2da Conferencia Regional sobre el IPCC

Cambio climático: conocimiento y soluciones hacia la COP26

DEBORA LEY

Opciones de Mitigación y Adaptación en Sistemas de Transición, SR1.5

FUNDACIÓN MERI

SYSTEMS TRANSITIONS

Energy and industry

Land and ecosystems

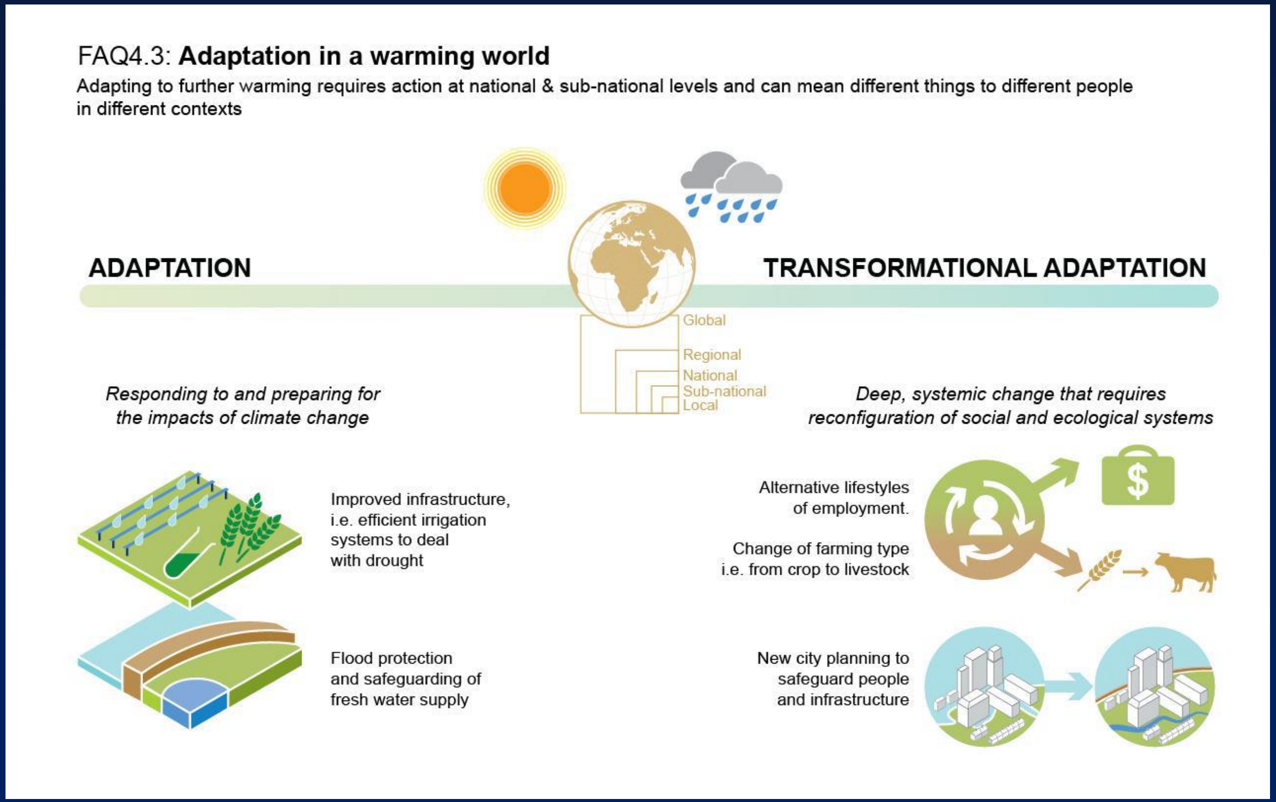
Urban and infrastructure

Overarching (aplicable to all systems transitions)

