

Land and climate Regional context and implications

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INTERGOVERNMENTAL PANEL ON climate change



People, land and climate in dry-land regions in a warming world

Arid and semi-arid biomes support valuable ecosystems with livelihoods linked to rain-fed agriculture and pastoralism and have unique biodiversity and cultural values

However desertification is land degradation in dry-lands that leads to loss of productivity and ecosystem services

Climate change is expected to increase arid biomes and stress on dry-lands due to increase in temperature and decrease in precipitation that will impact vegetation, livestock and people

Asia and Africa projected to have maximum number of people affected by desertification especially poor, women and children.

Decrease in vegetation due to desertification can amplify *global* warming through carbon emissions but increased reflection can cause *local* cooling

Increased frequency of dust storms, heat stress and dry-spells can impact human well-being

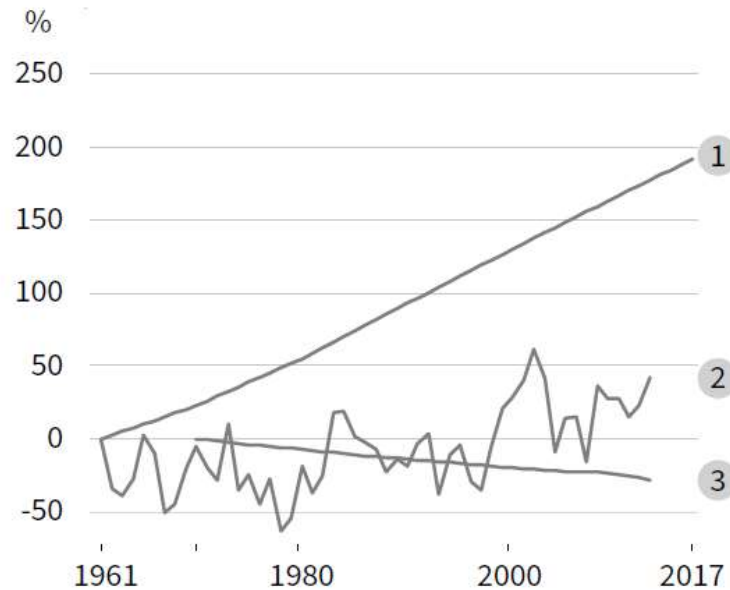
Climate change is impacting food-security according to local and indigenous knowledge

Dry-lands

Land-use change, land-use intensification and climate change have contributed to desertification and land degradation.

