United Nations
Convention to Combat
Desertification

Desertification and land degradation and their impact on natural ecosystems and food security

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United Nations
Climate Change

SED2

First meeting of the Structured Expert Dialogue
Second Periodic Review (Session 2)
4 June 2021 | 16:00 – 18:00 (CET)

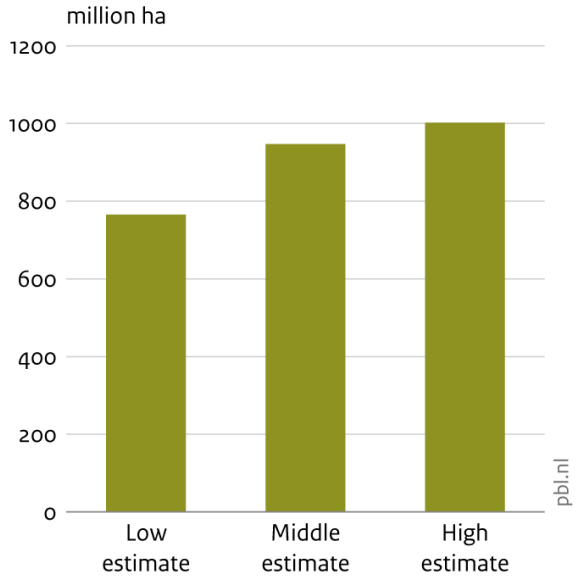
We are days away from the launch of the UN Decade on Ecosystem Restoration 2021-2030

What has been committed by countries so far?

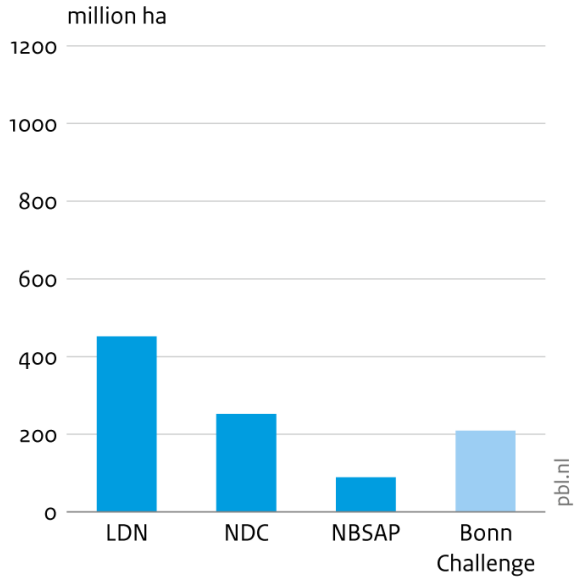
How many hectares?

PBL Netherlands Environmental Assessment Agency

Total estimate range



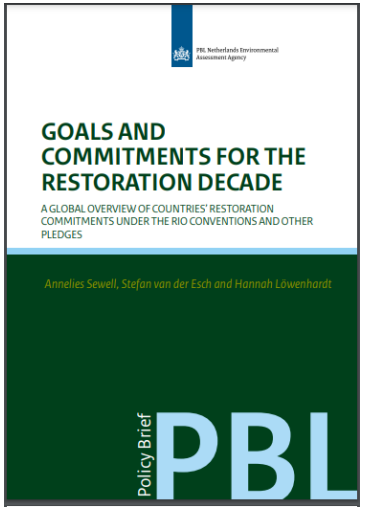
Estimate per data source



Total of national commitments under the Rio Conventions

Total of national commitments under the Bonn Challenge and the associated regional intitiatives

Source: UNCCD, UNFCCC, CBD, Bonn Challenge; collected and adapted by PBL for Global Restoration Commitments database, August 2020



Global total of country restoration commitments:

- **765 million – 1 billion hectares**
- **115 countries**

Land transformation

The IPBES Global Assessment (2019) and the IPCC Special Report on Climate Change and Land (2019) report that as much as **75%** of the land area is very significantly altered.

This is typically for agriculture and urban expansion (i.e., conversions to farmland and settlements).

(Slide: Courtesy , Prof. Dr. Josef Settele, co-chair of the Global IPBES assessment)

The primary driver of land transformation?

- Meeting the demand for food, feed, fibre and energy
- More food, energy and materials than ever before are now being supplied to people across distant regions
- Forests, wetlands and grasslands and savannas are paying the price

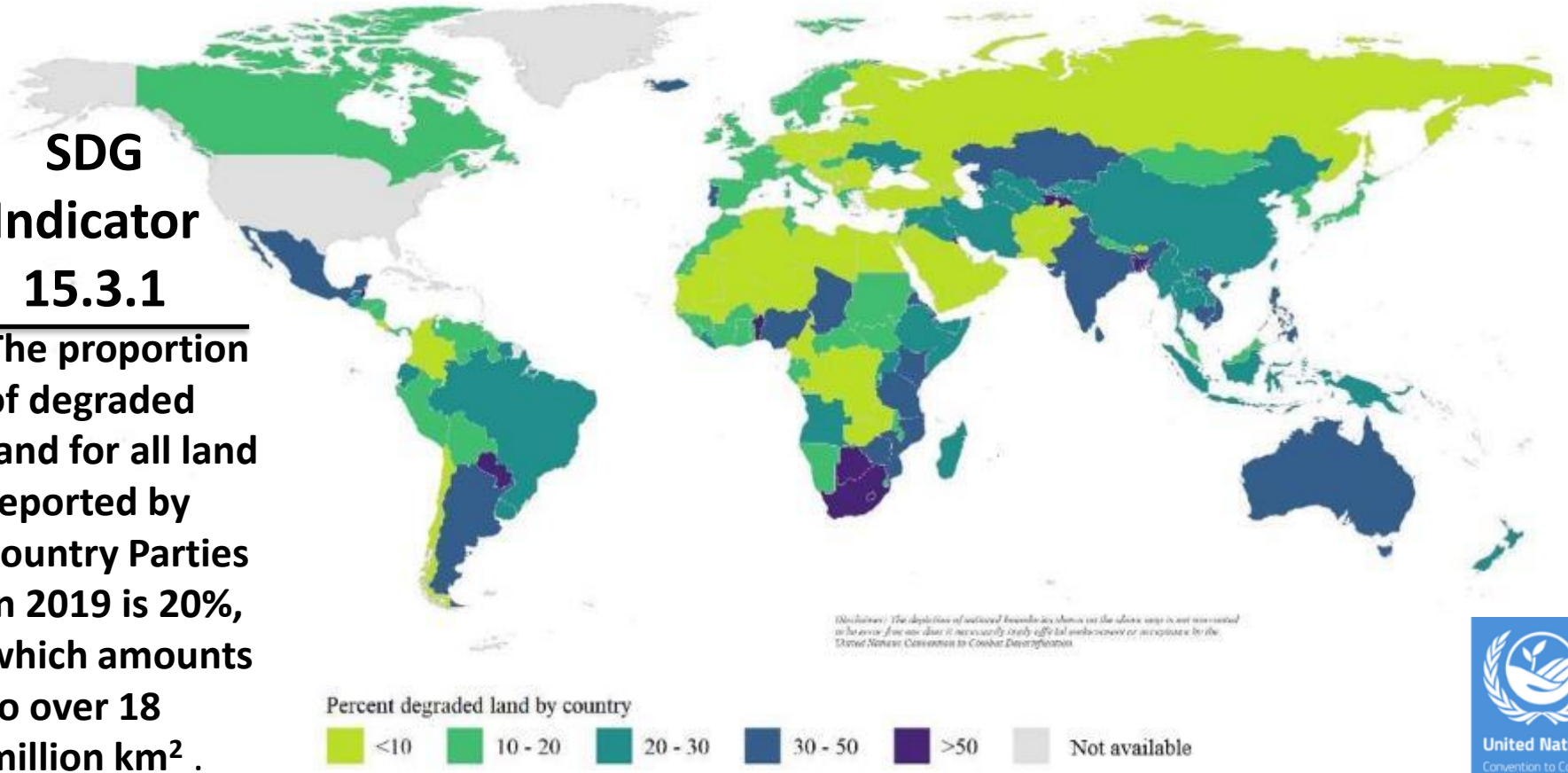
IPBES 2019 https://ipbes.net/global-assessment

(Slide: Courtesy, Prof. Dr. Josef Settele, co-chair of the Global IPBES assessment)

Countries report that 1 in 5 hectares are now degraded

SDG Indicator 15.3.1

The proportion of degraded land for all land reported by country Parties in 2019 is 20%, which amounts to over 18 million km² .



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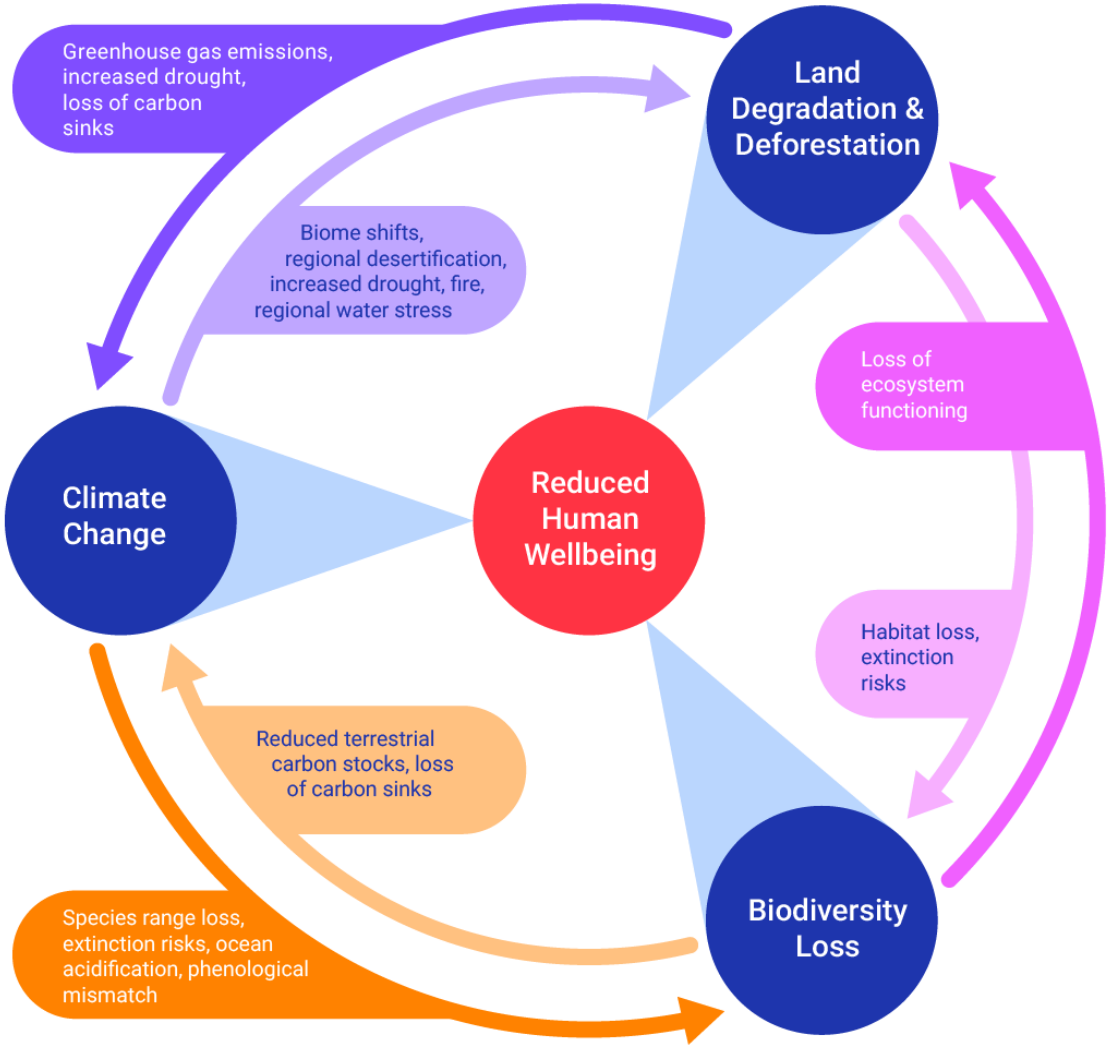
The environmental emergencies are intertwined

