IPCC AR5, WG II

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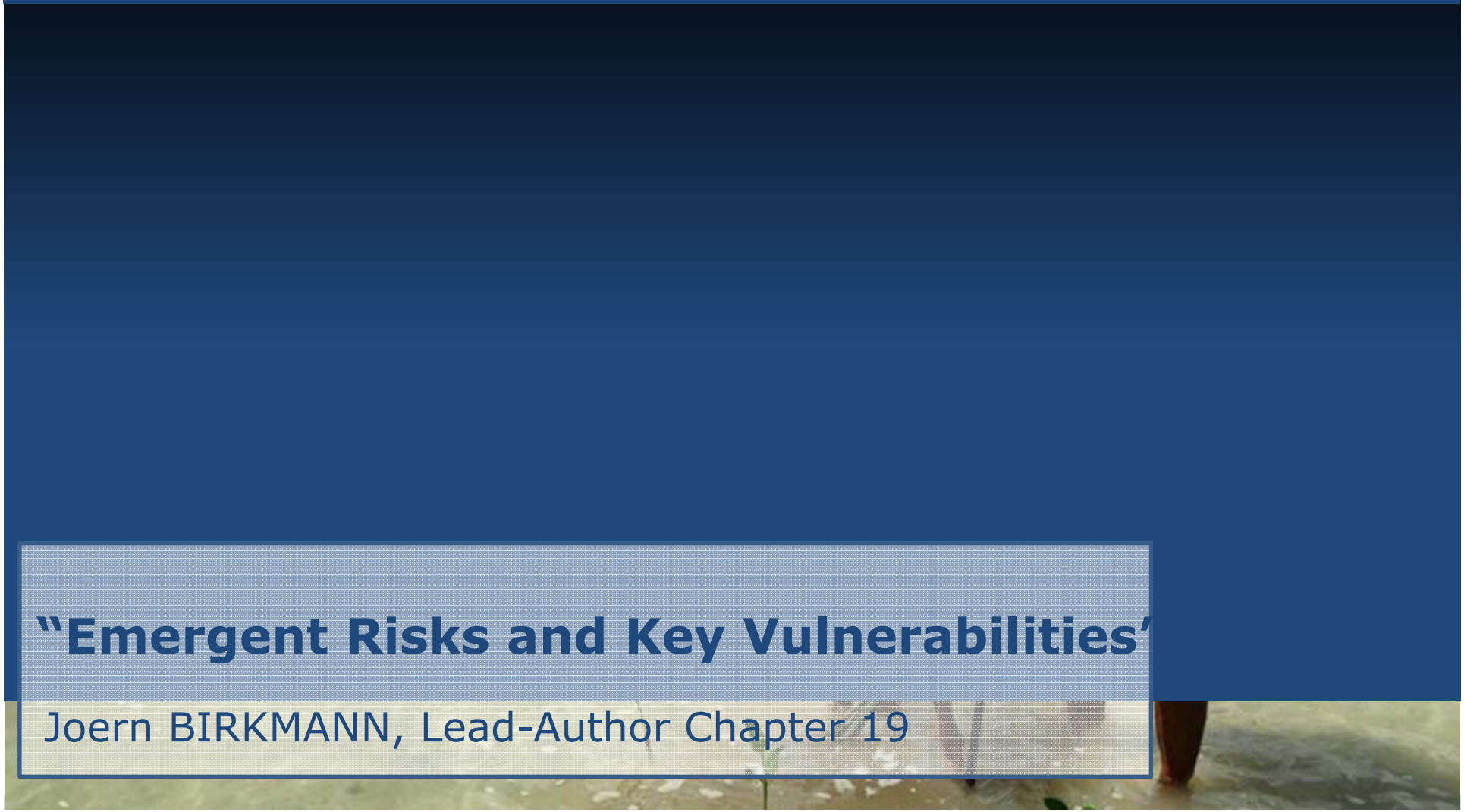
