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INTERGOVERNMENTAL PANEL ON climate change

Climate Change and Land

An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

Summary for Policymakers



WG I WG II WG III



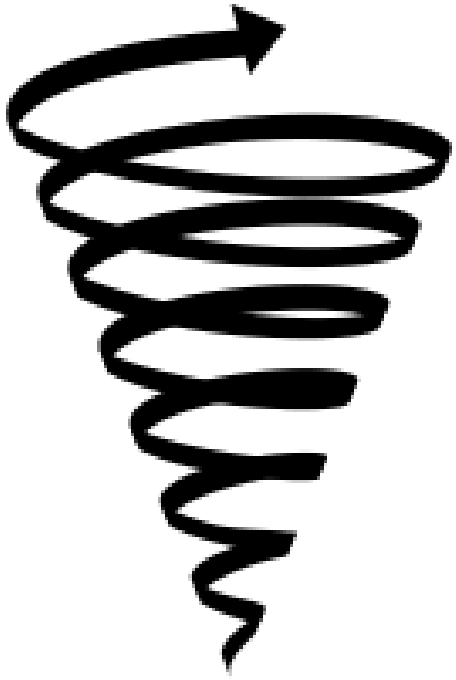
Climate Change and Land Degradation: Impacts and Responses

Annette Cowie

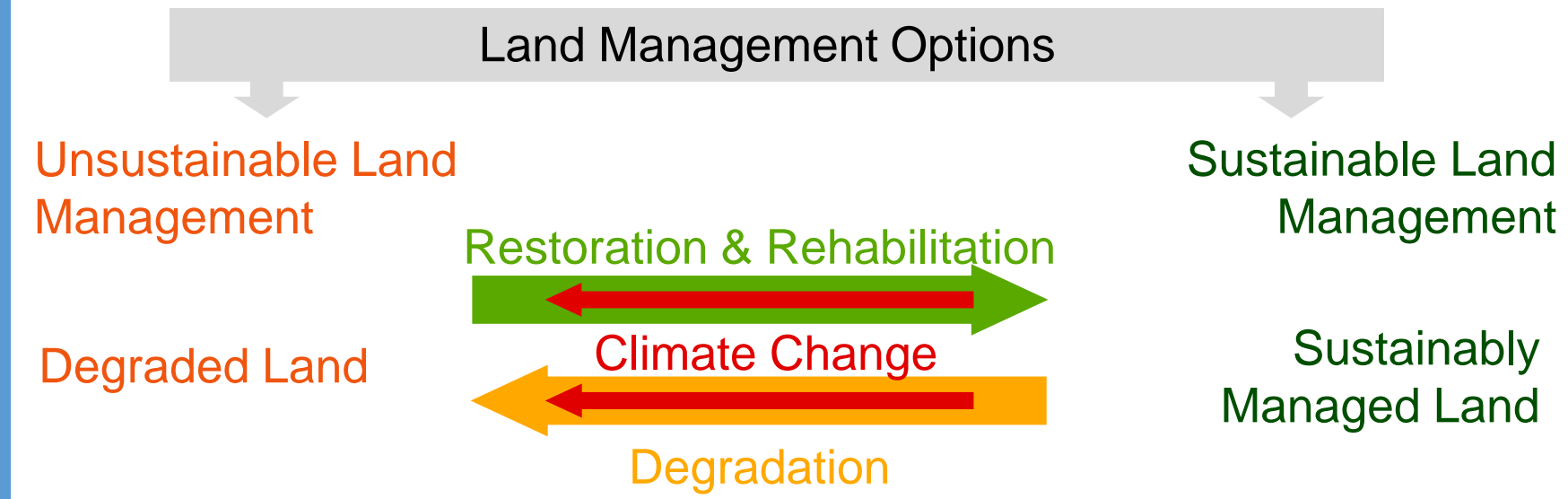
Climate change + Land degradation



Sustainable Land Management



The stewardship and use of land resources, including soils, water, animals and plants, to meet changing human needs, while simultaneously enhancing resilience, to ensure the long-term productive potential of these resources and the maintenance of their environmental functions





