Challenges and opportunities for achieving the LTGG, as identified in the IPCC 2018-19 Special Reports

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The talk will cover:

Key challenges:

- Benefits to early action and urgency of timing due to increasing risks
- Need for immediate and near-term risk reduction measures, acknowledging limits to adaptation
- Sustainable development challenges in BAU

Key opportunities:

- Climate resilient pathways can balance challenges and opportunities
- Some mitigation and adaptation options can produce co-benefits (and manage for trade-offs)
- Enabling conditions help in realizing opportunities and overcoming challenges

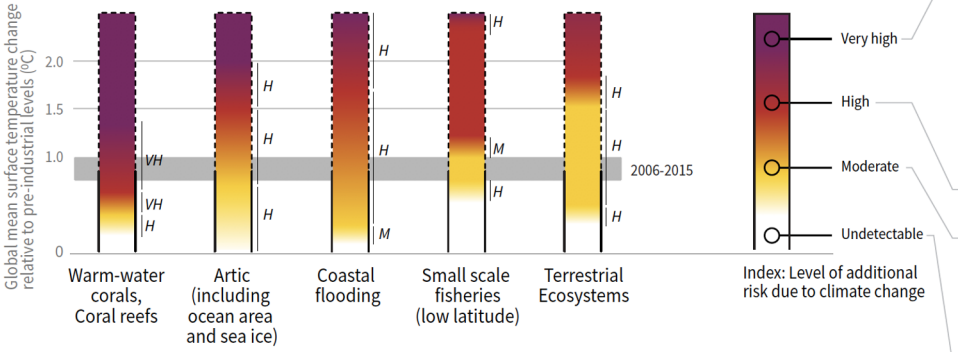
Key Challenge 1. There are benefits to early action, given increasing risks over time

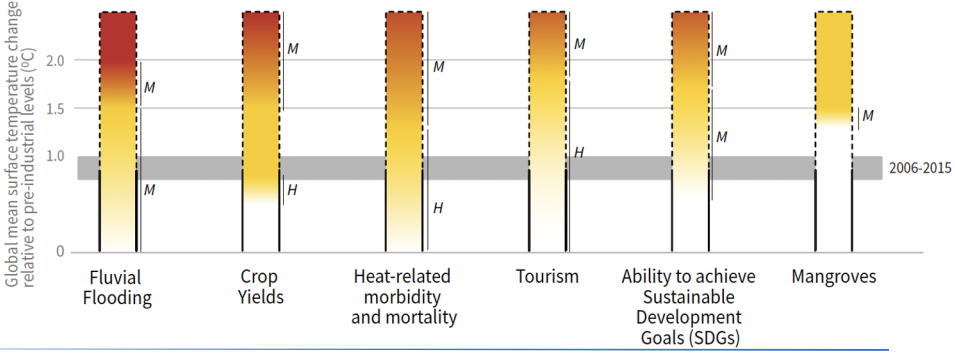
- **Irreversibility of some impacts to ecosystems**
  - Coral reef impacts, ice sheet and glacier mass loss (SROCC SPM A.3.3., SPMFig 3)
  - Irreversible impacts on some ecosystems...in the longer-term has the potential to lead to substantial additional GHG emissions from ecosystems that would accelerate global warming (SRCCL SPM D.3.3).
- **Decreasing options over time**
  - Potential for some response options, such as increasing soil organic carbon, decreases as climate change intensifies (SRCCL SPM D.3.2)
- **Delayed action increases costs**
  - Risk of cost escalation, lock-in in carbon-emitting infrastructure, stranded assets, and reduced flexibility in future response options in the medium to long term (SR1.5 SPM D.1.3)
- **Delayed action risks overshoot, and requires more use of CDR** (as seen in presentation 2)

Key Challenge 1. Delayed action increases risks

Risks and/or impacts for specific natural, managed and human systems

The key elements are presented here as a function of the risk level assessed between 1.5°C and 2°C.





Purple indicates very high risks of severe impacts and the presence of significant irreversibility or the persistence of climate-related hazards, combined with limited ability to adapt due to the nature of the hazard or impacts/risks.

Red indicates severe and widespread impacts/risks.

Yellow indicates that impacts/risks are detectable and attributable to climate change with at least medium confidence.

