Key findings and messages from the *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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www.ipcc.ch/report/SRCCL

Jim Skea, Co-Chair IPCC WG III
Kuala Lumpur, 26th October

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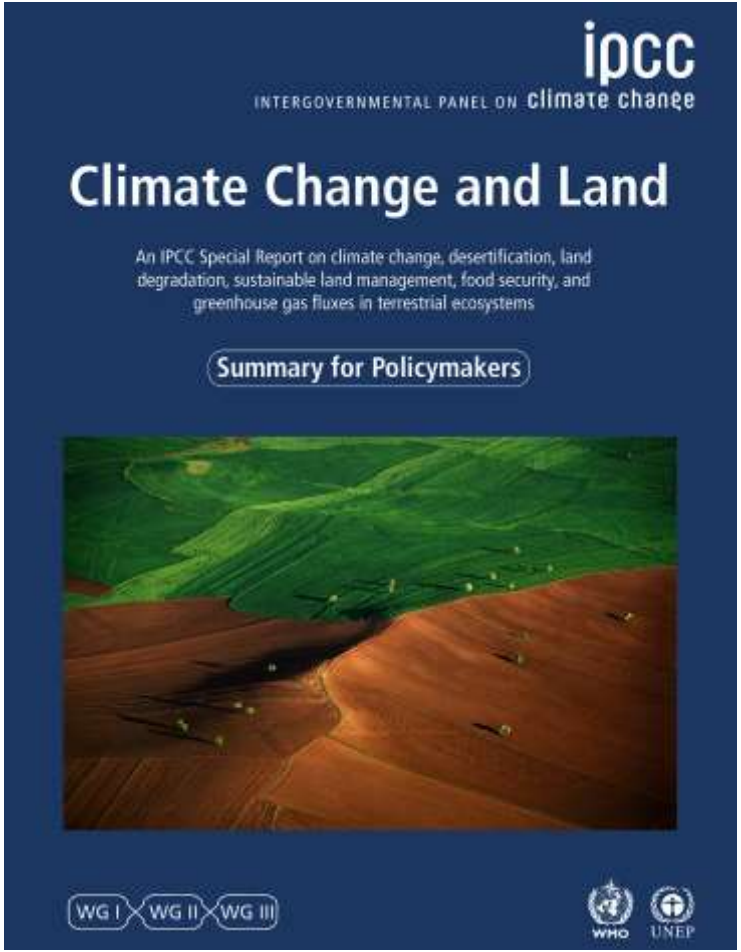
CLIMATE CHANGE AND LAND

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



REPORT COVER IMAGE:
Agricultural landscape between Ankara and Hattusha, Anatolia, Turkey (40°00' N – 33°35' E)
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The long title mixes a variety of concepts….

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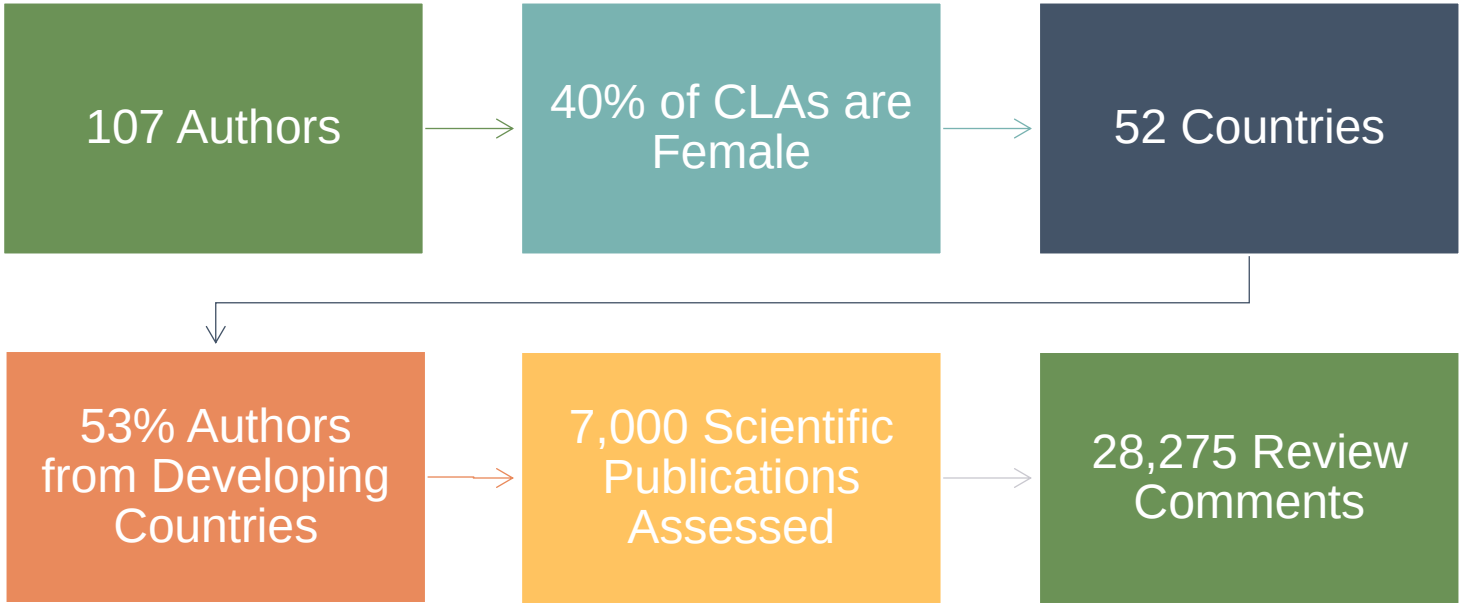
Report Structure