Win-win options in land management

Response options based on land management		Mitigation	Adaptation	Desertification	Land Degradation	Food Security	Cost
Agriculture	Increased food productivity	L	M	L	M	H	—
	Agro-forestry	M	M	M	M	L	●
	Improved cropland management	M	L	L	L	L	●●
	Improved livestock management	M	L	L	L	L	●●●
	Agricultural diversification	L	L	L	M	L	●
	Improved grazing land management	M	L	L	L	L	—
	Integrated water management	L	L	L	L	L	●●
	Reduced grassland conversion to cropland	L	—	L	L	- L	●
Forests	Forest management	M	L	L	L	L	●●
	Reduced deforestation and forest degradation	H	L	L	L	L	●●
Soils	Increased soil organic carbon content	H	L	M	M	L	●●
	Reduced soil erosion	↔ L	L	M	M	L	●●
	Reduced soil salinization	—	L	L	L	L	●●
	Reduced soil compaction	—	L	—	L	L	●
Other ecosystems	Fire management	M	M	M	M	L	●
	Reduced landslides and natural hazards	L	L	L	L	L	—
	Reduced pollution including acidification	↔ M	M	L	L	L	—
	Restoration & reduced conversion of coastal wetlands	M	L	M	M	↔ L	—
	Restoration & reduced conversion of peatlands	M	—	na	M	- L	●

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INTERGOVERNMENTAL PANEL ON climate change

Global Warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty



WG I WG II WG III



IPCC Special Report 1.5°C

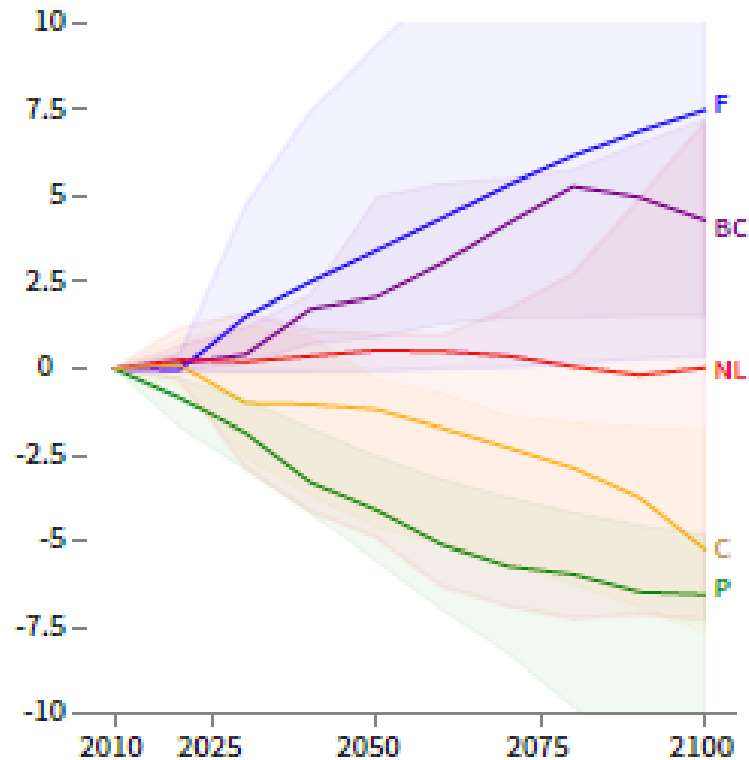
- Human activities have already caused about 1.0°C of global warming above pre-industrial levels
- Climate-related risks for natural and human systems are substantially lower for global warming of 1.5°C than 2°C
- Drastic cuts to current rate of emissions required to meet Paris Agreement target
- Carbon dioxide removal will be needed: key role for bioenergy with CCS - BECCS

