

# IPCC: Perspectives on Climate Change and Sustainability

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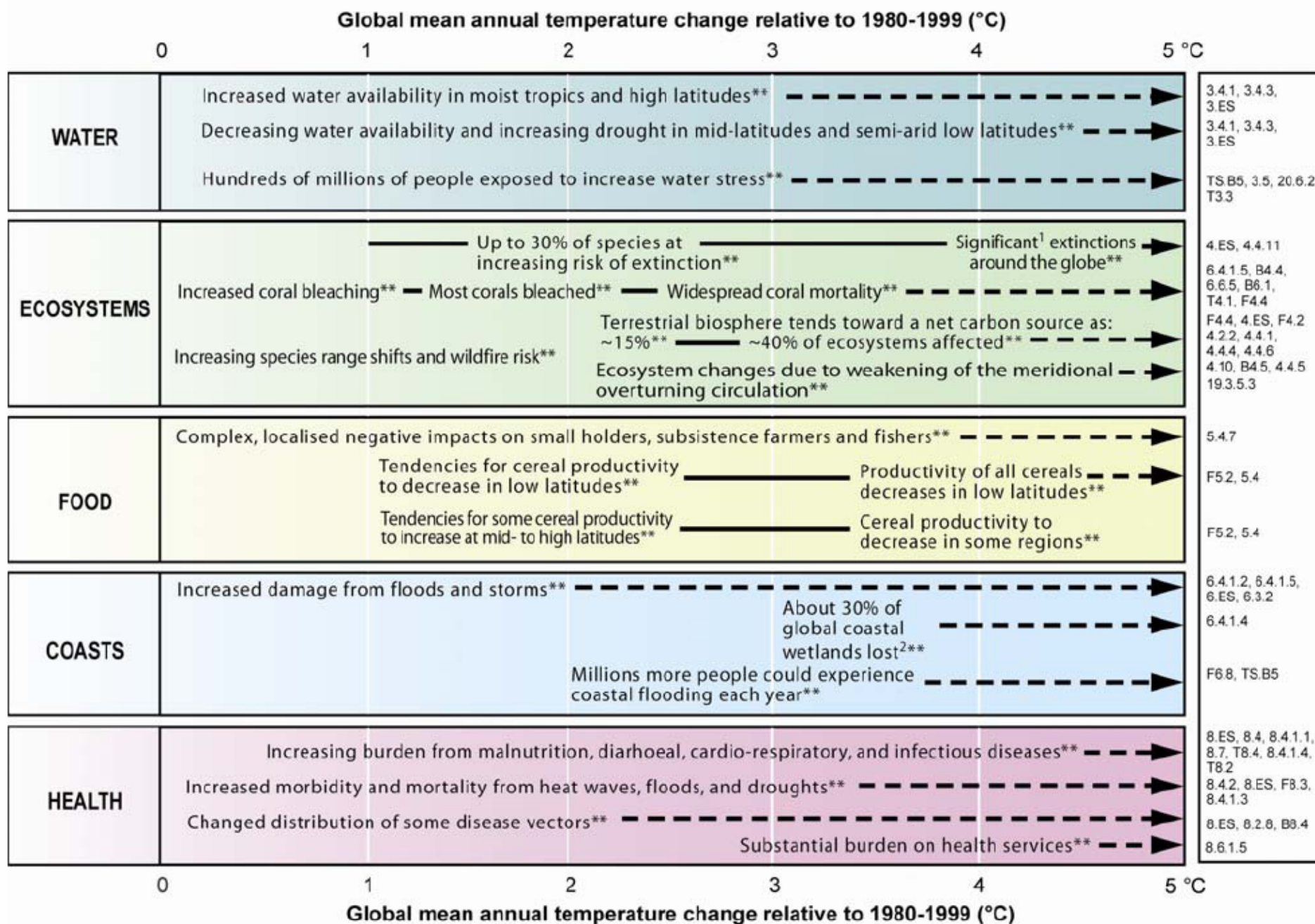
# Adaptation and Vulnerability

- Adaptive capacity is the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.
- Vulnerability is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.