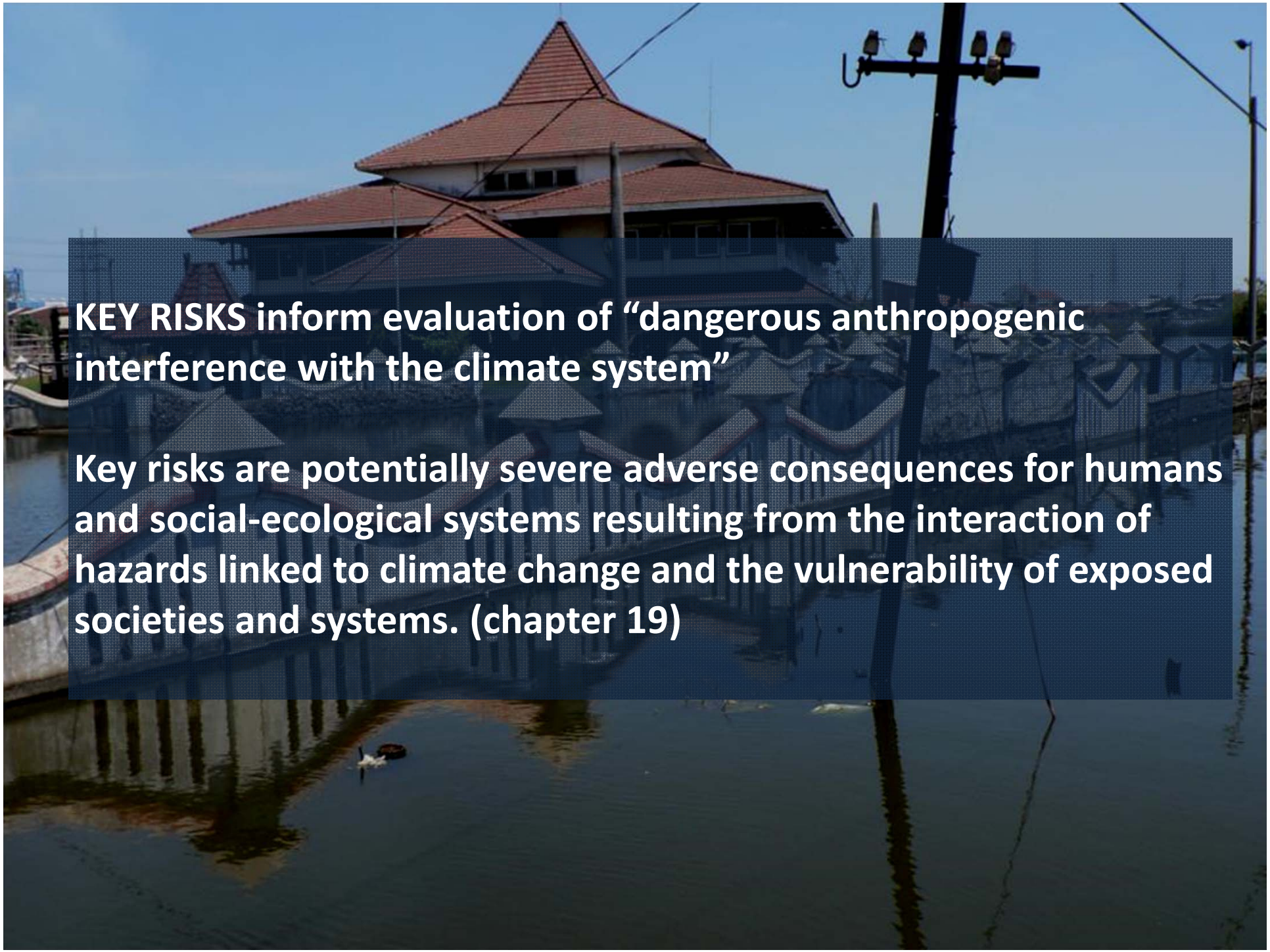
Emergent Risks and Key Vulnerabilities



