

4 per 1000 initiative day

Madrid, December 10, 2019

IPCC special report on climate change and land



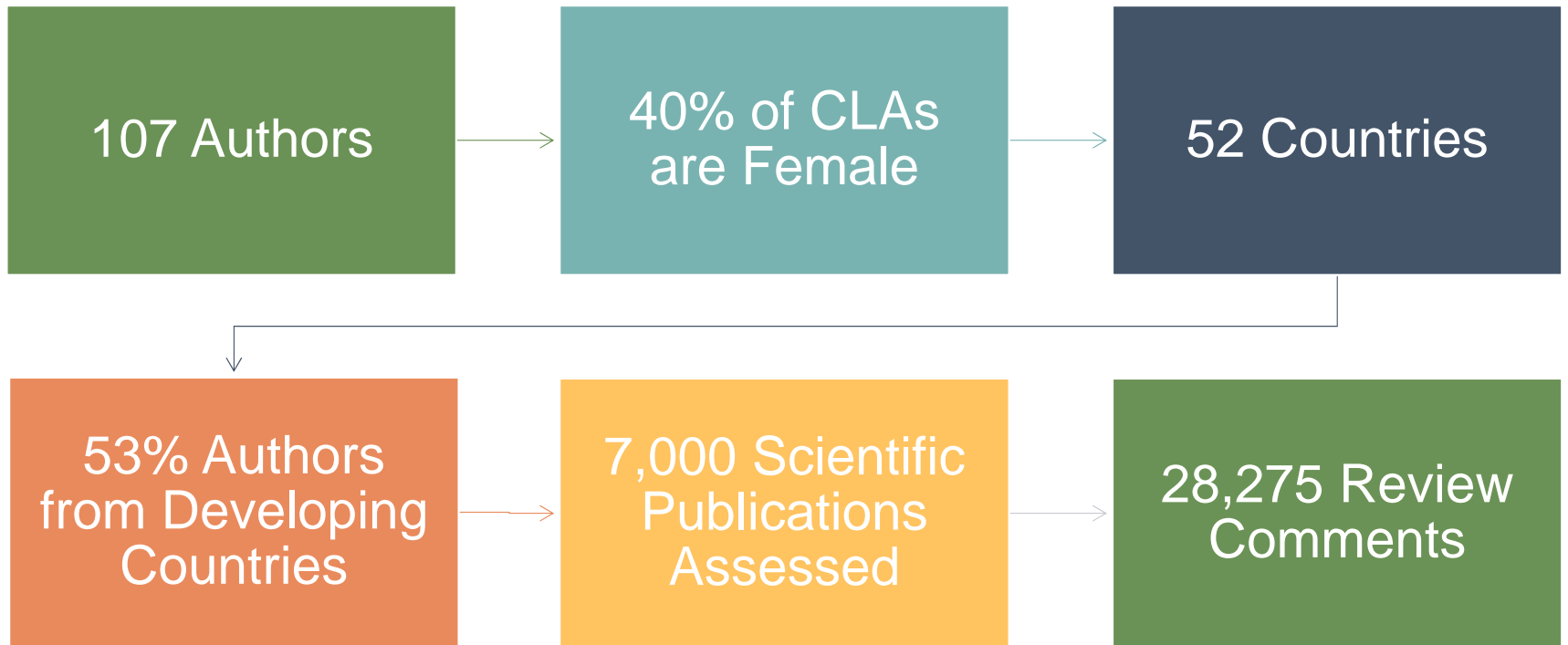
Agricultural landscape between Ankara and Hattusha, Anatolia, Turkey (40°00' N – 33°35' E)
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Jean-François Soussana, INRA, France

www.ipcc.ch/report/SRCCL

ipcc
INTERGOVERNMENTAL PANEL ON climate change





Authors included:
Scientists engaged with IPBES and UNCCD; FAO employees



Emissions and Land

- Gross emissions from AFOLU make up **23% of total global emissions.**
- Land accounts for **44% of net anthropogenic methane emissions.**
- **50% of the nitrogen applied** to agricultural land is **not taken up** by the crop, resulting in nitrous oxide emissions.
- Grazing lands are responsible for more than one-third of total anthropogenic nitrous oxide emissions and one-half of agricultural emissions.