White indicates that no impacts are detectable and attributable to climate change.

Source: SR1.5 Ch 3 Figure 3.20

Key Challenge 2. There is a strong need for risk reduction and adaptation measures in the immediate and near-term

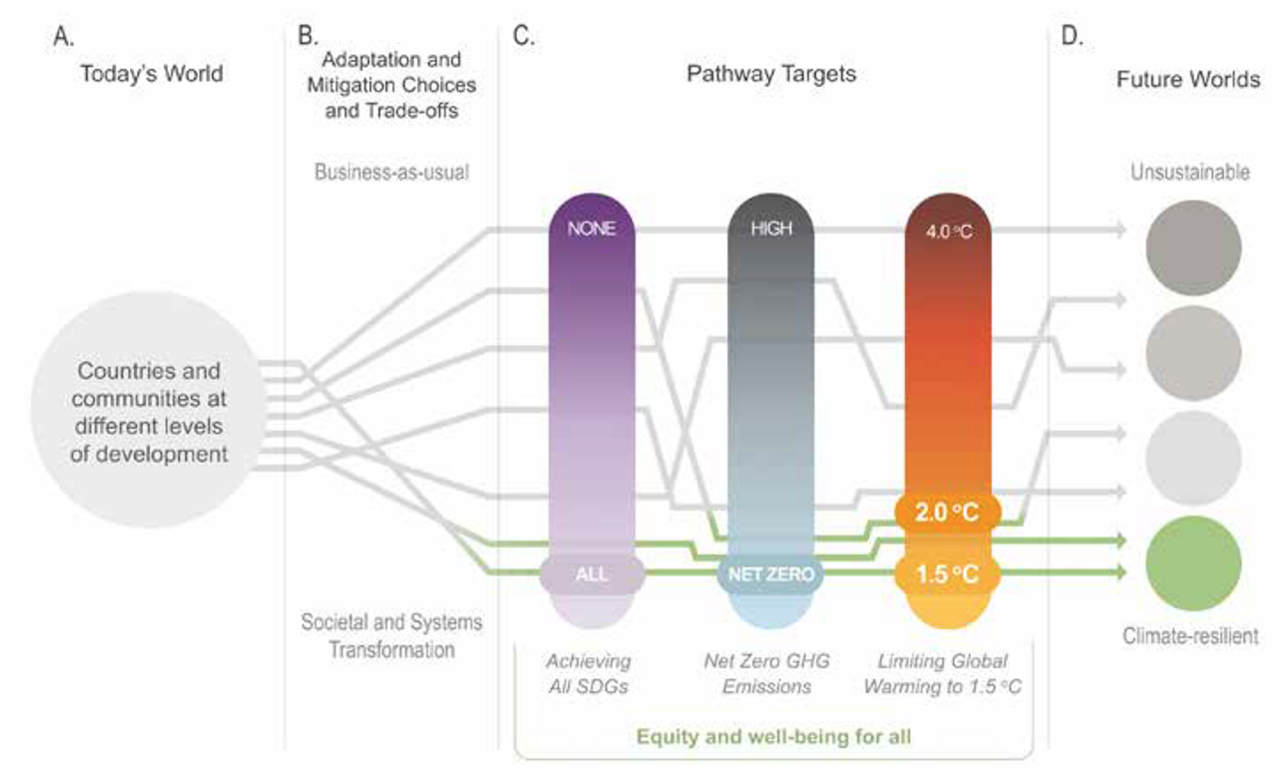
- **Risks of compound problems increases with temperature rise:** "Exposure to multiple and compound climate-related risks is projected to increase between 1.5°C and 2°C of global warming with greater proportions of people both exposed and susceptible to poverty in Africa and Asia (high confidence)" (SR1.5 SPM B.5.6)
- **There are limits to adaptation:** "Limits to adaptive capacity exist at 1.5°C of global warming, become more pronounced at higher levels of warming and vary by sector, with site-specific implications for vulnerable regions, ecosystems and human health" (SR1.5 SPM B.6.3).
    - These include both **hard** and **soft** limits (SR1.5 Cross-chapter Box 12).
    - *Hard limits*: e.g. coral reefs; *soft limits*: e.g. poverty; *both types*: coastal livelihoods
- **Maladaptation is another risk**: "Some adaptation options can become maladaptive due to their environmental impacts, such as irrigation causing soil salinisation or over extraction leading to ground-water depletion (medium confidence)." (SRCCL SPM B.4.5)