"Emergent Risks and Key Vulnerabilities"

Joern BIRKMANN, Lead-Author Chapter 19



KEY RISKS inform evaluation of “dangerous anthropogenic interference with the climate system”

Key risks are potentially severe adverse consequences for humans and social-ecological systems resulting from the interaction of hazards linked to climate change and the vulnerability of exposed societies and systems. (chapter 19)

Understanding the Determinants of Risks

Hazard, Exposure and Vulnerability

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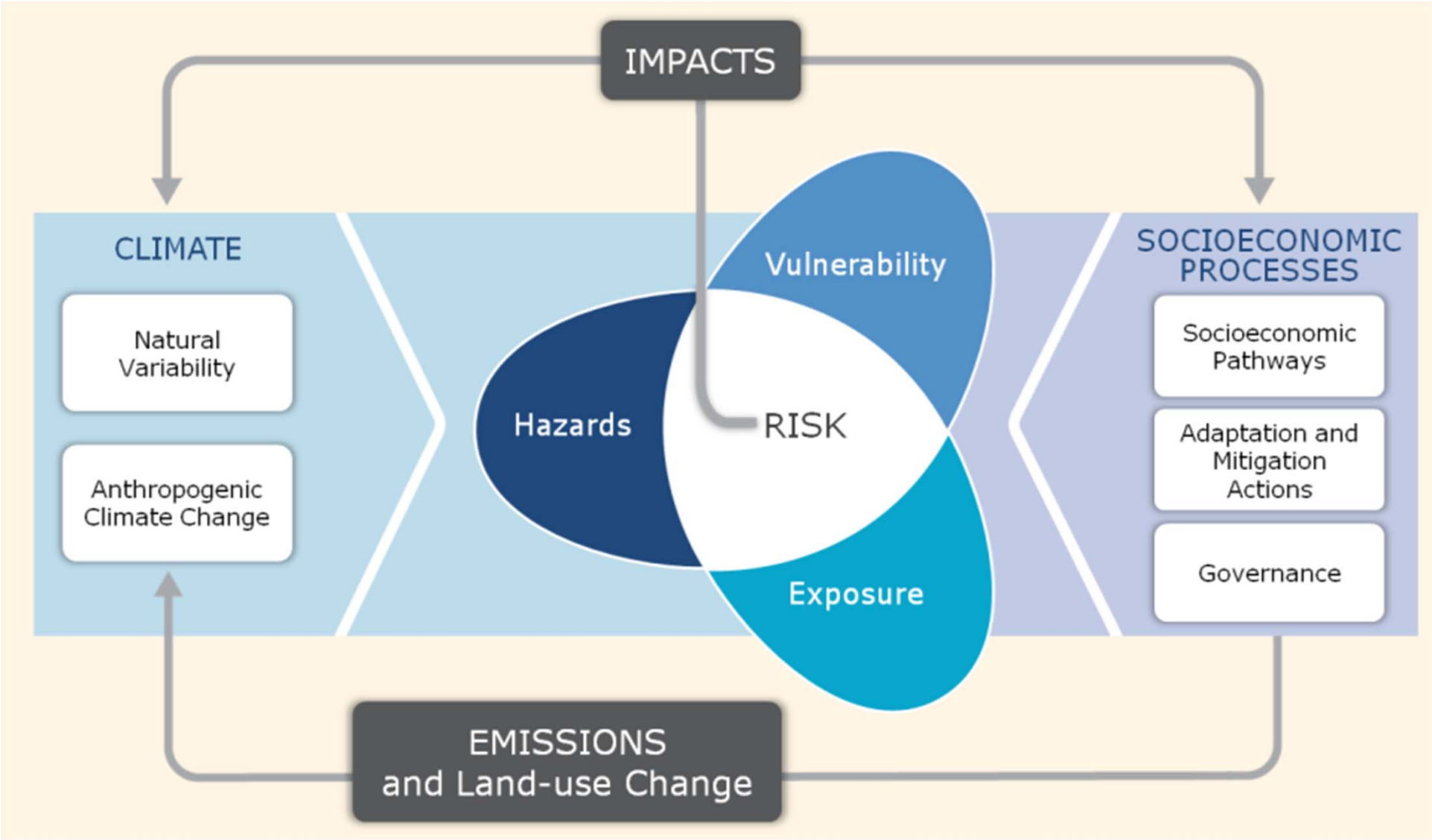
The new framing: AR5



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Differences in vulnerability and exposure arise from non-climatic factors and from multidimensional inequalities often produced by uneven development processes (very high confidence). (IPCC 2014 (SPM))

