Spatial Ecological–Economic Analysis for Wetland Management

Modelling and Scenario Evaluation of Land Use

Wetlands are very sensitive and valuable ecosystems that are subject to much stress from human activities. The study presented here develops an innovative triple-layer framework for analysis of wetland management. This approach provides support for spatial matching of physical planning, hydrological and ecological processes, and economic activities. The authors describe how integrated modelling at the regional scale can be achieved in practice. Following an introduction to wetlands, theoretical aspects of the contributing disciplines are discussed, as well as various aspects of integrated and spatial modelling. An applied, integrated assessment of spatial wetland management in the Netherlands, namely for the Vecht area between the cities of Amsterdam and Utrecht, is then presented. This assessment has resulted in a set of linked hydrological, ecological and economic models, formulated at the level of grids and polders, and various types of evaluation and rankings of scenarios. The results indicate the value of maintaining spatial detail for as long as possible.

Written to encompass aspects of both the natural and the social sciences pertinent to environment management, the book will satisfy readers from both areas seeking sustainable solutions at a regional scale.

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Preface

In all parts of the world, wetlands are endangered by human activities and development. Areas with wetlands often provide locations for housing and recreation. Consequently, threats to wetlands rapidly lead to the loss of the valuable services they provide to humans. Wetlands have been studied in many disciplines, both in the natural and the social sciences. Integration between disciplines has been tried, though often without much success. This study approaches the analysis of wetlands' development and policy by using integrated ecosystem modelling that builds upon a combination of insights from hydrology, ecology and economics. It devotes particular attention to the spatial dimension, the development of a set of complementary indicators and the aggregation and evaluation of information.

The first part of the book provides a short introduction to the relevant building blocks of the approach, which include discussions of wetlands, the natural sciences, economics, integrated modelling and evaluation. The second part of the book presents a case study in which the integrated modelling approach is applied to a wetlands area in the centre of the Netherlands: the Vecht area.

The case study was part of an EU project entitled *Ecological–Economic Analysis of Wetlands: Functions, Values and Dynamics*, sponsored by the EU's Environment and Climate R&D programme (ECOWET, contract no. ENV4-CT96-0273). This project ran from June 1996 to June 1999 and was coordinated by R. K. Turner (CSERGE, C. J. M. University of East Anglia in the UK) and J. C. J. M. van den Bergh. A short article summarising the case study has been published previously (van den Bergh *et al*., 2001).

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