

# Environmental and Agricultural Modelling

Floor M. Brouwer • Martin van Ittersum  
Editors

# Environmental and Agricultural Modelling

Integrated Approaches for Policy  
Impact Assessment

 Springer

*Editors*

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ISBN 978-90-481-3618-6 e-ISBN 978-90-481-3619-3  
DOI 10.1007/978-90-481-3619-3  
Springer Dordrecht Heidelberg London New York

Library of Congress Control Number: 2009943042

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Printed on acid-free paper

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# Preface

Agriculture faces increasingly the challenge of balancing its multiple functions in a sustainable way. Integrated assessment and modelling (IAM) can provide insight into the potential impacts of policy changes. However, concepts to address the wide range of issues and functions typical for agriculture are still scarce. The volume reviews and presents our current understanding of integrated and working tools to assess and compute, ex-ante, alternative agricultural and environmental policy options, allowing:

1. Analysis at the full range of scales (farm to European Union and global), whilst focusing on the most important issues emerging at each scale
2. Analysis of the environmental, economic and social contributions of agricultural systems towards sustainable rural development and rural viability
3. Analysis of a broad range of issues, such as climate change, environmental policies, rural development options, effects of an enlarging EU, international competition and effects on developing countries

This volume has a strong ‘lessons to be learnt’ emphasis, to facilitate and promote the use and further development of integrated assessment tools to support policies promoting agricultural development in support of sustainable development.

The book is an effort from many contributors whose input is much appreciated. The work presented in this volume has been (co-)funded by the SEAMLESS integrated project (January 2005–March 2009), EU 6th Framework Programme for Research Technological Development and Demonstration, Priority 1.1.6.3 Global Change and Ecosystems (European Commission, DG RTD, contract no. 010036-2); we gratefully acknowledge this support. We also appreciate the assistance provided by Mrs. Eline Bazen (LEI Wageningen UR) who took responsibility for guiding the publication process and preparing the chapters of the book.

July 2009

Floor Brouwer  
Martin van Ittersum

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# Acronyms and Abbreviations

AAAT	Average Annual Accumulated Temperature
ACG	AgroManagement Configuration Generator
ACP countries	African, Caribbean and Pacific countries
AEnZ	Agri-Environmental Zonation
AMF	Action Message Format
APES	Agricultural Production and Externalities Simulator
API	Application Programming Interface
ATS	Austrian Shilling
BRME	Biogeographical Regions Map of Europe
C	Carbon
CA	Current activity
CAP	Common Agricultural Policy
CAPRI model	Common Agricultural Policy Regional Impact model
CBA	Cost-Benefit Analysis
CEH	Centre for Ecology and Hydrology
CGE model	Computable General Equilibrium model
CIA	Crucial institutional aspect
CLC	Corine Land Cover
CM	Choice modelling
CMO	Common Market Organization
COPI	Cost of Policy Inaction
CropMP	Crop Model Library
CRUD	Create, retrieve, update, delete
CVM	Contingent valuation method
DBC	Design-by-Contract
DBMS	DataBase Management System
DEM	Digital elevation model
DG	Directorate-General
DNDC model	DeNitrification-DeComposition model
DOT.force	Data and Ontology Task force
DSM	Digital surface model
DSS	Decision Support System
DTM	Digital terrain model

DTO	Data Transfer Object
EAA	Economic Accounts for Agriculture
EC	European Commission
ECU	European Currency Unit
EDIM	European Dairy Industry Model
EEA	European Environment Agency
E-FAST	Extended FAST
EFORWOOD	Sustainability Impact Assessment of the Forestry-Wood Chain
ELPEN	European Livestock Policy Evaluation Network
EnS	Environmental Stratification
EnZ	Environmental Zone
ESA	Environmentally Sensitive Area
ESB	European Soil Bureau
ESDB	European Soil Database
ESU	European Size Unit
EU	European Union
FADN	Farm Accountancy Data Network
FAO	Food and Agriculture Organization of the United Nations
FAST	Fourier Amplitude Sensitivity Test
FSS	Farm Structure Survey
FSSIM	Farm System Simulator
FSSIM-AM	Agricultural management part of FSSIM
FSSIM-MP	Mathematical programming part of FSSIM
GAEZ	Global Agro-Ecological Zonation
GAMS	General Algebraic Modeling System
GAP	Good Agricultural Practice
GDD	Graphic Data Display
GDP	Gross domestic product
GFP	Good Farming Practice
GHCN	Global Historical Climatology Network
GIS	Geographic information system
GUI	Graphical User Interface
GVA	Gross value added
HPM	Hedonic pricing method
IA	Integrated Assessment
IAM	Integrated Assessment and Modelling
IIASA	International Institute for Applied Systems Analysis
IM GUI	Integrative modeller GUI
IO analysis	Input-Output analysis
IPCC	Intergovernmental Panel on Climate Change
ITE	Institute of Terrestrial Ecology
JRC	Joint Research Centre
LFA	Less Favoured Area
LHS	Latin Hypercube Sampling
LP	Linear programming

MARS	Monitoring of Agriculture with Remote Sensing
MCE	Model Component Explorer
MFA	Multifunctional agriculture
MPE	Model Parameter Editor
MUSLE	Modified Universal Soil Loss Equation
N	Nitrogen
NLP model	Non-linear programming model
NOAA	National Oceanic and Atmospheric Administration
NUTS	Nomenclature des Unités Territoriales Statistiques
OCTOP	Organic carbon topsoil
OECD	Organisation for Economic Co-operation and Development
OOP	Object Oriented Programming
OPEN MI	Open Modelling Interface
ORM	Object Relational Mapping
PAD	Percent Absolute Deviation
PAR	Photosynthetic Active Radiation
PCA	Principal Component Analysis
PE	Parameter Estimator
PE GUI	Policy expert GUI
PEG	Production Enterprise Generator
PICA	Procedure for Institutional Compatibility Assessment
PLA	Protected Landscape Area
PMP	Positive Mathematical Programming
PTF	PedoTransfer Function
PTG	Production Technique Generator
PTRDB	Pedo Transfer Rules Database
QGIS	Quantum GIS
RDF	Resource Description Framework
REST	Representational State Transfer
RIA	Rich Internet Application
RUE	Radiation Use Efficiency
RUSLE	Revised Universal Soil Loss Equation
SA	Sensitivity Analysis
SEAMCAP	SEAMLESS version of CAPRI
SEAMLESS	System for Environmental and Agricultural Modelling; Linking European Science and Society
SEAMLESS-IF	SEAMLESS-Integrated Framework
SENSOR	Sustainability Impact Assessment Tools for Environmental, Social and Economic Effects of Multifunctional Land Use in Europe
SGDBE	Soil Geographical Database of Eurasia
SINFO	Soil Information
SLE	SEAMLESS Landscape Explorer
SOE	Simulation Output Evaluator
SOM	Soil Organic Matter
SRTM	Shuttle Radar Topographic Mission

STU	Soil Typological Unit
TCG	Technical Coefficient Generator
TCM	Travel Cost Method
TRIS	Temperature in paddy-Rice Simulation
UCD	User Centred Design
UF	User Forum
UNCSD	Commission on Sustainable Development of the United Nations
USGS	United States Geological Survey
WEPP	Water Erosion Prediction Project
WTO	World Trade Organisation
WTP	Willingness to pay