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Sistema Nazionale per la Protezione dell'Ambiente

Rimini, 8 novembre 2023

How to preserve natural capital by recognizing its economic value

"UN Agreement and EU Regulation. How to connect the economic activities and natural processes"

Lorenzo Ciccarese, ISPRA, NFP IPBES

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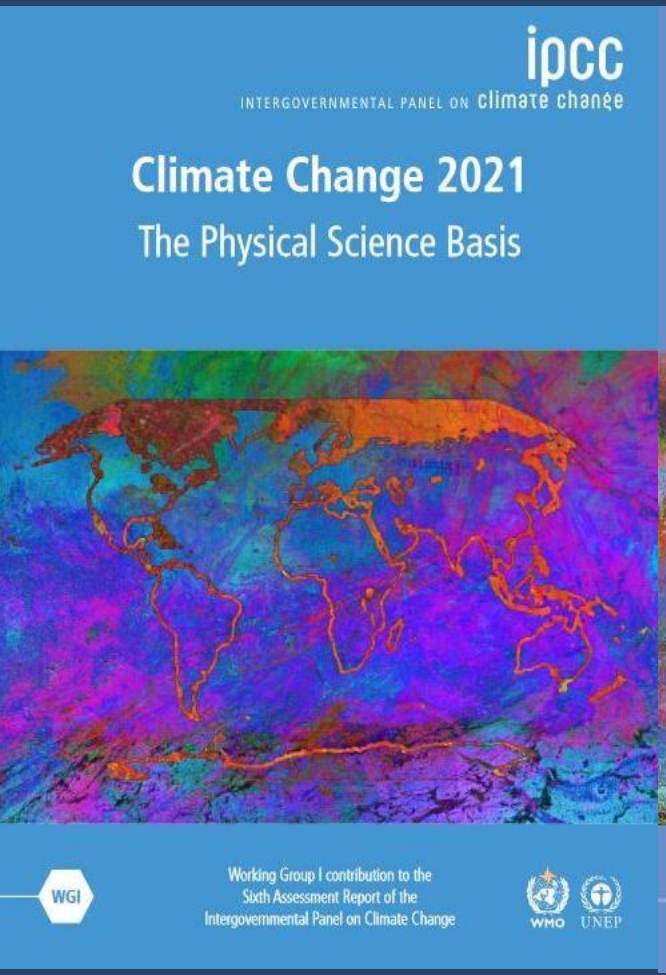
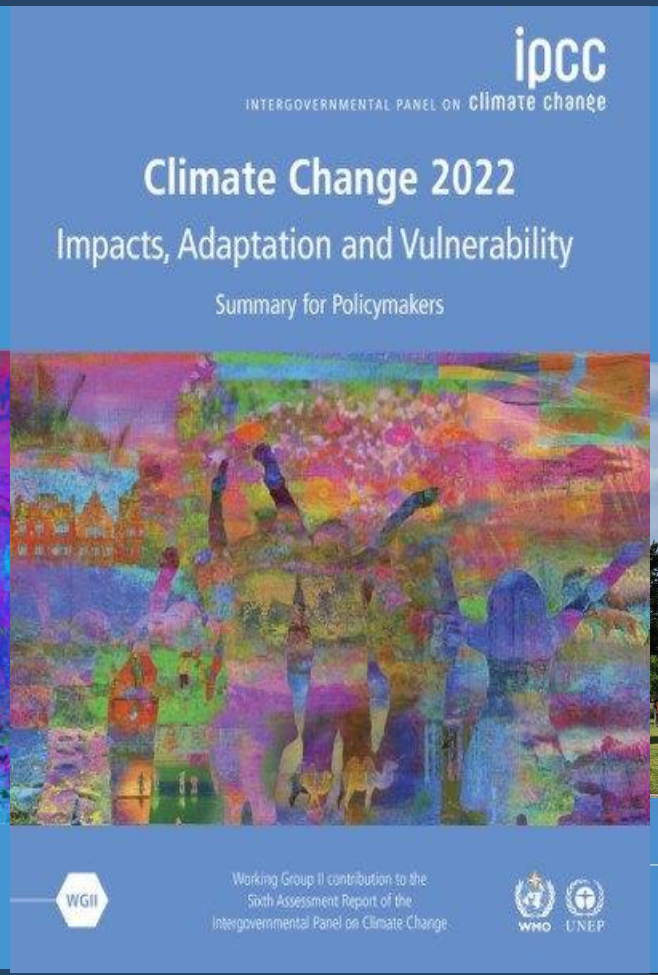
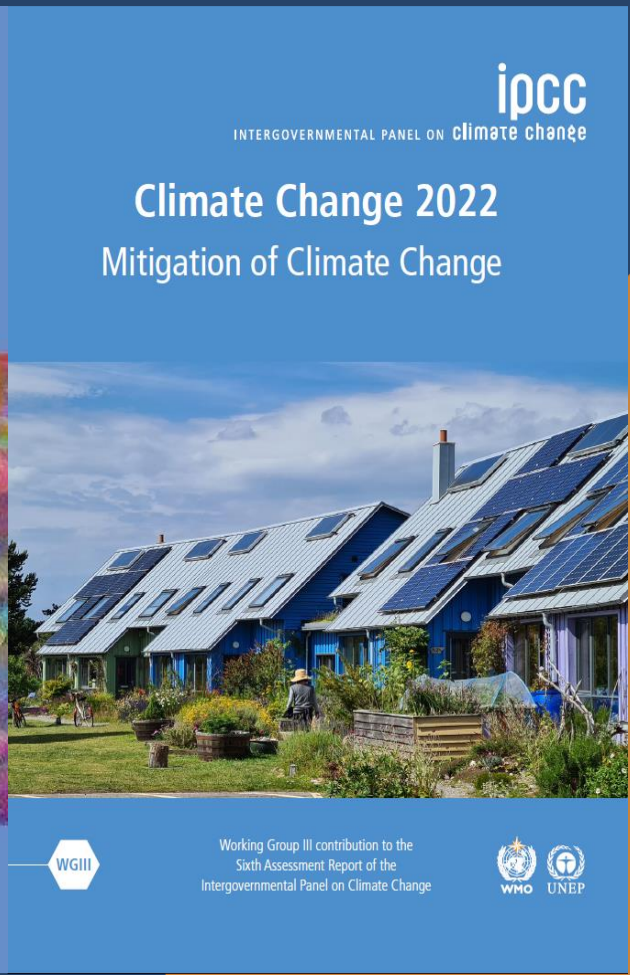
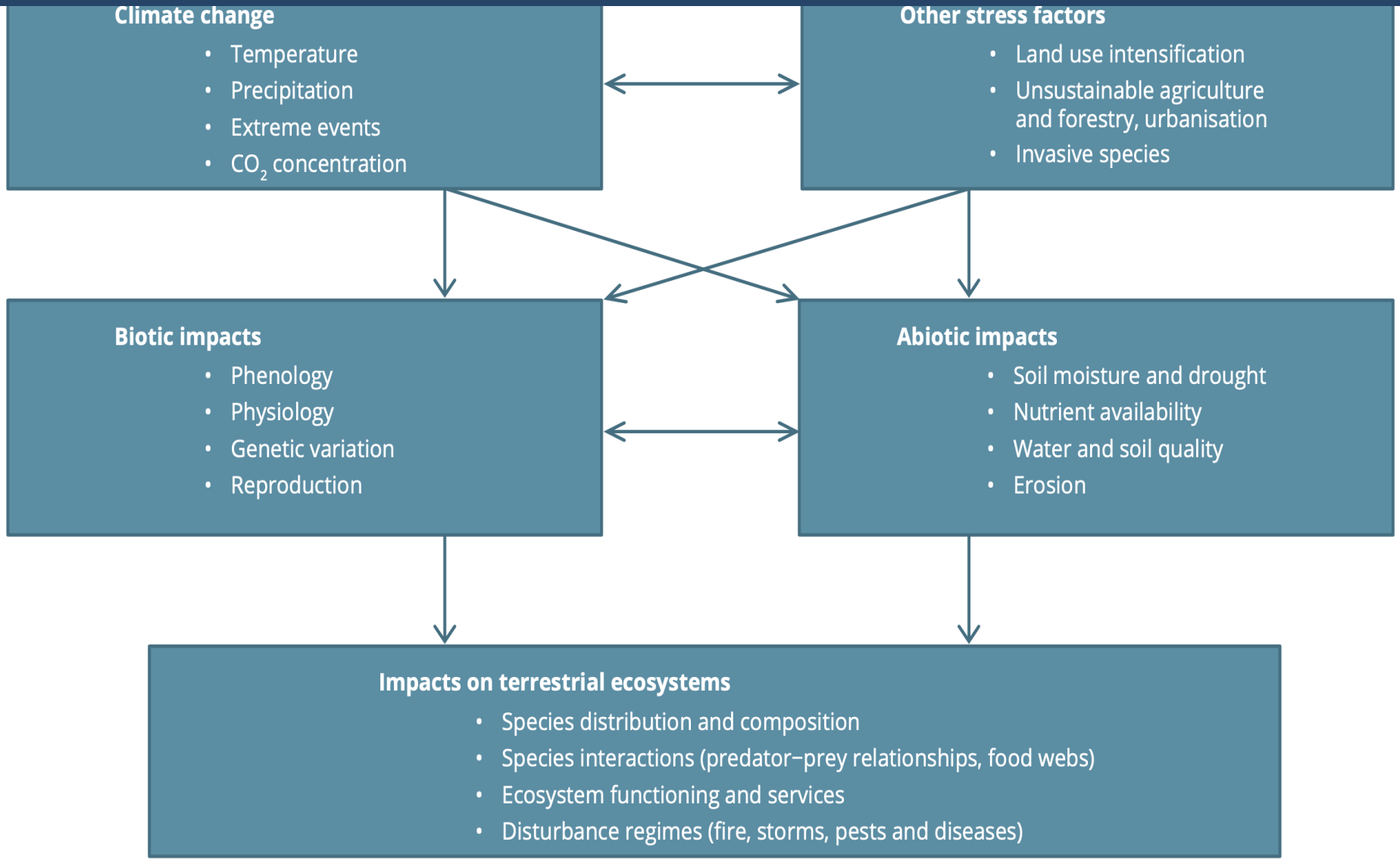






I principali *climatic impact-drivers* (CID) sulla biodiversità, secondo l'IPCC 6AR



NEWS FEATURE | 09 June 2023

Examining the role of climate change in the Emilia-Romagna floods

A preliminary study raised questions about the contribution of global warming to the recent disaster, but the data needs to be considered through varying qualifiers.

Q&A | 02 November 2021

Assessing Italy's climate risk

Climatologist Donatella Spano says recent extreme events in Sicily show what is at stake for Italy and the Mediterranean in the COP26 negotiations.

Impacts of climate change on productivity of natural and seminatural ecosystems

nature climate change

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Article | Published: 01 April 2021

Anthropogenic climate change has slowed global agricultural productivity growth

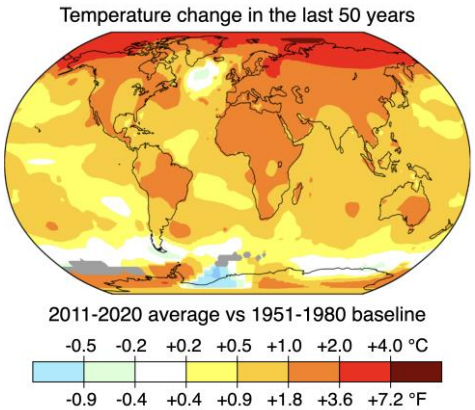
Ariel Ortiz-Bobea, Toby R. Ault, Carlos M. Carrillo, Robert G. Chambers & David B. Lobell

Nature Climate Change **11**, 306–312(2021) | Cite this article

4476 Accesses | **3** Citations | **1210** Altmetric | Metrics

Abstract

Agricultural research has fostered productivity growth, but the historical influence of anthropogenic climate change (ACC) on that growth has not been quantified. We develop a robust econometric model of weather effects on global agricultural total factor productivity (TFP) and combine this model with counterfactual climate scenarios to evaluate impacts of past climate trends on TFP. Our baseline model indicates that ACC has reduced global agricultural TFP by about 21% since 1961, a slowdown that is equivalent to losing the last 7 years of productivity growth. The effect is substantially more severe (a reduction of -26–34%) in warmer regions such as Africa and Latin America and the Caribbean. We also find that global agriculture has grown more vulnerable to ongoing climate change.