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The Solution Space

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Vulnerability & Exposure

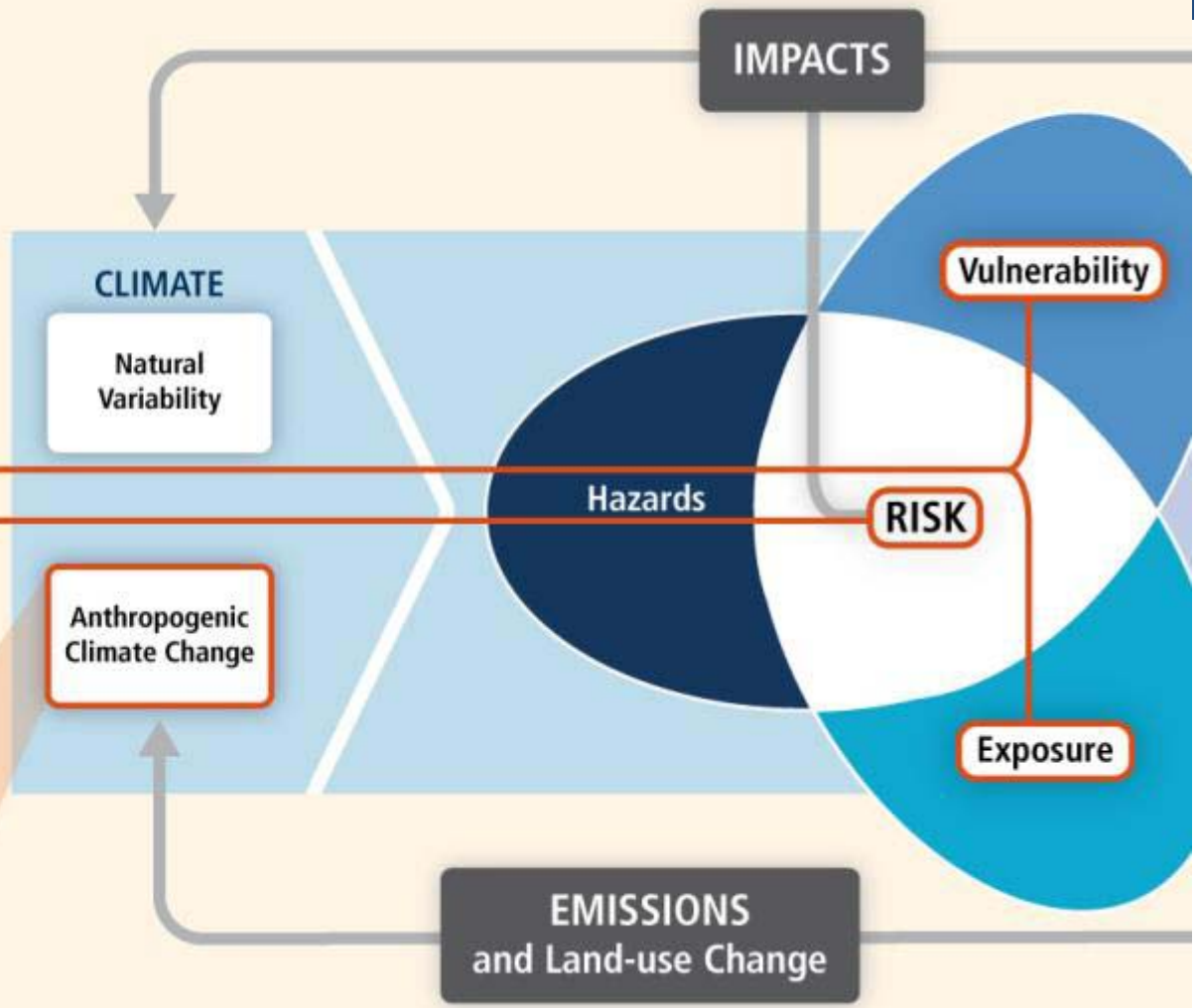
- Vulnerability & exposure reduction [C-1]
- Low-regrets strategies & actions [C-1]
- Addressing multidimensional inequalities [A-1, C-1]