Adaptation: Incremental and Transformational

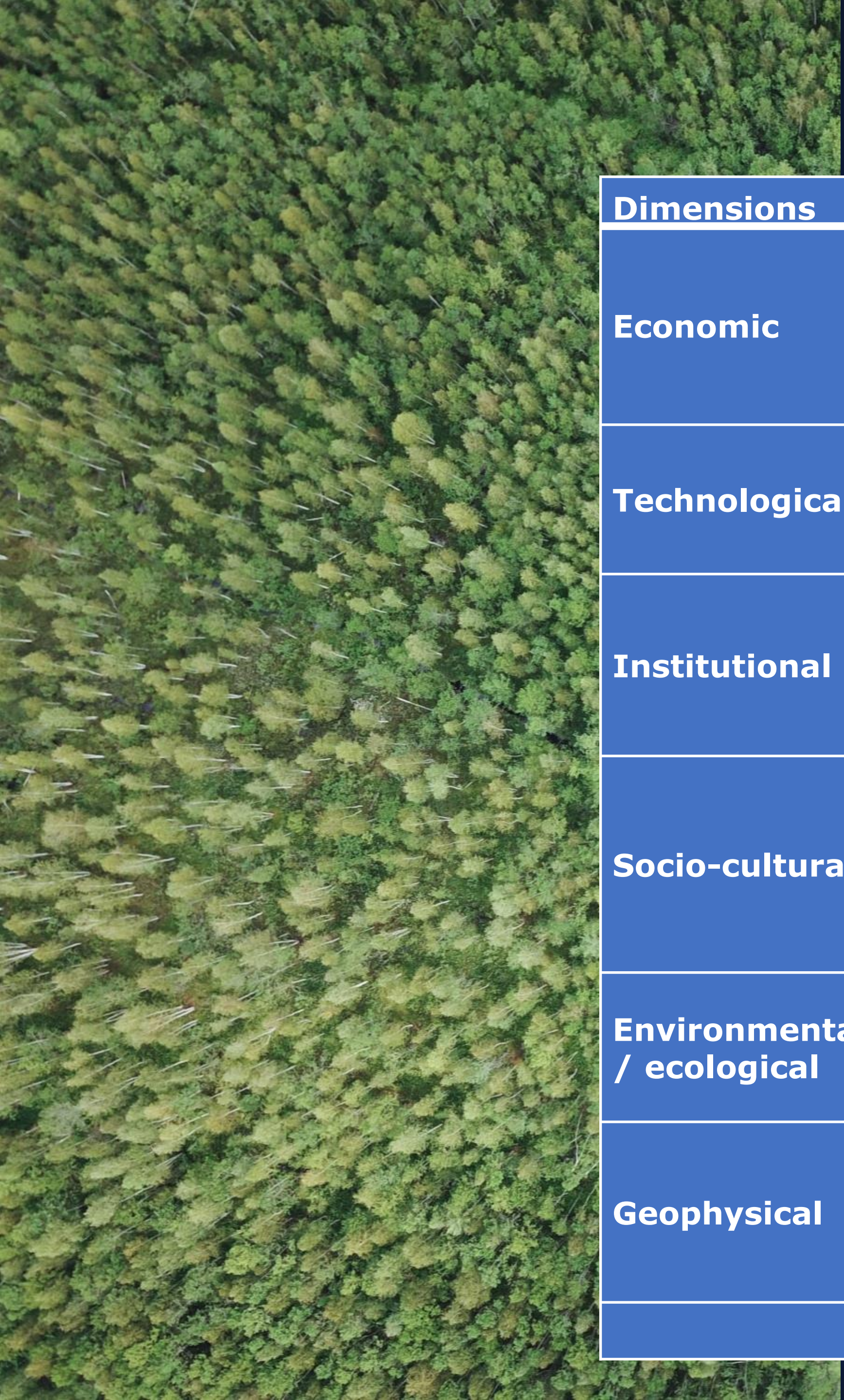
Incremental adaptation:
Adaptation that maintains the essence and integrity of a system or a process at a given scale.

Transformational adaptation:
Adaptation that changes the fundamental attributes of a socio-ecological system anticipating climate change and its impacts