Key Challenge 3. A warming world can make the SDGs less obtainable

Impacts	Chapter 3 Section	1.5°C	2°C	Sustainable Development Goals (SDGs) More Easily Achieved when Limiting Warming to 1.5°C
Water scarcity	3.4.2.1	4% more people exposed to water stress	8% more people exposed to water stress, with 184–270 million people more exposed	SDG 6 water availability for all
	Table 3.4	496 (range 103–1159) million people exposed and vulnerable to water stress	586 (range 115–1347) million people exposed and vulnerable to water stress	
Ecosystems	3.4.3, Table 3.4	Around 7% of land area experiences biome shifts	Around 13% (range 8–20%) of land area experiences biome shifts	SDG 15 to protect terrestrial ecosystems and halt biodiversity loss
	Box 3.5	70–90% of coral reefs at risk from bleaching	99% of coral reefs at risk from bleaching	
Coastal cities	3.4.5.1	31–69 million people exposed to coastal flooding	32–79 million exposed to coastal flooding	SDG 11 to make cities and human settlements safe and resilient
	3.4.5.2	Fewer cities and coasts exposed to sea level rise and extreme events	More people and cities exposed to flooding	
Food systems	3.4.6, Box 3.1	Significant declines in crop yields avoided, some yields may increase	Average crop yields decline	SDG 2 to end hunger and achieve food security
	Table 3.4	32–36 million people exposed to lower yields	330–396 million people exposed to lower yields	
Health	3.4.5.1	Lower risk of temperature-related morbidity and smaller mosquito range	Higher risks of temperature-related morbidity and mortality and larger geographic range of mosquitoes	SDG 3 to ensure healthy lives for all
	3.4.5.2	3546–4508 million people exposed to heat waves	5417–6710 million people exposed to heat waves	