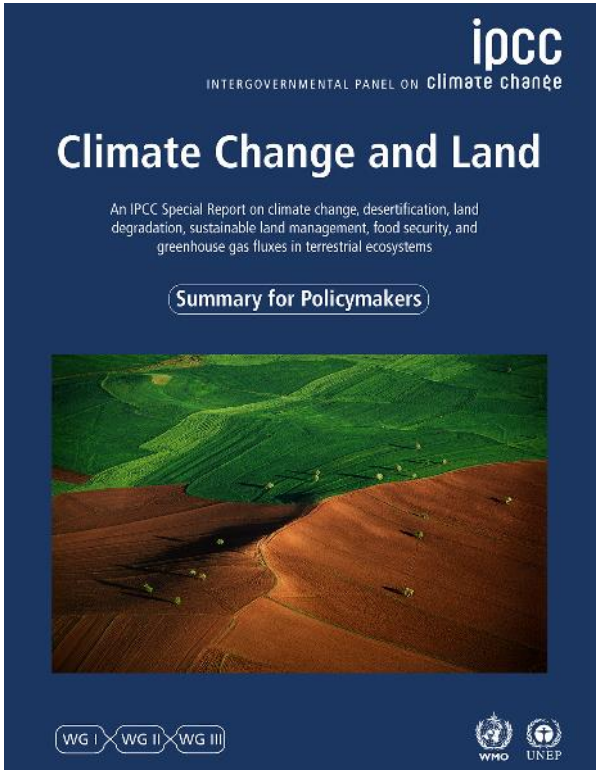
(Slide: Courtesy, Sir Robert Watson)



3.9. The interactions between climate change, land use and biodiversity

Climate Change and Land

- Climate change **exacerbates** land degradation
- Land degradation is **a driver** of climate change through emissions of GHGs and reduced uptake of carbon
- Gross emissions from Agriculture, Forestry and Other Land Use make up **1/3 of total global emissions**
- Land accounts for **61% of anthropogenic methane emissions**.
- **50% of the nitrogen** applied to agricultural land is **not taken up by the crop**, resulting in nitrous oxide emissions

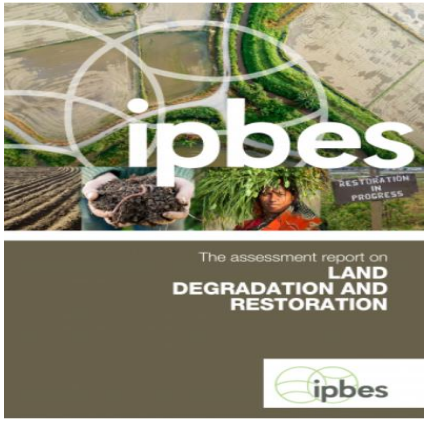


https://www.ipcc.ch/report/srccl/

(Slide: Courtesy, Dr. Jim Skea, IPCC)

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

The impact is monumental



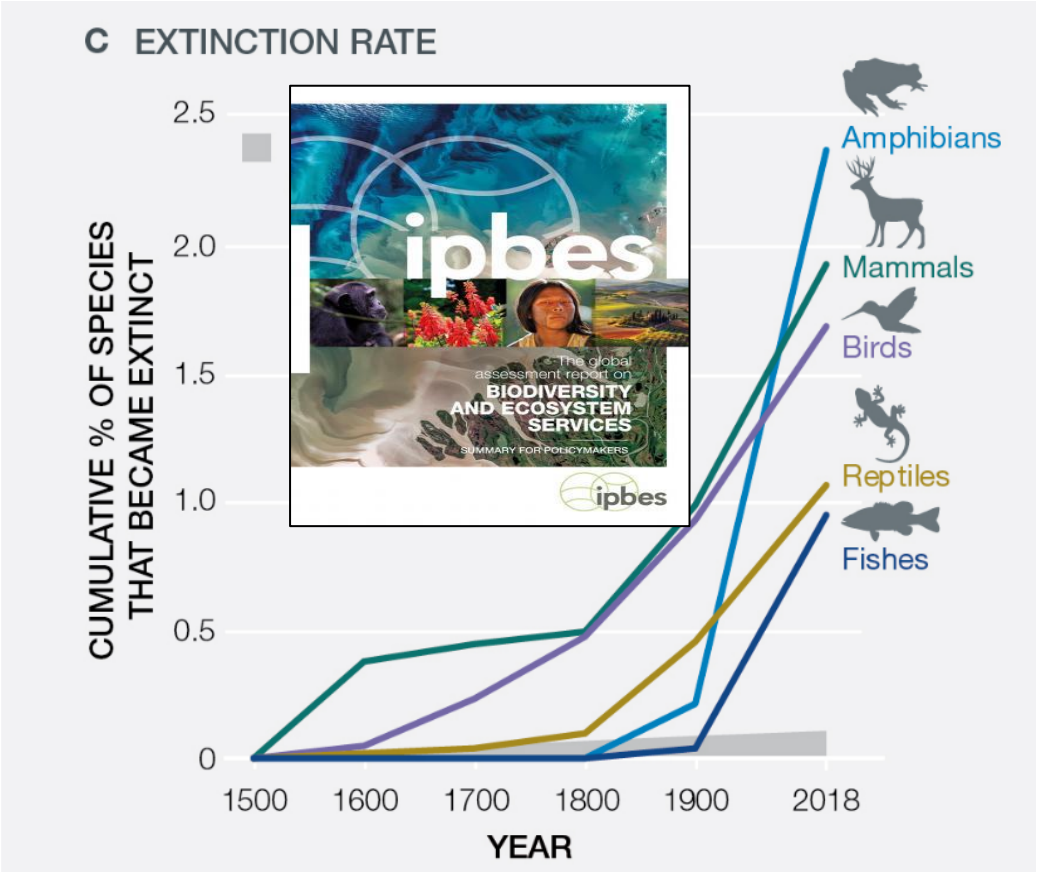
THE ECONOMICS OF LAND DEGRADATION

- Wellbeing of over **3.2 billion people undermined** by land degradation
- **Biodiversity loss** to reach **38–46%** by 2050**.**
- The **cost** of ecosystem services lost through **land degradation** is estimated at approximately **6 trillion USD per year** or ar **loss of** more than **10% of the annual global gross product**.

IPBES LDRA 2018 & ELD 2015

The tradeoffs

- **1 million species** are threatened by extinction largely because **75% of the land surface has been altered**
- These **(negative) transformational changes** are creating the conditions for a biological evolution **so rapid**, it is **visible just over a few years**.



IPBES 2019 Global Assessment Report on Biodiversity and Ecosystem Services

https://ipbes.net/global-assessment


Credit: Adriano Gambarini/WWF Brazil

Consumption eats land

"High and rising per capita **consumption**, amplified by continued population growth in many parts of the world, can **drive** unsustainable levels of agricultural expansion, natural resource and mineral extraction, and urbanization – typically leading to greater levels of **land degradation**," (IPBES 2018)

DATA SNAPSHOT

CURRENT IMPACTS OF FOOD PRODUCTION ON NATURE

Agriculture is responsible for

80%

of global deforestation

Food systems release

29%

of global GHGs into the air

Agriculture accounts for

70%

of freshwater use

Drivers linked to food production cause

70%

of terrestrial biodiversity loss

52%

of agricultural land is degraded

Drivers linked to food production cause

50%

of freshwater biodiversity loss

Source of data: WWF Living Planet Report 2020
Infographic: UNCCD Boosting Nature-Positive Production Action Guide 2021

Acute food insecurity soars to five-year high in 2020

155 million people experienced acute food insecurity (IPC/CH Phase 3 or above)