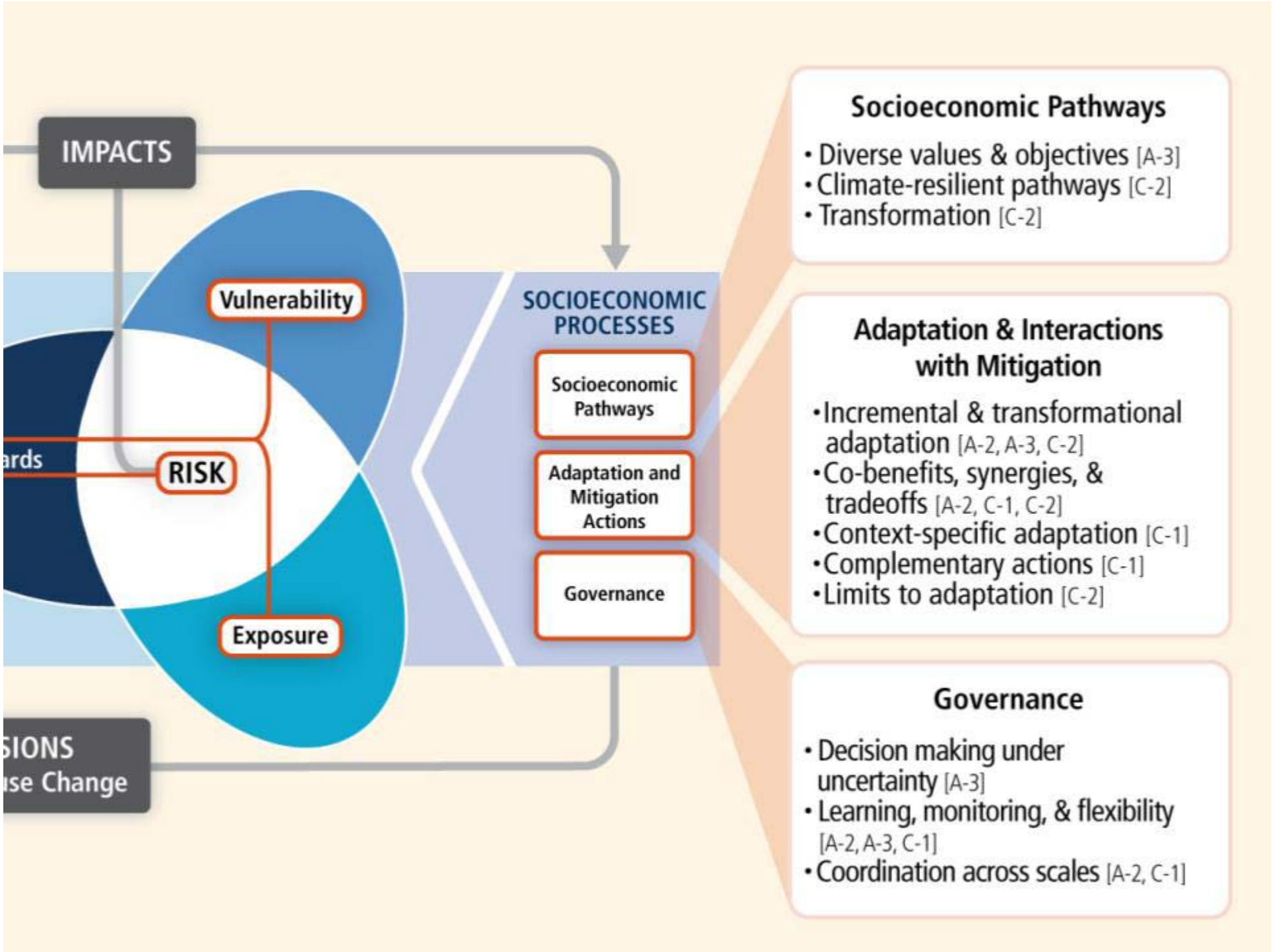
Risk

- Risk assessment [B]
- Iterative risk management [A-3]
- Risk perception [A-3, C-1]

Anthropogenic Climate Change

- Mitigation [WGIII AR5]