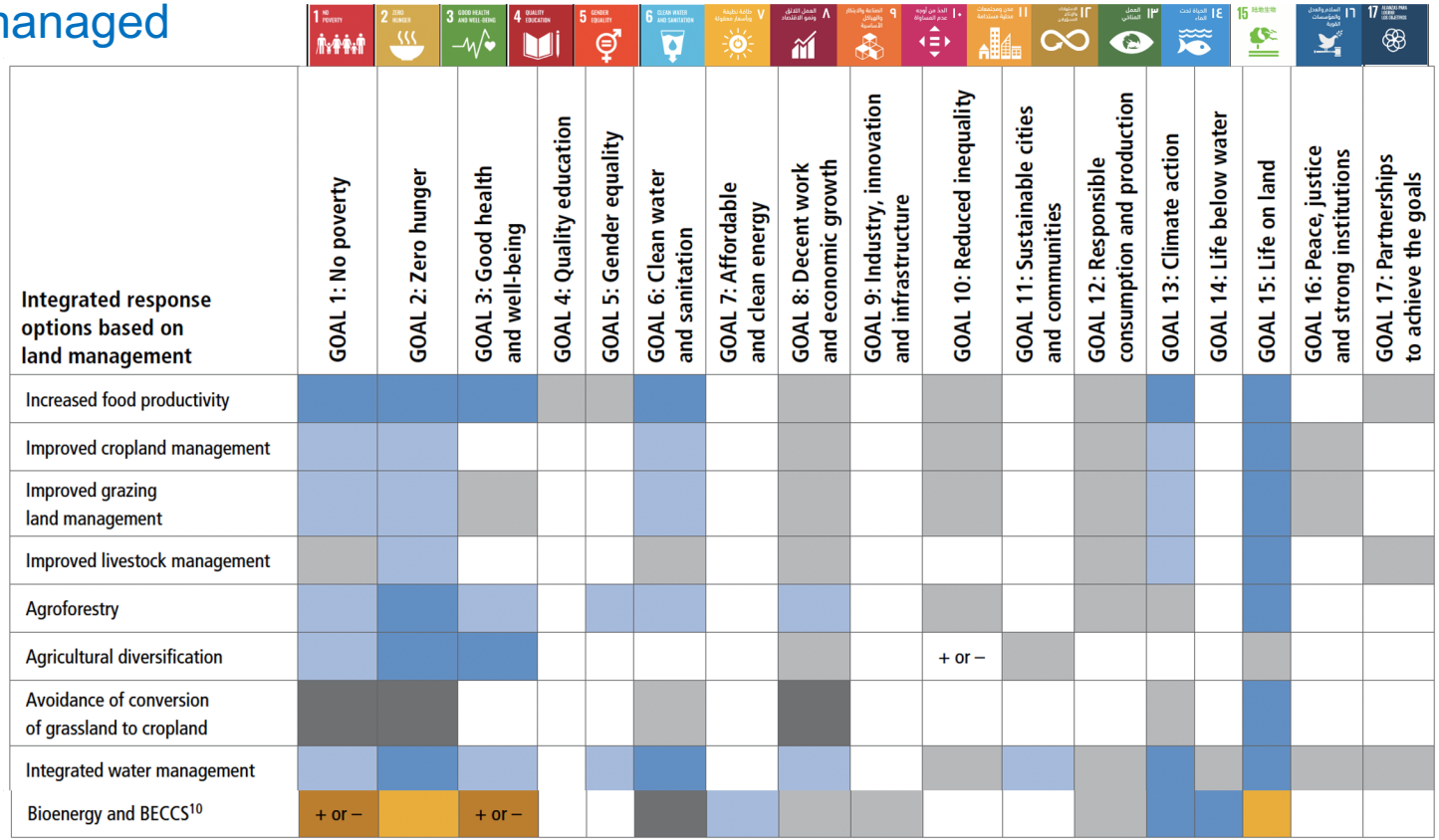
Source: SR1.5 Ch 5 Table 5.1

Key Opportunity 1. Climate resilient development pathways can help balance challenges and opportunities.



Source: SR1.5 Fig 5.1

Key Opportunity 2. Mitigation and adaptation options have different co-benefits to be maximized and trade-offs to be managed



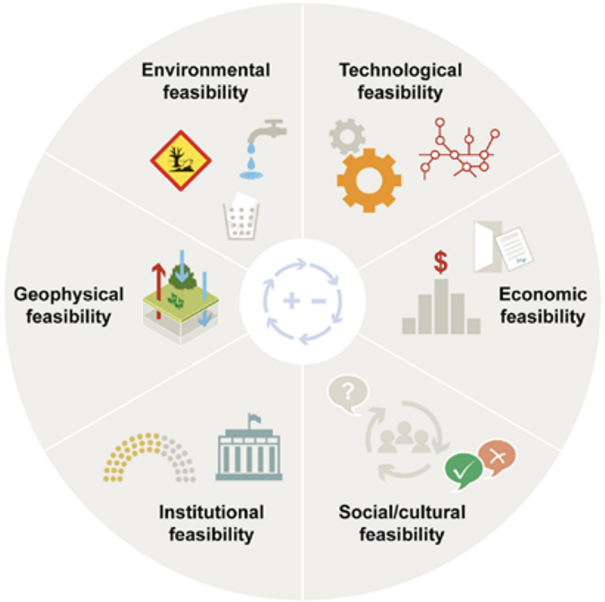
Integrated response options based on land management	GOAL 1: No poverty	GOAL 2: Zero hunger	GOAL 3: Good health and well-being	GOAL 4: Quality education	GOAL 5: Gender equality	GOAL 6: Clean water and sanitation	GOAL 7: Affordable and clean energy	GOAL 8: Decent work and economic growth	GOAL 9: Industry, innovation and infrastructure	GOAL 10: Reduced inequality	GOAL 11: Sustainable cities and communities	GOAL 12: Responsible consumption and production	GOAL 13: Climate action	GOAL 14: Life below water	GOAL 15: Life on land	GOAL 16: Peace, justice and strong institutions	GOAL 17: Partnerships to achieve the goals
Increased food productivity																	
Improved cropland management																	
Improved grazing land management																	
Improved livestock management																	
Agroforestry																	
Agricultural diversification										+ or –							
Avoidance of conversion of grassland to cropland																	
Integrated water management																	
Bioenergy and BECCS[10]	+ or –		+ or –														

Large positive impacts, strong evidence
Medium positive impacts, some evidence
Small positive impacts or low evidence
Low negative impacts or low evidence
Medium negative impacts, medium evidence

SRCCL Ch 6 Table 6.73

Key Opportunity 3. Enabling conditions can help realize opportunities and overcome challenges, including through attention to feasibility

FAQ4.1: **The different feasibility dimensions towards limiting warming to 1.5°C**
Assessing the feasibility of different adaptation and mitigation options/actions requires consideration across six dimensions.