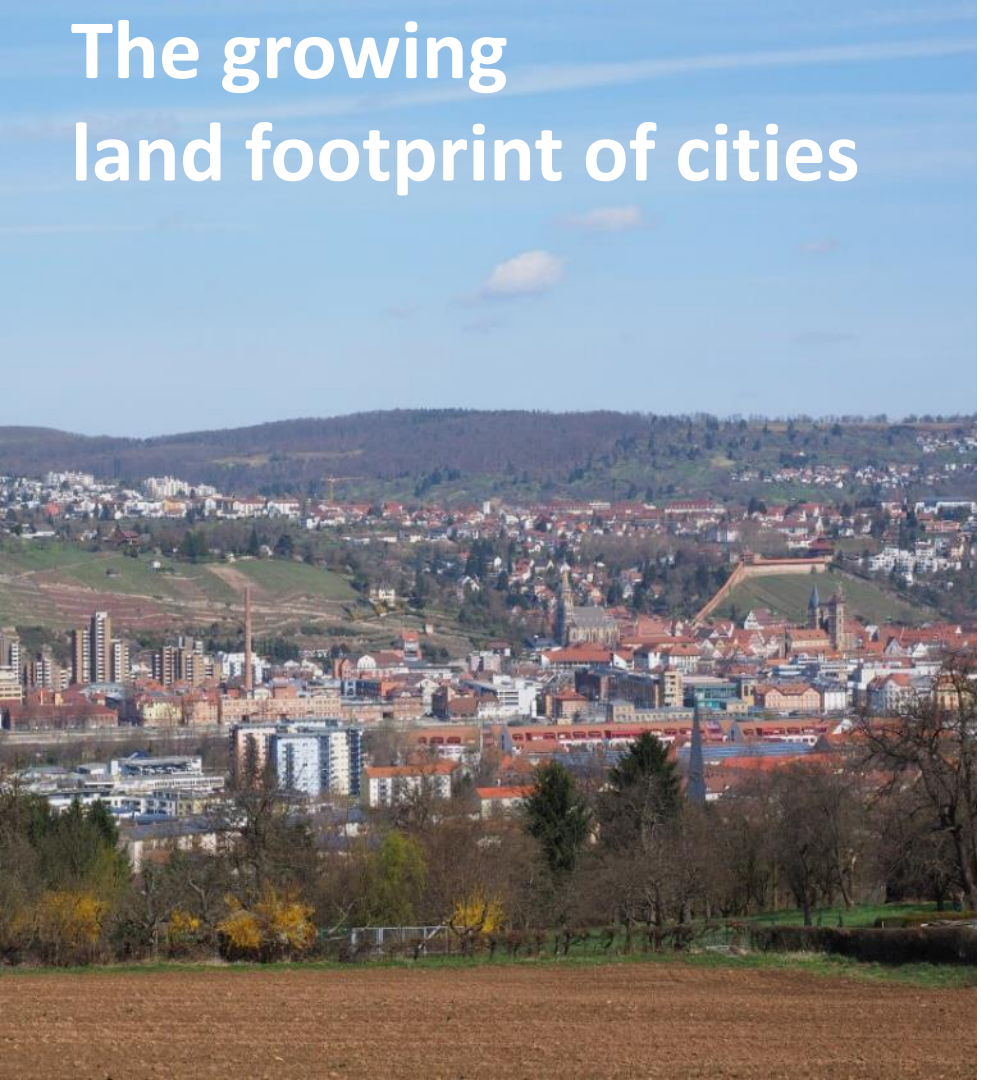
208 million people were under stressed conditions, at the cusp of acute hunger (IPC/CH Phase 2)

15.7 million children suffered from wasting due to acute malnutrition

55 countries and territories in food crises covered by the report

An increase of 20 million people from last year, continuing the relentless rise in acute food insecurity since 2017.

The growing land footprint of cities

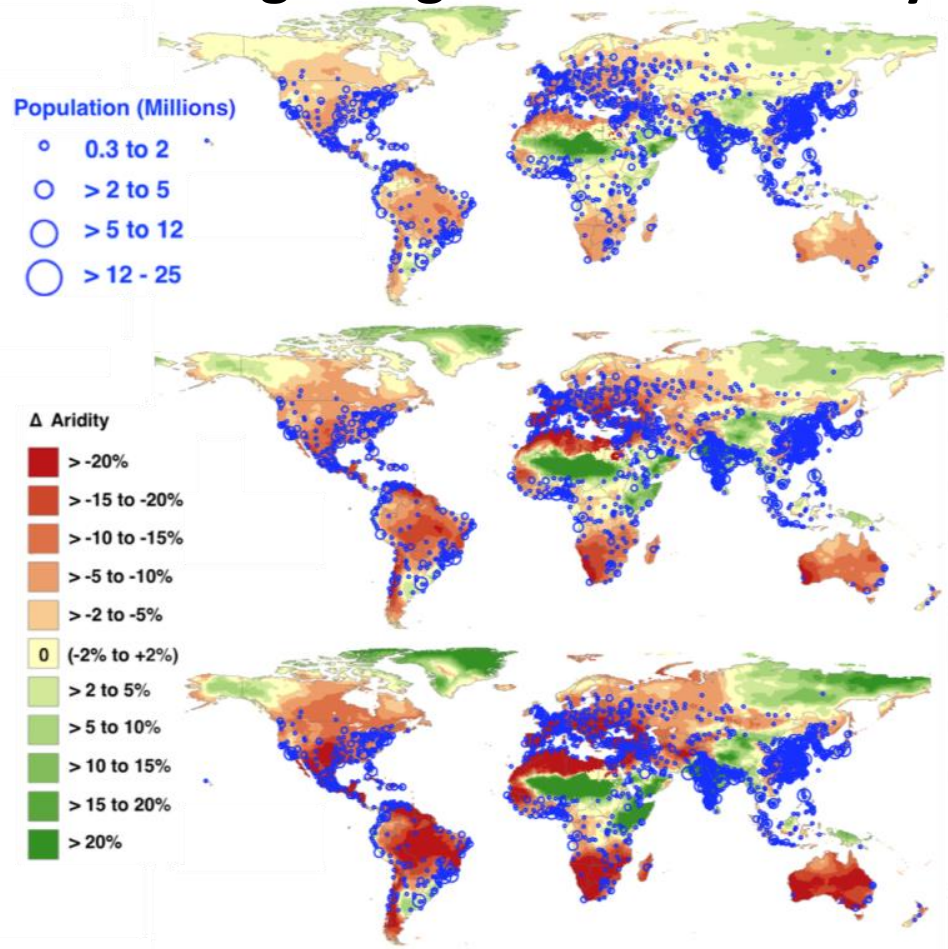


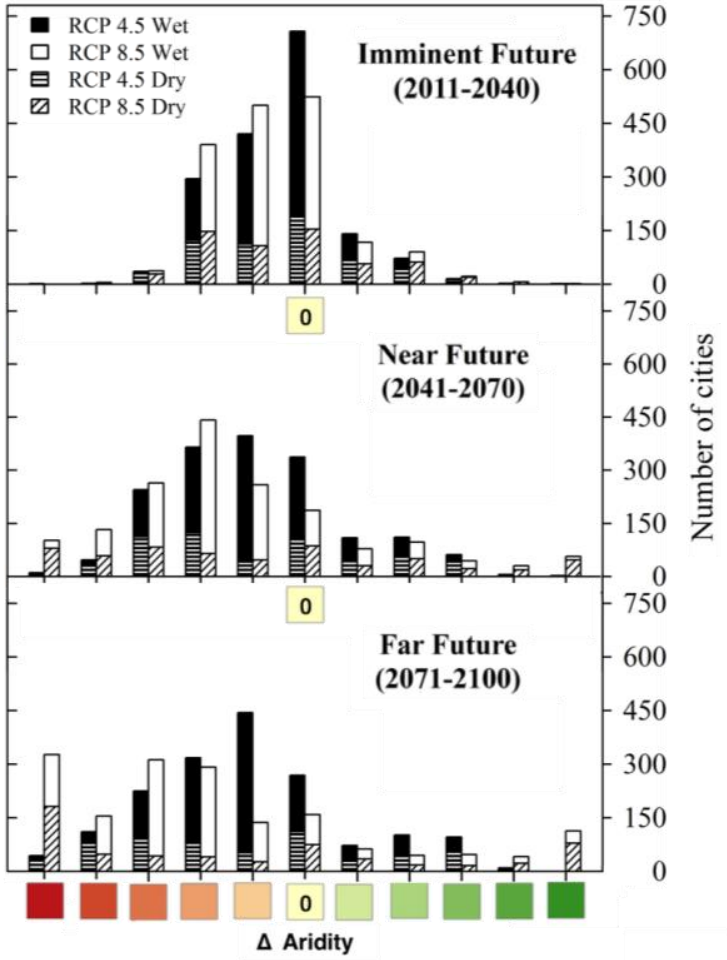
- More than 60% of the world's irrigated croplands located near urban areas
- Urban expansion will consume 1.8-2.4% of global croplands by 2030
- Africa and Asia to experience 80% of the global cropland loss due to urban area expansion
- Slum settlements often located in areas of high environmental risk ; while worsening env. conditions in rural areas can increase unplanned peri-urban development

Source of text: Bren d'Amour et al. 2017

The world is getting *drier* where many people live – or will live

By mapping cities larger than 300,000 against aridity trends, it becomes clear that many of them get drier, impacting 70% of the world's urban population.

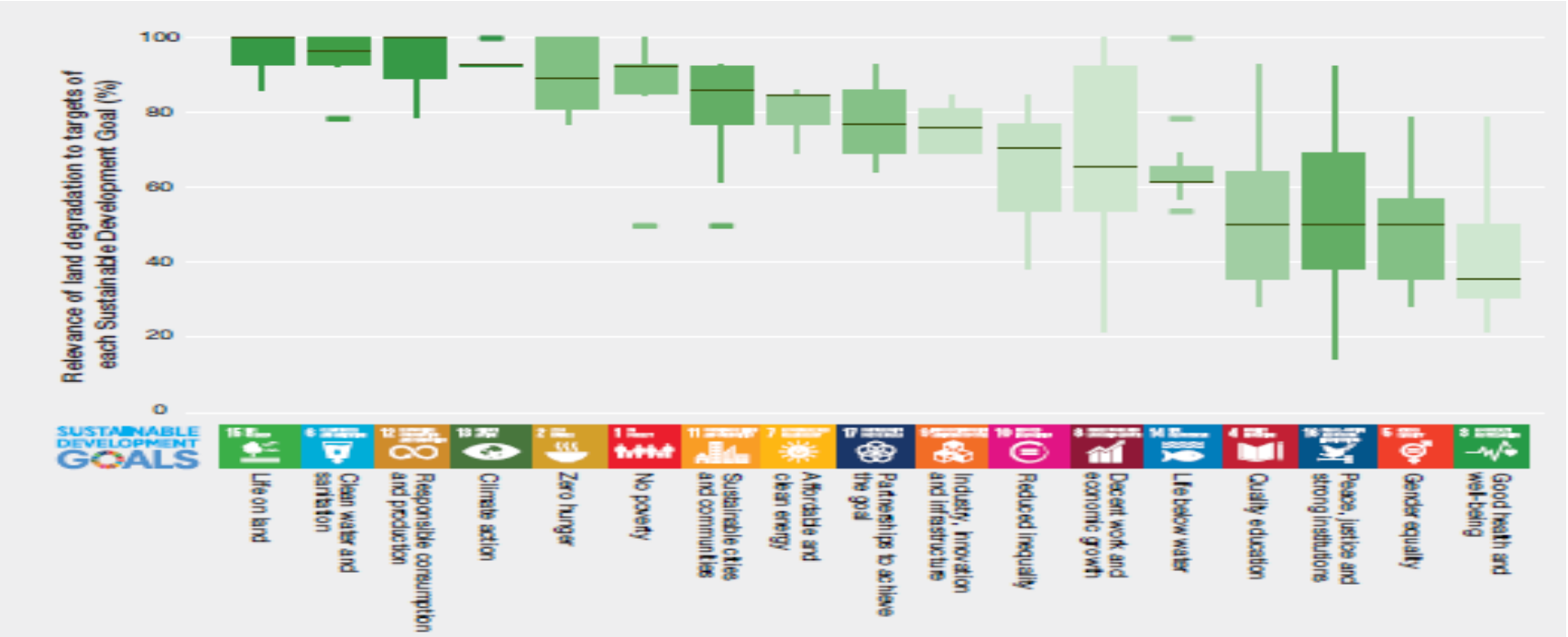




Source: Feng and Fu 2013 and Reynolds et al. 2018

https://wad.jrc.ec.europa.eu/globalurbanisation

Successfully addressing the Sustainable Development Goals requires simultaneously halting and reversing land degradation.