Significant mitigation potential for response options in the global food system



Emissions from the global food system are estimated to be 21-37% of total net anthropogenic GHG emissions

Response options across the entire food system, from production to consumption, including food losses and wastes, can be deployed and scaled up to support adaptation and mitigation

A number of agricultural response options (e.g. soil carbon sequestration and agroforestry) deliver co-benefits across land-based challenges

The total technical mitigation potential from crop and livestock activities and agroforestry is estimated to be between 2.3 and 9.6 Gt CO_{2e} per year by 2050



Land Degradation

- Land degradation adversely affects people's livelihoods and occurs over $\frac{1}{4}$ of the Earth's ice-free land area.
- Land use changes and unsustainable land management are direct human causes of degradation). Agriculture is a dominant sector driving degradation.
- Climate change exacerbates the rate and magnitude of land degradation processes.
- There are implications for natural resource-based livelihoods and societal groups.
 - *People in degraded areas who depend on natural resources for subsistence, food, and income, including women & youth are especially vulnerable to land degradation & climate change.*
- Climate change will have detrimental effects on livelihoods, habitats, & infrastructure due to degradation.

Combating desertification and land degradation: co-benefits for the climate

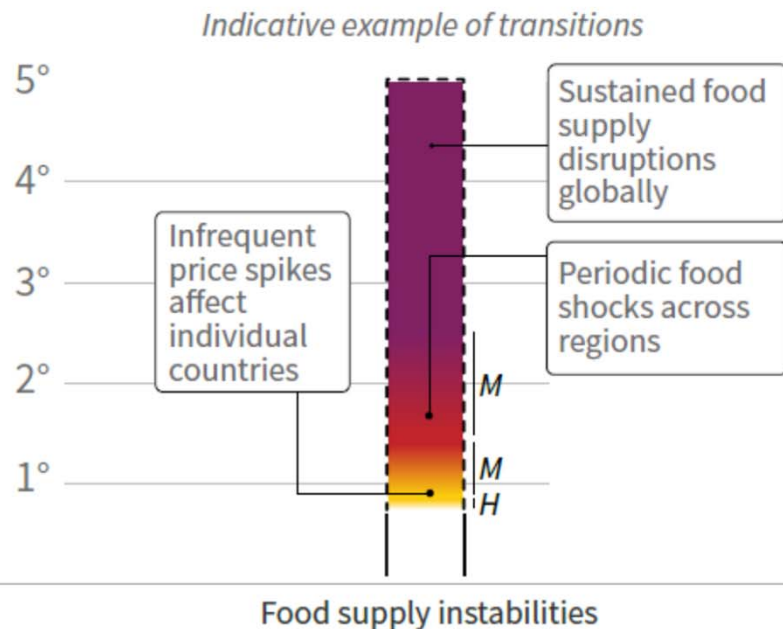
The fight against land degradation has immediate and long-term co-benefits for adaptation and mitigation (high confidence)

Many activities to combat desertification can contribute to climate change adaptation and reduce biodiversity loss with positive spin-offs for sustainable development

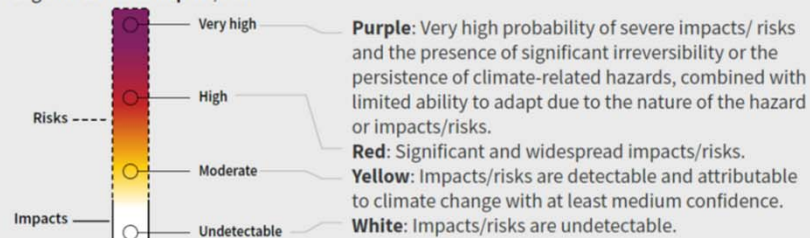
Avoiding, limiting and reversing desertification would improve soil fertility, increase carbon storage in soils and biomass, while promoting agricultural productivity and food security (high confidence)



Risks to food supply stability as a result of climate change



Legend: Level of impact/risk



The stability of food supply is projected to decrease as the magnitude and frequency of extreme weather events that disrupt food chains increases

Increased atmospheric CO₂ levels can also lower the nutritional quality of crops

Median economic models project a 7 % increase in food prices due to climate change by 2050 leading to increased risks of food insecurity

