

AGENT-BASED MODELLING IN AGRICULTURAL AND RESOURCE ECONOMICS

Instructors

Prof. Dr. Alfons Balmann, Department for Structural Development of Farms and Rural Areas, Institute of Agricultural Development in Central and Eastern Europe (IAMO)
Theodor-Lieser-Str.2, D-06120 Halle (Saale),
Tel.: +49 345 2928 300; Fax: +49 345 2928 399;
Email: balmann@iamo.de

Kathrin Happe, Department for Structural Development of Farms and Rural Areas, Institute of Agricultural Development in Central and Eastern Europe (IAMO)
Theodor-Lieser-Str.2, D-06120 Halle (Saale),
Tel.: +49 345 2928 322; Fax: +49 345 2928 399;
Email: happe@iamo.de

Course Description

The learning objectives address conceptual, methodological, and practical issues of agent-based modeling in the field of agricultural and resource economics. To accomplish this objective, theoretical and methodological sessions will be followed by examples of practical and theoretically oriented applications as well as with practical exercises. The course consists of two five-day learning workshops. Upon completion of this course, students will understand the underlying concept and are familiar with the use of agent-based models for own research purposes.

Course Outline - Topics

I. Introduction to Agent-based Modeling

- Motivation
- Definitions
- Examples

II. Introduction to Complex Systems

- Systems, Models, and Simulation
- System Dynamics
- Emergent Structures

III. Applications of Agent-based Modeling in Social and Environmental Sciences

- Modeling Platforms (SugarScape, Netlogo, AScape,...)
- Object-Oriented Programming
- Simple Applications (with Exercises)

III. The Modeling of Agents

- Agent Characteristics
- Perception of the Environment
- Behavioral Foundation
(rule-based behavior, BDI, optimizing behavior, computational intelligence)
- Excursus: Distributed Intelligence

IV. Modeling the Interactions of Agents

- Forms of Interactions (direct, indirect)
- Auctions
- Communication

V. Modeling Techniques

- Data Input and Calibration
- Analysis of Outputs
- Validation Techniques

VI. The Use of Agent-based Models in Agricultural and Resource Economics

- Theoretical Applications
- Applied Examples
- Scientific Relevance
- Research Perspectives

Teaching methods

Lectures (23 %), practical exercises (12 %), seminar (15 %), home work (50 %)

Grading

Participants will write a paper on developing or using a simple agent-based model. Details of the composition of the paper will be given to participants on the last day of the course. The paper will be due two months after the course ends and will be sent via e-mail to the instructors and later on presented in a one-day seminar.

Credit points

6

Requirements

Microeconomic and game theory at the graduate level. Working Knowledge in MS-Excel.

Necessary course materials

to be completed...

Software

MS-Excel, SugarScape, Ascape, CORMAS

Organisation and time

The course is organised as two one-week (5 full days) block modules and a one-day seminar. It will be held preferably in April or May at the Institute of Agricultural Development in Central and Eastern Europe (IAMO) starting in 2005.

Language

English or German.