

## Table of Contents

List of Acronyms .....	11
Executive Summary .....	13
<b>Chapter 1. Introduction</b> .....	19
Introduction .....	20
What do we mean by “costs of inaction”? .....	21
Criteria for selecting the issues examined in this report .....	27
Summary .....	30
Notes .....	30
References .....	31
<b>Chapter 2. Costs of Inaction with Respect to Air and Water Pollution</b> ...	33
Introduction .....	34
Water pollution and health .....	38
Air pollution and health .....	41
Aggregate health effects from air and water pollution .....	45
Valuation of the health costs of policy inaction with respect to air and water pollution .....	49
Macroeconomic, labour productivity, and public finance implications of health impacts .....	60
Non-health costs of air and water pollution .....	62
Summary .....	64
Notes .....	65
References .....	66
<b>Chapter 3. Costs of Inaction with Respect to Climate Change</b> .....	73
Introduction .....	74
Aggregate estimates of costs of inaction .....	76
Sectoral and Regional Estimates .....	79
Reasons for Variation .....	89
Summary .....	101
Notes .....	102
References .....	103
<b>Chapter 4. Costs of Inaction with Respect to Environment-related     Industrial Accidents and Natural Disasters</b> .....	107
Introduction .....	108

Environment-related industrial accidents and hazards .....	111
Environment-related natural disasters .....	129
Summary .....	143
Notes .....	144
References .....	146
<b>Chapter 5. Costs of Inaction with Respect to Natural Resource</b>	
<b>Management</b> .....	151
Introduction .....	152
Marine capture fisheries .....	152
Groundwater Management .....	176
Summary .....	190
Notes .....	191
References .....	192
<b>Chapter 6. Summary and Conclusions</b> .....	199
General conclusions .....	200
Key methodological issues .....	202
Different types of “cost” arising out of inaction .....	207
Incidence .....	209
Notes .....	211
References .....	211
<b>List of tables</b>	
2.1. Selected Types of Costs Related to Air and Water Pollution .....	36
2.2. Types and Incidence of Health Costs from Air and Water Pollution .....	37
2.3. The Relative Importance of Health Costs in Total Social Costs of Policy Inaction .....	38
2.4. Health Effects Associated With Selected Water Pollutants .....	41
2.5. Health Effects Associated With Selected Air Pollutants” .....	42
2.6. Air Pollution Concentrations in PM10, SO2 and NO2, for 2002 .....	44
2.7. Global Burden of Disease from Selected Environmental Risk Factors .....	46
2.8. Valuation of Health Benefits of Selected Policies Related to Water Pollution .....	50
2.9. Benefit-Cost Ratios for Selected Water-related Studies .....	50
2.10. CBA of Improving Water Supply and Sanitation at the Global Level per Year .....	53
2.11. Value of a Statistical Life (VSL) Estimates, Using the Same Contingent Valuation Survey Instrument in Many Countries .....	54
2.12. Estimated Costs and Benefits of Policies Aiming at Improving Air Quality .....	56
2.13. Costs of Illness for Patient and Others (Acute Respiratory Problem from Air Pollution) .....	58
2.14. % of Total Health Costs Related to Pain and Suffering .....	59

