

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







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Humans affect > 70% of Ice-Free Land



Figure SPM.1 (Adapted)

Average Temperature Rise: Land vs. Global



Figure SPM.1

Global average temperature at 1.5 °C





Hoegh-Guldberg, O., et al. 2019. The human imperative of stabilizing global climate change at 1.5°C. Science **365**:eaaw6974.

Shared Socio-economic Pathways (SSP)

SSP1: Sustainable Development

SSP5: Fossil-fuelled Development

Land Use Changes & Climate Change Mitigation

Sustainability-focused (SSP1 at 1.5°C)







Future socioeconomic pathways affect risks



\approx 40 response options & their interlinkages

- Afforestation
- Avoided deforestation
- Dietary changes
- Bioenergy
- Biochar
- Reduce food waste
- Reduce soil erosion



- Climate Change Mitigation
- Climate Change Adaptation
- Desertification
- Land Degradation
- Food Security
- Ecosystem Services
- Regional context
- Sustainable Development Goals (SDGs)

Mitigation Potential of Land-Based Response Options

Land Use Change, Carbon Sink Enhancement, and Agriculture Measures

Avoided deforestation Avoided degradation Avoided conversion of peatlands Avoided conversion of coastal wetlands Avoided conversion of savannas and natural grasslands Afforestation/Reforestation (A/R) Agroforestry Wetland Restoration Forest Management Soil carbon enhancement in agriculture Biochar Cropland management Pasture management Rice Enteric fermentation Manure management Synthetic fertilizer production



Annual emissions of anthropogenic CO₂:

<u>~ 37 GtCO₂</u>

Forest management and reduced deforestation have many co-benefits across the land challenges

| | Mitigation | Adaptation | Desertification | Land Degradation | Food Security |
|---|------------|------------|-----------------|---------------------|---------------|
| Forest Management | | 1 | 1 | 1 | 1 |
| Reduced Deforestation & Forest Degradation | 1 | | 1 | 1 | |

Reforestation and afforestation demands land – Implementation practice matters!



Forest – Climate interactions

- Above 45° N latitude yields of food crops increased due to warming (<u>medium confidence</u>).
- Climate change resulted in increased outbreaks of pests and disease (<u>high</u> <u>confidence</u>).



Forest – Climate interactions

- Under medium/high GHG emissions scenarios, climate zones are projected to shift poleward and upward in mountainous regions (*high confidence*).
- Winter warming will be enhanced in boreal regions where the treeline migrates northward and the growing season lengthens (<u>high confidence</u>).
- Enhanced evapotranspiration from increased vegetation growth will reduce warming during the growing season (*high confidence*).



- Deferral of GHG emissions reductions implies (...) significant economic damage (...) in many regions of the world (*high confidence*)
- Prompt action (...) could reduce the risk to millions of people from climate extremes, desertification, land degradation and food insecurity (*high confidence*)



Investment