Land use change under different scenarios consistent with 1.5°C target

SSP1 Sustainability-focused

- Sustainable land management
- Sustainable production and consumption
- Ag intensification
- Spares land for afforestation, bioenergy

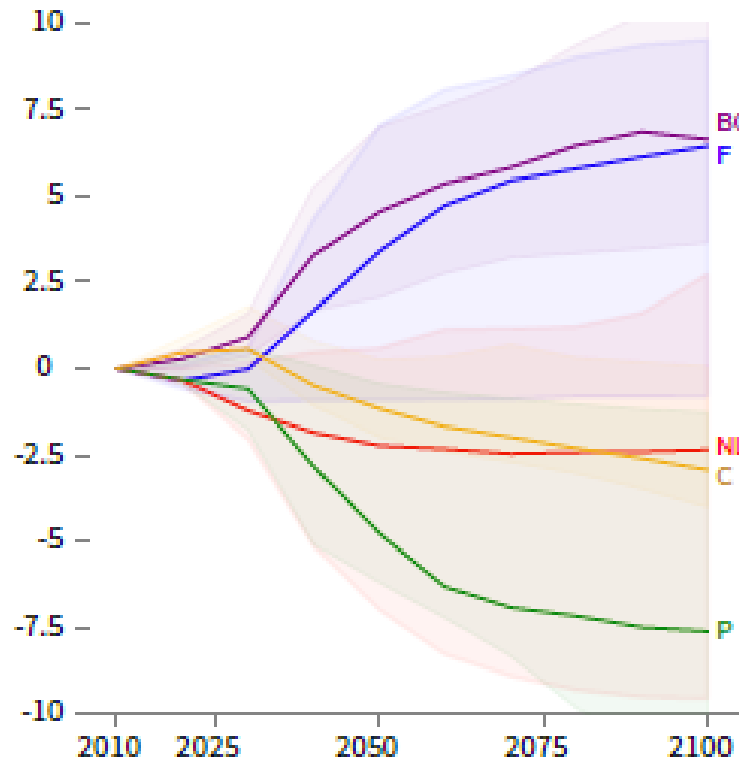
Change In Land from 2010 (Mkm²)



SSP2 Middle of the road

- Continues historical social, economic, and technological trends
- Slow progress in sustainable development

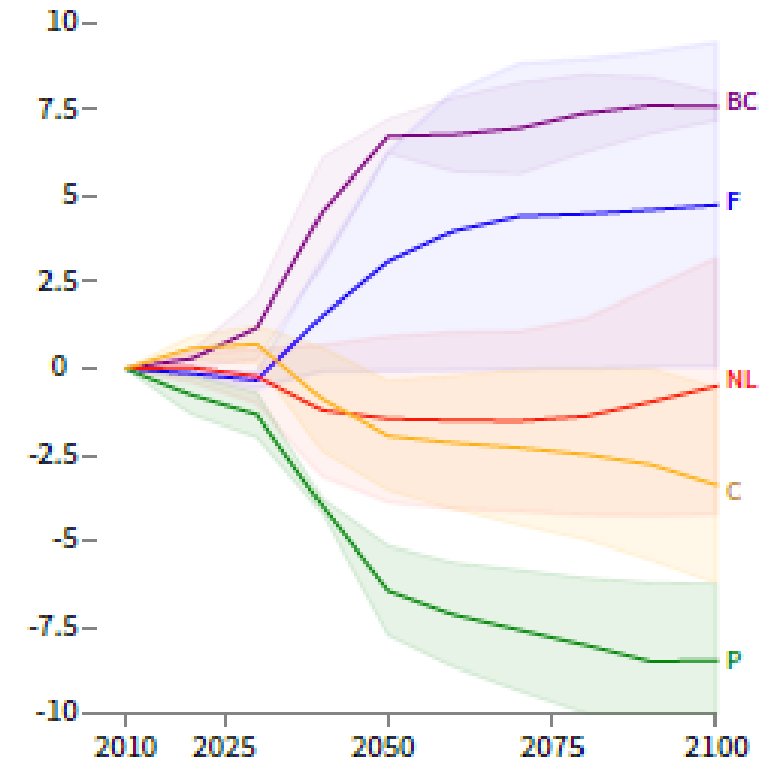
Change In Land from 2010 (Mkm²)