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IPCC WGI Interactive Atlas: Regional synthesis

Home About License

SELECT VISUALIZATION

MAP | REGIONS | COMBINATIONS

HEAT AND COLD
- Mean surface temperature
- Extreme heat
- Cold spell
- Frost

WET AND DRY
- Mean precipitation
- River flood
- Heavy precipitation and pluvial flood
- Landslide
- Aridity
- Hydrological drought
- Agricultural and ecological drought
- **Fire weather**

WIND
- Mean wind speed
- Severe wind storm
- Tropical cyclone
- Sand and dust storm

SNOW AND ICE
- Snow, glacier and ice sheet
- Permafrost
- Lake, river and sea ice
- Heavy snowfall and ice storm
- Hail
- Snow avalanche

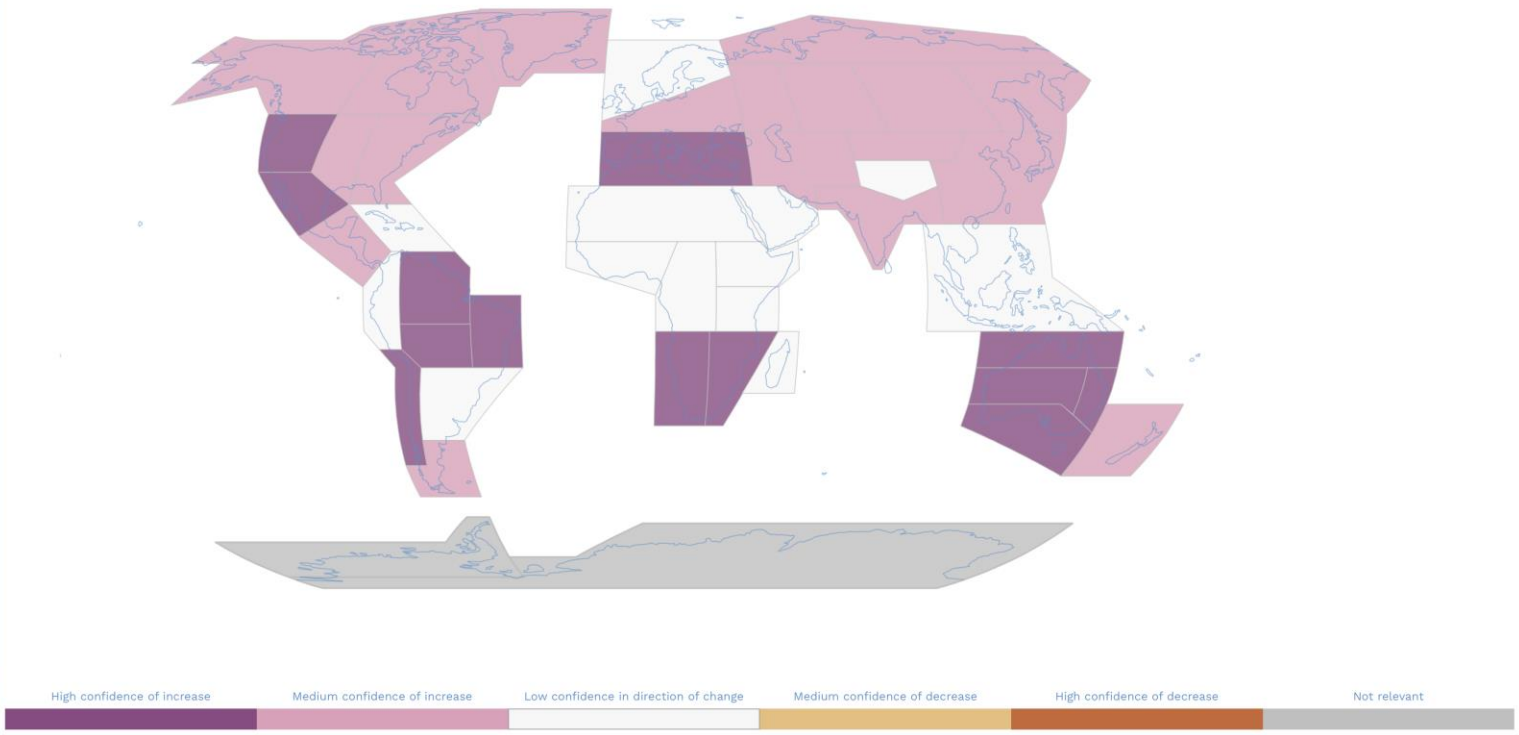
COASTAL
- Relative sea level
- Coastal flood
- Coastal erosion
- Marine heatwave
- Ocean acidity

OTHERS
- Air pollution weather
- Atmospheric CO_2 at surface
- Radiation at surface

SELECT MAGNITUDE

PROJECTIONS | PAST TRENDS

Secondo il II volume dell'AR6 dell'IPCC esiste «high confidence of increase» del «fire weather» nella regione mediterranea



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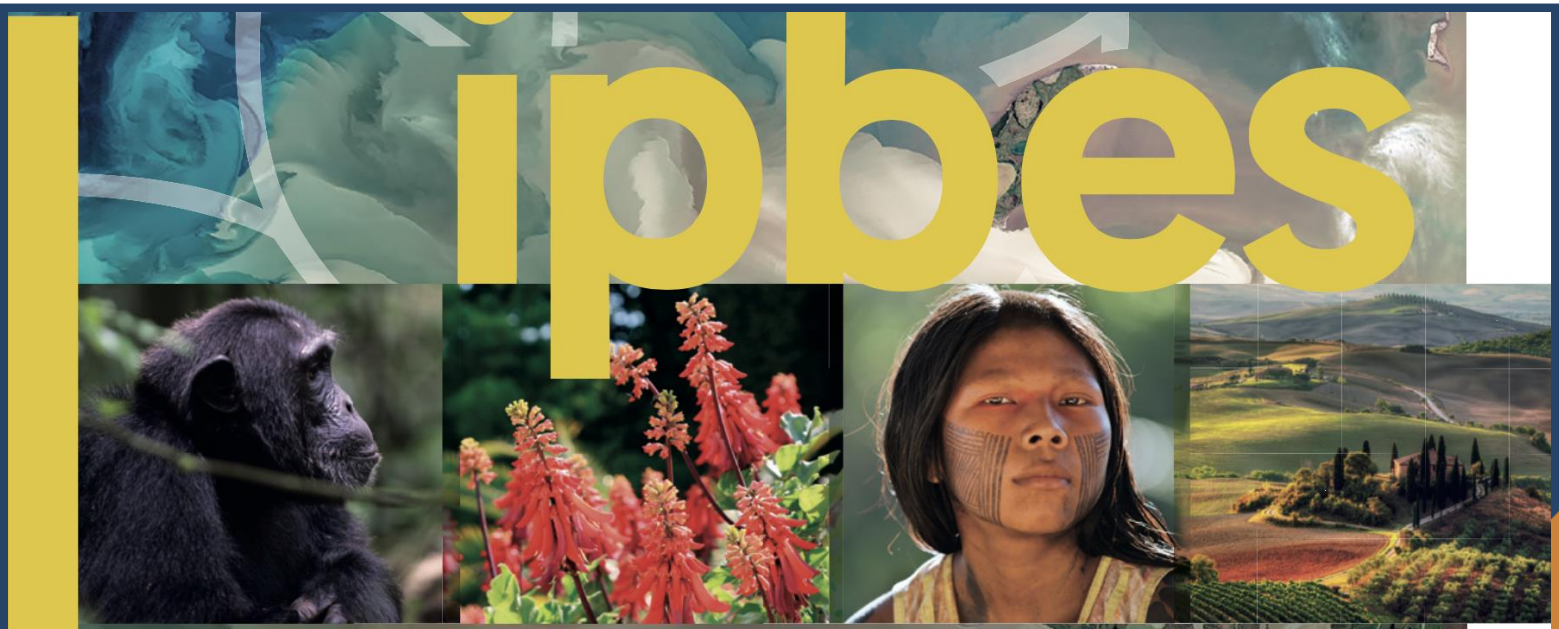

The global assessment report on

BIODIVERSITY AND ECOSYSTEM SERVICES

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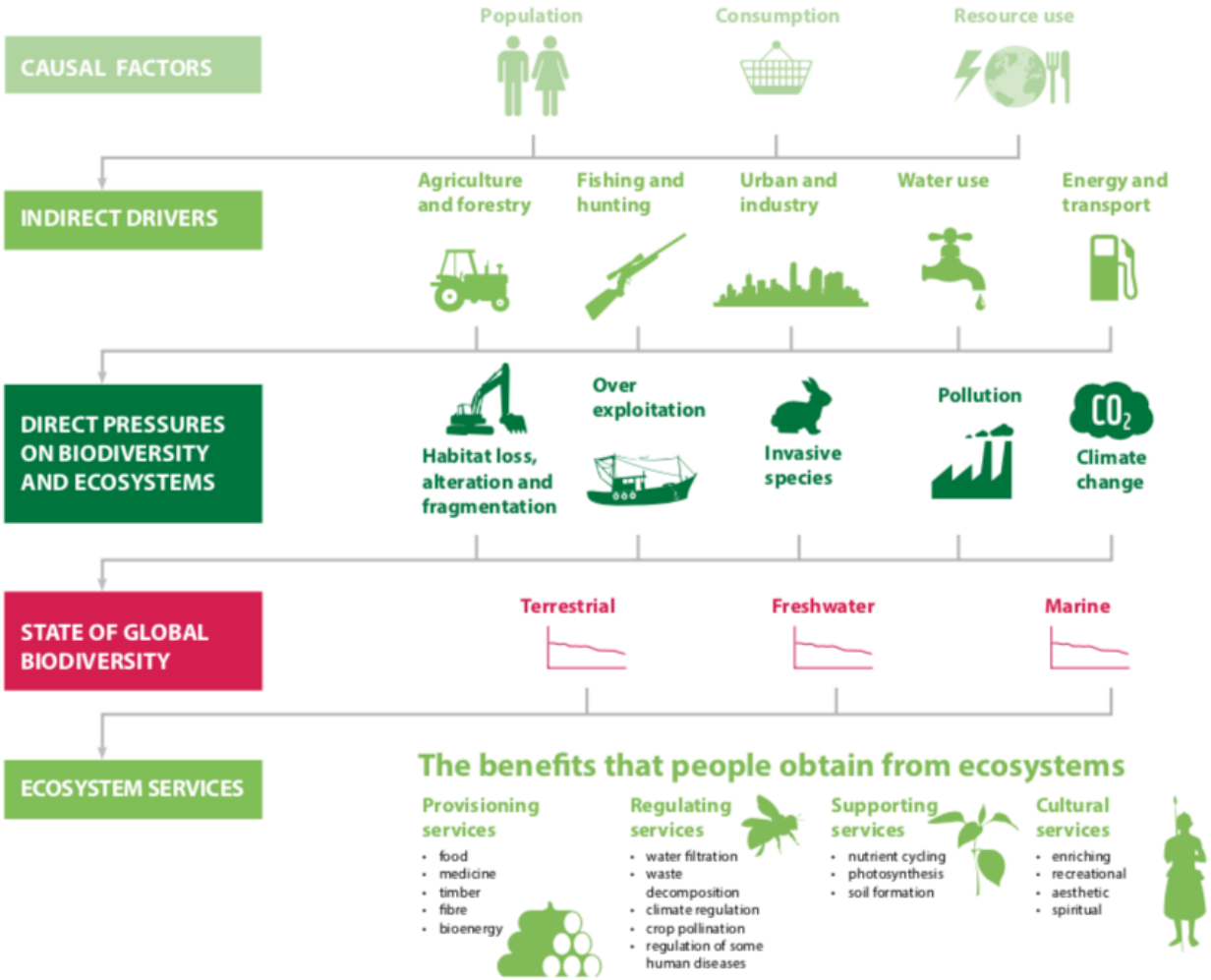
Figure 6.2: Interconnections between people, biodiversity, ecosystem health and provision of ecosystem services showing drivers and pressures



Source: World Wide Fund for Nature (WWF) *et al.* (2012).

	Nature's contribution to people	50-year global trend	Directional trend across regions	Selected indicator
REGULATION OF ENVIRONMENTAL PROCESSES	1 Habitat creation and maintenance	↓ ↓	○ ○	• Extent of suitable habitat • Biodiversity intactness
	2 Pollination and dispersal of seeds and other propagules	↓ ↓	○ ○	• Pollinator diversity • Extent of natural habitat in agricultural areas
	3 Regulation of air quality	↘	↓↑	• Retention and prevented emissions of air pollutants by ecosystems
	4 Regulation of climate	↘	↓↑	• Prevented emissions and uptake of greenhouse gases by ecosystems
	5 Regulation of ocean acidification	→	↓↑	• Capacity to sequester carbon by marine and terrestrial environments
	6 Regulation of freshwater quantity, location and timing	↘	↓↑	• Ecosystem impact on air-surface-ground water partitioning
	7 Regulation of freshwater and coastal water quality	↘	○	• Extent of ecosystems that filter or add constituent components to water
	8 Formation, protection and decontamination of soils and sediments	↘	↓↑	• Soil organic carbon
	9 Regulation of hazards and extreme events	↘	↓↑	• Ability of ecosystems to absorb and buffer hazards
	10 Regulation of detrimental organisms and biological processes	↓ ↘	○ ○	• Extent of natural habitat in agricultural areas • Diversity of competent hosts of vector-borne diseases
NON-MATERIAL MATERIALS AND ASSISTANCE	11 Energy	↗ ↘	↓↑ ↓↑	• Extent of agricultural land—potential land for bioenergy production • Extent of forested land
	12 Food and feed	↗ ↓	↓↑ ↓↑	• Extent of agricultural land—potential land for food and feed • Abundance of marine fish stocks
	13 Materials and assistance	↗ ↘	↓↑ ↓↑	• Extent of agricultural land—potential land for material production • Extent of forested land
	14 Medicinal, biochemical and genetic resources	↘ ↓	○ ○	• Fraction of species locally known and used medicinally • Phylogenetic diversity
	15 Learning and inspiration	↓ ↓	○ ○	• Number of people in close proximity to nature • Diversity of life from which to learn
	16 Physical and psychological experiences	↘	○	• Area of natural and traditional landscapes and seascapes
	17 Supporting identities	↘	○	• Stability of land use and land cover
	18 Maintenance of options	↓ ↓	○ ○	• Species' survival probability • Phylogenetic diversity

Decrease ← → Increase

DIRECTIONAL TREND

Gloal trends: ↓ ↘ → ↗ ↑

Across regions: ○ Consistent ↓↑ Variable

LEVELS OF CERTAINTY

- Well established
- Established but incomplete
- Unresolved

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On a global level, none of the 20 targets was fully achieved. Of the 60 specific elements that make up the Aichi Biodiversity Targets:

7 were (partially) achieved, including the Protected Areas target

38 show progress

13 show no progress or deviation from the target

2, progress not known.

