



Advanced Bio-Economic Modelling

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Agricultural Economics Research Institute (LEI)

November 23-27, 2009

Wageningen University and Research

Organised by:

- **Mansholt Graduate School of Social Sciences (MG3S)**
- **LEI-Wageningen UR**

Introduction

There is a growing need for training at graduate level in bio-economic modelling in order to adequately combine quantitative economic and bio-physical methodologies. The interest follows work related to sustainable land management, especially related to work of the lecturer in Mali, Ethiopia, Costa Rica, China, and Kenya in the late 1990s and first years of the 21st century.

Bio-economic household modeling is also of relevance for rural development in industrialized countries, especially where positive and negative environmental externalities play a role, such as in the switch from regular to biological production technologies. In recent years developments in modeling non-point source pollution from agriculture and its effects on the environment, in terms of for instance water and bio-diversity) have become important in the European context.

General Algebraic Modelling System (GAMS) is a programming environment for building such models. It is a script based language which allows us to incorporate quality management issues.

Objectives

The two main objective of this course courseare to give insight into bio-economic modelling and to acquaint the participants with quality oriented modelling.

The first objective is to give insight into the practice of bio-economic modeling for policy analysis. The focus is on complex models, models using lots of data and models consisting of more than one module. The second objective is to provide the participants with a basis in structured modelling to allow for transparent models , reproducible results. The course will consist partly of lectures and partly of hands-on practical exercises using bio-economic models in GAMS software.

The main emphasis of the course will be on the application of mathematical programming techniques to combine economic and biophysical information in order to assess the effects of policy change on land use decisions and its interactions with the environment.

At the end of the course, the participants should have a good understanding of the structure and functioning of bio economic models for policy analysis. They should be able to construct their own more complex bio economic models and successfully adapt and use existing bio-economic models.

Special attention will be given to the use of tools to enhance quality oriented model building such as the modelling environment GTREE, the simulation environment GSE,

The examples in the course will be directed mainly at issues related to soil degradation in developing countries. Other examples may be used as well, where relevant and useful.

Contents

The first part of the course (1.5 ECTS) covers the coursework consisting of lectures in the morning and computer assisted practicals in the afternoons. In these sessions the theoretical underpinnings and practical application of bio-economic modeling are dealt with. We start with a standard agricultural household model formulated as a mathematical programming problem. This model is then extended to include biophysical processes, making it a bio-economic model. We look at some extensions of the basic bio-economic model and discuss in some detail, how to solve this type of model. Finally the simulations results are analysed.

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The lectures in the morning consist of four subjects:

1. Modelling philosophy
2. advanced GAMS modelling
3. bio-economic modelling theory and practice
4. The use of tools

The second – facultative – part of the course (1.5 ECTS) is making and handing in an assignment for grading.

Conditions for credits will be:

- 1) Presence and active participation;
- 2) Completion of the exercises during the practical;
- 3) Passing mark for the assignment handed in.

Teaching methods

Lectures, working on modelling assignments and exercises in small groups, individual assignments.

Program

Monday November 23, 2009: Introduction.

This will include an introduction into bio-economic household modeling with special reference to developing countries. The main elements of the household model will be addressed: including utility maximisation and incomplete markets. A translation of the theoretical model is made to a practical mathematical programming model. All the issues that will arise during the course will be placed into context.

Tuesday November 24, 2009: Incorporating biophysical process models

This will include a number of different methods for incorporating biophysical process models or the information from these models in household models. Examples of incorporated biophysical models and models using output from biophysical models will be dealt with.

Wednesday November 25: dynamic modeling

This will include methods for dealing with multiple households within a defined setting, and methods for taking into account the time dimension. We will look at the use of continuous and discrete time.

Thursday November 26: Dealing with non-linearities and nested modeling

A major concern in modeling is the occurrence of non-linearities in the results. In this session we will look at ways to check the model for consistency and touch upon methods for solving non-linear models. The second topic is nested modeling to capture interactions between optimizing agents. We will also look at meta-modeling

Friday November 27: Result analysis, calibration, verification, validation

Lecturer: Gideon Kruseman, PhD
Wietse Dol, PhD

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Location

Wageningen University, Building “De Leeuwenborch”, Hollandseweg 1, Wageningen.
Exact venues will be announced later.