The report outline proposed by the scoping meeting was agreed, after some refinement, by the Panel

1: Framing and context
2: Land-climate interactions
3: Desertification
4: Land degradation
5: Food security
6: Interlinkages between desertification, land degradation, food security and GHG fluxes: Synergies, trade-offs and integrated response options
7: Risk management and decision making in relation to sustainable development

SRCCL REPORT BY THE NUMBERS



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

“Land is a critical resource –
we rely on it for food, water, health and wellbeing – but it is already under growing human pressure. Climate change is adding to these pressures

Land provides the basis for human livelihoods and well-being.

- Warming over land has occurred at a faster rate than the global mean.
  - *1.53°C Higher over 2006–2015.*
- Current use of land and loss of biodiversity are unprecedented in human history.
  - *Climate change will add to these challenges.*
- Urgent action would buffer the negative impacts from over-exploitation of resources.
- Restricting warming to "well below 2°C" would greatly reduce the negative impacts of climate change on land.

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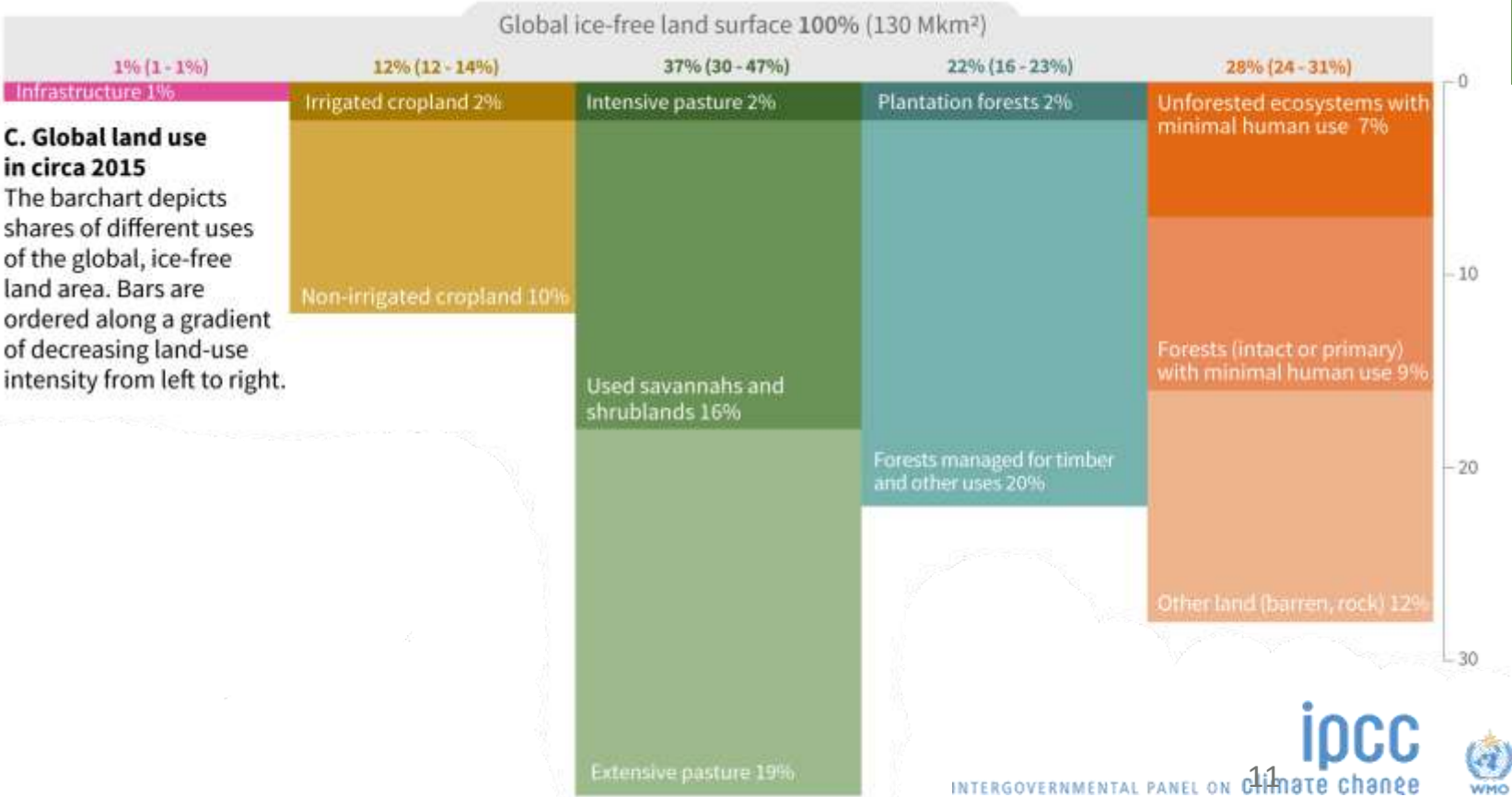
How we use land now