44 trilioni di dollari di generazione di valore economico - oltre la metà del PIL totale mondiale - sono potenzialmente a rischio a causa della dipendenza delle imprese dalla natura e dai relativi servizi.
Fonte: WEF, 2021

La perdita di biodiversità e il collasso degli ecosistemi sono stati classificati come una delle cinque principali minacce che l'umanità dovrà affrontare nei prossimi 10 anni nel Global Risks
Fonte: *WEF*, 2021

The failure of the 2011-2020 Aichi Targets

EDITORIAL | 18 February 2020

The United Nations must get its new biodiversity targets right

Global goals to reduce biodiversity loss will be revised this year. All eyes are on China, which must ensure the new targets are measurable and meaningful.

International Institute for Applied Systems Analysis
IIASA www.iiasa.ac.at

The Aichi targets failed, in part, because of:

- **they did not set out what is sufficient to prevent ongoing biodiversity decline;**
- **their format made progress hard to measure;**
- **the lack of a (i) regular monitoring and (ii) review of the contributions.**
- **Ambiguous, insufficient, unquantifiable, and complex and redundant objectives, lack of baselines and indicators;**
- **national strategies to achieve these targets have been inefficient in their allocation of (limited) resources.**

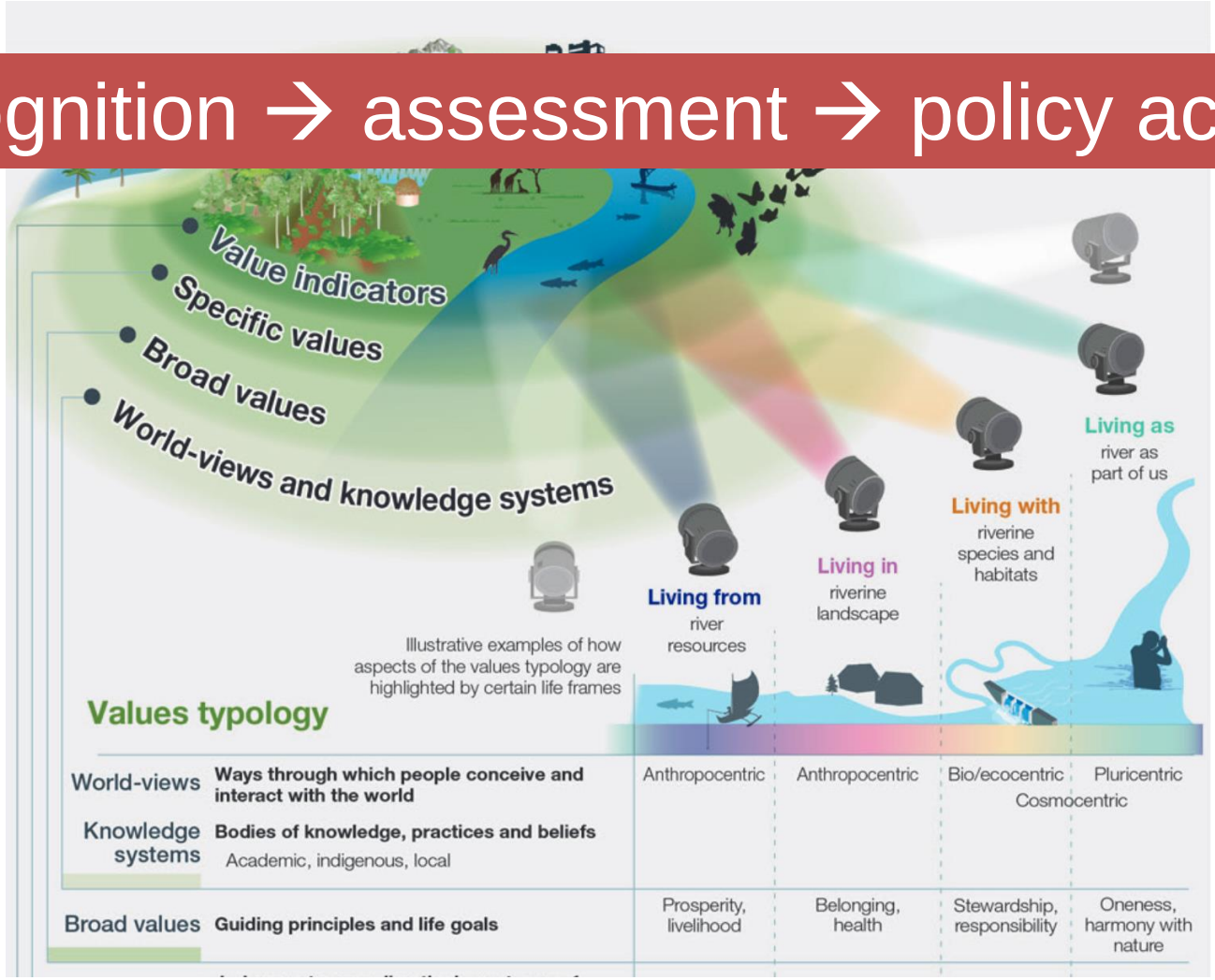
Per arrestare e invertire il declino della biodiversità entro il 2030 » colmare un *funding gap* per la protezione e il restauro della natura di 824 miliardi di US$ l'anno, da una spesa attuale di 124-134 miliardi attuali a 722-824 US$ (eliminare i sussidi '*harmful*' e aumentare politiche fiscali, green finance, investimenti in infrastture verdi come *Nature-based Solutions*, …)

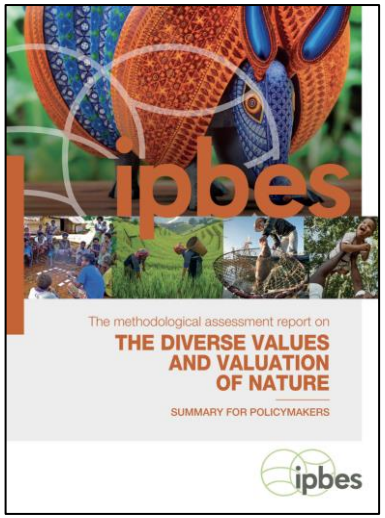
Fonte: *The Nature Conservancy*, 2020

.

«Living in harmony with nature»: *from*, *in*, *with*, *as* nature

Value recognition → assessment → policy action



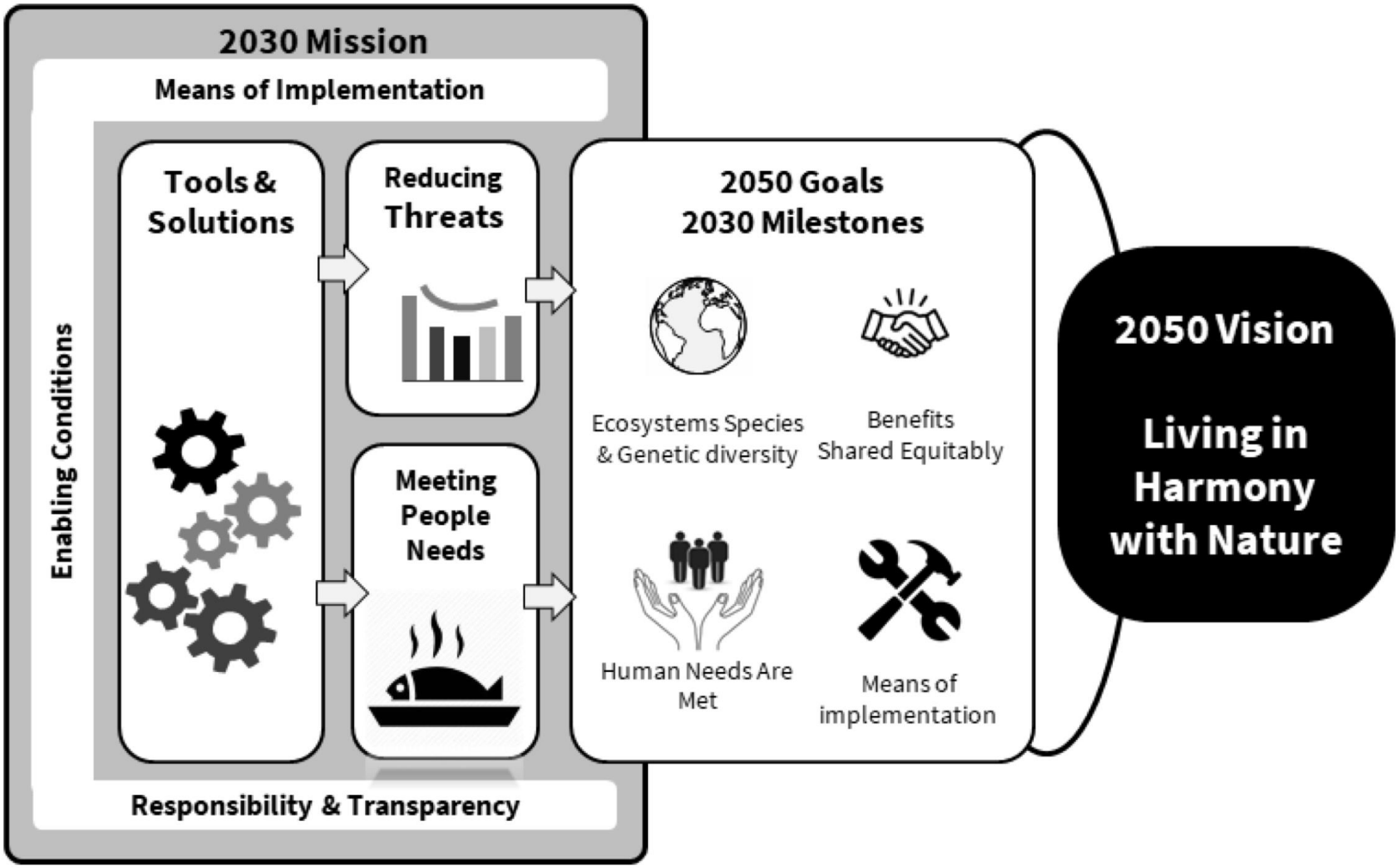


https://zenodo.org/record/7410287/files/EN_SPM_VALUES_V8D_DIGITAL.pdf

IPBES Methodological Assessment Report: an extraordinary attention to the social dimension of biodiversity protection

«*The Assessment demonstrates that recognizing and respecting the worldviews, values and traditional knowledge of indigenous peoples and local communities lead to the formulation of policies that are more inclusive, with better outcomes for people and nature*»

Source: IPBES (2022). Methodological Assessment Report (…) p. v


2030 Mission
Means of Implementation
Enabling Conditions
Tools & Solutions
Reducing Threats
Meeting People Needs
Responsibility & Transparency
2050 Goals
2030 Milestones
Ecosystems Species & Genetic diversity
Benefits Shared Equitably
Human Needs Are Met
Means of implementation
2050 Vision
Living in Harmony with Nature

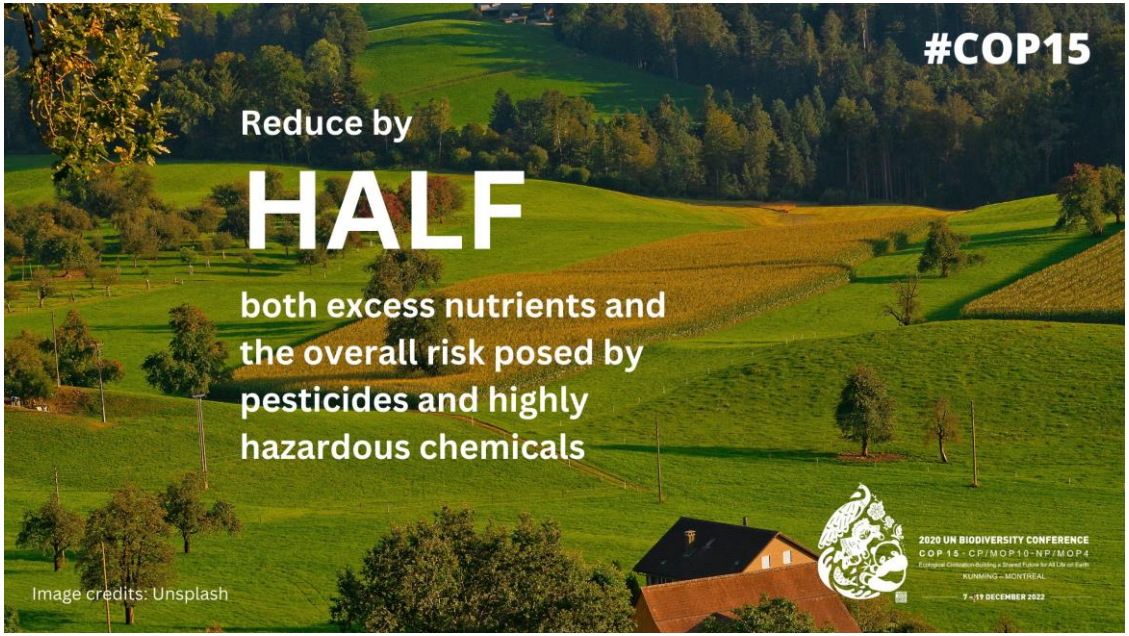
Section H of the Kunmimg Montreal Global Biodiversity Framework to the UN Convention on Biological Diversity