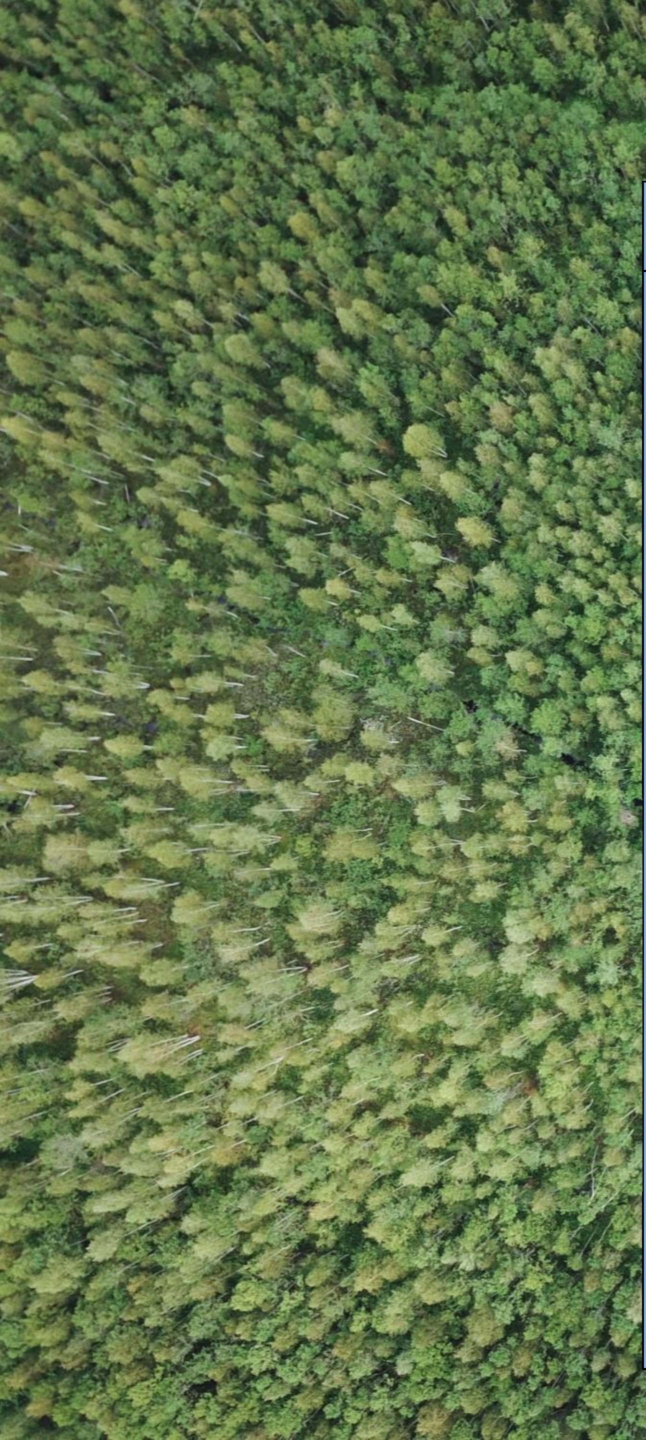
System	Adaptation Option	Mitigation Option
Energy	Resilient infrastructure Efficient water use	Wind emergy (on-shore and off-shore) Solar PV Bioenergy Electricity storage Power sector CCS Nuclear energy
Land and ecosystem	Conservation agriculture Efficient irrigation Efficient livestock systems Agroforestry Community-based adaptation Ecosystem restoration and AD Biodiversity management Coastal defense and hardening Sustainable aquaculture	Reduced food wastage and efficient supply chains Dietary shift Sustainable intensification of agriculture Ecosystem restoration and AD
Urban and infrastructure	Sustainable land-use and urban planning Sustainable water management Green infrastructure and ecosystem services Building codes and standards	Land-use and urban planning Electric cars and buses Sharing schemes Public transport Non-motorised transport Aviation and shipping Smart grids Efficient appliances Low/zero-energy buildings

System	Adaptation Option	Mitigation Option
Industrial	Resilient infrastructure Efficient water use	Energy efficiency Bio-based and circularity Electrification and hydrogen Industrial CCUS
Carbon dioxide removal		Bioenergy with CCS (BECCS) Direct air carbon capture and storage (DACCS) Afforestation and reforestation Soil carbon sequestration and biochar Enhanced weathering
Overarching adaptation options	Disaster risk management Risk spreading and sharing Climate services Indigenous knowledge Education and learning Population health and health system Social safety nets Human migration	