2.15. Examples of the Impact of the Discount Rate on the Costs of Inaction with Respect to PM2.5 .....	60
2.16. Effect of Pollution in Terms of Sick Leave and Restricted Activity Days .....	62
3.1. Estimates of Marginal Cost of Carbon Dioxide Emissions (USD/tC) ..	77
3.2. Estimates of Aggregate Damages and SCC Under Different Policy Scenario Using DICE .....	78
3.3. Estimates of Burden of Disease in 2000 Attributable to Climate Change .....	80
3.4. Percentage Increase in Health Risks in 2030 Due to Climate Change	81
3.5. IPCC 4th Assessment Estimates of Contributions to SLR .....	82
3.6. Developing Country Winners and Losers from Climate Change Impacts on Agriculture .....	85
3.7. Estimates of Differences in Crop Yields due to Climate Change under Different Scenarios .....	86
3.8. Regional Climate Impacts in 2100 (Billion USD/year) – Cross-Sectional Estimates .....	86
3.9. Increase in People (Millions) at Risk of Hunger, Relative to Reference Case (No Climate Change) .....	87
3.10. Estimate Costs of Ecosystem Damages .....	89
3.11. Estimates of Present Value of Environmental Damages .....	90
3.12. Estimated Costs of Inaction, Assuming Different Damage Functions .....	92
3.13. Estimated Impact of Adaptation on Crop Yields .....	95
3.14. Effect of the Discount Rate on Estimated Costs of Inaction .....	96
3.15. Effect of Elasticity of Marginal Utility of Income of Costs of Inaction .....	98
3.16. The Effect of the Pure Rate of Time Preference on the Estimated SCC ..	98
3.17. An Example of the Effects of Equity Weighting on the Costs of Inaction .....	100
3.18. SCC “With” and “Without” Equity Weighting .....	101
4.1. Technological Disasters with at Least 100 Reported Deaths .....	112
4.2. Major oil Spills Since 1967 .....	115
4.3. Costs of Exxon Valdez Oil Spill to Exxon .....	118
4.4. Social Costs of the Amoco Cadiz Oil Spill .....	119
4.5. Social Costs of Erika Oil Spill .....	120
4.6. Social Costs of the Prestige Oil Spill for All Affected Areas .....	121
4.7. Social Costs of the Prestige Oil Spill for the Galicia Region (Spain) ..	121
4.8. Cleaning and Restoration Costs in Selected Oil Spills .....	122
4.9. The Twenty Most Costly Insured Events World-wide, 1970-2005 Insurance Losses .....	131
4.10. Hurricane Katrina Insured Losses (Estimates in Billions USD) .....	132
4.11. The Twenty Worst Catastrophes in Terms of Victims (1970-2005) ..	133
4.12. Average Number of Tropical Cyclones which Reached “Storm”, “Hurricane”, and “Major Hurricane” Status .....	134

4.13. The Thirty Costliest Mainland US Tropical Cyclones, 1900-2006 Property Damages .....	136
4.14. Benefits and Costs of Mitigation by Hazard .....	138
4.15. Heat-associated Excess Mortality in Summer 2003 in Selected Countries (Number of Excess Deaths) .....	140
4.16. Financial Impact of the Summer 2003 Drought and Fires on the Agricultural and Forest Sectors .....	142
4.17. Damages Due to Natural Disasters as % of Country's Annual GDP, 1990-2000 .....	143
4.18. Comparing the Human Impact of Natural Disasters Between the 10 Richest and the 10 Poorest Countries .....	143
5.1. Global List of Fish Stocks Ranked as "Depleted" .....	155
5.2. Assessment of Fisheries in the North Sea Eco-region .....	159
5.3. Assistance Programmes for the Atlantic Fishery with a License Retirement Component (1992-2001) (CAD million) .....	170
5.4. Selected Income Support and Special Adjustment Programmes Aimed at Atlantic Fisheries in Canada .....	170
5.5. Recreational Fishing Valuation Studies for Marine and Anadromous Species (USA and Canada) .....	174
5.6. Value of Goods and Services Provided by Marine Biodiversity in the UK .....	176
5.7. Percentage of Drinking Water Supply Obtained From Groundwater .....	178
5.8. Some Large Aquifers of the World .....	179
5.9. Groundwater Exploitation in Mexico, 2004 (Number of Aquifers) ..	180
5.10. The Most Unsustainably Exploited Aquifers in Mexico, 2004 .....	180
5.11. Groundwater Abstraction in Selected European Countries (% of Available Resource*) .....	181
5.12. Average Value of Irrigation Water as a Percentage of Total Irrigated Farmland Price (%) .....	186
5.13. Groundwater Dependence of Selected Cities in Latin America ....	187
5.14. Valuation of Groundwater Protection for Drinking Water Supplies ..	188