IMPACTS
Vulnerability
ards
RISK
Exposure
SIONS
se Change
SOCIOECONOMIC PROCESSES
Socioeconomic Pathways
Adaptation and Mitigation Actions
Governance
Socioeconomic Pathways
• Diverse values & objectives [A-3]
• Climate-resilient pathways [C-2]
• Transformation [C-2]
Adaptation & Interactions with Mitigation
• Incremental & transformational adaptation [A-2, A-3, C-2]
• Co-benefits, synergies, & tradeoffs [A-2, C-1, C-2]
• Context-specific adaptation [C-1]
• Complementary actions [C-1]
• Limits to adaptation [C-2]
Governance
• Decision making under uncertainty [A-3]
• Learning, monitoring, & flexibility [A-2, A-3, C-1]
• Coordination across scales [A-2, C-1]

Key Risks

Key Risks Examples

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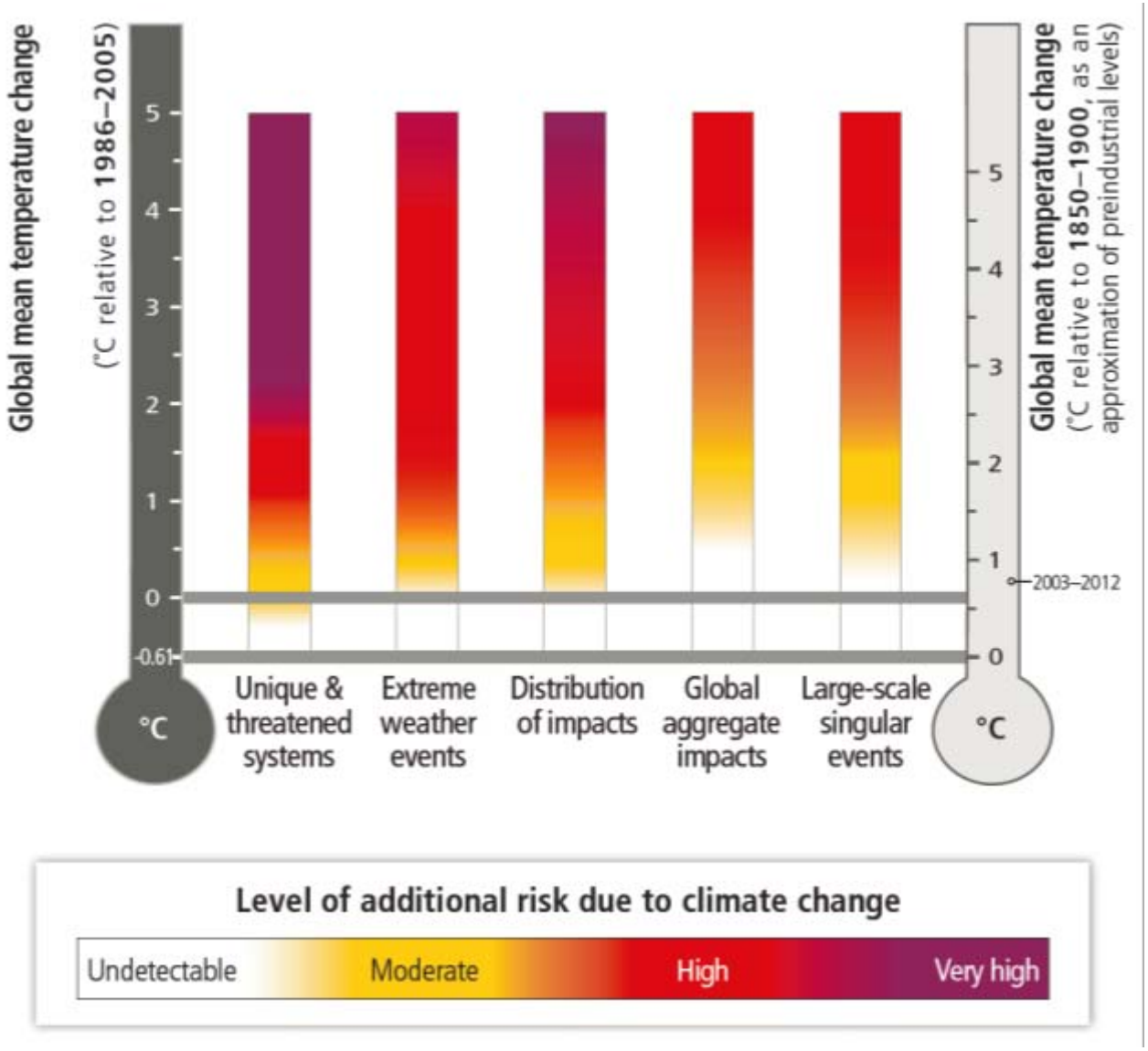
Risk of death, injury, ill-health, or disrupted livelihoods in low-lying coastal zones and small island developing states and other small islands, due to storm surges, coastal flooding, and sea-level rise. [RFC 1-5]