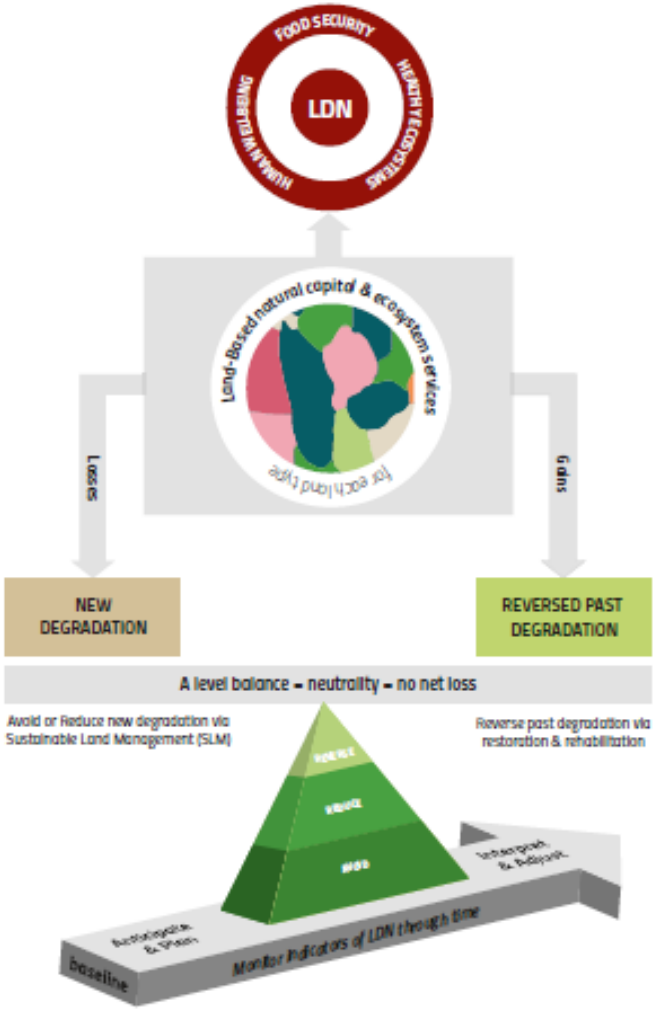
How do we build back better?

We need a positive transformation, a positive change in the fundamental attributes of natural and human systems.

A balanced approach is needed.

- One that **anticipates new degradation** even as we plan to reverse past degradation
- One that **considers tradeoffs** among competing interests across the landscape

LDN provides the framework for this.



Land Degradation Neutrality (LDN)

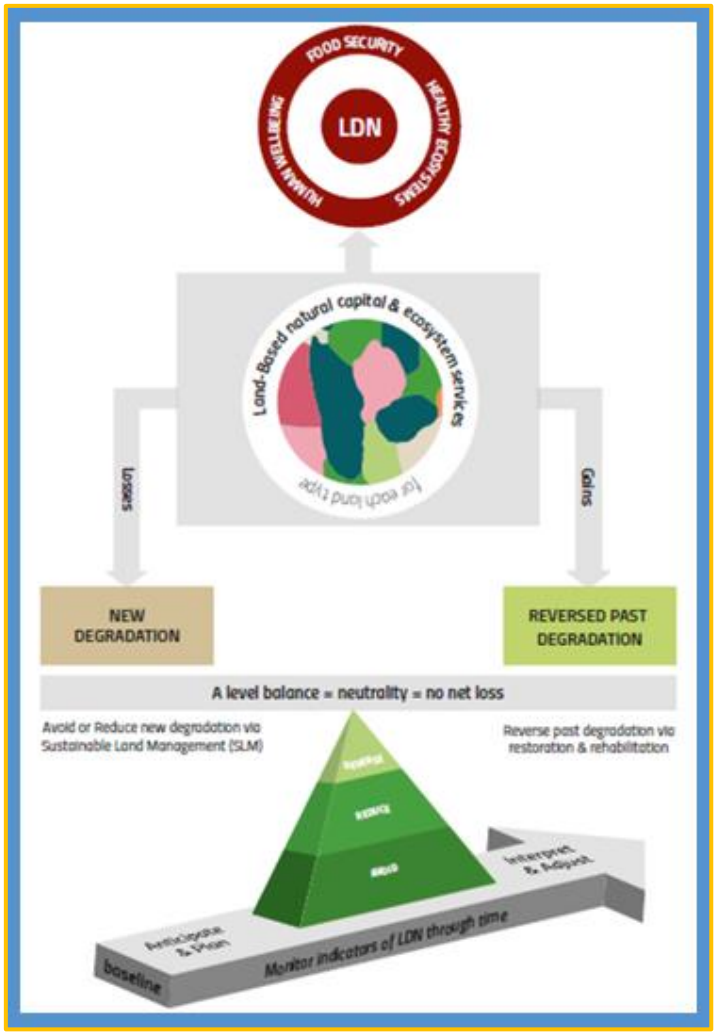
United Nations
Convention to Combat Desertification

"A state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems"

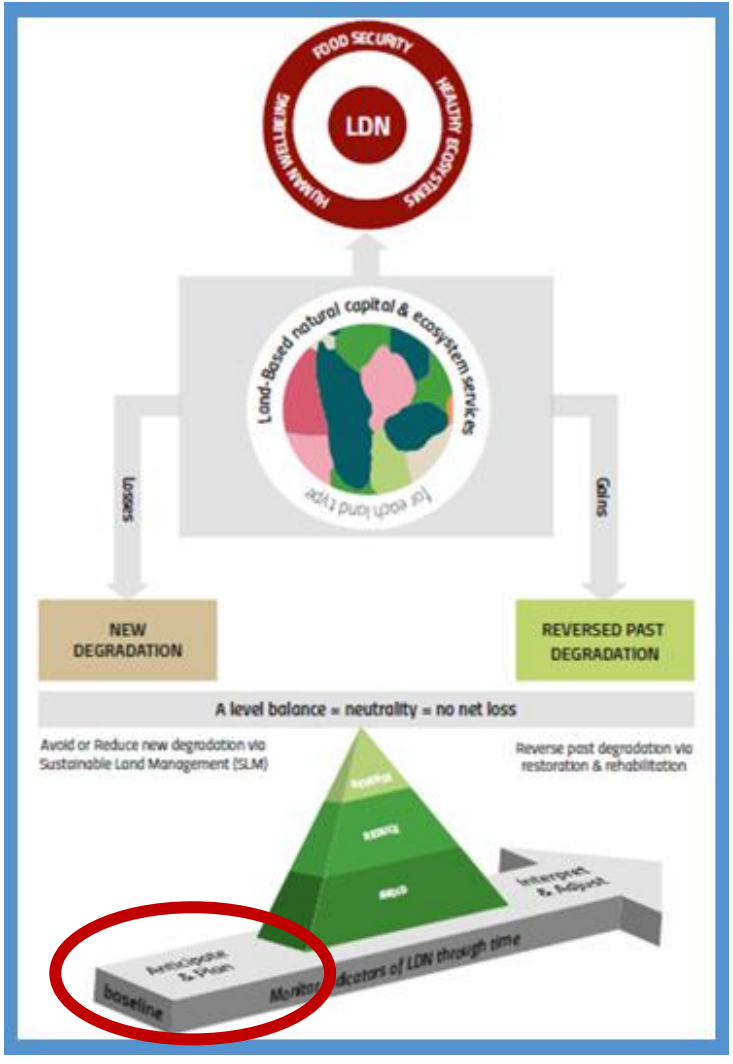
UNCCD COP12 October 2015

Land Degradation Neutrality

- LDN seeks to **maintain natural capital** and the **ecosystem services** that flow from it;
- LDN is about keeping **land in balance;**
- Keeping land in balance provides the basis for **keeping food, water, carbon and biodiversity in balance** as well;
- LDN is about achieving **multiple benefits;**
- LDN provides a framework with **multiple entry points** which facilitate **optimizing the synergies** among the Rio Conventions (Climate Change, Biodiversity, Land Degradation).



https://knowledge.unccd.int/publication/ldn-scientific-conceptual-framework-land-degradation-neutrality-report-science-policy