23 Target for 2030, https://www.cbd.int/gbf/targets

1. Reducing threats to biodiversity (1-8)
2. Meeting people's needs through sustainable use and benefit-sharing (9-13)
3. Tools and solutions for implementation and mainstreaming (14-23)

Target 6

Target 7



Target 8

Minimize the impact of climate change [...] on biodiversity and increase its resilience through **mitigation**, **adaptation** and **disaster risk reduction actions**, including through **nature-based solutions** and/or **ecosystem-based approaches**, minimizing negative impacts and promoting the positive impacts of climate action on biodiversity

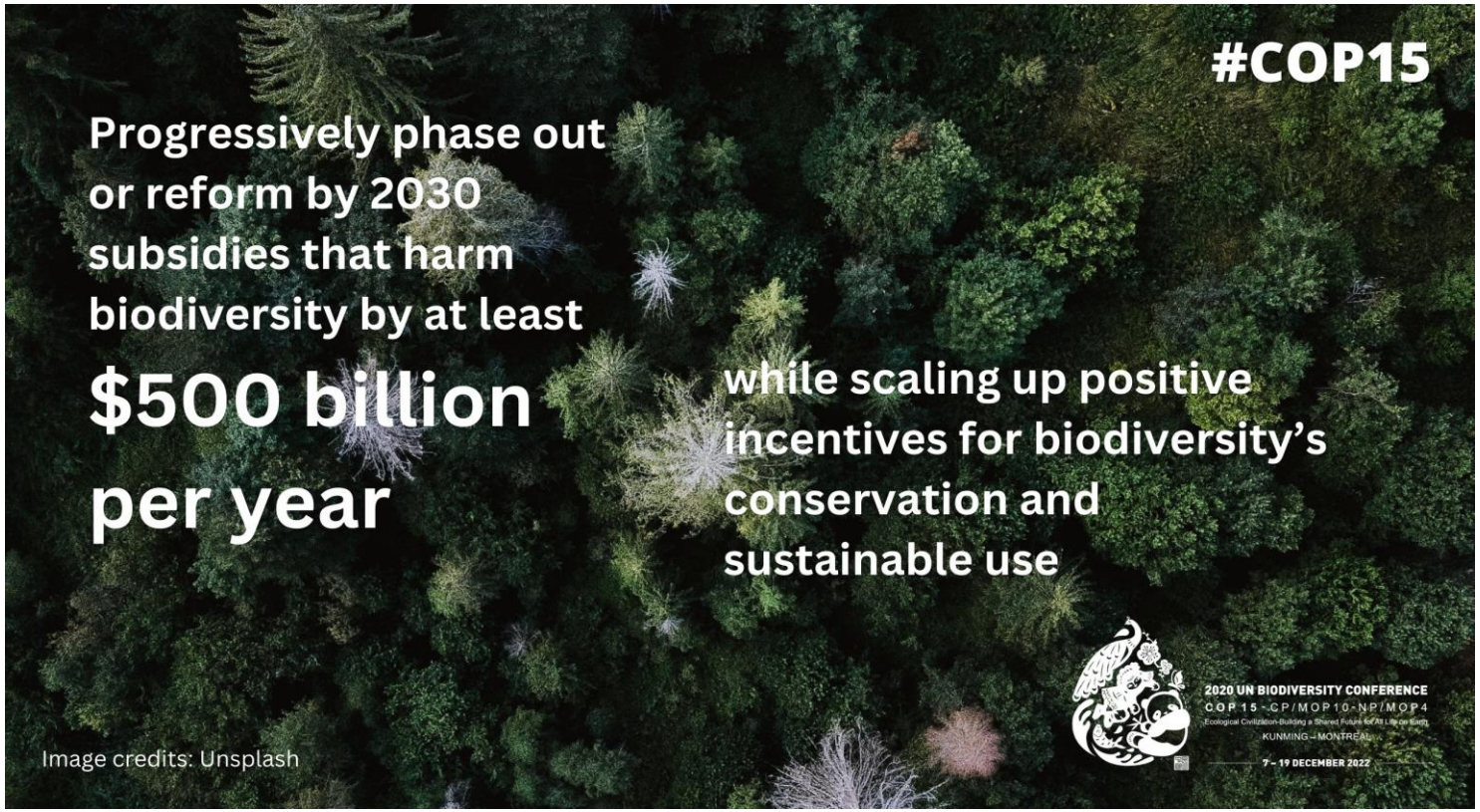
Nature-based Solutions according to UNEA-5 (2022)

- NbS are actions to **protect, conserve, restore, sustainably use and manage** natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits.

Target 15

Target 16

Target 18


#COP15
Progressively phase out or reform by 2030 subsidies that harm biodiversity by at least
$500 billion per year
while scaling up positive incentives for biodiversity's conservation and sustainable use
2020 UN BIODIVERSITY CONFERENCE
COP 15 - CP/MOP10 - NP/MOP4
KUNMING – MONTREAL
7 – 19 DECEMBER 2022
Image credits: Unsplash

European Commission

Nature Restoration Law

For people, climate, and planet

22 June 2022
#EUGreenDeal

THE NATURE RESTORATION LAW WILL:

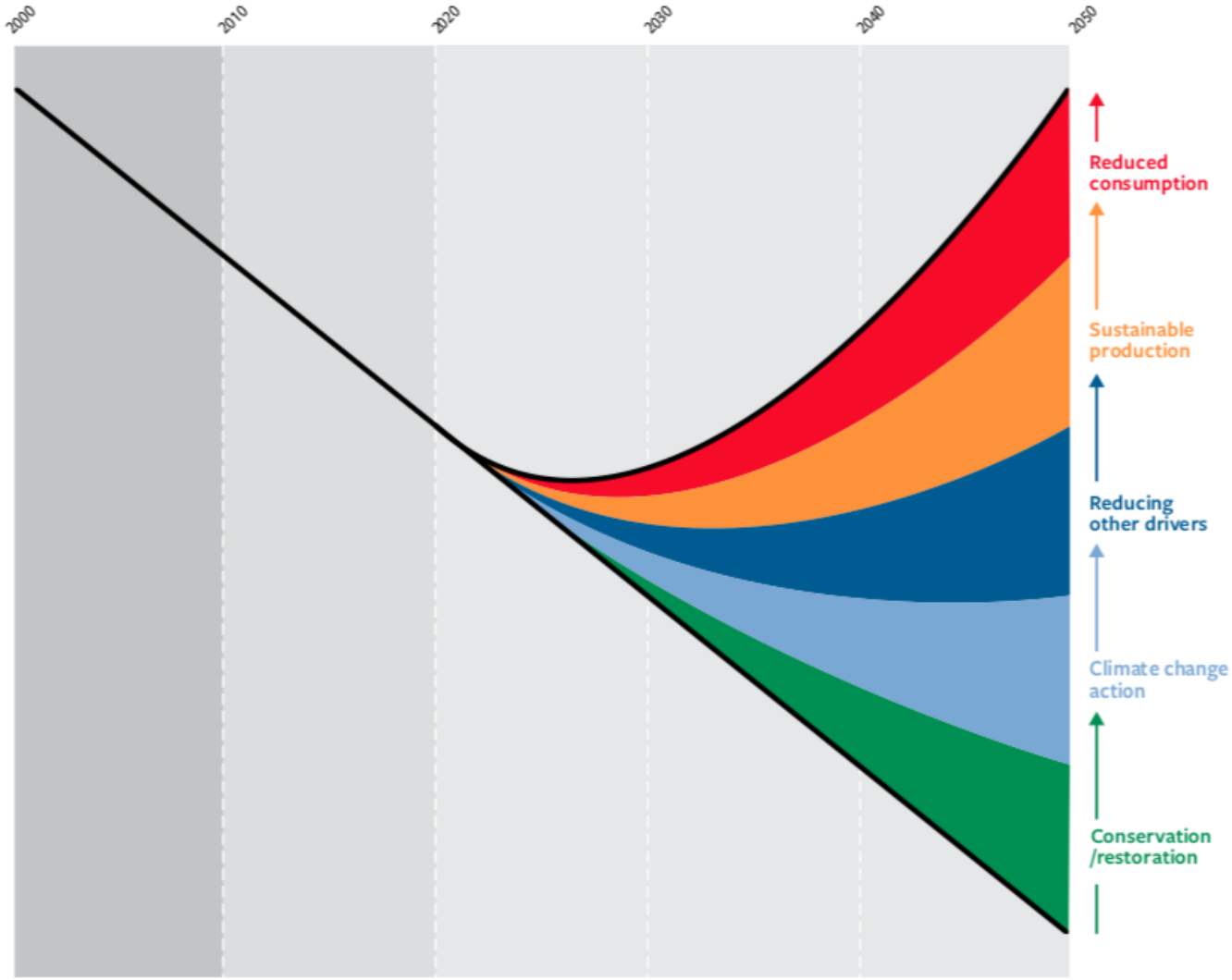
Restore at least 20% of EU land and sea by 2030, and all ecosystems in need of restoration by 2050

Require Member States to develop **National Restoration Plans** taking account of national circumstances

Build on EU nature laws, focusing on all natural habitats, and not just those protected under **Birds and Habitats Directives or Natura 2000**

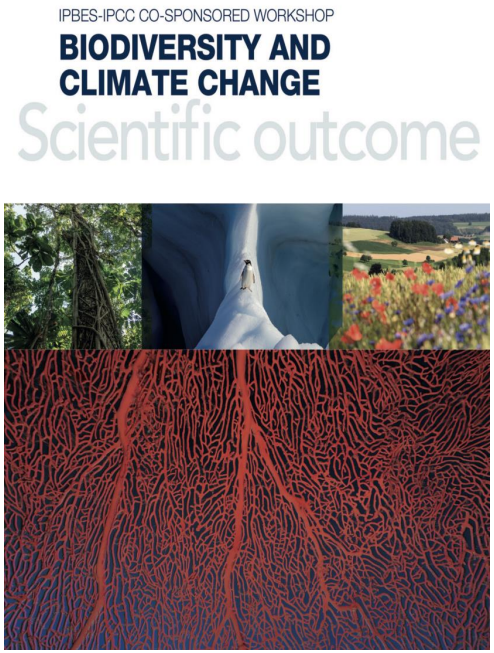
Demonstrate EU **leadership in protecting and restoring nature** and set the bar for global action ahead of the Biodiversity COP15

A portfolio of actions to reduce loss and restore biodiversity



Trends in biodiversity (various metrics, left axis) have been declining and are projected to continue to do so under business as usual scenarios (trend line). Various areas of action could reduce the rate of biodiversity decline, and the full portfolio of actions, in combination, could halt and reverse the decline (bend the curve), potentially leading to net biodiversity gains after 2030. These are, from bottom to top: (1) Enhanced conservation and restoration of ecosystems; (2) climate change mitigation; (3) action on pollution, invasive alien species and overexploitation; (4) more sustainable production of goods and services, especially food; and (5) reduced consumption and waste. However, none of the areas of action alone, nor in partial combinations, can bend the curve of biodiversity loss. Moreover, the effectiveness of each area of action is enhanced by the other areas (see Part III of the full report for discussion).