Risk of severe ill-health and **disrupted livelihoods for large urban populations** due **to inland flooding** in some regions. [RFC 2 and 3]

Systemic risks due to extreme weather events leading to breakdown of infrastructure networks and critical services such as electricity, water supply, and health and emergency services. [RFC 2-4]

Risk of loss of rural livelihoods and income due to insufficient access to drinking and irrigation water and reduced agricultural productivity, particularly for farmers and pastoralists with minimal capital in semi-arid regions.[RFC 2 and 3]


Global mean temperature change
(°C relative to 1986–2005)
5
4
3
2
1
0
-0.61
°C
Unique & threatened systems
Extreme weather events
Distribution of impacts
Global aggregate impacts
Large-scale singular events
Global mean temperature change
(°C relative to 1850–1900, as an approximation of preindustrial levels)
5
4
3
2
1
2003–2012
0
°C
Level of additional risk due to climate change
Undetectable
Moderate
High
Very high

Options for adaptation have to focus also on future risk, vulnerability and exposure patterns

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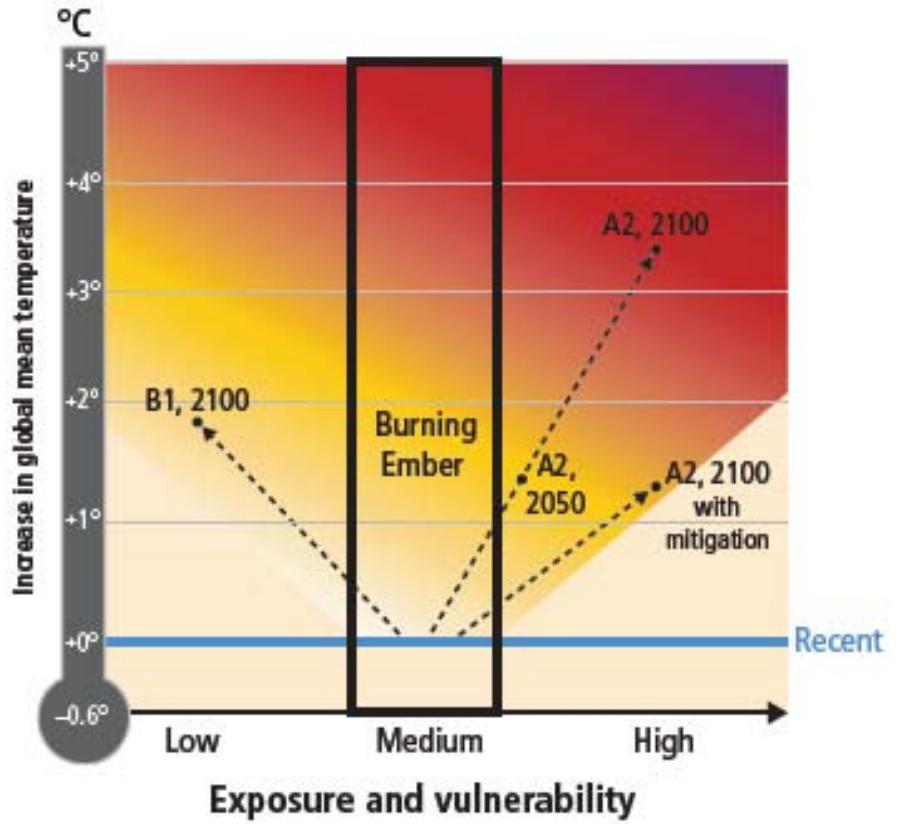
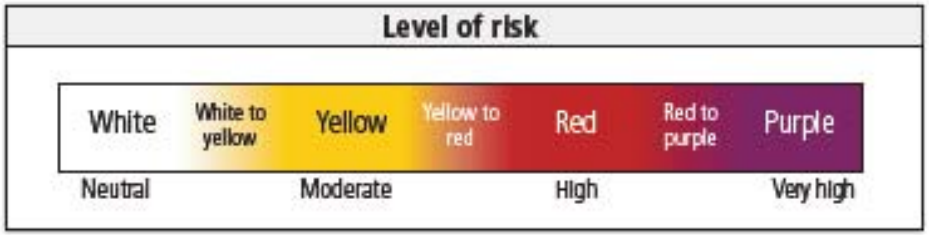
Level of Risks