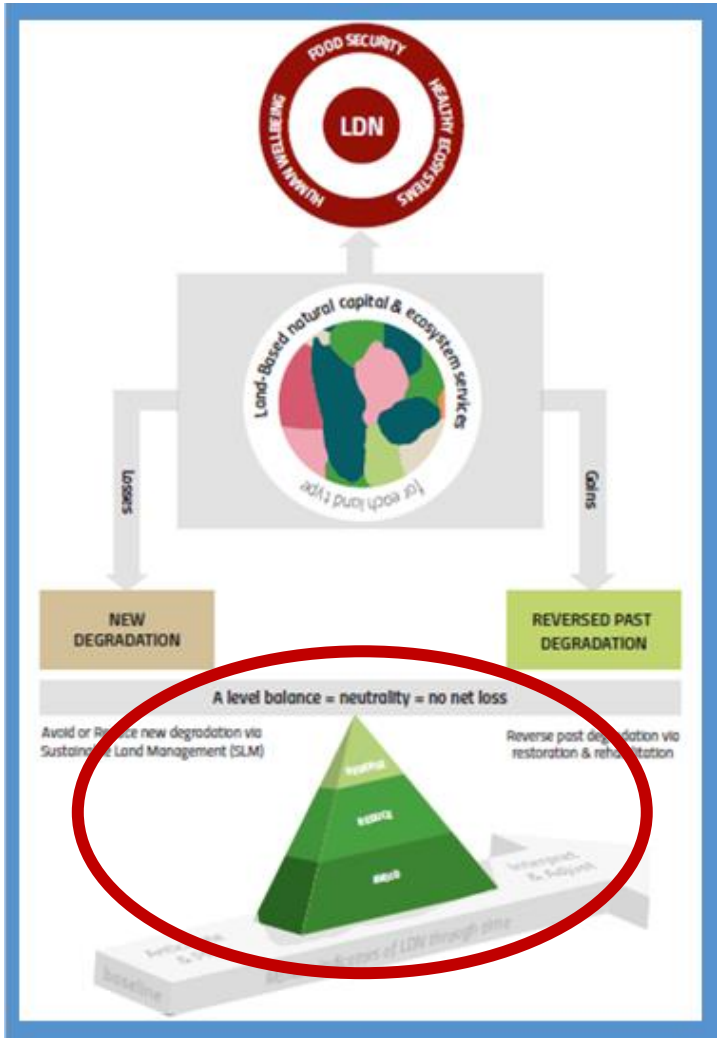


Integrated land use planning

United Nations
Convention to Combat Desertification

LDN planning (from target setting to territorial / spatial planning to integrated landscape management) involves anticipating where degradation is likely and modelling the tradeoffs among competing demands on land resources, location by location, so that the optimal mix of interventions across the landscape to achieve neutrality can be pursued.

Land Degradation Neutrality is about doing the **right things** in the **right places** at the **right scale**



Response Hierarchy

Prevention is better than cure

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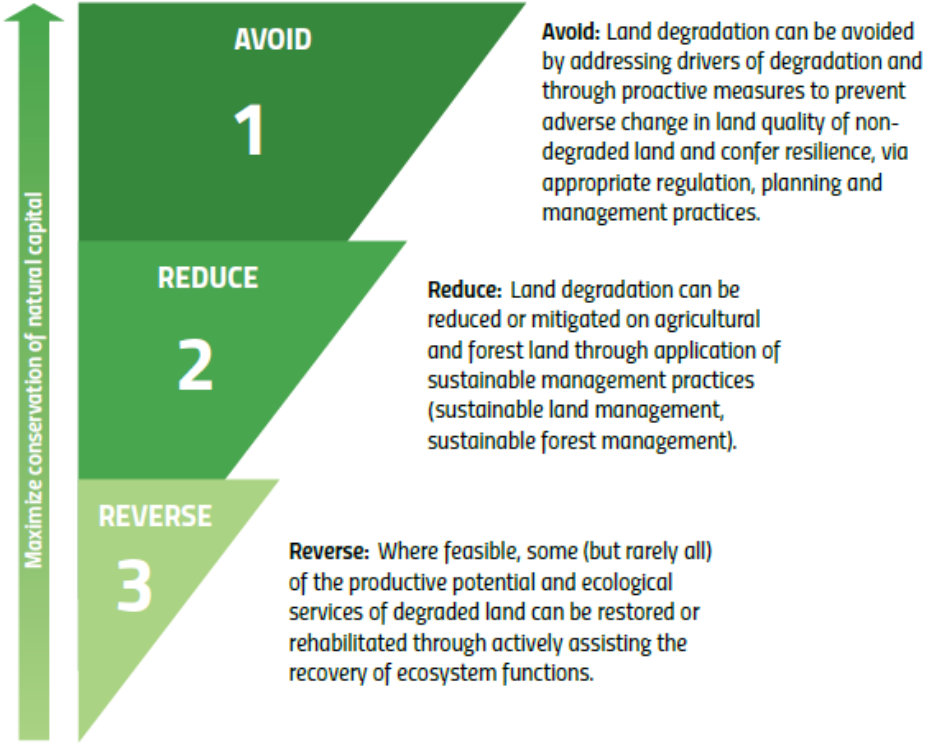

Avoid: Land degradation can be avoided by addressing drivers of degradation and through proactive measures to prevent adverse change in land quality of non-degraded land and confer resilience, via appropriate regulation, planning and management practices.

Reduce: Land degradation can be reduced or mitigated on agricultural and forest land through application of sustainable management practices (sustainable land management, sustainable forest management).

Reverse: Where feasible, some (but rarely all) of the productive potential and ecological services of degraded land can be restored or rehabilitated through actively assisting the recovery of ecosystem functions.

LDN targets set since 2017

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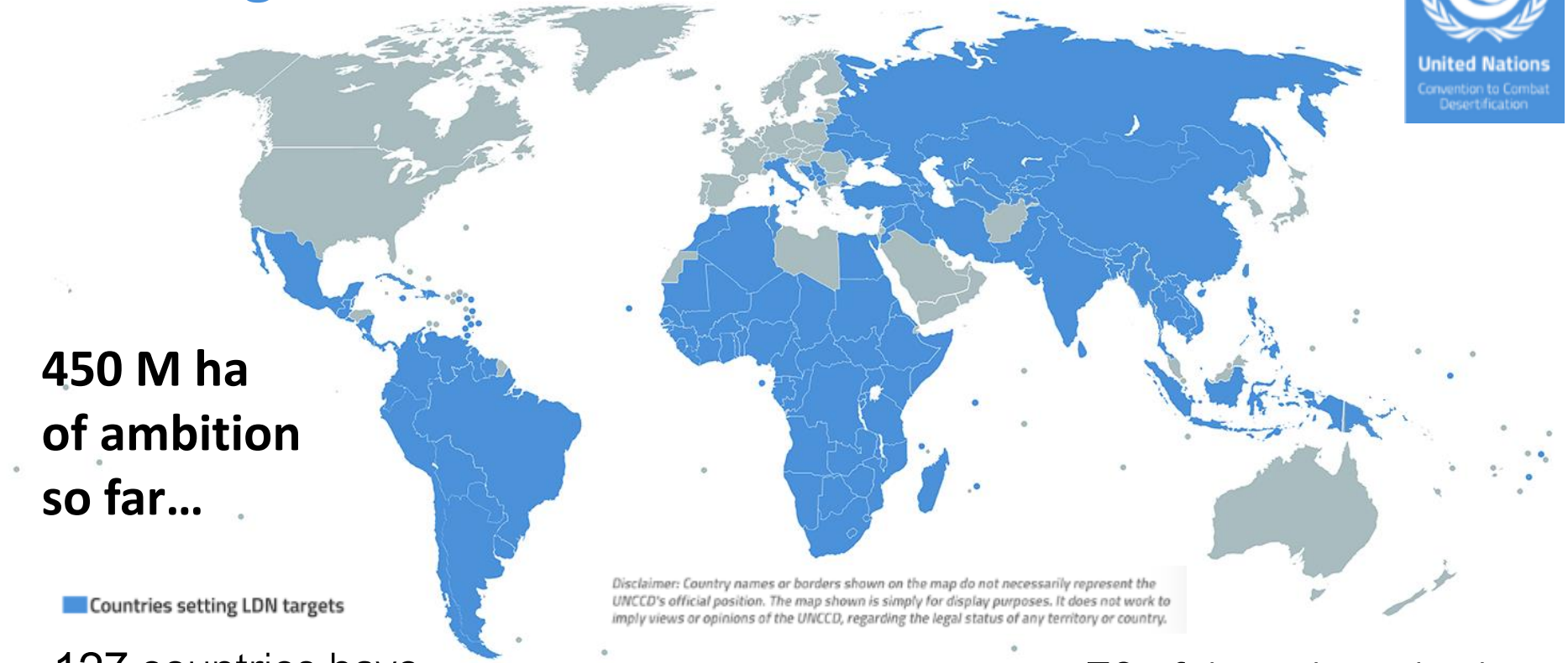


450 M ha of ambition so far…

127 countries have committed to set LDN targets so far

104 of these have completed setting their LDN targets

70 of these have had their targets formally adopted by government

How can LDN and land restoration boost nature-positive food production?

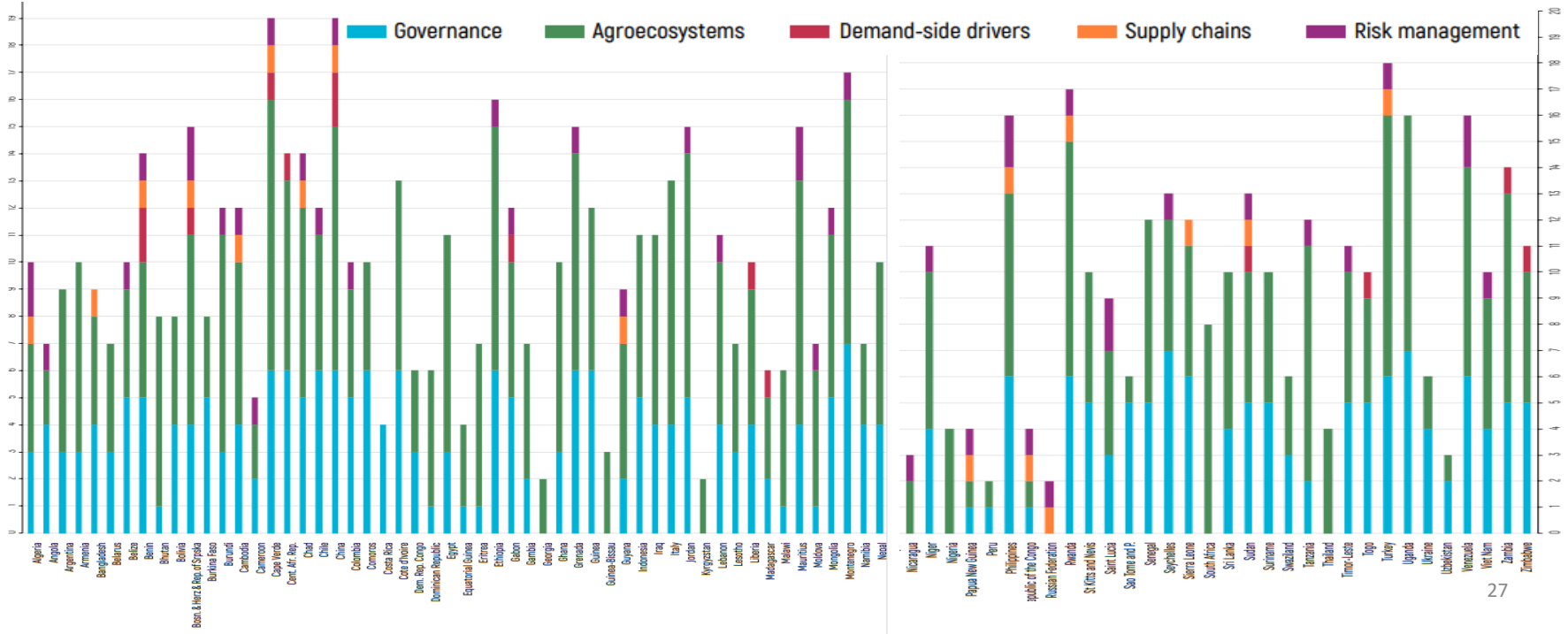
Sneak preview to an action guide that will be launched at the upcoming Food Systems Summit.