OPZIONI NBS, secondo il rapporto congiunto IPBES-IPCC



1. PROTEZIONE

- **Riduzione delle emissioni da deforestazione e degradazione forestale**
- **Conservazione di ecosistemi terrestri e marini 'non-forestali' ricchi di carbonio (aree umide, torbiere, ecc.)**

2. RIPRISTINO

- **Ripristino di ecosistemi degradati**

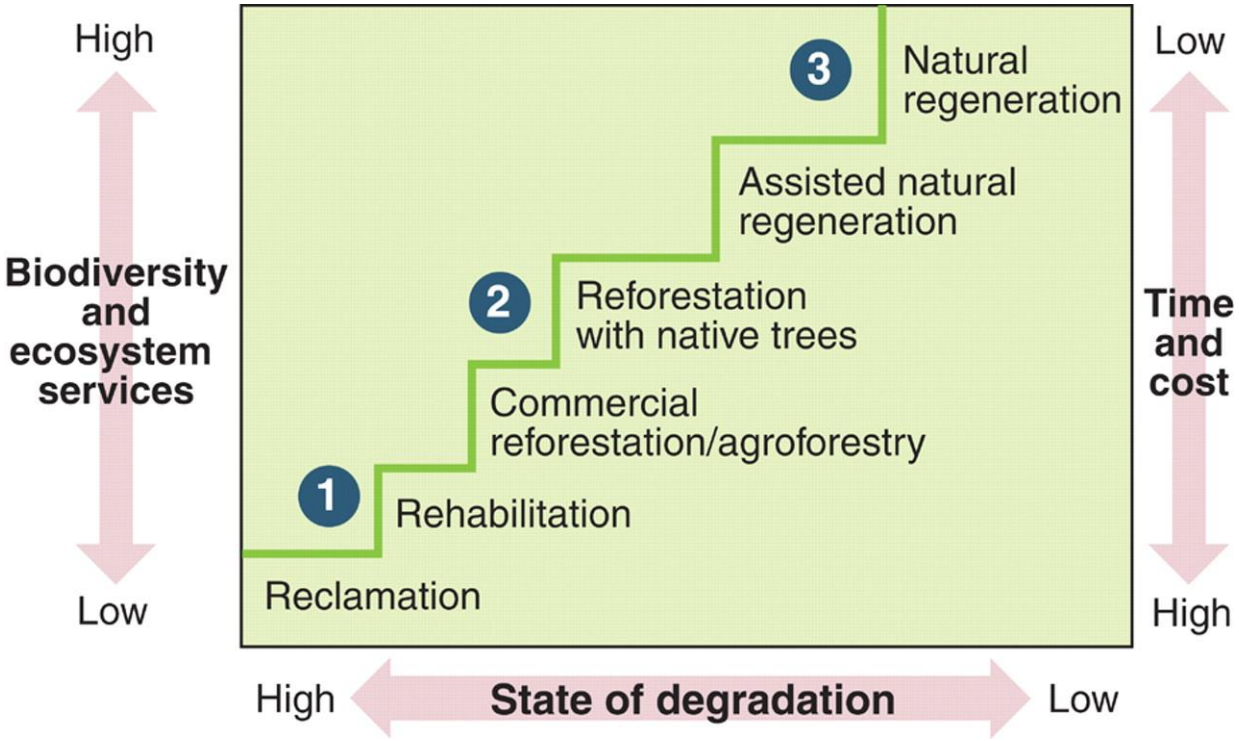
3. GESTIONE

- **Pratiche agricole rispettose del clima e della biodiversità**
- **Pratiche forestali rispettose del clima e della biodiversità**
- **Pratiche di pesca e acquacoltura rispettose della biodiversità**
- **Localizzazione delle filiere**

4. CREAZIONE

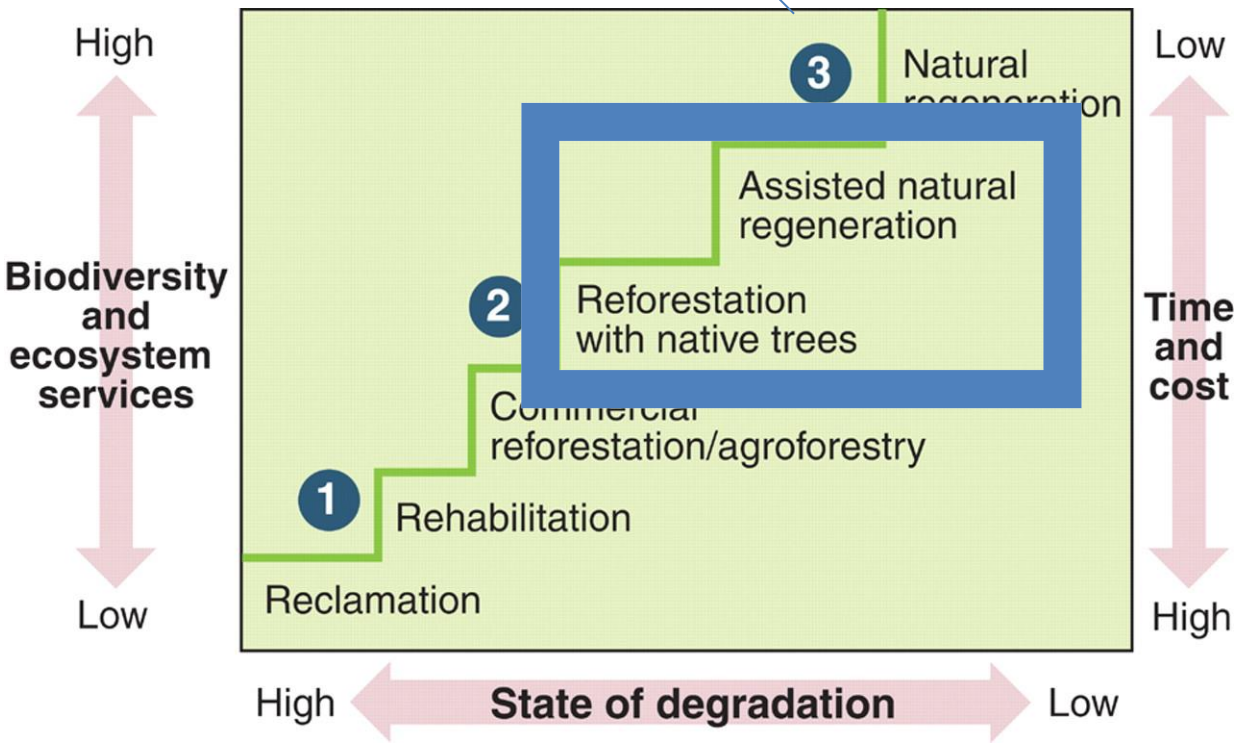
- **Inverdimento urbano e sostegno alla biodiversità**
- **Variazioni nei consumi**
- **Rewilding trofico (reintroduzione di erbivori, carnivori, …)**
- **Tecnologia combinata e opzioni di mitigazione basate sulla natura**
- **Opportunità di mitigazione su habitat nuovi ed emergenti**

La scala del restauro degli ecosistemi



R L Chazdon 2008, Science 320:1458-60

La scala del restauro degli ecosistemi



R L Chazdon 2008, Science 320:1458-60

Sezione K. Comunicazione, educazione, consapevolezza e comprensione

a. Aumentare la consapevolezza, la comprensione e l'apprezzamento dei sistemi di conoscenza, dei diversi valori della biodiversità e del contributo della natura alle persone;

b. Aumentare la consapevolezza sull'importanza della conservazione e dell'uso sostenibile della biodiversità;

c. Sensibilizzare tutti i settori e gli attori sulla necessità di un'azione urgente per attuare il Quadro;

d. Facilitare la comprensione del Quadro, anche attraverso una comunicazione mirata, adattando il linguaggio utilizzato, il livello di complessità e il contenuto tematico ai pertinenti gruppi di attori;

e. Promozione o sviluppo di piattaforme, partenariati e programmi d'azione, anche con i media, la società civile e le istituzioni educative;

f. Integrare l'educazione trasformativa sulla biodiversità nei programmi educativi formali, non formali e informali;

g. Sensibilizzare sul ruolo critico della scienza, della tecnologia e dell'innovazione per rafforzare le capacità scientifiche e tecniche per monitorare la biodiversità, colmare le lacune di conoscenza e sviluppare soluzioni innovative per migliorare la conservazione e l'uso sostenibile della biodiversità.

The main points

- IPBES Report: the right approach in dealing with in biodiversity assessment and protection
- The social dimension is needed for reaching consensus on balanced solutions
- Defining a balance between public and private actors' responsibilities and action

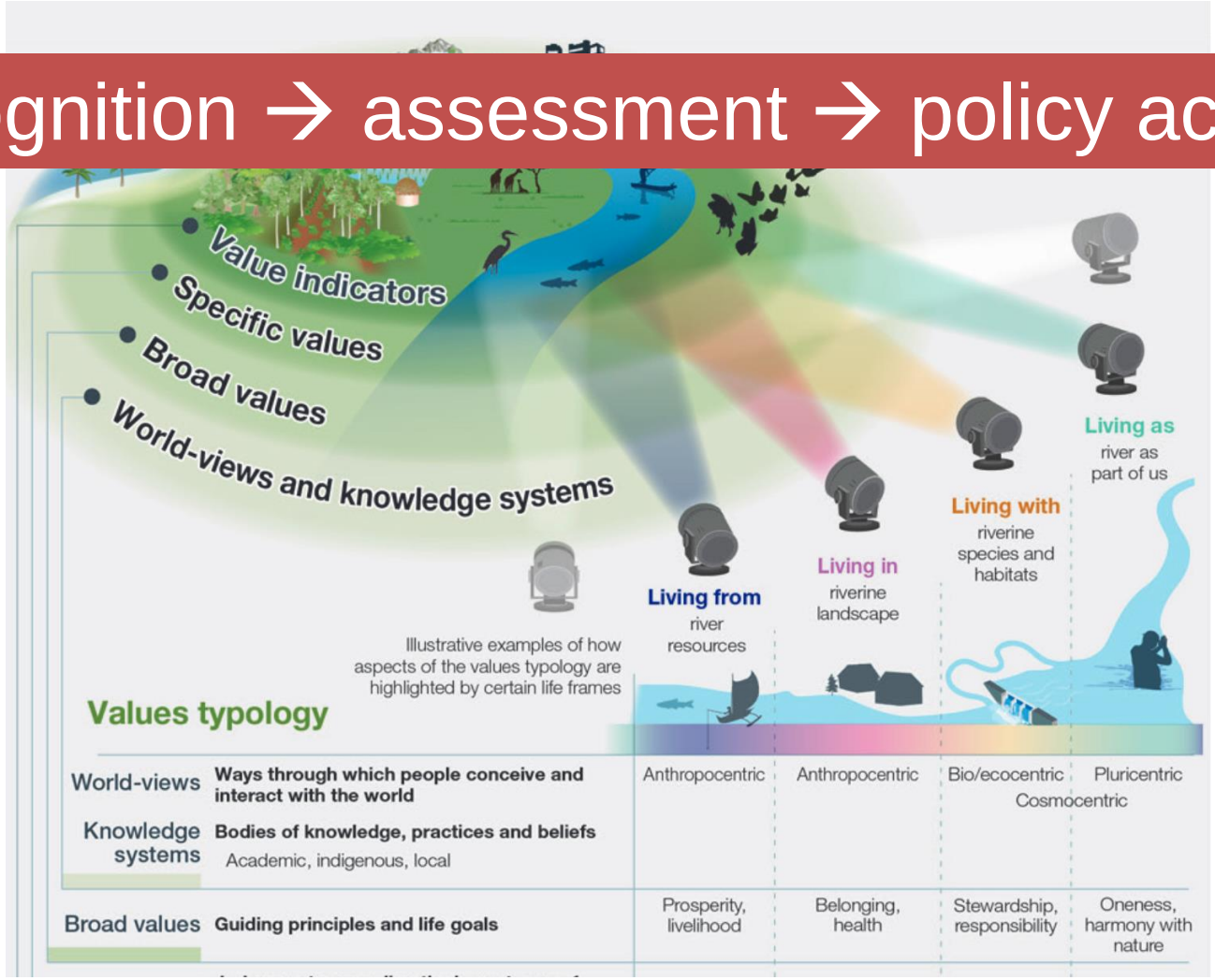
These slides will be available in Internet (search "pettenella")

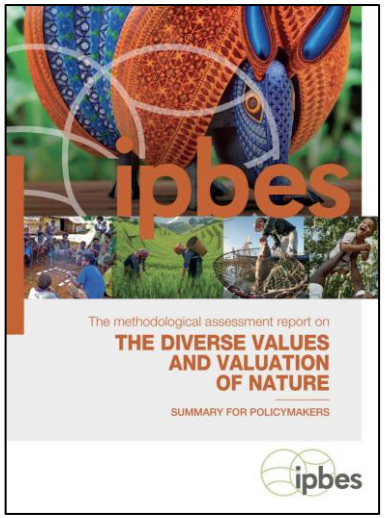
The main points

- **IPBES Report: the right approach in dealing with in biodiversity assessment and protection**
- The social dimension is needed for reaching consensus on balanced solutions
- Defining a balance between public and private actors' responsibilities and action

