

**OUTLINE FOR THE IPCC WORKING GROUP I CONTRIBUTION TO
THE FOURTH ASSESSMENT REPORT**

CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS

Summary for Policymakers

Technical Summary

1. Historical Overview of Climate Change Science

Executive Summary

- Introduction
- Progress in Observations
- Progress in Understanding of Radiative Forcing, Processes, and Coupling
- Progress in Climate Modelling
- Advances in Understanding Uncertainties

Appendix: Glossary of Terms

2. Changes in Atmospheric Constituents and in Radiative Forcing

Executive Summary

- Introduction
- Definition and Utility of Radiative Forcing
- Recent Changes in Greenhouse Gases
- Aerosols – Direct and Indirect Radiative Forcing
- Radiative Forcing due to Land Use Changes
- Contrails and Aircraft-Induced Cirrus
- Variability in Solar and Volcanic Radiative Forcing
- Synthesis of Radiative Forcing Factors
- GWPs and Other Metrics for Comparing Different Emissions

Appendix: Techniques, Error Estimation, and Measurement Systems

3. Observations: Surface and Atmospheric Climate Change

Executive Summary

- Introduction
- Changes in Surface Climate
- Changes in the Free Atmosphere
- Changes in Atmospheric Circulation
- Patterns of Variability
- Changes in the Tropics and Sub-Tropics
- Extra-Tropical Changes
- Changes in Extreme Events
- Synthesis: Consistency across Observations

Appendix: Techniques, Error Estimation, and Measurement Systems

4. Observations: Changes in Snow, Ice and Frozen Ground

Executive Summary

- Introduction
- Changes in Snow Cover and Albedo
- Sea Ice Extent and Thickness Changes
- Changes in Glaciers and Small Ice Caps
- Changes and Stability of Ice Shelves
- Changes and Stability of Ice Sheets
- Changes in Frozen Ground

Appendix: Techniques, Error Estimation, and Measurement Systems

5. Observations: Oceanic Climate Change and Sea Level

Executive Summary

- Introduction
- Changes in Ocean Salinity, Temperature, Heat Uptake, and Heat Content
- Biogeochemical Tracers
- Changes in Ocean Circulation and Water Mass Formation
- Sea Level: Global and Regional Changes

Appendix: Techniques, Error Estimation, and Measurement Systems

6. Paleoclimate

Executive Summary

- Introduction
- Proxy Methods and their Uncertainty
- Inferred Past Climate System Change
- Abrupt Climate Change
- Paleo-Environmental Model Evaluation and Sensitivity
- Synthesis: Insights into Climate System Behavior

Appendix: Guide to the Use of Paleoclimatic Information.

7. Couplings Between Changes in the Climate System and Biogeochemistry

Executive Summary

- Introduction to Biogeochemical Cycles
- The Carbon Cycle and the Climate System
- Global Atmospheric Chemistry and Climate Change
- Air Quality and Climate Change
- Aerosols and Climate Change
- The Changing Land Surface and Climate
- Synthesis: Interactions Among Cycles and Processes

8. Climate Models and their Evaluation

Executive Summary

- Advances in Modeling
- Evaluation of Contemporary Climate as Simulated by Coupled Global Models
- Evaluation of Large Scale Climate Variability as Simulated by Coupled Global Models
- Evaluation of the Key Relevant Processes as Simulated by Coupled Global Models
- Model Simulations of Extremes
- Climate Sensitivity
- Evaluation of Model Simulations of Thresholds and Abrupt Events
- Representing the Global System With Simpler Models

9. Understanding and Attributing Climate Change

Executive Summary

- Introduction
- Radiative Forcing and Climate Response
- Seasonal-to-Interannual Predictions of Climate Change and their Reliability
- Understanding Pre-Industrial Climate Change
- Understanding Climate Change During the Instrumental Era

Appendix: Methods used to assess predictability

Appendix: Methods used to detect externally forced signals (detection/attribution)

Appendix: Methods used to assess uncertainty

10. Global Climate Projections

Executive Summary

- Introduction
- Projected Radiative Forcing
- Timescales of Response
- Climate Change to 2100 and Beyond
- Sea Level Projections
- Scenarios and Simple Models
- Uncertainties in Global Model Projections

11. Regional Climate Projections

Executive Summary

- Introduction
- Evaluation of Regionalization Methods
- Alternative Simple Methods
- Projections of Regional Climate Changes
- Small Islands
- Uncertainties in Regional Projections

List of Authors and Reviewers

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OUTLINE FOR THE IPCC WORKING GROUP II CONTRIBUTION TO THE 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

A. 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

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

2. New Assessment Methodologies and the Characterisation of Future Conditions

- New developments in methods
 - 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 B:

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
3. Assumptions about future trends: climate, development, technology, etc.
4. Key future impacts and vulnerabilities
5. Costs and other socio-economic aspects
6. Adaptation: practices, options and constraints
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 (including aquifers)
- Agriculture, forestry and fisheries (including 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

C. ASSESSMENT OF FUTURE IMPACTS AND ADAPTATION: REGIONS

Content guide for chapters in section C:

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: practices, options and constraints and their spatial variation
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

D. ASSESSMENT OF RESPONSES TO IMPACTS

17. Assessment of Adaptation Practices, Options, Constraints and Capacity

- 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 and constraints: criteria for decision making; effectiveness; benefits and costs; limitations/barriers; role of technology; links to development; equity issues
- 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, unknowns, priorities for research

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; 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

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

CLIMATE CHANGE 2007: MITIGATION OF CLIMATE CHANGE

Summary for Policy Makers

Technical Summary

A. INTRODUCTION AND FRAMING ISSUES

1. Introduction

- Article 2 of the Convention and mitigation
- Past, present, future, including previous IPCC reports
- Time scales
- Structure of the report, the rationale behind it, the role of Cross Cutting Themes and framing issues

2. Framing issues

- The scope of the global climate change problem
- Climate change mitigation and sustainable development
- Mitigation, vulnerability and adaptation relationships
- Regional dimensions
- Technology research, development, deployment, diffusion and transfer
- Risk and uncertainty
- Distributional and equity aspects
- Cost and benefits concepts
- Decision making and implementation

Regional differentiation will be emphasized in all chapters in parts A, B, C and D as far as literature is available. However, this regional disaggregation may differ by sector and could be along different characteristics, such as level of development, national circumstances or geographical location.

B. ISSUES RELATED TO MITIGATION IN THE LONG-TERM CONTEXT

3. Issues related to mitigation in the long-term context

Executive summary

- Emission scenarios: assessment of new literature since SRES
- Mitigation and stabilization scenarios and strategies, and costs and socio-economic implications (with appropriate uncertainties) including multiple gases
- Development pathways, trends and goals
- Role of technologies in long-term mitigation and stabilization: research, development, deployment, diffusion and transfer
- Interaction of mitigation and adaptation, in the light of climate change impacts and decision making under long-term uncertainties
- Linkages between short and medium term mitigation and long-term stabilization, including the implications of inertia, risk and uncertainty for decision making

C. SPECIFIC MITIGATION OPTIONS IN THE SHORT AND MEDIUM TERM

Chapters 4-10 will follow the following template. Template issues will only be incorporated when relevant and when literature is available.

Executive summary

- Introduction
- Status of the sector, development trends including production and consumption, and implications
- Emission trends (global and regional)
- Description and assessment of mitigation technologies and practices, options and potentials (technical, economic, market and social), costs and sustainability
- Interactions of mitigation options with vulnerability and adaptation
- Effectiveness of and experience with climate policies, potentials, barriers and opportunities / implementation issues
- Integrated and non-climate policies affecting emissions of greenhouse gases
- Co-benefits of greenhouse gas mitigation policies
- Technology research, development, deployment, diffusion and transfer
- Long-term outlook / systems transitions, decision making; inertia and its relation with long-term/short-term choices, decision tools

4. Energy supply

5. Transport and its infrastructure (road, rail, aviation, shipping, including transport fuels)

6. Residential/commercial (including services)

7. Industry

8. Agriculture (including land use and biological carbon sequestration)

9. Forestry (including land use and biological carbon sequestration)

10. Waste management¹

D. CROSS SECTORAL, NATIONAL AND INTERNATIONAL DIMENSIONS

11. Mitigation from a cross-sectoral perspective

Executive summary

- Introduction, including system perspective, relationship with chapter 3, key issues across sectors and use of models/analysis
- Cross-sectoral mitigation options: description, characterization and costs
- Technology research, development, deployment, diffusion and transfer
- Synergies and trade-offs with other policies
- Overall mitigation potential and costs, including portfolio analysis and cross-sectoral modeling
- Macroeconomic effects
- Spill-over effects
- Assessment of bottom-up and top-down analysis
- Mitigation and adaptation - synergies and trade-offs

¹ Recycling of industrial waste would be covered in chapter 7 as was done in TAR.

12. Sustainable development and mitigation

Executive summary

- Introduction
- Impact of mitigation policies on sustainable development goals
- Impact of sustainable development policies on climate change mitigation
- Determinants of mitigative capacity (link to adaptive capacity in Working Group II)
- Sustainable development and climate change mitigation - issues and opportunities

13. Policies, instruments and co-operative arrangements

Executive summary

- Economic and other generic policy instruments (including taxes, emissions trading)
- Implementation of and interaction between policies
- Climate change agreements and other arrangements (including international co-operation and insights from and interactions with other inter-governmental arrangements)
- Insights from and interactions with private, local and non-governmental initiatives

List of authors and reviewers

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