INTEGRATED LDN RESPONSE ACTIONS

LDN is driving the integrated approach needed to halt the loss of healthy and productive land, and sustainably manage agroecosystems for present and future generations

This analysis of national LDN reports identified a total of

842 Response Actions in **86** Countries



LDN response actions for food security and sustainable agriculture

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DRIVERS AND PRESSURES

Biophysical
- Climate change
- Agricultural expansion/land conversion
- Loss of biodiversity/diverse landscapes

Institutional
- Land tenure/rights
- Incentives/Investment
- Policy, regulation & enforcement
- Land grabbing

Socio-economic
- Food demand
- Dietary trends
- Food loss/waste
- Resource use efficiency
- Competing land uses

LAND DEGRADATION

SDG target 15.3
Land Degradation Neutrality (LDN)

LDN Target Setting Programme

FOOD SYSTEMS
LDN response actions

- Governance
- Agroecosystems
- Demand-side drivers
- Supply chains
- Risk management

OUTCOMES

- Food/nutrition security
- Improved livelihoods
- Nature-positive food production
- Resilient agroecosystems and healthy landscapes

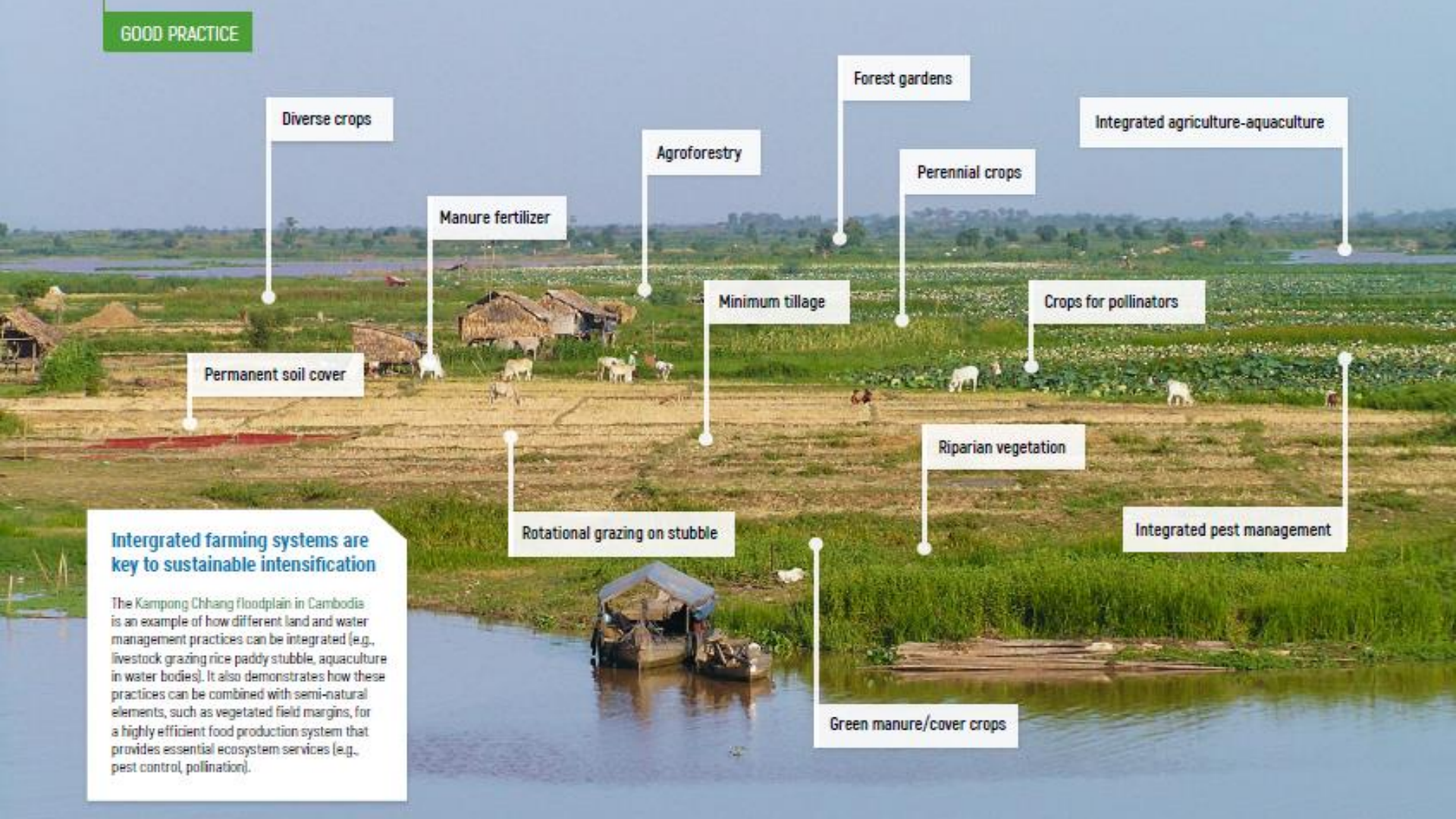
ENVIRONMENTAL CONDITION OF LAND

(including soil health, above and below ground biodiversity, surface and ground water)

Place-based approach

PLACE	 **Cities/urban areas**	 **Urban–rural interface**	 **Rural/agricultural landscapes**	 **Natural ecosystems/ protected areas**
APPROACHES	Green spaces and water management	Sustainable territorial development	Regenerative food and commodity production	Conservation and restoration of nature
ENABLERS	**Rights** (tenure security) / **Rewards** (incentives/investments) / **Responsibilities** (long term planning)			
ACTIONS	» Community gardens and urban farming » Tree planting and wetland restoration » Green belts and buildings (roofs/walls)	» Land use planning Protect watersheds and fertile farmland » Manage urbanization » Sectoral coordination for green infrastructure and supply chains	» Integrated farming (crops/trees/livestock) » Rangeland management » Sustainable intensification and agroecological practices	» Ecological restoration » Wildlife corridors and buffer zones » Indigenous/ community management » Sustainable harvesting in protected areas
BENEFITS	» Human health (quality of life) » Clean air and water » Flood control and wastewater management » Parks and recreation Cooler temperatures	» Water availability for urban residents » Local and regional food security » Biodiversity conservation Reduced urban sprawl	» Food security and rural livelihoods » Healthy soils and ecosystem functions » Reduced emissions » Water storage/recharge » Biodiversity conservation	» Nature's contribution to people » Global public goods (climate stability/ biodiversity) » Ecotourism and cultural landscapes

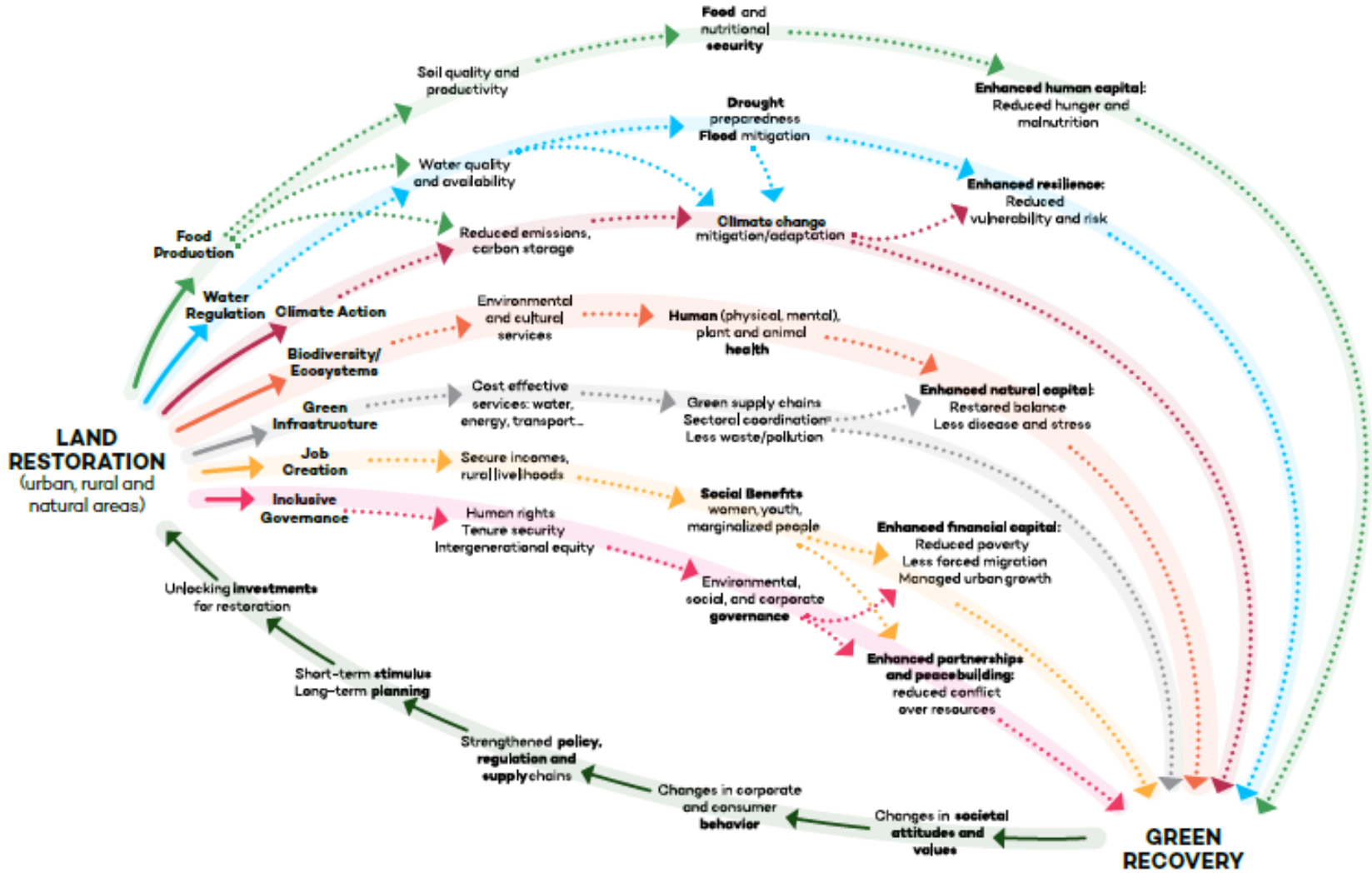
GOOD PRACTICE



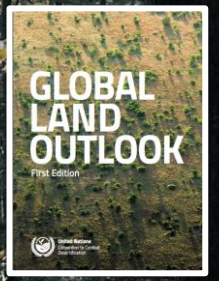
Intergrated farming systems are key to sustainable intensification