SSP5 Resource intensive

- Resource-intensive production, consumption and lifestyles
- Innovation, free trade
- Large challenge for mitigation

Change In Land from 2010 (Mkm²)



CROPLAND PASTURE BIOENERGY CROPLAND FOREST NATURAL LAND

SRCCL SPM4

Compared with: 15 Mkm² total global cropland; 35 Mkm² pasture; 40 Mkm² forest



Biochar



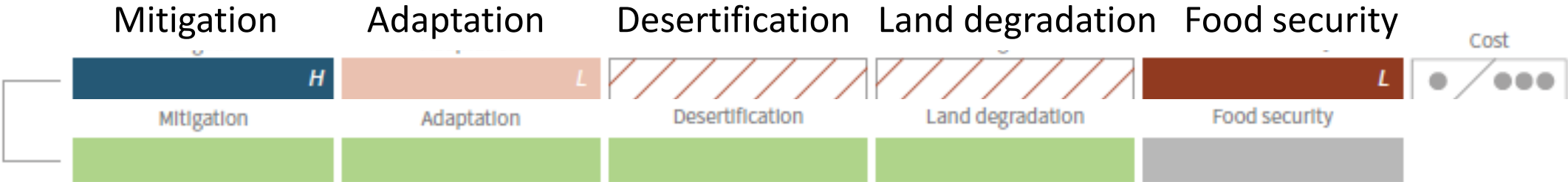
Biochars can:

- Improve soil properties – relieve soil constraints:
 - chemical
 - physical
 - biological
- Have liming effect
- Increase water holding capacity
- Increase nutrient use efficiency
- Increase plant growth, plant health
- Reduce leaching and N volatilisation
- Immobilise contaminants
- Climate benefits: Carbon stabilisation, reduced non-CO2 emissions
- Benefits vary between biochars