C. Global land use in circa 2015
The barchart depicts shares of different uses of the global, ice-free land area. Bars are ordered along a gradient of decreasing land-use intensity from left to right.

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Land and the climate

- Gross emissions from agriculture, forestry and land use (AFOLU) make up **1/3 of total global emissions**.
- Land accounts for **44% of net anthropogenic methane** emissions.
- Grazing lands are responsible for more than one-third of total anthropogenic nitrous oxide emissions and one-half of agricultural emissions.
- Changes in land conditions from human use or climate change **in turn affect regional and global climate**.
- Changes in land conditions modulate the likelihood, intensity and duration of many extreme events.

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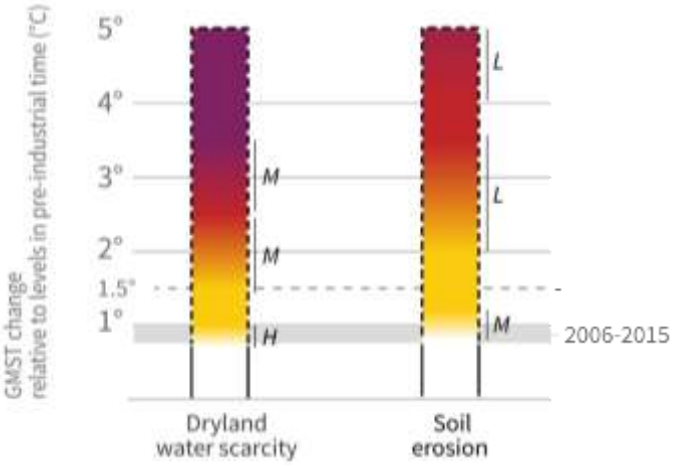
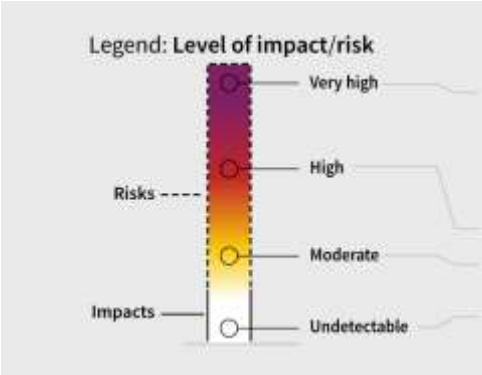
Land degradation and desertification

- Drylands currently cover 46% of global land and are home to 3 billion people.
- The major human drivers of desertification are expansion of croplands, unsustainable land management and increased pressure on land from population/income growth.
- Land degradation is a **driver of climate change** through emission of greenhouse gases and reduced carbon uptake.
- In some cases, land degradation can be **avoided, reduced or reversed** by implementing sustainable land management, restoration and rehabilitation practices.
- **Lack of action** to address land degradation will increase emissions and reduce carbon sinks, **inconsistent with the emission reductions** required to limit global warming to 1.5°C or 2°C.
- Large-scale biomass production for bioenergy **increases competition for land** with **potentially serious consequences** for food security and land degradation.