The Kampong Chhang floodplain in Cambodia is an example of how different land and water management practices can be integrated (e.g., livestock grazing rice paddy stubble, aquaculture in water bodies). It also demonstrates how these practices can be combined with semi-natural elements, such as vegetated field margins, for a highly efficient food production system that provides essential ecosystem services (e.g., pest control, pollination).

The restoration pathways to a green recovery



PBL Netherlands Environmental Assessment Agency



Can restoration deliver? Sneak preview of the PBL contribution to the forthcoming 2nd Edition of the Global Land Outlook

Restoration scenario to estimate the potential global and regional benefits of large-scale restoration and prevention of further degradation

- For multiple **functions**: water, agriculture, biodiversity, carbon sequestration
- In light of **future changes** to land use, land degradation and climate
- Compared to current global and national **ambitions for restoration**

To be published summer 2021

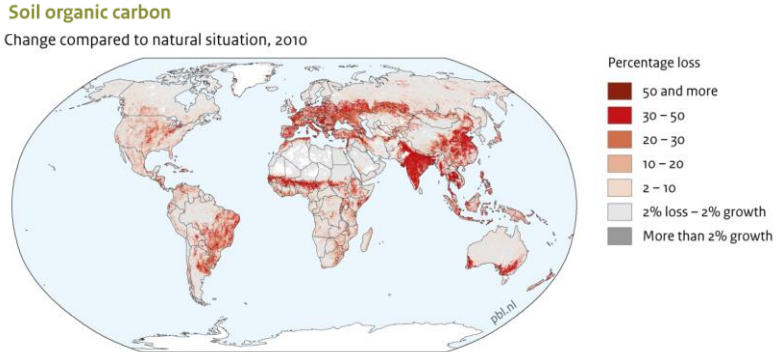
Stefan van der Esch, Elke Stehfest, Annelies Sewell, Jonathan Doelman, Michel Bakkenes, Ben ten Brink (all PBL), Luuk Fleskens, Jetse Stoorvogel (Wageningen University)

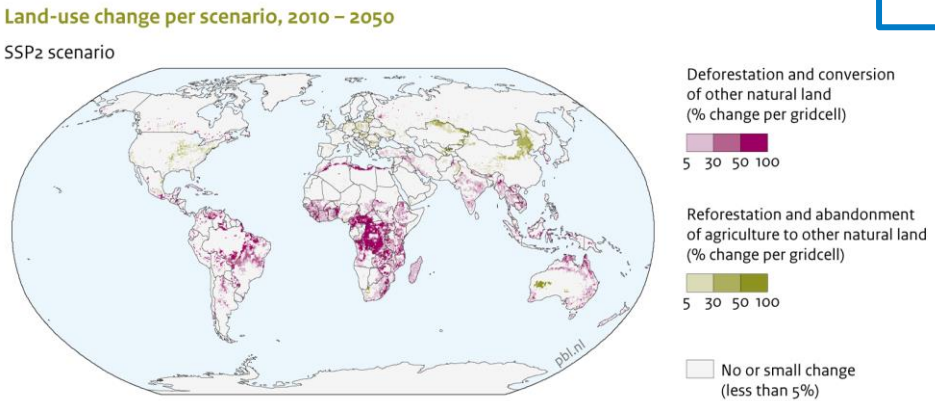
Assumptions on measures

Protection/prevention measures		Management measures	
Protected areas for biodiversity	Expand to assumed Post2020 target of 30% plus effective	Conservation agriculture	On degrading land / all cropland
Agriculture on slopes	No agriculture expansion on slopes over x% incline	Agroforestry (cropland)	On cropland in tropical and subtropical zones with yields at <50% of max potential
Peatland protection	No conversion of peatlands	Agroforestry (livestock)	On rangeland/pasture in tropical and subtropical zones
Water-towers	Areas with relatively high contribution to water regulation	Improved grazing	On all rangeland/pasture
REDD / high carbon forests	No conversion of forests with carbon stock > 100t/ha	Grassland improvement	On pastures outside tropical and subtropical zones
Riparian zones	Areas close to rivers/streams	Cross-slope barriers	On cropland on slopes over x% incline
		Reforestation and forest restoration	Degraded forests, reforestation

Baseline: estimates on past and future changes

Restoration: Measures to protect areas for key functions and to improve land management



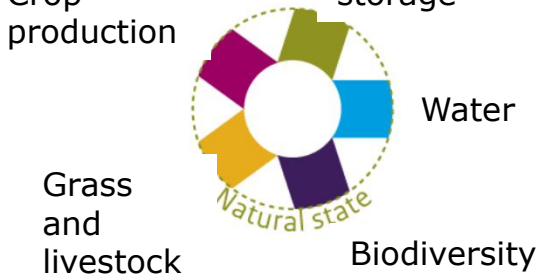


Protect key areas:

- Biodiversity areas
- High carbon forests
- Peatlands
- Water towers
- Vulnerable soils/slopes (high erosion risk)
- Riparian zones

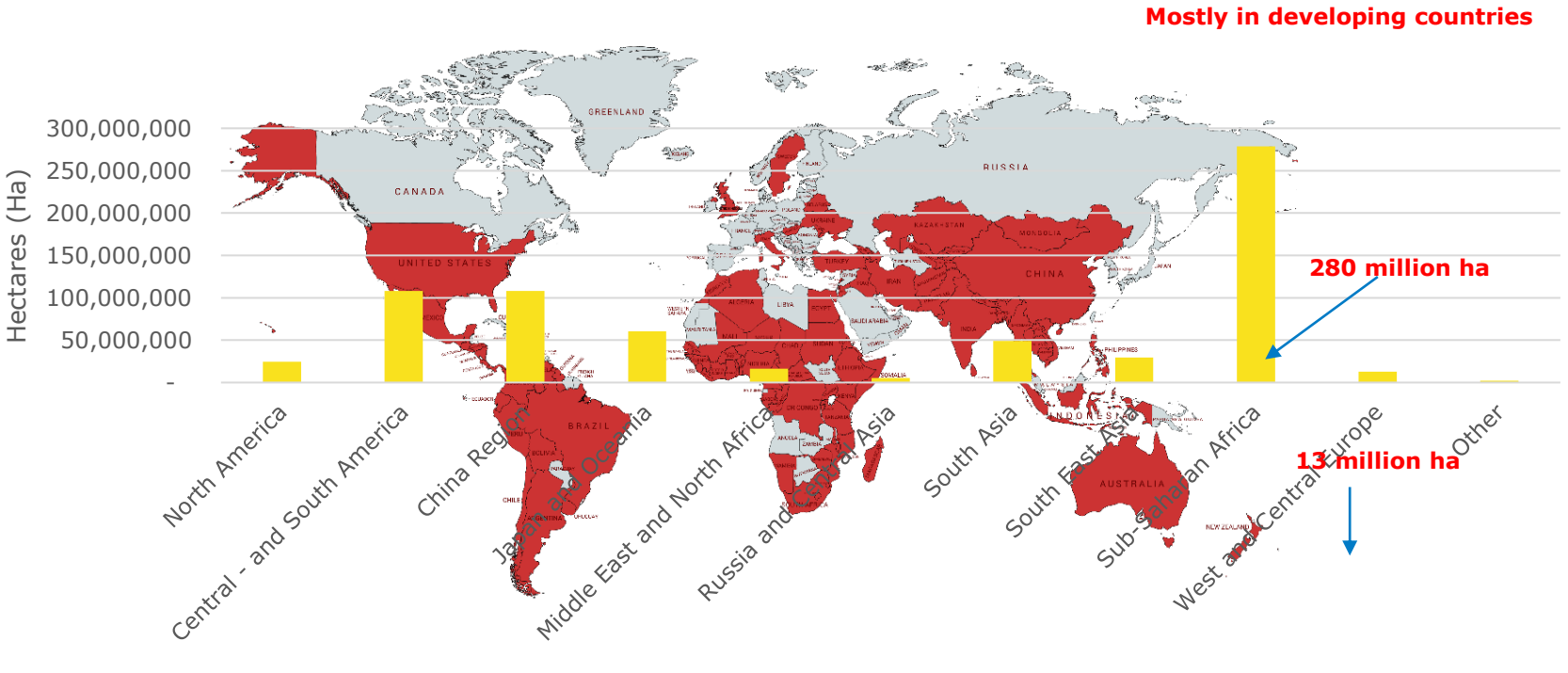
Management (prevention and restoration):

- Agroforestry
- Conservation agriculture
- Grazing and grassland management
- Reforestation
- Cross-slope barriers
- Water management



PBL Netherlands Environmental Assessment Agency

700 to 950 M ha total of current national ambitions, but where?