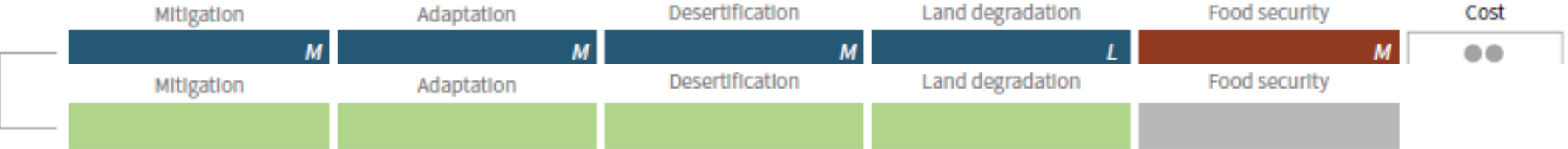


Land options with risks and opportunities

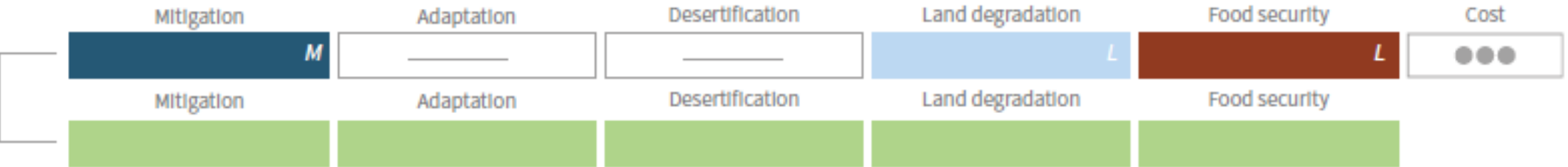
Bioenergy/BECCS



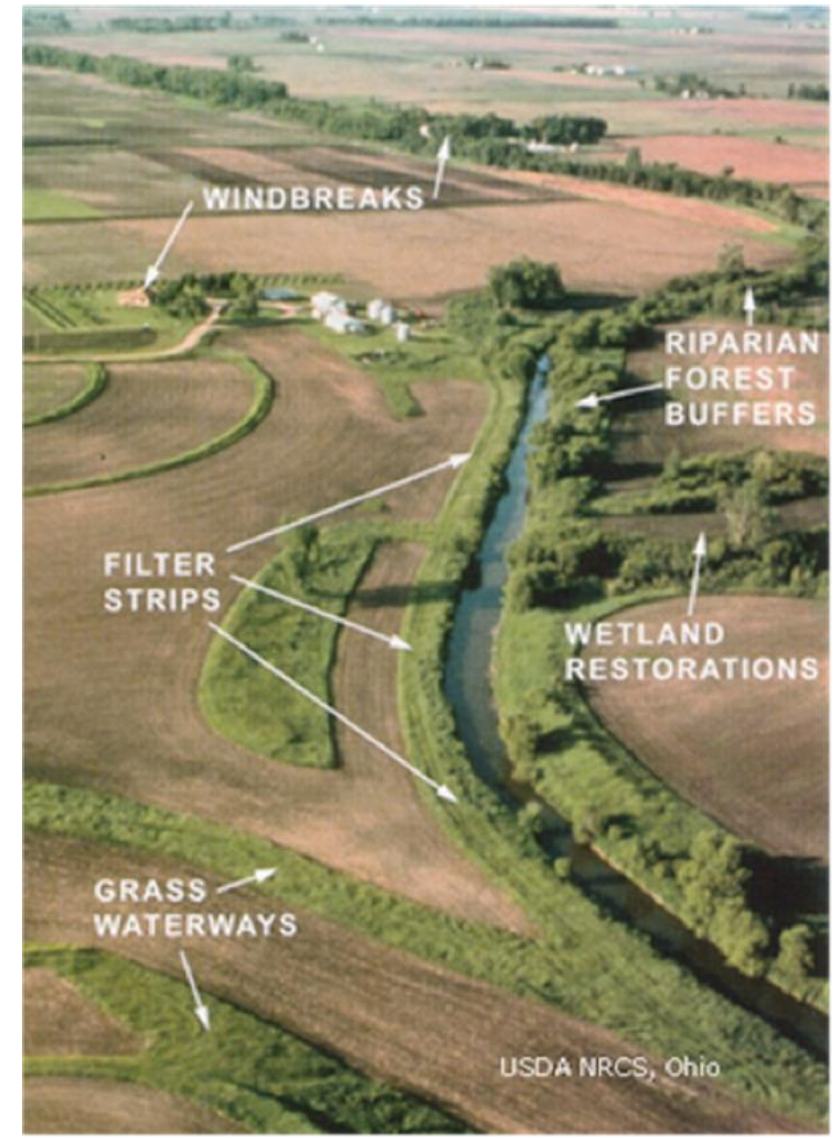
Afforestation

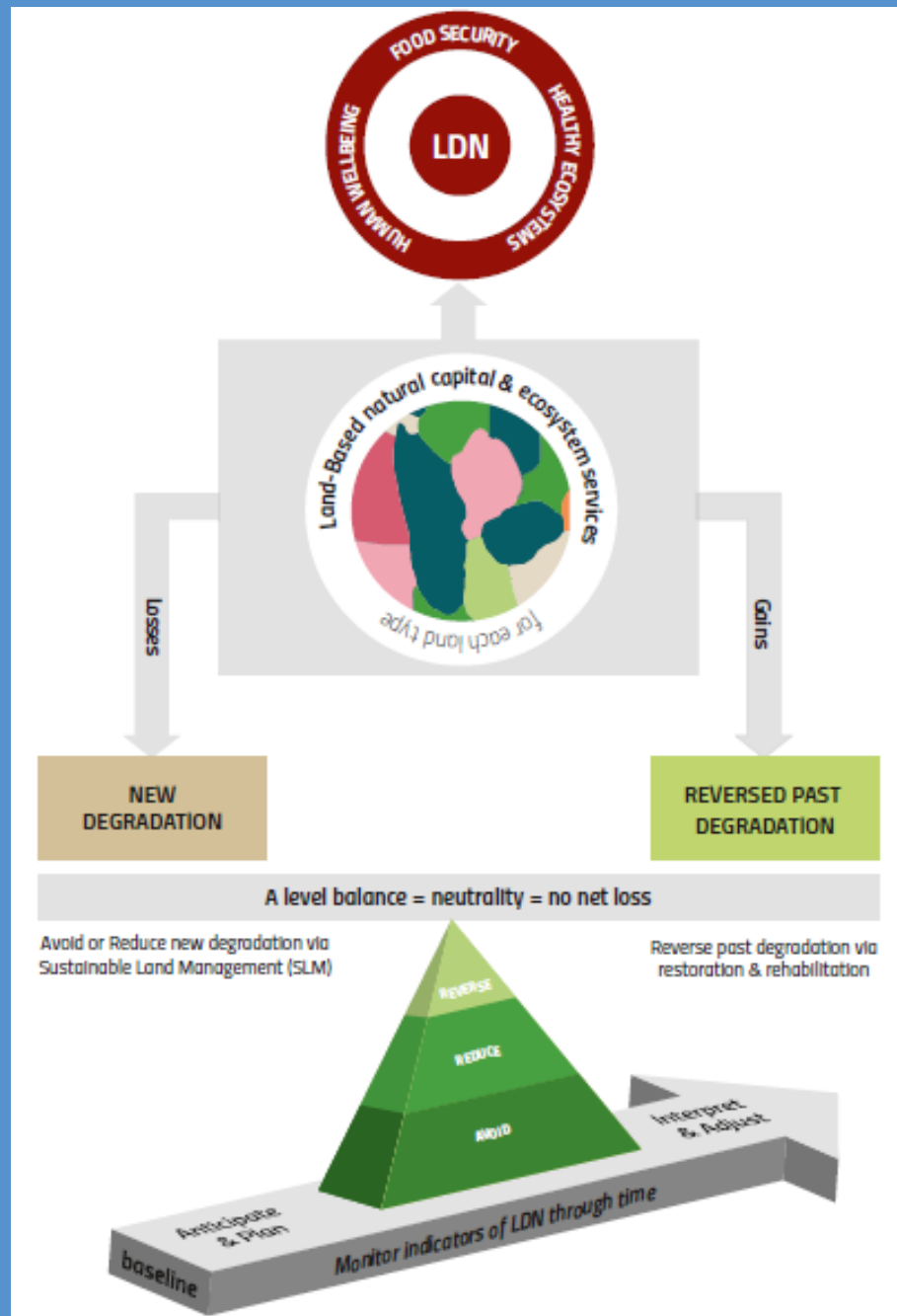


Biochar



Integrating biomass production with agriculture



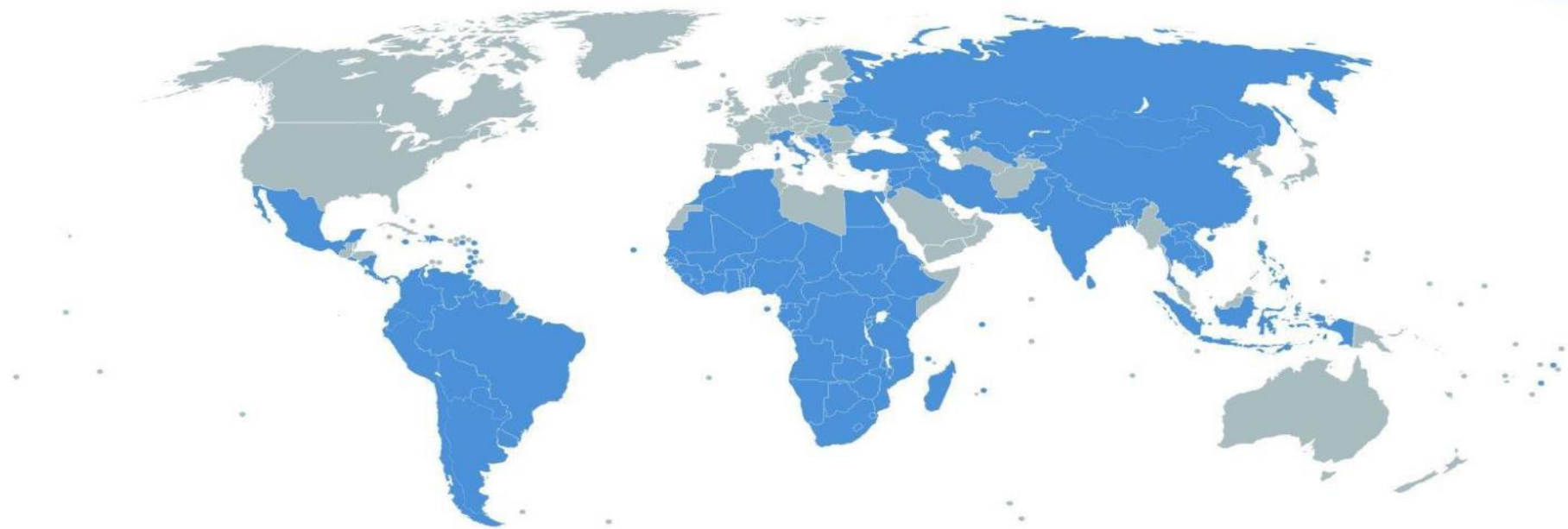


Land degradation neutrality

No net loss of healthy, productive land

- Avoid degradation
- Reduce degradation - SLM
- Counterbalance anticipated degradation through restoration and rehabilitation within the same land type

LDN commitments



■ Countries setting LDN targets

Disclaimer: Country names or borders shown on the map do not necessarily represent the UNCCD's official position. The map shown is simply for display purposes. It does not work to imply views or opinions of the UNCCD, regarding the legal status of any territory or country.

- 122 countries have committed to set LDN targets
