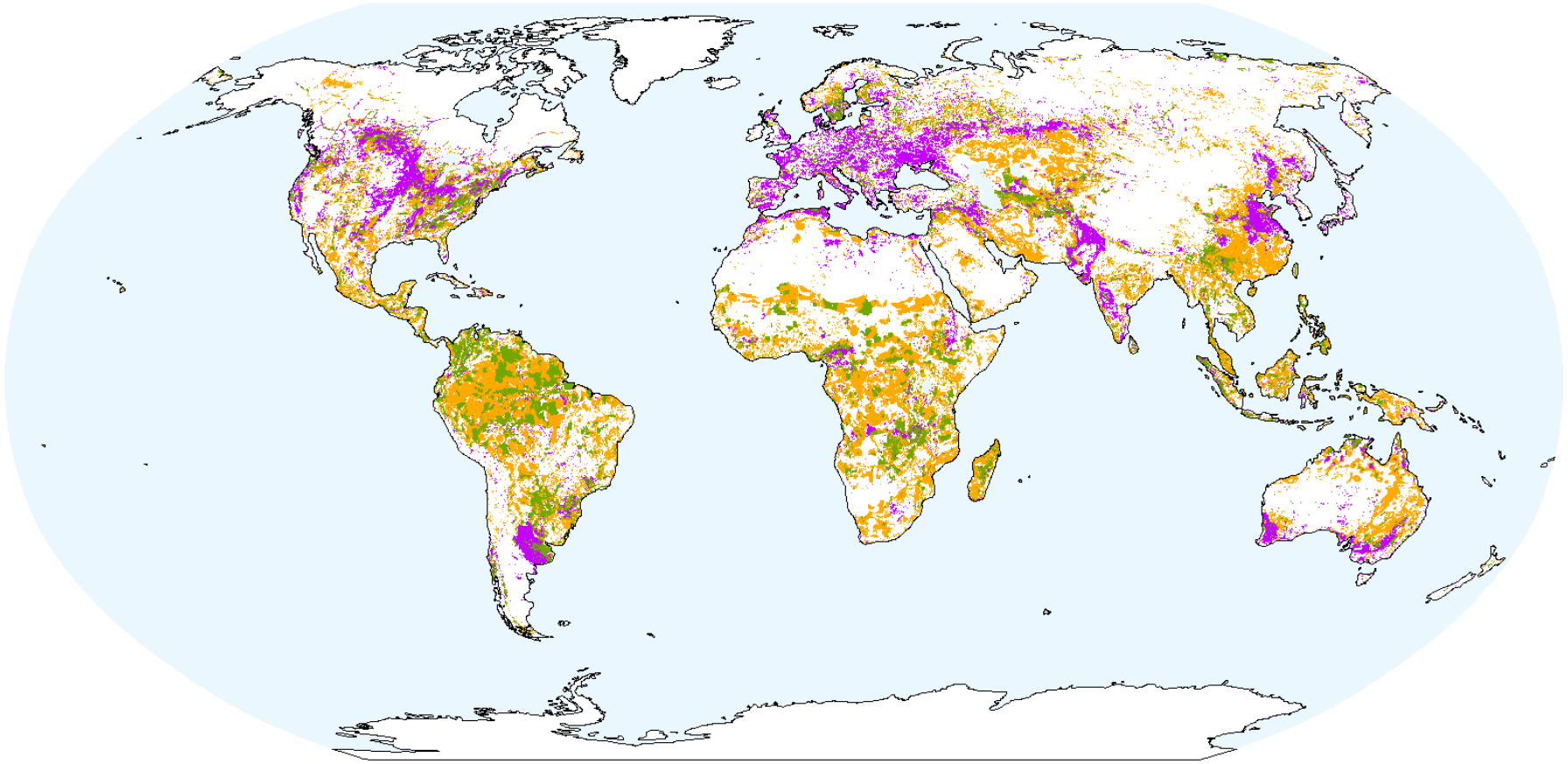
(a) Global population at risk of hunger



(b) Regional population at risk of hunger, 2015 and 2070



Effects of HE and SP conservation strategies on MSA



Improved MSA by five percentage points compared to the baseline in 2070

- Improved MSA under both HE and SP strategies
- Improved MSA under the HE strategy
- Improved MSA under the SP strategy

Some conclusions from solution scenarios

- By 2050, it is possible to achieve biodiversity-, climate- and food-related goals
- However, this is extremely ambitious and requires several transitions
- A broad portfolio of measures required to tackle related problems
- Biodiversity and climate must be tackled together
- Need to expand current protected areas and stimulate restoration
- Land-use changes are central in achieving targets
- Changes in food consumption (proteins) will play a crucial role
- New agricultural sector structures needed

Implications for smallholder positions

"HALF EARTH"

- Agricultural intensification
- Investment driven
- Efficient production
- Reducing externalities
- Link to global markets
- Viability of small-scale agriculture?

"SHARING THE PLANET"

- Agro-ecological pathway
- Development driven
- Nature-based solutions
- Using local benefits of nature
- Serving mostly regional demands
- Capture additional revenue streams?