Indicators for mitigation and adaptation differ

Dimensions	Adaptation indicators	Mitigation indicators
Economic	Micro-economic viability Macro-economic viability Socio-economic vulnerability reduction potential Employment & productivity enhancement potential	Cost-effectiveness Absence of distributional effects Employment & productivity enhancement potential
Technological	Technical resource availability Risks mitigation potential	Technical scalability Maturity Simplicity Absence of risk
Institutional	Political acceptability Legal & regulatory feasibility Institutional capacity & administrative feasibility Transparency & accountability potential	Political acceptability Legal & administrative feasibility Institutional capacity Transparency & accountability potential
Socio-cultural	Social co-benefits (health, education) Socio-cultural acceptability Social & regional inclusiveness Intergenerational equity	Social co-benefits (health, education) Public acceptance Social & regional inclusiveness Intergenerational equity Human capabilities
Environmental / ecological	Ecological capacity Adaptive capacity/ resilience building potential	Reduction of air pollution Reduction of toxic waste Reduction of water use Improved biodiversity
Geophysical	Physical feasibility Land use change enhancement potential Hazard risk reduction potential	Physical feasibility (physical potentials) Limited use of land Limited use of scarce (geo)physical resources Global spread
	Total:19 indicators	**Total: 24 indicators**



Synergies and Trade-offs of Mitigation Options

System	Mitigation Option	Synergies	Trade-offs
Energy system transitions	Wind energy (on-shore and off-shore)	Resilience can be increased by wind, solar and bioenergy due to distributed grids (Parkinson and Djilali, 2015), given that energy security standards are in place (Almeida Prado et al., 2016). The use of residential batteries can increase resilience, especially after extreme weather events (Qazi and Young Jr., 2014; Liu et al., 2017). A shift from coal-generated to natural gas-generated electricity could decrease water consumption (DeNooyer et al., 2016).	Renewable energy infrastructure that does not follow security standards can increase vulnerability (Ley, 2017).
	Solar photovoltaic (PV)		
	Bioenergy		
	Electricity storage		
	Power sector CCS	NE	Some renewable energy technologies, carbon dioxide capture and storage (CCS), and concentrating solar power technologies have substantial water demand associated with their operation (Fricko et al., 2016). In particular, lower power plant efficiency due to CCS increases the vulnerability to water constraints in most regions (McCollum et al., 2013; van Vliet et al., 2016).
	Nuclear energy	Increased safety and protection standards can improve the climate risk profiles (Schneider et al., 2017).	Increased safety and protection standards will increase costs, making some electricity systems less reliable (Jacobson and Delucchi, 2009; Lovins et al., 2018).

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Synergies and Trade-offs of Adaptation Options

System	Adaptation Option	Synergies	Trade-offs
Urban and infrastructure system transitions	Sustainable land-use and urban planning	Potential for synergies in urban planning at policy, organizational and practical levels, for example, urban Urban planning can enhance adaptation, mitigation and sustainable development (Hurlimann and March, 2012; Davidse et al., 2015; King et al., 2016; Francesch-Huidobro et al., 2017). Land-use management for co-benefits can result in carbon sequestration (Duguma et al., 2014; Woolf et al., 2018).	Promotion of green spaces to reduce flood risk and heat island effects may reduce potential for the promotion of urban densification (Landauer et al., 2015; Di Gregorio et al., 2017b; Endo et al., 2017; Ürge-Vorsatz et al., 2018).
	Sustainable water management	Strong co-benefits to the implementation of demand-side management measures, such as reducing leakages and water loss (Wang et al., 2011; Deng and Zhao, 2015), while minimizing the need to address the environmental and energy implications of supply measures such as desalination (Miller et al., 2015).	Increasing water quality is linked to increasing energy use in the water sector (Rothausen and Conway, 2011; Mamais et al., 2015).
	Green infrastructure and ecosystem services	Urban canopy is a cooling mechanism that can help decrease heat and water stress (Hines, 2017).	Not considering the role green cover and vegetation has within the heat-water-vegetation nexus can worsen heat and water stress (Hines, 2017).
	Building codes and standards	Sustainable construction materials, reduced building energy consumption and construction designed to reduce the urban heat island effects can have adaptation and mitigation benefits (Steenhof and Sparling, 2011; Aerts et al., 2014; Stewart, 2015; Shapiro, 2016; Ürge-Vorsatz et al., 2018).	NE

THANK YOU VERY MUCH FOR YOUR ATTENTION

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