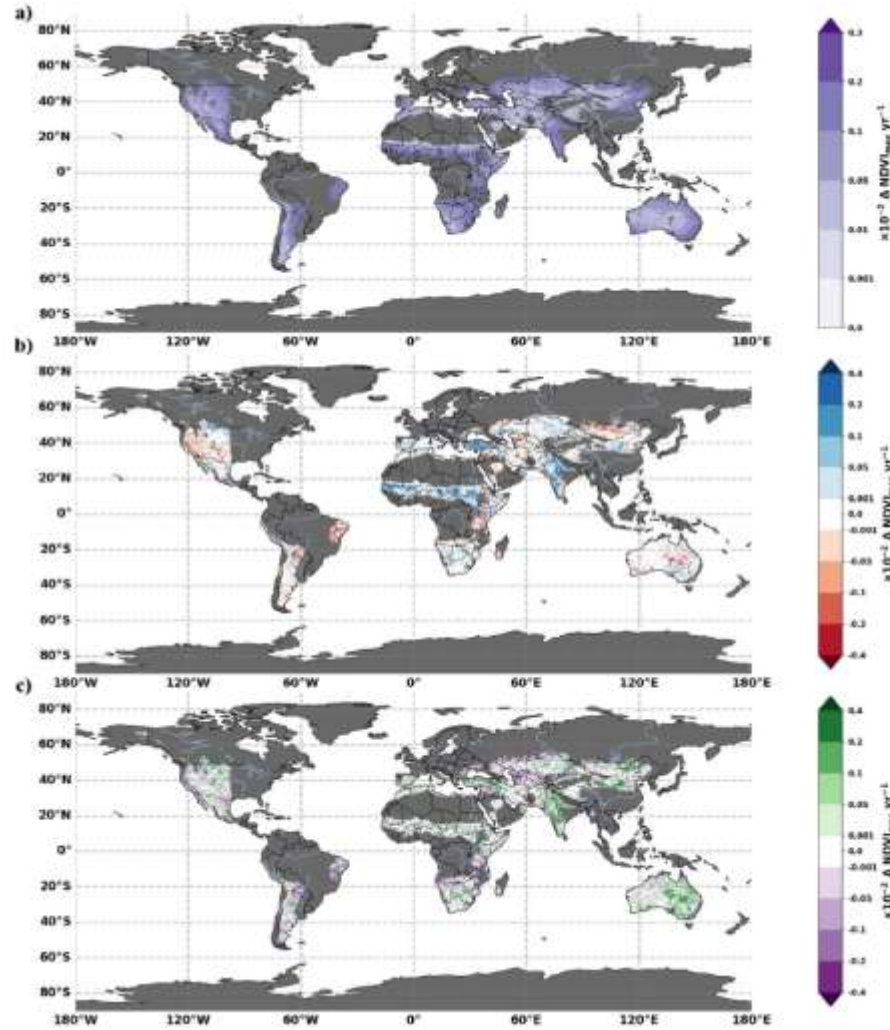
CHANGE in % rel. to 1961 and 1970

- 1 Population in areas experiencing desertification
- 2 Dryland areas in drought annually
- 3 Inland wetland extent