The most vulnerable people will be more severely affected

Increased warming may amplify migration both within countries and across borders

IPCC, SR CCL, SPM, 2019

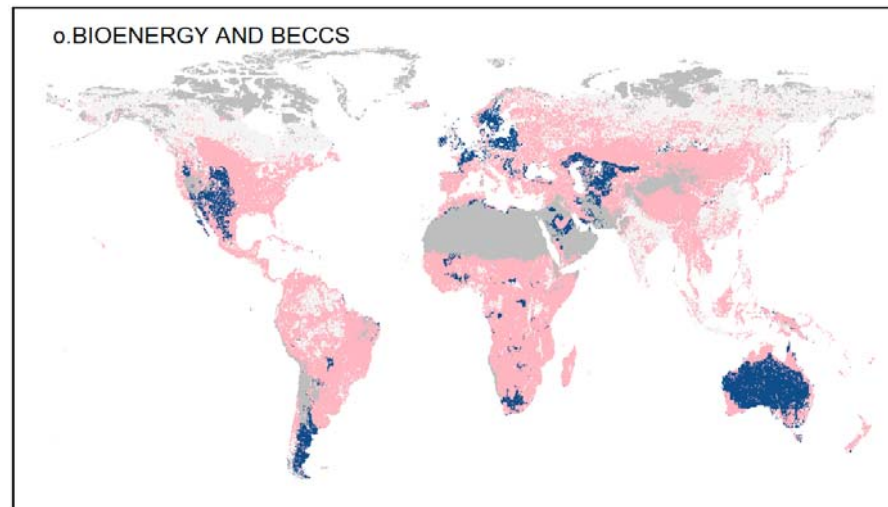
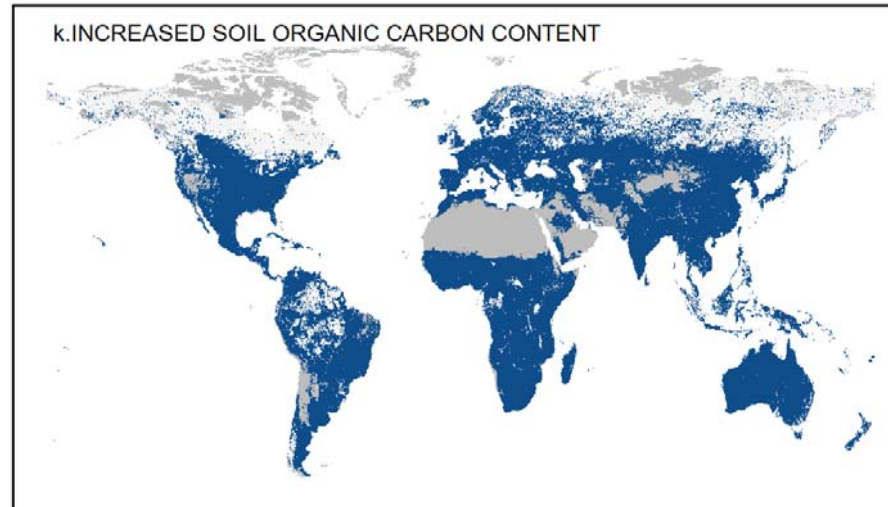
Land management responses and their global impacts on land based challenges

Co-benefits and trade-offs

Response options based on land management		Mitigation	Adaptation	Land degradation or Desertification	Food Security	Biodiversity	Ground water stress	Water quality
		Impact of each response option						
Agriculture	Increased food productivity	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Negligible	Negligible	Negative (trade-off)
	Agroforestry	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Negligible
	Improved cropland management	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Positive (co-benefit)	Negligible	Negligible
	Improved livestock management	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Positive (co-benefit)	Negligible	Negligible
	Improved grazing land management	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Positive (co-benefit)	Negligible	Negligible
	Integrated water management	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)
Forest	Reduced grassland conversion to cropland	Positive (co-benefit)	Negligible	Negligible	Negative (trade-off)	Positive (co-benefit)	Negligible	Negligible
	Forest management	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Negligible
	Reduced deforestation and degradation	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)
Soils	Reforestation and forest restoration	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Negligible	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)
	Increased soil organic carbon content	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)
Other ecosystems	Fire management	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Negligible
	Restoration & reduced conversion of coastal wetlands	Positive (co-benefit)	Positive (co-benefit)	Negligible	Negligible	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)
	Restoration & reduced conversion of peatlands	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)	Negative (trade-off)	Positive (co-benefit)	Positive (co-benefit)	Positive (co-benefit)
CDR	Bioenergy and BECCS	Positive (co-benefit)	Negative (trade-off)	Negative (trade-off)	Negative (trade-off)	Negative (trade-off)	Negative (trade-off)	Negative (trade-off)

After IPCC, SR CCL, SPM and Chap. 6, 2019

Contrasted options for sustainable land management: co-benefits and trade-offs across challenges