**List of figures**

1.1. Unbundling the Costs of Inaction .....	25
1.2. Marginal and Total Costs of Inaction .....	26
2.1. Costs of Inaction with Respect to Air and Water Pollution .....	36
2.2. Potential Exposure of Urban Population to Ozone Concentrations of More than 35 Parts per Billion .....	45
2.3. Deaths and Years of Life Lost Associated with PM10 Pollution in Selected OECD Countries in 2002 .....	47
2.4. Premature Death per Million Inhabitants in Urban Agglomerations Attributable to Urban Outdoor Exposure to PM10 (Deaths per Million) .....	47

2.5. % of Total Mortality and Burden of Disease Due to Unsafe Water, Sanitation and Hygiene – 2002 .....	48
2.6. Decomposition of Costs of Not Meeting the MDGs for WSS (USD million) .....	52
2.7. Gross and Net Costs of Not Introducing Policies More Stringent Than CAFÉ (EUR Billion) .....	58
2.8. Public and Private Health Expenditures in the OECD (2004) .....	61
2.9. Costs of Reduced Agriculture Yields due to Ozone .....	63
3.1. Estimated Emissions of Carbon Dioxide and Other GHGs .....	75
3.2. Global Mean Temperature Change, Relative to Pre-industrial Temperature .....	76
3.3. Types of Costs Associated with Climate Change .....	76
3.4. Pathways from Climate Change to Health .....	80
3.5. Projected Sea Level Rise Under Alternative IPCC Scenarios .....	82
3.6. Number of People Affected by Coastal Surges in 2080s Under Different Policy Scenarios .....	83
3.7. Regional Impacts of 1 Metre SLR .....	84
3.8. Temperature Increases and Likely Impacts of Marine and Terrestrial Ecosystems .....	88
3.9. Market Impacts as % of GDP in 2100 .....	100
4.1. Flood Disasters in Europe (1973 – 2002) .....	110
4.2. Distribution of Environmentally-relevant Incidents in the EU (2005) .....	113
4.3. Social Costs of Inaction with Respect to Oil Spills .....	114
4.4. Number of Oil Spills Over 7 Tonnes, 1970-2005, World-wide .....	116
4.5. Volume of Oil Spills, US .....	119
4.6. Social Costs of Inaction With Respect to Contaminated Land .....	124
4.7. Total Annual Remediation Expenditures for Contaminated Sites (2005) in Europe as a % of GDP .....	128
4.8. % of Total Annual Remediation Expenditures for Contaminated Sites (2005) in Europe by Public and Private Sectors .....	129
4.9. Social Costs of Inaction with Respect to Natural Disasters .....	130
4.10. Death Toll and Economic Damages Caused by Flooding in Europe, 1973-2002 (Billions of 2002 EUR) .....	137
4.11. Damages by Storms and Floods in Japan, 1993-2002 .....	139
5.1. Status of World Fish Stocks (2005) .....	153
5.2. Costs of Inaction with Respect to Fisheries Management .....	154
5.3. Reported World Catch of Orange Roughy (1970-2005) .....	156
5.4. World Capture and Aquaculture Production from Marine Fisheries (1950-2005) .....	158
5.5. World Capture and Aquaculture Production from Inland Fisheries (1950-2005) .....	158
5.6. Capture Fisheries Production in World Oceans .....	160
5.7. Example of a Biomass Growth Function .....	161

## TABLE OF CONTENTS

---

5.8. Advice, Allowable Catch, and Actual Landings:	
Cod in the North Sea .....	163
5.9. Cod in Skagerrak .....	163
5.10. Cod in the Kattegat .....	164
5.11. Allowable Catch and Actual Landings: Norway Pout	
in the North Sea .....	165
5.12. Advice, Allowable Catch, and Actual Catch: Herring	
in the North Sea and Eastern Channel .....	166
5.13. Potential for Welfare Improvements .....	167
5.14. World Fisheries and Aquaculture Production (Million Tonnes) ....	172
5.15. Marginal Willingness-to-pay, Based on a Meta-analysis	
of Recreational Fishery Valuation Studies .....	175
5.16. Endowment of Freshwater Resources in OECD Countries	
by Source, 2007 .....	177
5.17. Percentage of irrigation water obtained from groundwater .....	178
5.18. Social Costs of Inaction with Respect to Groundwater	
Management .....	182