«Living in harmony with nature»: *from*, *in*, *with*, *as* nature

Value recognition → assessment → policy action





https://zenodo.org/record/7410287/files/EN_SPM_VALUES_V8D_DIGITAL.pdf

Key-word recurrence

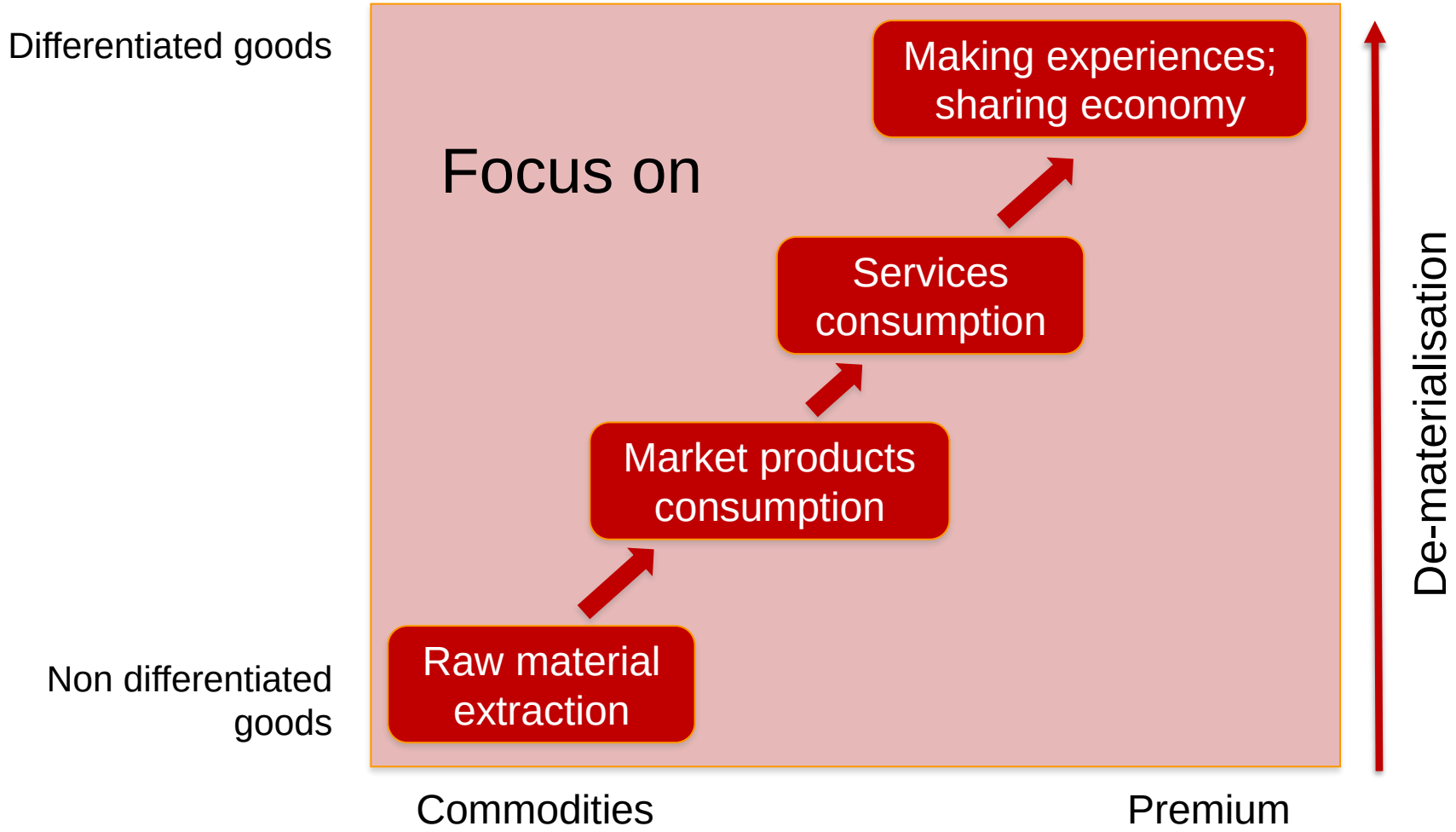
«**indigenous**» a word mentioned **713 times** in the document

In association to: people, communities, territories, groups, leaders, helders and youth, women, gender practices, conservation measures, knowledge, traditions, understanding, worldviews, perspectives, wisdom, sacredness, philosophies, epistemology, science approaches, management, scholars, languages, story telling, stakes, rights, power, struggle, institutions, treaties,

Indigenous plant(s): **2** times
Indigenous tree: 0

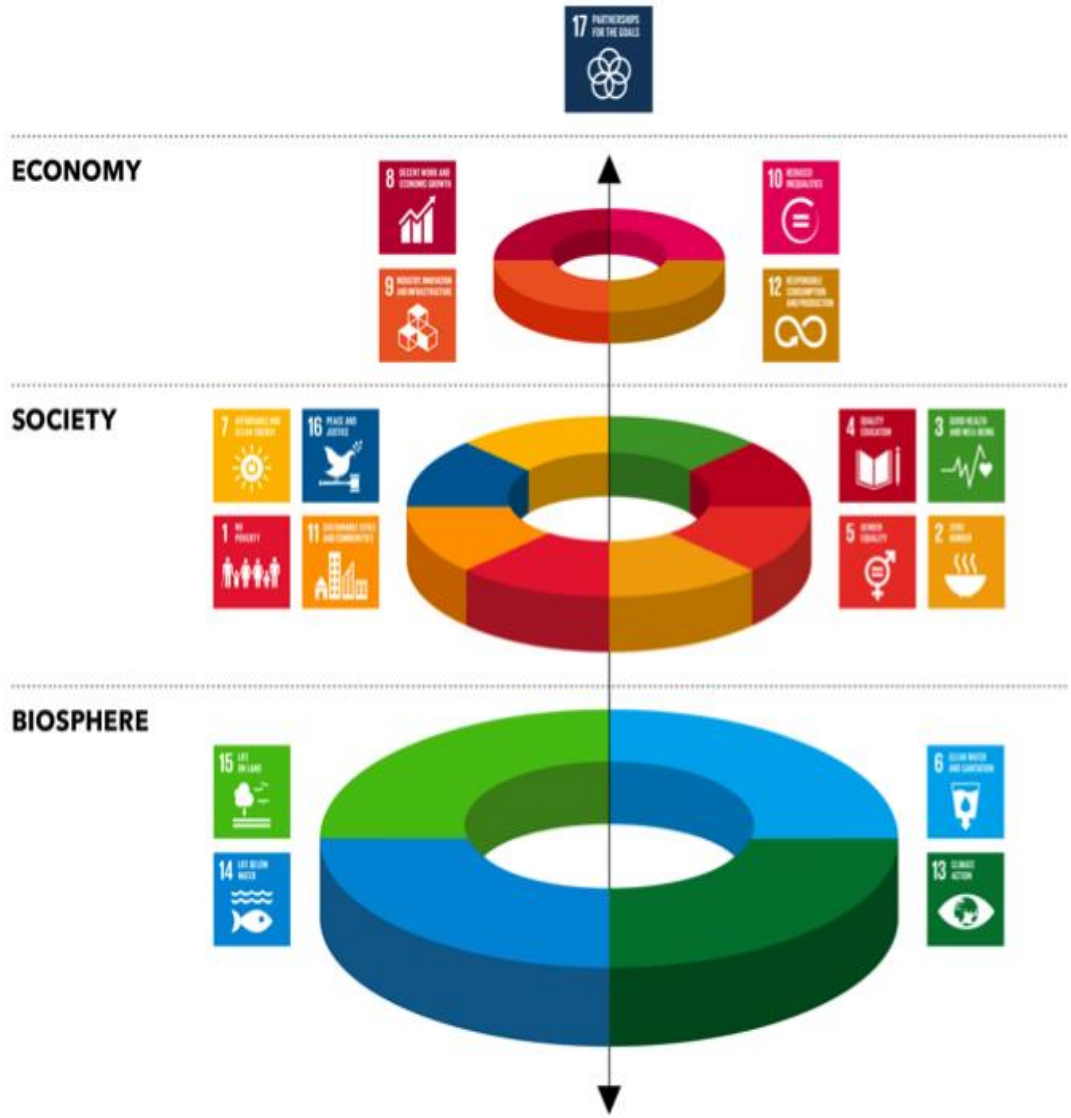
local communities: **216** times

"From, in, with, as" nature: a vision in line with the changes in economy

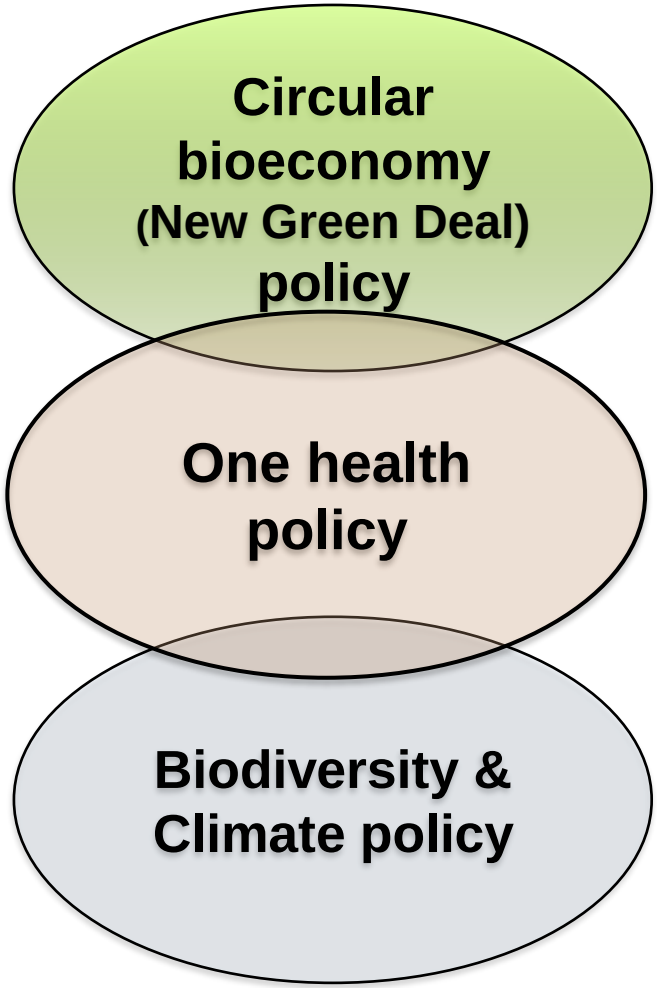


Source: B. Joseph Pine II e James H. Gilmore, 1998 (modif.)

SDGs



The 3 fields of policy action



A <u>simplified</u> view of nature's contributions to people (NCP)-functions or ecosystem services

NCP		Institutions, drivers	Prevailing instruments
Provisioning	Circular bioeconomy policy	Market	prices under the free market economy
Socio-Cultural	One health policy	Community	people engagement, technical assistance, local authorities' animation, entrepreneurial support, …
Regulating	Biodiversity & Climate policy	State	compensations, incentives, (eco)taxes, …

The main points

- IPBES Report: the right approach in dealing with in biodiversity assessment and protection
- **The social dimension is needed for reaching consensus on balanced solutions**
- Defining a balance between public and private actors' responsibilities and action

EU ambitious targets

Biodiversity Strategy:

- 30% legally protected areas
- 10% “strictly protected”
- “Effectively manage all protected areas, defining clear conservation objectives and measures, and monitoring appropriately”

Climate policy:

- -55% emissions (2030); zero net emission (2050)
- LULUCF: carbon removal in 2030: - 310 Mt CO_2 eq (← CRC draft Regulation)

Forest strategy

- All old growth forests protected

Zero Deforestation (EUDR)

- Due diliegence for 6 products (wood, meat, soy, palm oil, coffee, cacao): legal origin

Draft Land Restoration Regulation

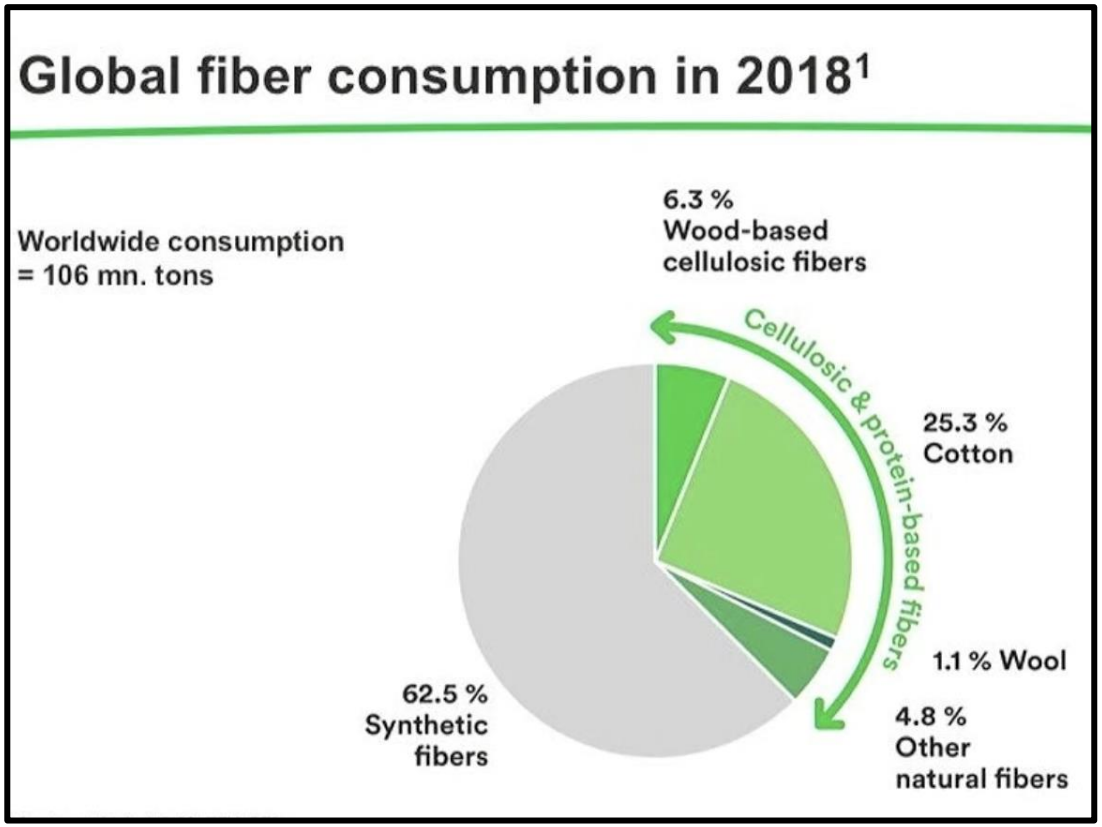
- 20% of all degraded land restored by 2030
- All degraded land restored by 2050

Decarbonization: how to deal with a very relevant increase of demand for biomass in the future?