SPM Figure 2 A

Climate change exacerbates:

- **Desertification:** Increased land surface air temperature and evapotranspiration and decreased precipitation amounts in drylands have contributed to desertification
- **Degradation:** Increases in rainfall intensity, flooding, drought frequency and severity, heat stress, wind, sea-level rise and wave action, and permafrost thaw can exacerbate land degradation processes

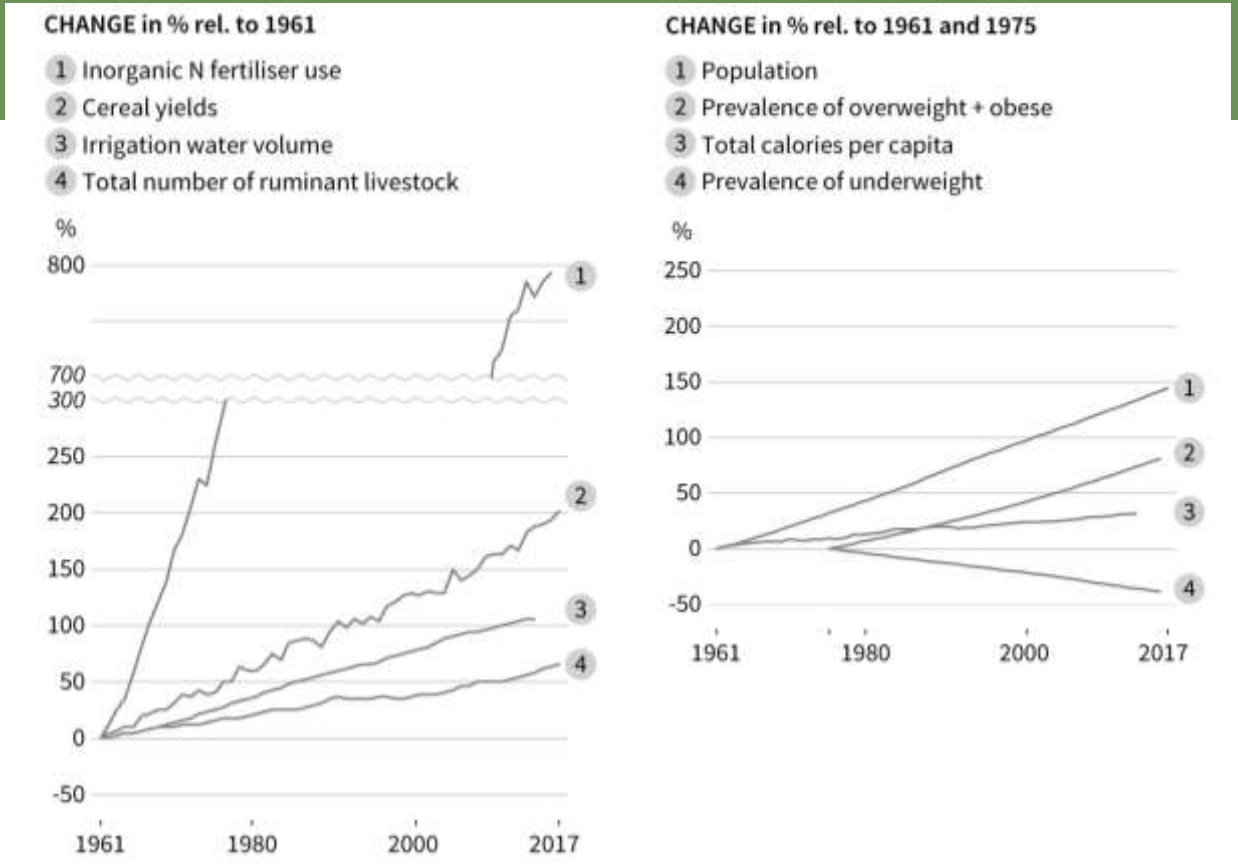
Figure:

- *Increases in global mean surface temperature (GMST), relative to pre-industrial levels, affect processes involved in desertification and land degradation*
- *Examples: dryland water scarcity (desertification) and soil erosion (land degradation)*

Food security:

“ Coordinated action to tackle climate change can **simultaneously improve land, food security and nutrition, and help to end hunger.**

Changes since 1961



Many response options can enhance food security while advancing climate adaptation and mitigation

- Sustainable production
- Diversification of the food system
- Consumption of healthy and sustainable diets
- Reducing food loss and waste

Integrated supply and demand side options can be scaled up in all segments of the food system.