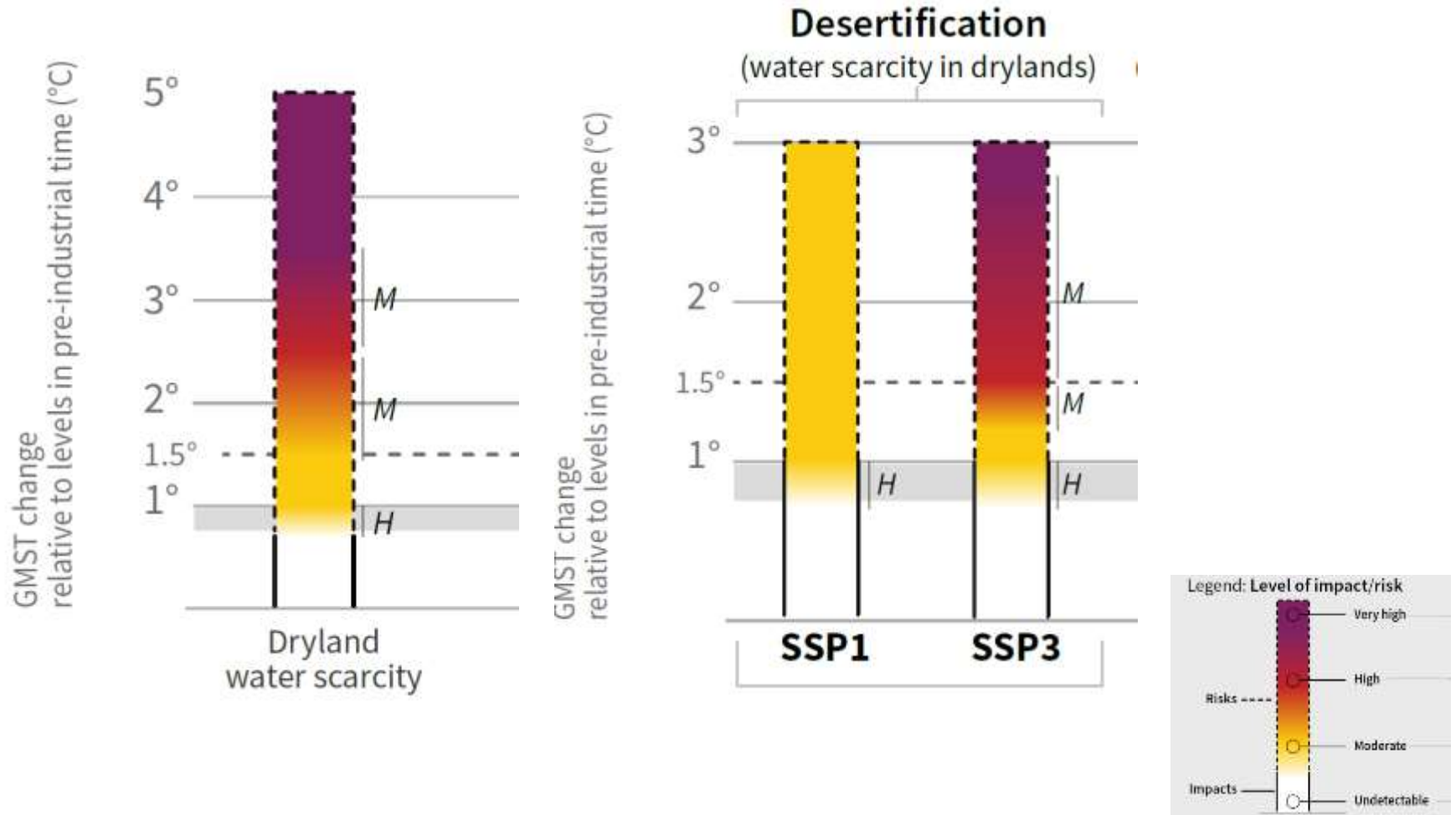


Drivers of vegetation change in dry lands

- a: CO₂
- b: Climate
- c: land-use



Risks to dry-lands under climate change depends on socio-economic pathways



Dry lands have potential for response options that mitigate climate change and also advance sustainable development goals

Land adaptation and mitigation (eg Conservation agriculture) and energy mitigation with land implications (eg solar and wind farms)



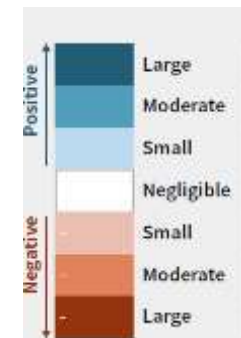
FAO



Wikipedia,CitizenMJ

Land management options that reduce competition for land with co-benefits and minimum negative impacts on key ecosystem services

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	●



Confidence level
Indicates confidence in the estimate of magnitude category.

H High confidence
M Medium confidence
L Low confidence

Cost range
See technical caption for cost ranges in US\$ tCO₂e⁻¹ or US\$ ha⁻¹.

- High cost
- Medium cost
- Low cost
- no data

Response options in food system and livelihood sectors

Response options based on value chain management

Demand	Reduced post-harvest losses	H	M	L	L	H	---
	Dietary change	H	---	L	H	H	---
	Reduced food waste (consumer or retailer)	H	---	L	M	M	---
Supply	Sustainable sourcing	---	L	---	L	L	---
	Improved food processing and retailing	L	L	---	---	L	---
	Improved energy use in food systems	L	L	---	---	L	---

Response options based on risk management

Risk	Livelihood diversification	---	L	---	L	L	---
	Management of urban sprawl	---	L	L	M	L	---
	Risk sharing instruments	↔ L	L	---	↔ L	L	●●

Key for criteria used to define magnitude of impact of each integrated response option

	Mitigation (t CO ₂ -eq yr ⁻¹)	Adaptation (\$/1000 people)	Desertification (\$/1000 km ²)	Land Degradation (\$/1000 km ²)	Food Security (\$/1000 people)
Positive	Large: More than 3 Moderate: 0.3 to 3 Small: Less than 0.3 Negligible: No effect	Large: Positive for more than 25 Moderate: 1 to 25 Small: Less than 1 Negligible: No effect	Large: Positive for more than 3 Moderate: 0.5 to 3 Small: Less than 0.5 Negligible: No effect	Large: Positive for more than 3 Moderate: 0.5 to 3 Small: Less than 0.5 Negligible: No effect	Large: Positive for more than 100 Moderate: 1 to 100 Small: Less than 1 Negligible: No effect
Negative	Small: Less than -0.3 Moderate: -0.3 to -3 Large: More than -3	Small: Less than 1 Moderate: 1 to 25 Large: Negative for more than 25	Small: Less than 0.5 Moderate: 0.5 to 3 Large: Negative for more than 3	Small: Less than 0.5 Moderate: 0.5 to 3 Large: Negative for more than 3	Small: Less than 1 Moderate: 1 to 100 Large: Negative for more than 100

■ Variable: Can be positive or negative
 no data
 not applicable

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Cost range
 See technical caption for cost ranges in US\$1000/ha² or US\$ ha⁻².
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 Medium cost
 Low cost
 no data

Mix of policies to help us cope with land and climate challenges in dry-lands

Regulation (eg land use zoning, land sparing and land sharing approaches)

Siting of solar/wind farms to reduce negative impacts on biodiversity and local livelihoods

Include costs of environmental effects

Land tenure

Voluntary (change in diet, standards and certification, collective action)

Persuasive (eg payments for ecosystem services)

Early warning systems and advisories

Risk sharing mechanisms (eg insurance)

THANK YOU FOR YOUR ATTENTION!

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