A. Agriculture related answers

B. Forest related answers

(C. “Blue carbon”: very limited potentials)



Source: M.Palahì (2023) on ICAC, CIRFS, TFY, FEB data

A. Agriculture related answers

‘Farm to fork’ Strategy and Common Agricultural Policy by 2030:

- to **reduce fertilizer use** in Europe by **20%** and
- **pesticides** by **50%**
- **one-quarter of land to be farmed organically**
- to **restore 25,000 kilometres** of **rivers**

→ better quality but not higher quantity of food commodities
→ more land needed for food production
→ no much room for increasing non-food internal production

B. Forest-related answers

- **Active biodiversity protection and land restoration policies** in the EU
- **No** visible increase of **forest biomass removals** in EU in the last years (not considering savage wood)

Two more solutions:

a. Expanding the EU forest area

b. Importing more biomass

a. Expanding the EU forest area

https://www.unep.org/resources/emissions-gap-report-2022

Climate pledges made by countries worldwide are "dangerously over-reliant" on tree planting.

The assessment of the national climate plans submitted by nearly 200 nations to the UN found they would require a total of 1.2 bln hectares of land for nature-based carbon removal activities, such as tree planting, i.e. they would require an area greater than the size of the US.

This strategy is not only slow to implement but could create conflicts by displacing farmland and putting climate and food security objectives at odds

B. Importing more biomass

More than 1/3 of biomass inputs for the EU bioeconomy are **sourced and imported from extra-UE areas**

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COMMENT | 26 October 2020 | Correction 12 November 2020 | Correction 21 December 2020 | Correction 03 March 2021

Europe's Green Deal offshores environmental damage to other nations

Importing millions of tonnes of crops and meat each year undercuts farming standards in the European Union and destroys tropical forests.

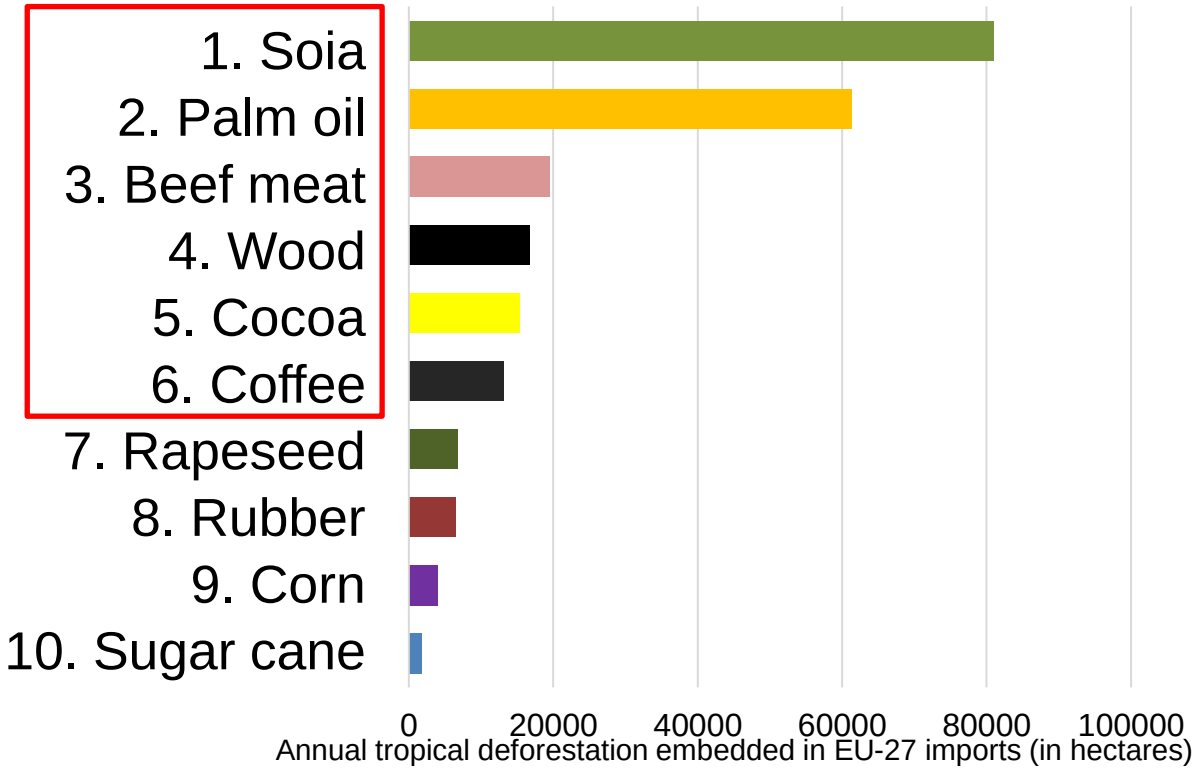
Richard Fuchs, Calum Brown & Mark Rounsevell

There is a formally defined need of reducing EU Carbon and biodiversity footprint from import

The impact of EU consumption on deforestation

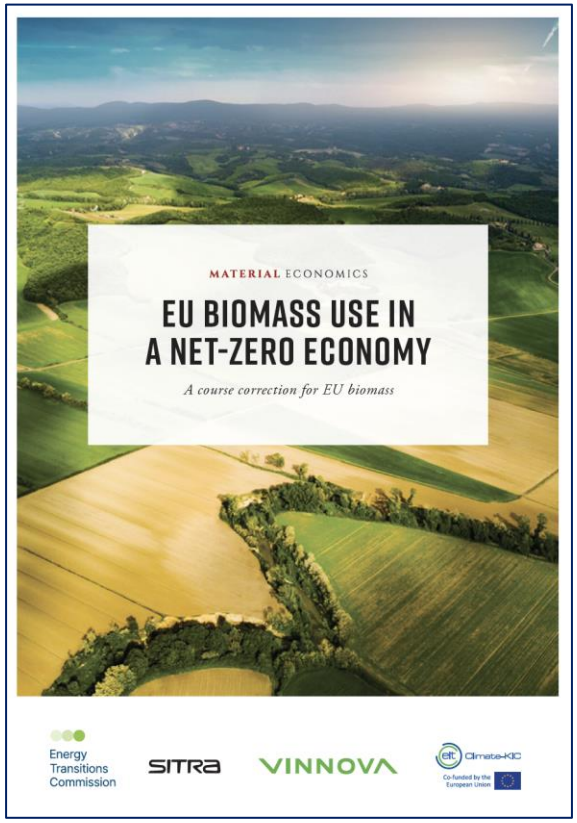
90% of the deforestation caused by EU-27 imports is due to the production of 10 commodities

New EU Regulation Zero deforestation and forest degradation (EUDR)

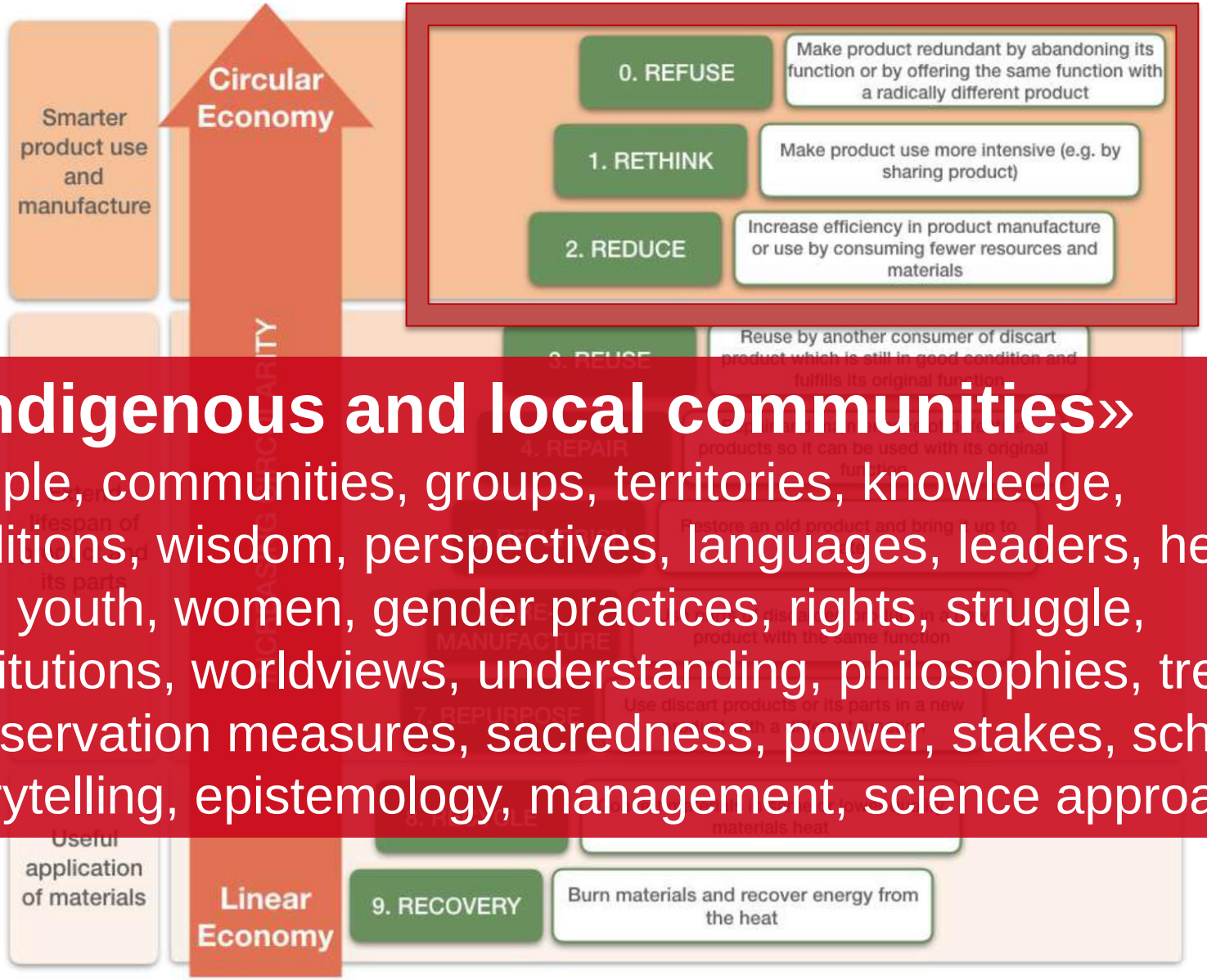


Our elaboration on the database provided by Pendrill et al.(2020)

A feasible strategy?



«Living in harmony with nature» = Changing life style



«indigenous and local communities»

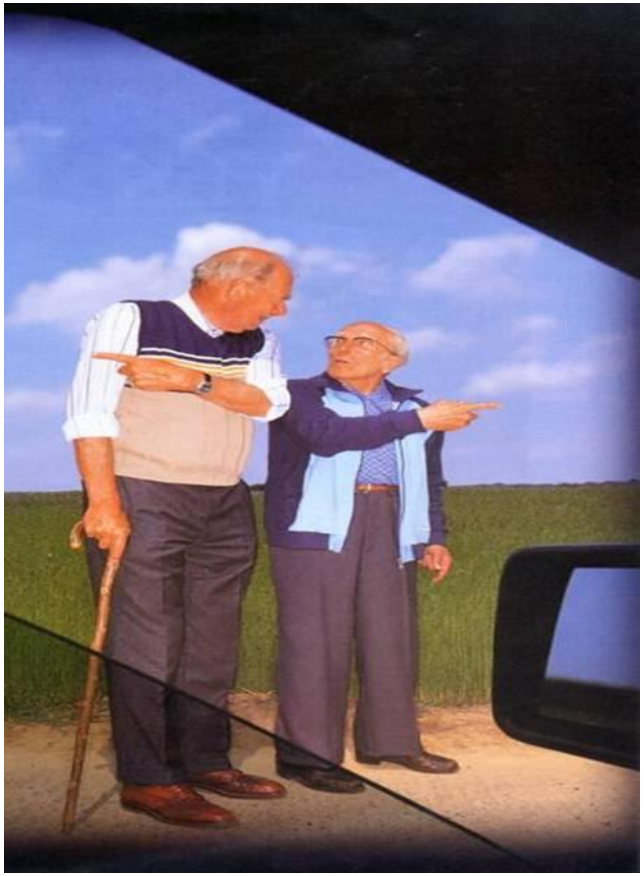
people, communities, groups, territories, knowledge, traditions, wisdom, perspectives, languages, leaders, helders and youth, women, gender practices, rights, struggle, institutions, worldviews, understanding, philosophies, treaties, conservation measures, sacredness, power, stakes, scholars, storytelling, epistemology, management, science approaches