- 83 countries have validated targets
- 51 countries target adopted by Governments

Deforestation, meat production driving climate crisis



Change food production and stop abusing land, major climate report warns



Although recent meat substitutes mimic the properties of meat accurately, the sales of red meat have declined

nature
International journal of science

Eat less meat: UN climate-change report calls for change to human diet

A balanced
diet rich in
plant-based
foods is good
for people
and the
planet



What about red meat?

- Reducing or avoiding red meat offers technical potential mitigation of 3-8 Gt CO₂e/year
- Includes sparing land for carbon sequestration

On the other hand:

- Ruminants turn cellulosic biomass into nutrient-dense food - High quality protein, source of Fe
- Only 11% of land is arable - Ruminants graze land that can't be used for crop production
- Most livestock feed is not suitable for human consumption
- Mixed crop-livestock systems reduce need for herbicides, ploughing, chemical fertiliser
- Pastures are important for restoring soil carbon, fertility of cropland
- Pastoralists manage grazing lands



Key messages on Climate Change and Land Degradation

- Climate change and land health are inter-twined
 - exacerbating risk of land degradation
 - threatening land capacity for climate change mitigation
 - threatening global food security
- Controlling land degradation, sustainable land management, building soil organic matter are win-win-win options
- Urgent need to reduce emissions in all sectors – land cannot do it all
- Bioenergy, afforestation and biochar are important parts of the climate solution with potential benefits for land – we need to ensure they are done well, integrated with agriculture and forestry
- Eat a healthy diet, think about the source of your food – choose foods with low carbon footprint, reduce food waste