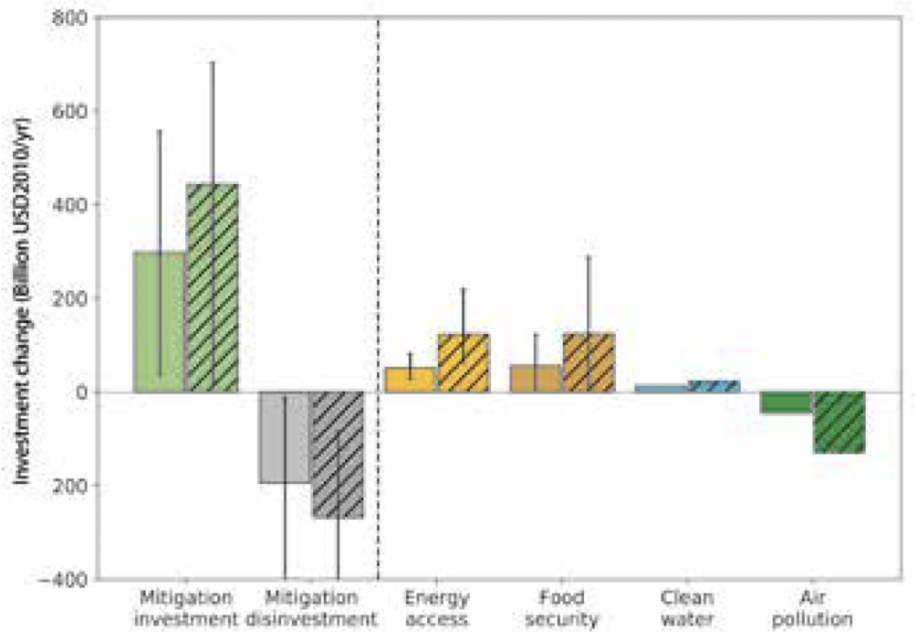
Source: SR 1.5 Ch4, FAQs

- Enhancing multilevel governance
- Enhancing institutional capacities
- Enabling lifestyle and behavioural change
- Enabling technological innovation
- Strengthening policy instruments (e.g. precautionary approaches)
- Enabling climate finance

Key Opportunity 3: Opportunities and challenges in finance

- There will need to be **a mix** of investment and disinvestment, public and private financing
- For a 2ºC-consistent transition, an estimate across multiple models of annual investment needs in the energy system is around **2.38 trillion** USD2010 between 2016-2035 (SR1.5, 4.4.5, Box 4.8)
- There are cost-savings from adaptation investments as well. Coastal protection can reduce flood risk by 2–3 orders of magnitude but depend on scale of investments; **cost-efficient for densely populated urban areas** (SROCC SPM B.9.3)
- Land investments in restoration can have **benefit-cost ratios between 3 to 6** (SRCCL SPM D.2.2)

Needed investment up until 2030



Hatched boxes are 1.5º pathways
Solid boxes are 2ºC pathways

Source: SR1.5 Ch 5 Figure 5.4

CONCLUSIONS

- The LTGG includes attention to mitigation, adaptation, and financing, all of which have needs for prioritization (this calls for attention to comprehensiveness and integration of actions)
- Because every action matters, important to take advantage of opportunities now and move quickly, particularly for those options which are time-limited.
- Managing response options for co-benefits and tradeoffs can help achieve climate-resilient development pathways, keeping in mind national and local contexts and differences between developed and developing countries.
- The longer we wait, the more constrained we will be (due to irreversible risks, challenges to sustainable development, cost increases, etc.). There have been decreasing opportunities and increasing risks even since the previous SED in 2013-2015.