Some answers are not appropriate to all local challenges

Large-scale deployment of mitigation options such as bioenergy and afforestation would have negative impacts on food security, biodiversity and land degradation:

- From 0.1 to 1 million km² in scenarios with high population and low environmental policies (SSP3)**
- From 1 to 4 million km² in low population scenarios and strong environmental policies (SSP1)**



Food



Food losses and waste contribute to 8-10% of anthropogenic GHG emissions. 25 to 30% of food production is lost or wasted (average confidence). A reduction of these losses and wastes could release millions of km² of land by 2050



Diversification of diets (more fruits, vegetables, protein crops and nuts) and production systems (integrated systems, diversified rotations, genetic diversity, resilient and low-emission livestock) supports climate change adaptation and 'mitigation



By 2050, food transitions towards healthy diets could release millions of km² of land with co-benefits for the environment and health and bring about an emission reduction of between 0.7 and 8.0 Gt CO_{2eq}

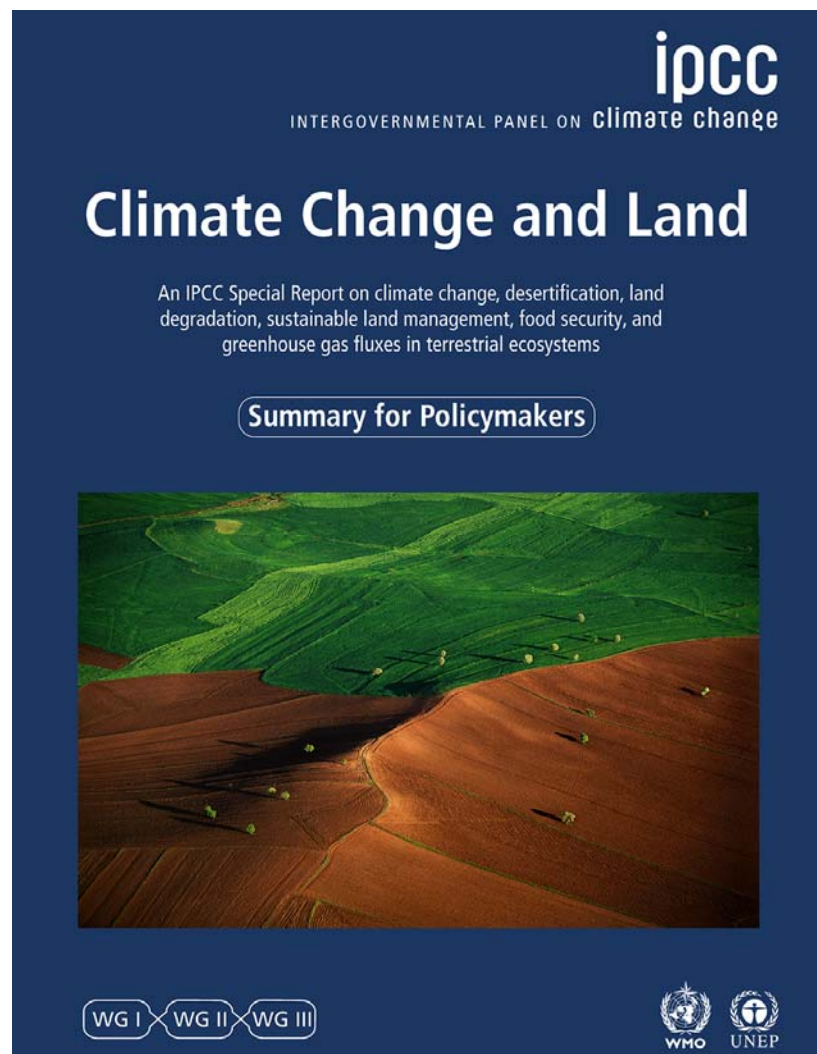
Delaying climate change mitigation and adaptation measures in all sectors will have increasingly negative effects on land and reduce the prospects for sustainable development

Late action in all sectors can reduce the potential of all these options in most parts of the world and limit their effectiveness (high confidence) - could also have irreversible impacts on some ecosystems

Rapid action on climate change mitigation and adaptation, aligned with sustainable land management and sustainable development, will reduce the risks to millions of people from climate extremes, desertification, land degradation and climate change. food insecurity and livelihoods (high confidence)

Postponing GHG emission reductions from all sectors leads to ever greater economic impacts for many countries in many parts of the world (high confidence)





FOR MORE INFORMATION:

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