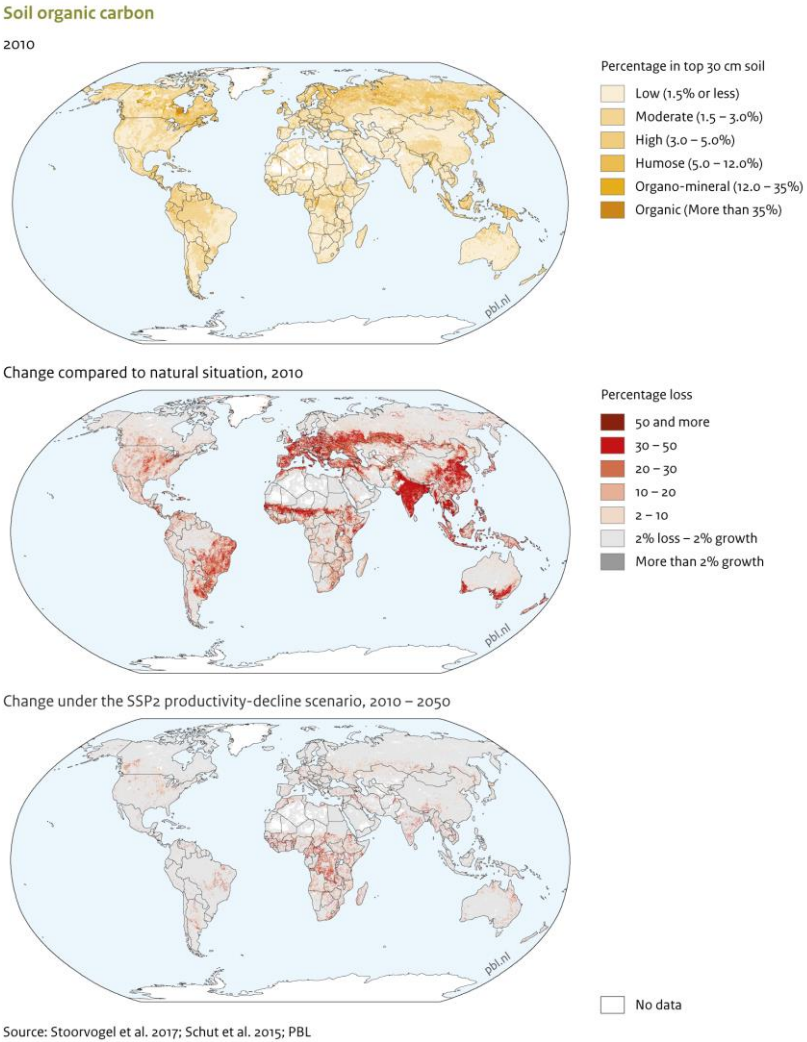


To what extent can we restore past loss of soil organic carbon and prevent future loss?

Situation in 2010

Historic loss: most losses in agricultural production areas -> also most potential for restoration?

Projected change to 2050



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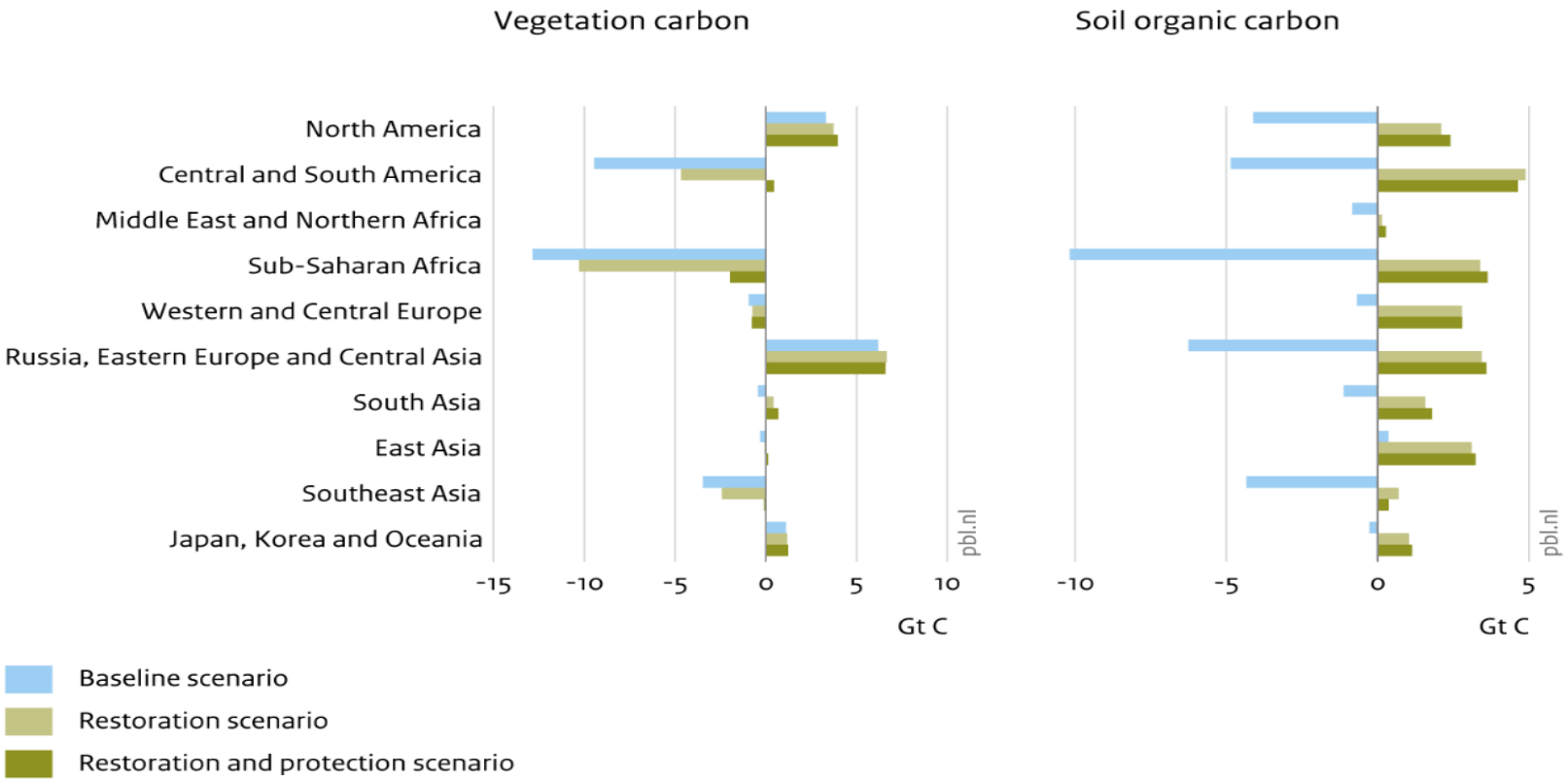
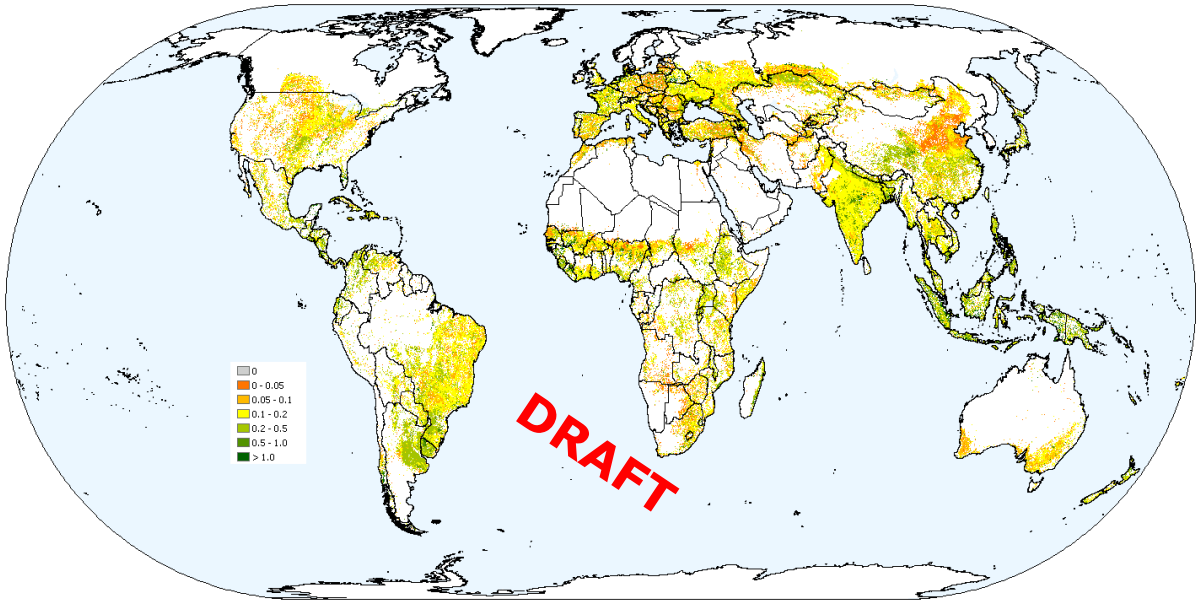
Changes in carbon stocks in vegetation and soil, 2015 - 2050



Source: PBL/IMAGE/GLOBIO, Stoorvogel et al. 2017

Where can we do this?
The conservation agriculture example



- Based on response rates
- All cropland
- Capped at natural maximum

Some take home messages the PBL work

- The **baseline scenario** leads to **a loss of about 60-70 Gt between 2015 and 2050**, roughly equally divided between vegetation (27) and soils (32) and continued peatland emissions (10). This equals some **16% of current annual emissions**.
- Compared against 2015, **restoration leads to a 17 Gt increase by 2050**. This is the effect of gains in soil carbon and reduced losses in vegetation carbon.
- This is **why it is so important it is to include prevention when talking about restoration**. If restoration prevents future loss, its real effect in carbon stored in soil and vegetation is much higher than 17 Gt.

Initiatives such as Land Degradation Neutrality, Nationally Determined Contributions (NDCs – Paris Agreement), National Biodiversity Strategies and Action Plans (NBSAPs) and the Bonn Challenge add up to global restoration commitments of 1 billion hectares.

The G20 Global Initiative on Reducing Land Degradation and Enhancing Conservation of Terrestrial Ecosystems

- Launched by the G20 Leaders at the G20 Riyadh Summit, 21-22 November 2020 – discussed and developed in the Environment Deputies meeting
- Aims to support existing efforts to prevent, halt, and reverse land degradation and habitat loss
- Building on existing initiatives, G20 leaders share the ambition to achieve a 50 percent reduction of degraded land by 2040, on a voluntary basis

G20
SAUDI ARABIA 2020

Desertification & Drought Day 17 JUNE 2021

Restoration. Land. Recovery.

We build back better with healthy land

Thank you!

United Nations
Convention to Combat Desertification

Web: www.unccd.int

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Facebook: www.facebook.com/UNCCD

#DesertificationAndDroughtDay #RestorationLandRecovery