Risks associated with the Reasons for Concern (RFC) depend on the level of climate change and exposure and vulnerability of society.

Arrows and dots illustrate the use of SRES scenario-based literature; evolution of climate and socio-economic conditions over time. (IPCC 2014)

Risk and Adaptation Prospects

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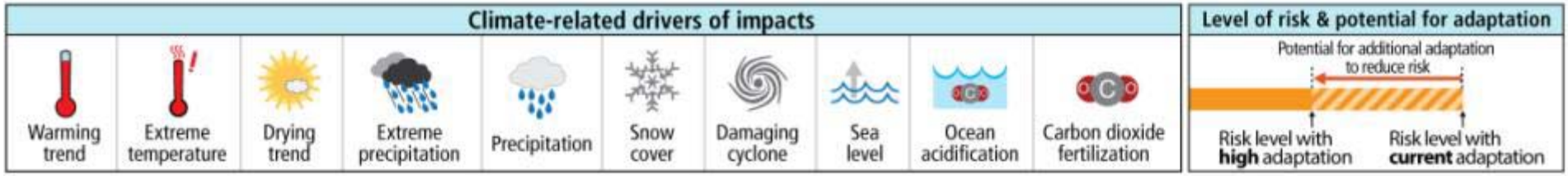

Africa

Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation (Very low / Medium / Very high)
Compounded stress on water resources facing significant strain from overexploitation and degradation at present and increased demand in the future, with drought stress exacerbated in drought-prone regions of Africa (*high confidence*) [22.3-4]	• Reducing non-climate stressors on water resources • Strengthening institutional capacities for demand management, groundwater assessment, integrated water-wastewater planning, and integrated land and water governance • Sustainable urban development		Present Near term (2030–2040) Long term (2080–2100) 2°C / 4°C	
Reduced crop productivity associated with heat and drought stress, with strong adverse effects on regional, national, and household livelihood and food security, also given increased pest and disease damage and flood impacts on food system infrastructure (*high confidence*) [22.3-4]	• Technological adaptation responses (e.g., stress-tolerant crop varieties, irrigation, enhanced observation systems) • Enhancing smallholder access to credit and other critical production resources; Diversifying livelihoods • Strengthening institutions at local, national, and regional levels to support agriculture (including early warning systems) and gender-oriented policy • Agronomic adaptation responses (e.g., agroforestry, conservation agriculture)		Present Near term (2030–2040) Long term (2080–2100) 2°C / 4°C	
Changes in the incidence and geographic range of vector- and water-borne diseases due to changes in the mean and variability of temperature and precipitation, particularly along the edges of their distribution (*medium confidence*) [22.3]	• Achieving development goals, particularly improved access to safe water and improved sanitation, and enhancement of public health functions such as surveillance • Vulnerability mapping and early warning systems • Coordination across sectors • Sustainable urban development		Present Near term (2030–2040) Long term (2080–2100) 2°C / 4°C	

Concluding Remarks

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The focus on risk, which is new in this report, supports decision-making in the context of climate change, and complements other elements of the report.

Some unique and threatend systems are at risk from climate change at recent temperatures, with increasing numbers at risk of severe consequences at global mean warming of 1 degree celsius.

However, climate change risk vary substantially across plausible alternative development pathways.