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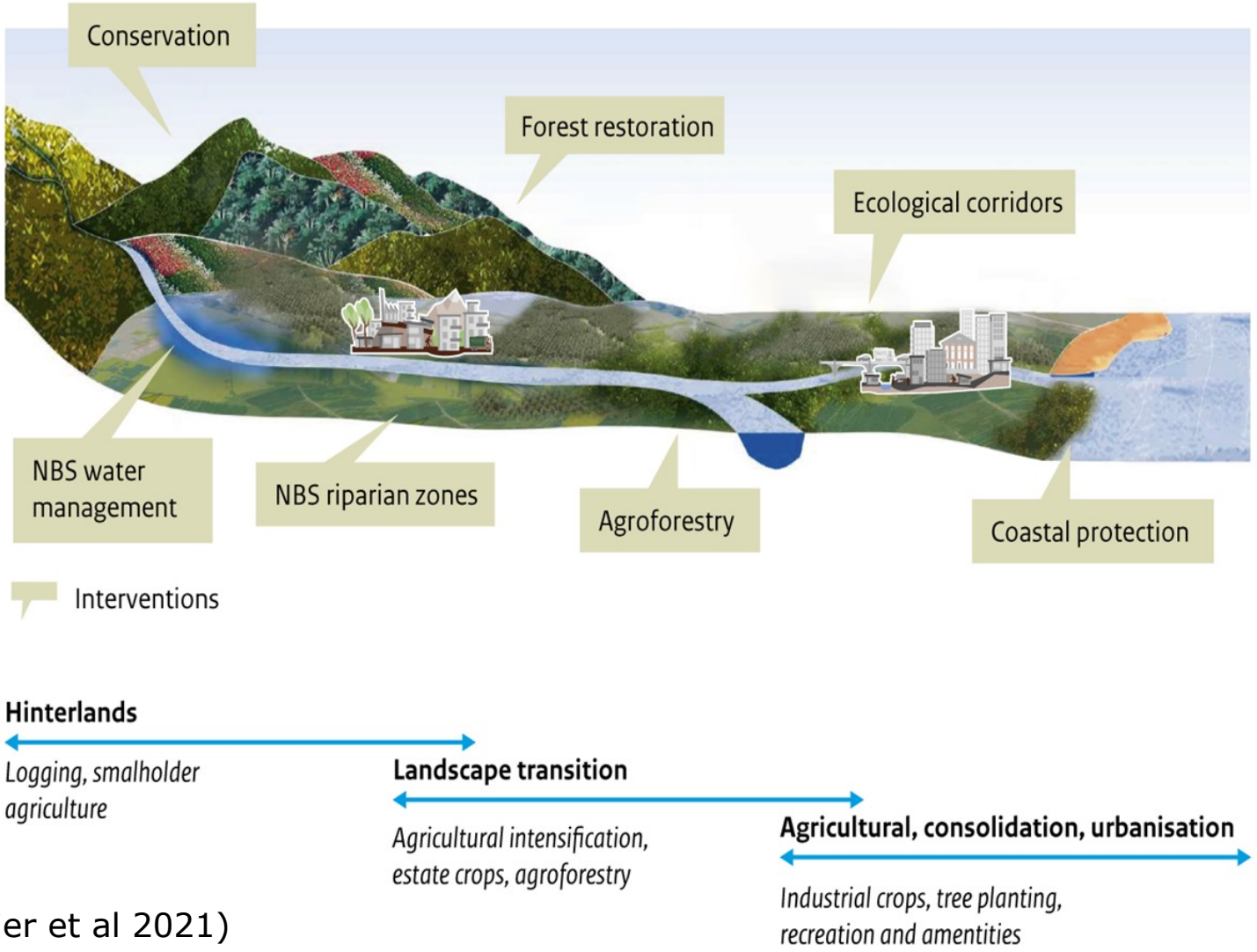
Complementary roles at the landscape level

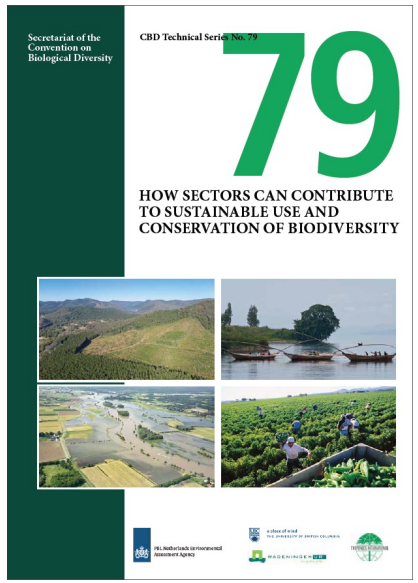
- General model archetypes
  - No one-size-fits-all
- Whole-of-society approach
  - Action required by many actors
- Doing the right thing at the right place
- Smallholder position
  - Complementary roles across landscapes

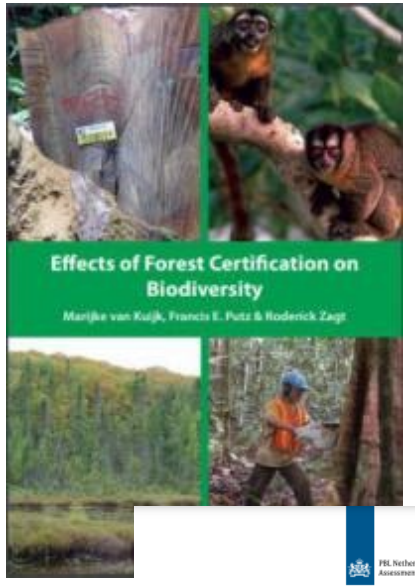


(Meijer et al 2021)

Cooperation PBL- TBI

- ✓ Ground truthing solutions
- ✓ Sustainable forestry and agriculture systems
- ✓ Insights from mosaic landscapes
- ✓ Local benefits and values of NBS
- ✓ Making investment work for SH
- ✓ Governance insights





Congratulations !