“

Better land management can play its part in tackling climate change, but it can’t do it all.

What is sustainable land management?

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

Many of sustainable land management actions **make strong economic sense**.

We didn't classify response options by mitigation/ adaptation: many options have multiple benefits

Responses by broad type

- Land management
- Value chain management
- Risk management

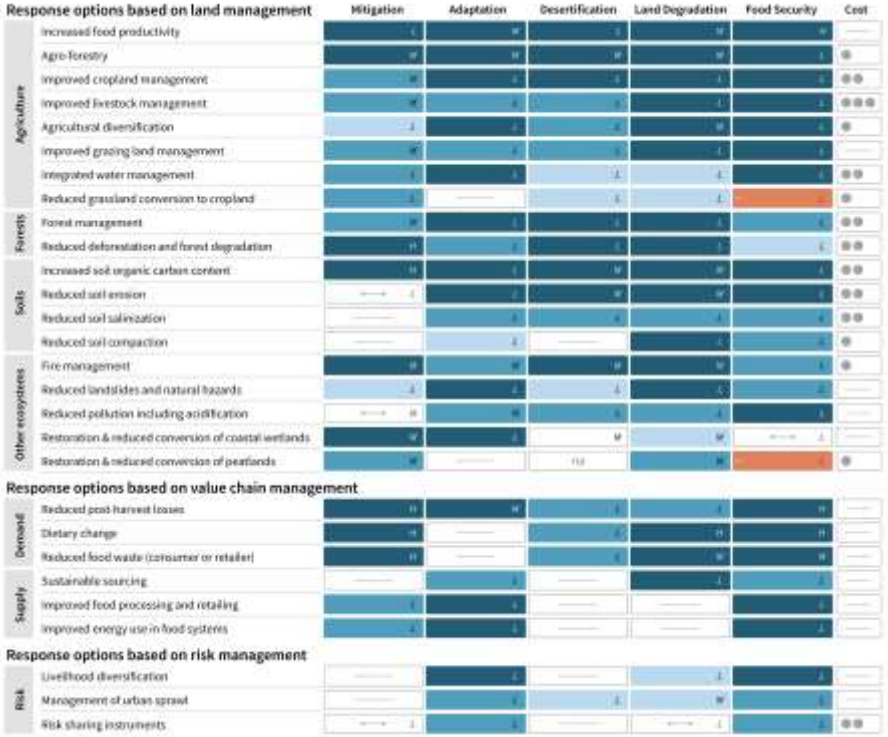
Responses by magnitude of impact (technical potential)

- > 3 Gt CO_2eq yr^{-1}
- 0.3 – 3 Gt CO_2eq yr^{-1}
- < 0.3 Gt CO_2eq yr^{-1}

Responses by impact on land competition

- No or limited competition for land
- Those that rely on additional land use change

Responses with no or limited land competition: many more co-benefits than adverse side effects



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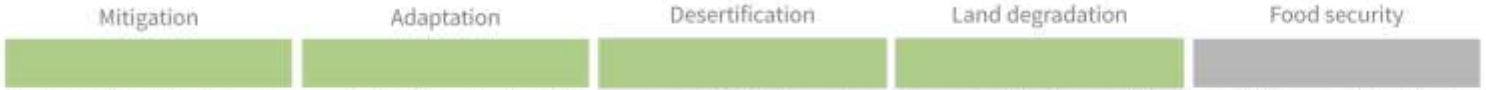
The impacts of responses involving additional land use change depend on scale, implementation and governance

Bioenergy and BECCS

High level: Impacts on adaptation, desertification, land degradation and food security are maximum potential impacts, assuming carbon dioxide removal by BECCS at a scale of 11.3 $GtCO_2\ yr^{-1}$ in 2050, and noting that bioenergy without CCS can also achieve emissions reductions of up to several $GtCO_2\ yr^{-1}$ when it is a low carbon energy source {2.7.1.5; 6.4.1.1.5}. Studies linking bioenergy to food security estimate an increase in the population at risk of hunger to up to 150 million people at this level of implementation {6.4.5.1.5}. The red hatched cells for desertification and land degradation indicate that while up to 15 million km_2 of additional land is required in 2100 in 2°C scenarios which will increase pressure for desertification and land degradation, the actual area affected by this additional pressure is not easily quantified {6.4.3.1.5; 6.4.4.1.5}.



