



WMO

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



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CHAPTER OUTLINE OF THE WORKING GROUP II CONTRIBUTION TO THE IPCC FOURTH ASSESSMENT REPORT (AR4)

(Submitted by the Co-chairs of Working Group II)

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OUTLINE FOR THE WORKING GROUP II CONTRIBUTION TO THE IPCC FOURTH ASSESSMENT REPORT

CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY

Summary for Policymakers

Technical Summary

Introduction

- *Scope of this Assessment*
- *Relation to other reports and studies*

I. ASSESSMENT OF OBSERVED CHANGES

1. Assessment of Observed Changes and Responses in Natural and Managed Systems

- Methods in detection and attribution of observed changes
 - Data and methods in observation of current and recent changes, including extremes
 - Climate and non-climate drivers of change
 - Exploring confidence in methods and results
- Systems and sectors under investigation: observed changes including vulnerability and adaptation
 - Cryosphere
 - Hydrology and water resources
 - Coastal processes and zones
 - Terrestrial biological systems
 - Freshwater and marine biological systems
 - Agriculture and forestry
 - Human health
 - Aspects of socio-economic systems
 - Disasters and hazards
- Larger scale aggregation and attribution
 - Regional aspects and dimensions of the issue
 - Relative sensitivity, resilience and adaptive capacity of different systems
 - Assessing the relation of observed changes in systems to regional climate trends
 - Assessing the relation of observed regional climate trends to anthropogenic climate change
 - Uncertainties and confidence levels
 - Learning from current and recent observed adaptation

II. ASSESSMENT OF FUTURE IMPACTS AND ADAPTATION: SECTORS AND SYSTEMS

2. New Assessment Methodologies and the Characterisation of Future Conditions

- New developments in methods trends
 - Resulting uncertainties and confidence levels
- Characterising the future: climate/other environmental/socio-economic assumptions
 - Data requirements for assessment
 - Sensitivity analysis

- The development and application of scenarios including extreme events
- Stabilisation scenarios
- Future requirements; caveats and uncertainties

Content guide for subsequent chapters in Section II:

1. Scope, key issues, summary of TAR conclusions, specific methods
2. Current sensitivity/vulnerability: to weather and climate (including extreme events); and to other stresses; recent and current trends; current adaptation [inc storm surges]
3. Assumptions about future trends: climate, development, technology, etc.
4. Key future impacts and vulnerabilities; [consider rates and magnitudes]
5. Costs and other socio-economic aspects
6. Adaptation: practices, options, constraints, opportunities and barriers [timeframes/planning horizons, limitations/maladaptation, policies/response measures]
7. Implications for sustainable development
8. Key uncertainties, confidence levels, unknowns, research gaps and priorities

3. Fresh Water Resources and their Management

- Water cycle: precipitation, evapotranspiration, soil moisture, snow cover
- Surface water: rivers, lakes, ice cover; quantity and quality
- Groundwater: extraction, salinisation, quantity and quality
- Water demand and use: agriculture, industry, energy, domestic
- Extreme events: floods, droughts and other precipitation events

4. Ecosystems, their Properties, Goods and Services

- Grasslands and savannahs
- Forests and woodlands
- Deserts
- Tundra
- Mediterranean ecosystems
- Wetlands
- Freshwater lakes and rivers
- Mountains
- Oceans, shallow seas and their ecosystems
- Overall implications for biodiversity

5. Food, Fibre and Forest Products

- Food-crop farming
- Livestock production
- Industrial crops and biofuels
- Forestry
- Fisheries: marine and fresh water; aquaculture and marine farming
- Global food trade and food security
- Subsistence systems, local food supply, regional employment and rural livelihood
- Further environmental consequences with respect to: water use, run-off, land use

6. Coastal systems and Low-lying Areas

- Natural systems, including their services
 - Wetlands, mangroves, mudflats and coral reefs
 - Deltas, estuaries and lagoons
 - Beaches and cliffed coasts
 - Atoll island systems
- Human society
 - Water supply (inc. aquifers)
 - Agriculture, forestry and fisheries (inc. aquaculture)
 - Human settlement, built infrastructure, industrial development; migration
 - Health
 - Tourism / recreation
- Extra-coastal effects on coastal environments
 - Inland effects: freshwater input and quality, sediment input
 - Oceanic effects