# Sustainable Development

- The Brundtland Commission definition of sustainable development is used in this Assessment: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”
- The same definition was used by the IPCC Working Group II Third Assessment and Synthesis Reports.

# Key Impacts as a Function of Increasing Global Average Temperature Change (Impacts will vary by extent of adaptation, rate of temperature change, and socio-economic pathway)



<sup>1</sup> Significant is defined here as more than 40%.

<sup>2</sup> Based on average rate of sea level rise of 4.2 mm/year from 2000 to 2080.

# Main Conclusions

- Vulnerability to specific impacts of climate change will be most severe when and where they are felt together with stresses from other sources (VHC).
- Efforts to cope with the impacts of climate change and attempts to promote sustainable development share common goals and determinants including, access to resources (including information and technology), equity in the distribution of resources, stocks of human and social capital, access to risk sharing mechanisms, abilities of decision-support mechanisms to cope with uncertainty (VHC).
- Nonetheless, some development activities exacerbate climate-related vulnerabilities (VHC).

# Main Conclusions

- Climate change will result in net costs into the future, aggregated across the globe and discounted to today; these costs will grow over time (VHC).
- Reducing vulnerability to the hazards associated with current and future climate variability and extremes through specific policies and programs, individual initiatives, participatory planning processes, and other community approaches can reduce vulnerability to climate change (HC).
- Efforts to reduce vulnerability will be not be sufficient to eliminate all damages associated with climate change (VHC).

# Main Conclusions

- Climate change will impede nations' abilities to achieve sustainable development pathways, as measured for example as long-term progress towards the Millennium Development Goals (VHC).
- Synergies between adaptation and mitigation measures will be effective through the middle of this century (HC), but even a combination of aggressive mitigation and significant investment in adaptive capacity could be overwhelmed by the end of the century along a likely development scenario (HC).

# Impacts and Costs

- Impacts of climate change will vary regionally but, aggregated and discounted to the present, they are very likely to impose net annual costs which will increase over time as global temperatures increase.

# Impacts and Costs

- This Assessment makes it clear that the impacts of future climate change will be mixed across regions. For increases in global mean temperature of less than 1 to 3°C above 1990 levels, some impacts are projected to produce benefits in some places and some sectors, and produce costs in other places and other sectors. It is, however, projected that some low latitude and polar regions will experience net costs even for small increases in temperature. It is very likely that all regions will experience either declines in net benefits or increases in net costs for increases in temperature greater than about 2 to 3. C [9.ES, 9.5, 10.6, T109, 15.3, 15.ES]. These observations re-confirm evidence reported in the Third Assessment that, while developing countries are expected to experience larger percentage losses, global mean losses could be 1-5% Gross Domestic Product (GDP) for 4°C of warming. [F20.3]

# Impacts and Costs

- Many estimates of aggregate net economic costs of damages from climate change across the globe (i.e., the social cost of carbon (SCC), expressed in terms of future net benefits and costs that are discounted to the present) are now available. Peer-reviewed estimates of the social cost of carbon for 2005 have an average value of US\$43 per tonne of carbon (tC) (i.e., US\$12 per tonne of carbon dioxide) but the range around this mean is large. For example, in a survey of 100 estimates, the values ran from US\$-10 per tonne of carbon (US\$-3 per tonne of carbon dioxide) up to US\$350/tC (US\$130 per tonne of carbon dioxide) [20.6].

# Impacts and Costs

- The large ranges of SCC are due in the large part to differences in assumptions regarding climate sensitivity, response lags, the treatment of risk and equity, economic and non-economic impacts, the inclusion of potentially catastrophic losses and discount rates. It is very likely that globally aggregated figures underestimate the damage costs because they cannot include many non-quantifiable impacts. Taken as a whole, the range of published evidence indicates that the net damage costs of climate change are likely to be significant and to increase over time. [T20.3, 20.6, F20.4].

# Impacts and Costs

- It is virtually certain that aggregate estimates of costs mask significant differences in impacts across sectors, regions, countries, and populations. In some locations and amongst some groups of people with high exposure, high sensitivity, and/or low adaptive capacity, net costs will be significantly larger than the global aggregate. [20.6, 20.ES, 7.4]