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Abstract

The book consists of 8 chapters. In the Introduction the basic concepts of quantitative analysis are presented: mass and energy balances, solutions, pollutant degradation kinetics, exchange at the air-water interface and adsorption at the sediment-water interface. Chapter 1 discusses the evolution of environmental concepts and institutions: from Adam Smith to the Club of Rome, and the road to Kyoto. Some important international conferences on the protection of the planet are also discussed. Chapter 2 focuses on some serious international environmental problems, such as acid rain, ozone layer depletion, global warming, loss of biodiversity, desertification and deforestation and, finally, the problem of waste management in the nuclear industry. Chapter 3 develops the economics of the environment: balance of costs and environmental impacts, quality indicators, pollution limits, and ecosystem carrying capacity. It explains why, from a purely economic point of view, the complete elimination of externalities is neither practical nor desirable. Chapter 4 is devoted to the financial viability of installations, cost-benefit analyses, government interventions and subsidies. Methods of assessing environmental costs, pollution prevention, and pollution permit schemes are discussed. Finally, a simple comparative theory favouring the conservation of wonders of nature is given. Chapter 5, with examples of reforestation and nuclear waste storage projects, points out the unfair treatment to future generations by standard discounting because it almost annihilates time-distant costs, and introduces modified discounting that favours projects with long-term benefits. Chapter 6 describes the evolution of the legal framework for environmental protection in Greece. It presents the corresponding legislation of the European Union and the evolution of the practice of Environmental Impact Assessments. Problems in the implementation of the bill are commented on. Chapter 7 develops four applications of environmental management using mathematical models: management of fishing zones, management of fossil fuel reserves, management of lakes, and management of combined sewer overflows.

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