7. Industry, Settlement, and Society

- Industry: manufacturing, construction, energy
- Services: retailing and trade, transport, tourism, insurance and finance
- Utilities: water supply, energy, waste disposal,
- Human settlement: urbanisation, urban design, planning, rural settlement
- Social issues: demography, migration, employment, livelihood and culture

8. Human Health

- Thermal stress
- Physical effects of extreme weather and climate events
- Synergies and interactions with environmental quality e.g air and water quality and aeroallergens
- Infectious diseases (including water- and vector-borne) and changing distributions; emerging diseases
- Changes in food quality, food supply and nutrition
- Demographic, economic and social aspects of health
- Cumulative effects; multiple stresses

III. ASSESSMENT OF FUTURE IMPACTS AND ADAPTATION: REGIONS

Content guide for chapters in Section III:

1. Summary of knowledge assessed in the TAR
2. Current sensitivity/vulnerability: to weather and climate (including extreme events); and to other stresses; recent and current trends; current adaptation
3. Assumptions about future trends: climate, development, technology, etc.
4. Summary of expected key future impacts and vulnerabilities and their spatial variation
5. Adaptation: spatial differences in practices, options, constraints, opportunities and barriers
6. Case studies
7. Implications for sustainable development
8. Key uncertainties, confidence levels, unknowns, research gaps and priorities

Chapter 9: Africa

Chapter 10: Asia

Chapter 11: Australia and New Zealand

Chapter 12: Europe

Chapter 13: Latin America

Chapter 14: North America

Chapter 15: Polar Regions (Arctic and Antarctic)

Chapter 16: Small Islands

IV. ASSESSMENT OF RESPONSES TO IMPACTS

17. Assessment of Adaptation Options, Capacity, Opportunities, Constraints and Practice

- Methods and concepts: vulnerability, resilience, adaptive capacity
- Assessment of current adaptation practices: current vulnerability, risk management, local knowledge; adapting to current climate and other stresses; policies and institutions
- Assessment of adaptation capacity, options, opportunities and constraints: criteria for decision making; effectiveness, limitations; benefits and costs; barriers; role of technology; links to development
- Enhancing adaptation: opportunities; development and transfer of technologies and know how; constraints; adaptive learning

18. Inter-relationships between Adaptation and Mitigation

- Elements for effective implementation: determinants, capacities
- Objectives and decision processes: reducing sensitivity vs exposure; dealing with risk
- Scale issues: global, national, sectoral, local and project levels
- Timing issues: timing of outcomes, including rates of change, time discounting
- Differing roles of stakeholders: governments, private, civil society
- Consideration of costs and damages avoided, and/or benefits gained
- Synthesis of complementarities and differences between adaptation and mitigation; mixes of strategies, uncertainties
- Research priorities

19. Assessing Key Vulnerabilities and the Risk from Climate Change

- Methods and concepts: issues relating to Article 2 of the UNFCCC, reasons for concern, measuring damage, identifying key impacts and vulnerabilities, and their risk of occurrence
- Approaches to determining levels of climate change for key impacts:
- Assessing key global risks
- Assessing key risks for regions and sectors
- Assessment of response strategies to avoid occurrence: stabilisation scenarios; mitigation/adaptation strategies; avoiding irreversibilities, role of sustainable development; treatment of uncertainty
- Uncertainties, unknowns, priorities for research

20. Perspectives on Climate Change and Sustainability

- Summary of new knowledge relating to impacts and adaptation
- Impacts and adaptation in the context of multiple stresses
- Implications for environmental quality
- Implications for risk, hazard and disaster management
- Global and aggregate impacts
- Implications for regional and sectoral development, access to resources and technology, and equity
- Sub-regional and local issues
- Opportunities, co-benefits and challenges for adaptation (including over long term)
- Uncertainties, unknowns, priorities for research

List of authors, reviewers

Glossary

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