Best practice: The sign and magnitude of the effects of bioenergy and BECCS depends on the scale of deployment, the type of bioenergy feedstock, which other response options are included, and where bioenergy is grown (including prior land use and indirect land use change emissions). For example, limiting bioenergy production to marginal lands or abandoned cropland would have negligible effects on biodiversity, food security, and potentially co-benefits for land degradation; however, the benefits for mitigation could also be smaller. {Table 6.58}

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Limits to Adaptation and Land Based Carbon Sinks

There are limits to the ability to prevent and reverse desertification and land degradation

- Where desertification results in the complete loss of land productivity, the adaptation options available are limited
- For land degradation there are limited options to address: coastal erosion, thawing of permafrost and extreme soil erosion

There are limits to the capacity of the land system to act as a carbon sink (in terms of carbon stored in soils and biomass)

- Mature vegetation and soil carbon reservoirs reach saturation points
- The carbon stored in these systems are vulnerable to loss due to disturbance (e.g. climate events or poor land management)

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The big picture

- The potential for mitigating climate can only be realised if **agricultural emissions** are **included in mainstream climate policy**.
- **Delayed action** will mean more of a **need to respond** to land challenges **but less potential for land-based responses** (due to climate change and other pressures).
- **Acting early** will avert or minimise risks, reduce losses and generate returns on investment but has **challenges** related to technology, upscaling and barriers. There is **enough knowledge to act now**.
- **Measuring progress towards goals** is important to decision-making, adaptive governance & policy success.
- Responses are interlinked:
  - Some have co-benefits or are more **effective when paired**.
  - Not all options increase competition for land. Some response options are **less feasible** than others.

Engaging people and good governance matter

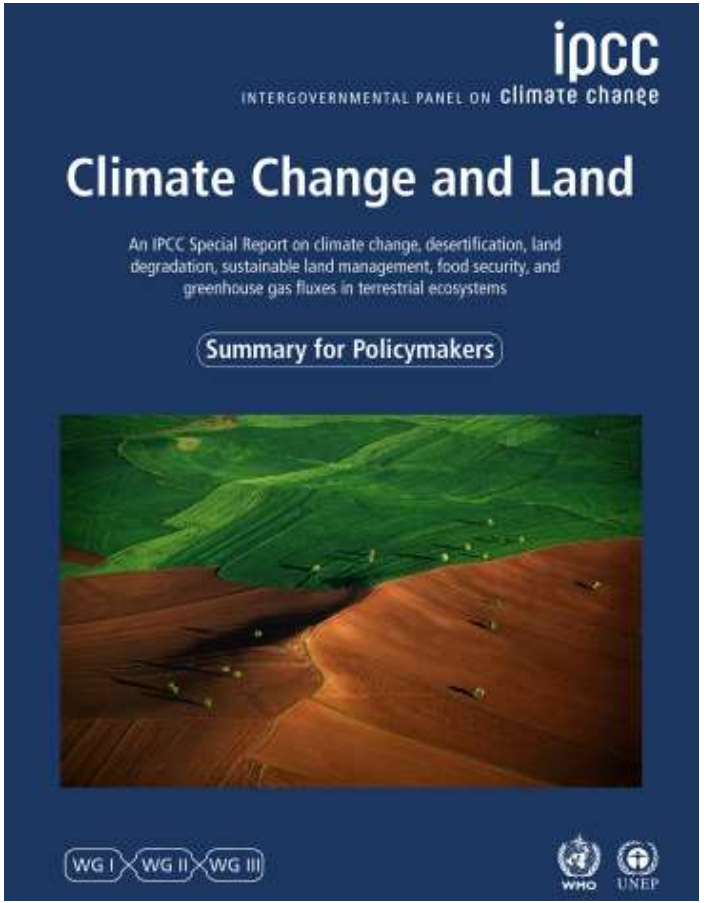
- **Indigenous and local knowledge** can play a key role in understanding climate processes, impacts and responses.
- **Involving people** in land and climate decision making **advances synergies** and **overcomes barriers** to adaptation and mitigation.
- **Empowering women** can bolster synergies among household food security and sustainable land management.
- The significant **social and political changes required** entail a wide range of governance mechanisms.

Land is where we live

Land is under growing human pressure

Land is a part of the solution

But land can't do it all



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