The main points

- IPBES Report: the right approach in dealing with in biodiversity assessment and protection
- The social dimension is needed for reaching consensus on balanced solutions
- **Defining a balance between public and private actors' responsibilities and action**

Interaction among private and public actors → subsidiarity

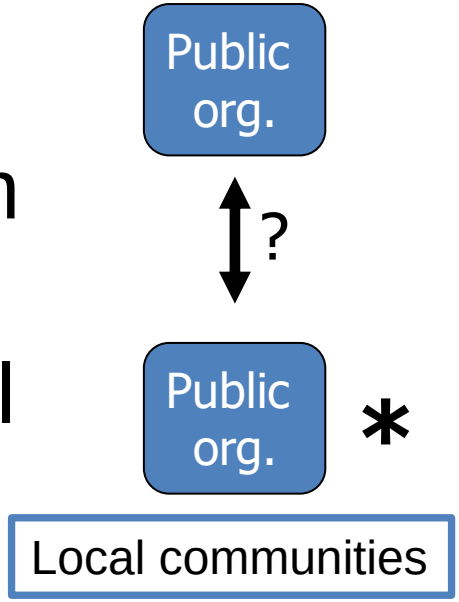
3 ways for implementing the subsidiarity principle



Vertical subsidiarity

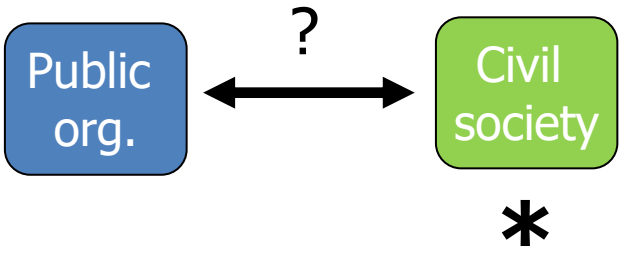
Policy matters should be handled by the **smallest, lowest or least centralized competent authority**

→ a central authority should perform only those tasks which cannot be performed effectively at a more local level.



Horizontal subsidiarity

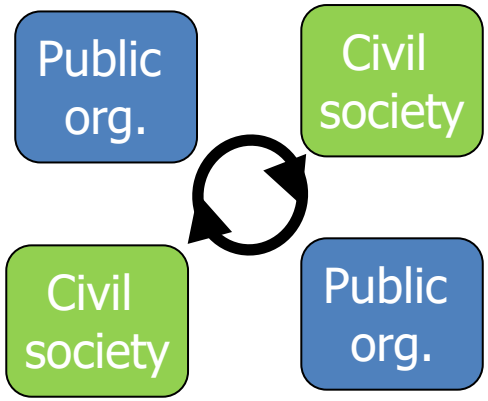
It addresses the specific **question of choices at the same level**: whether the allocation and exercise of competences by public institutions or by the social partners is preferable, **granting the preference to civil society (individuals and people's organizations)** and legitimizing their actions when directed towards accomplishing the same ends with higher efficiency or effectiveness



Circular subsidiarity

Circular s.: the idea that action for public goods is the responsibility not only of public bodies, but is based on the **mutual recognition of responsibilities**, skills and operational capabilities between the various subjects, public and private

→ actions not only promoted through the contribution of civil society, but together with it = sharing of policies and related processes of **co-programming, co-creation and co-management** (PPP Public-Private Partnership)



… only trough sharing responsibilities we can live in harmony with nature

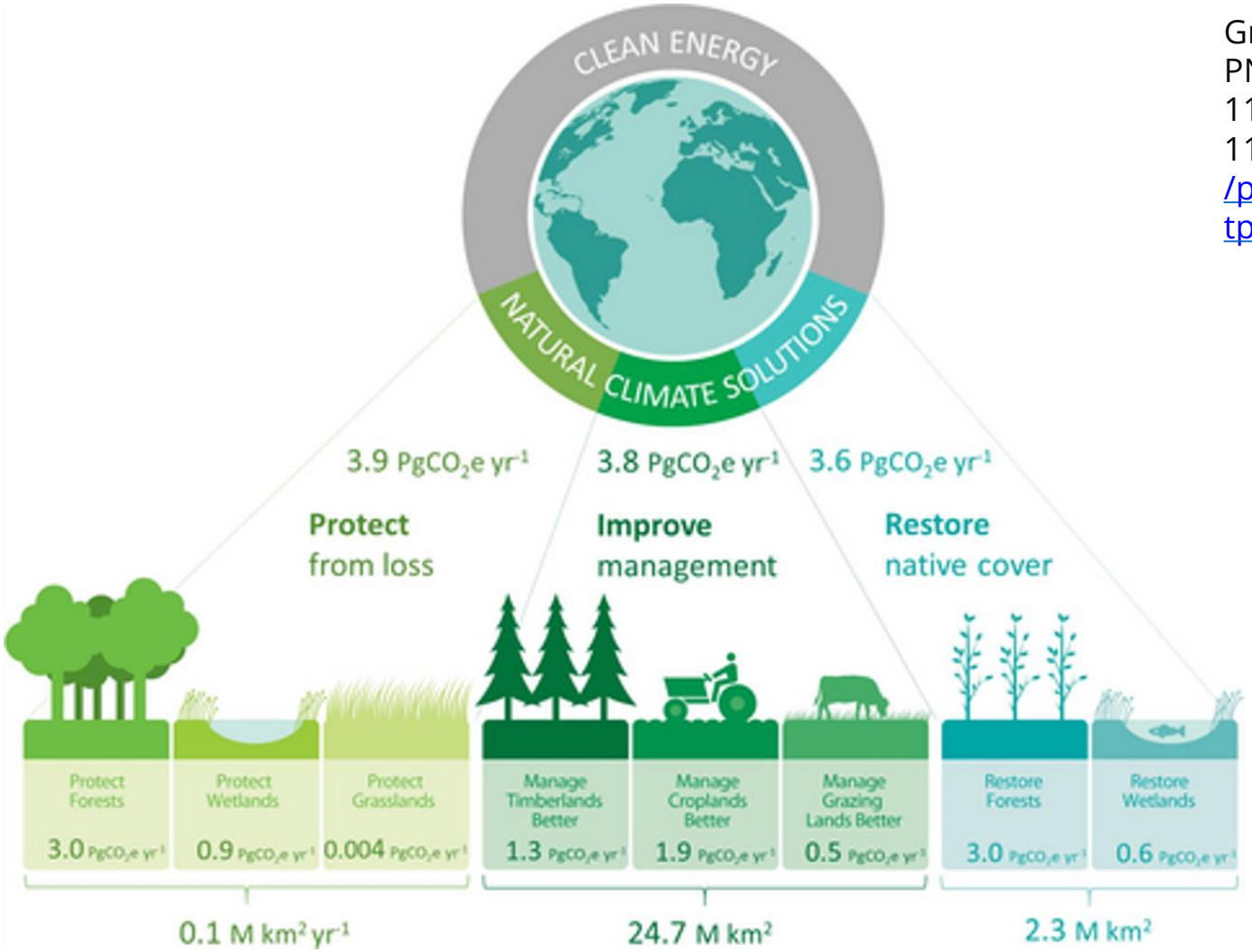
Target 8

Minimize the impact of climate change [...] on biodiversity and increase its resilience through **mitigation**, **adaptation** and **disaster risk reduction actions**, including through **nature-based solutions** and/or **ecosystem-based approaches**, minimizing negative impacts and promoting the positive impacts of climate action on biodiversity

Nature-based Solutions according to UNEA-5 (2022)

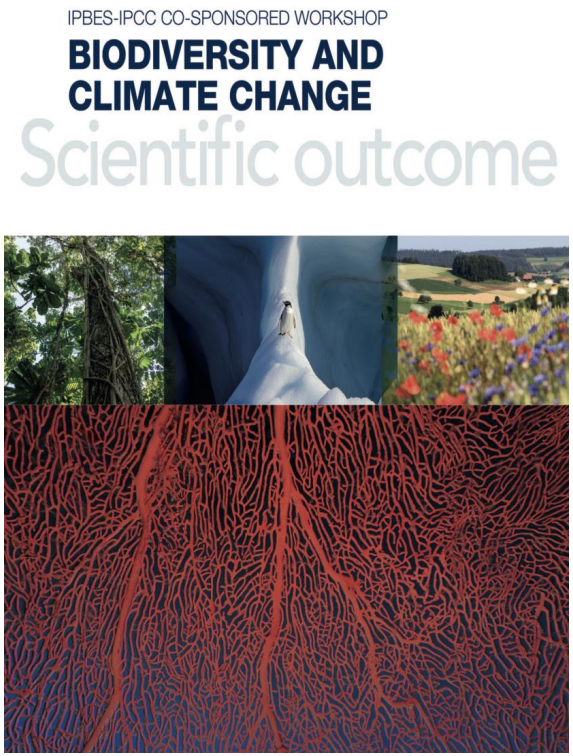
- NbS are actions to **protect, conserve, restore, sustainably use and manage** natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits.

Pörtner *et al.*, 2021
https://www.ipbes.net/events/ipbes-ipcc-co-sponsored-workshop-biodiversity-and-climate-change)



Griscom et al., 2017, PNAS, 114 (44) 11645-11650, /pnas.1710465114https://doi.org/10.1073

NbS options, according to the IPBES-IPCC joint report (Pörtner *et al*., 2021)



1. PROTECTION

- Reduction of emissions from deforestation and forest degradation
- Conservation of 'non-forest' terrestrial and marine ecosystems rich in carbon (fluid areas, peatlands, etc.)

2. RESTORATION

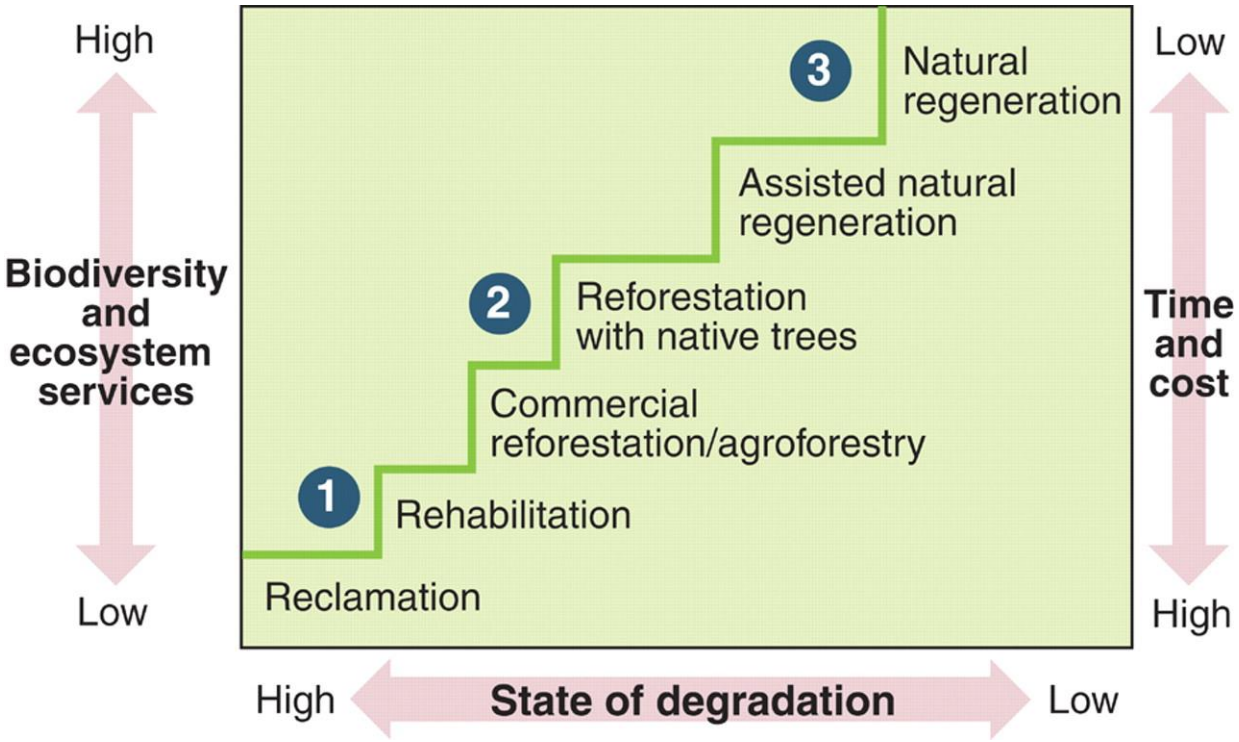
- Restoration of marine, coastal, wetland and terrestrial degraded ecosystems

3. MANAGEMENT

- Management
- Agricultural practices respectful of the climate and biodiversity
- Forestry practices that respect the climate and biodiversity
- Biodiversity-friendly fishing and aquaculture practices
- Localization of supply chains

• 4. CREATION

- Urban greening and support for biodiversity
- Changes in consumption
- Trophic rewilding (reintroduction of herbivores, carnivores, ...)
- Combined technology and nature-based mitigation options
- Mitigation opportunities on new and emerging habitats



R L Chazdon 2008, Science 320:1458-60