Participants

The target group is Mansholt PhD candidates, but also other PhD students and interested third parties who have at least an MSc degree.

Prerequisites

The participants are assumed to have MSc level knowledge of micro-economics with adequate knowledge of quantitative economic methods. Basic knowledge of mathematical programming is absolutely necessary. Basic to intermediate-level knowledge of GAMS is also necessary. If you are unsure about your level please consult the self study course provided by Environmental Economics:

http://www.sls.wageningen-ur.nl/enr/education/scenariostudies_and_the_environment/gams/default.htm

For participants who lack some of the modelling skills, or who have programming skills but not in GAMS, we can suggest the introductory course.

Additional information is available with Gideon Kruseman (Gideon.Kruseman@wur.nl) and Wietse Dol (Wietse.Dol@wur.nl).

Course fees:

For PhD-students of Mansholt Graduate School with an approved training and supervision plan there is a fee of 300; for other participants and staff members, there is a fee of 600 for the whole course (including drinks, lunches, course material and a course dinner).

Cancellations may be made free of charge until 1 month before the start of the course. After this date the charge will be 50% of the fee paid or due.



Registration

Registration is possible electronically via the Mansholt Graduate School courses page:

http://www.mansholt.wur.nl/UK/education/courses/upcoming_ongoing/

The maximum number of participants is set at 20, the minimum at 10. PhD candidates of Mansholt Graduate School have preference if they register before 14th September 2009.

Please make sure that you provide the most recent contact details so that in case of any changes you will be notified promptly. After your internet registration you will receive a short notification that your name has been registered. At least two weeks before the course you will receive a confirmation about the location and the schedule. MG3S will also send an invoice to the address indicated in the registration form.

Please e-mail to Marcella.Haan@wur.nl in case you have not received the second confirmation two weeks before the course.

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Cancellations

Cancellations may be made free of charge until 1 month before the start of the course. Cancellation fee of 100 % applies if participants cancel the course less than 1 month prior to the course.

The organisers have a right to cancel the course not later than 1 month before the course starts.

The participants will be notified of any changes at their e-mail addresses.

Further information on

On course content: Gideon.Kruseman@wur.nl or Wietse.Dol@wur.nl.

On MG3S: [www. Mansholt.wur.nl](http://www.Mansholt.wur.nl)

For details about the logistics, accommodation, registration, fees, study materials, etc. please contact

Marcella Haan

Tel +31 317 484126

Marcella.haan@wur.nl

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Useful information for participants from outside Wageningen

Hotels:

Wageningen International Centre (Hof van Wageningen): 75 euro for 1 persons room, 98.50 euros for 2 persons room, both prices are including breakfast. Details:

<http://www.hofvanwageningen.nl/>

Hotel de Wageningseberg: 62.50 euro 1 person room, 97.50 euro for 2 persons room, also including breakfast; www.wageningseberg.com

Hotel Nol in 't Bosch: 83,50 euro for 1 person room, 110 euro for 2 persons room, also including breakfast; <http://www.nolintbosch.nl/>

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Hotel de Nieuwe Wereld (Hotel School): 50-60 euro for a 1 person room.
<http://www.denieuwewereld.nl> (only in Dutch)

Bed&Breakfast:

B& B De Heksenspeeltuin: 25 euro for a 1 person room

Address: Einthovenstraat 15, 6706JA Wageningen

Phone: +31 317-418161

E-mail: callyd@zonnet.nl

Website: www.heksenspeeltuin.nl (only in Dutch)

Villaria Bed en Breakfast: 32-38 euro for a 1 person room

Address: Nassauweg 21, 6703CG Wageningen

Phone: +31 317-419636

Email: villaria@hari.demon.nl

Ons Bakhuus Bed & Breakfast: 25 euro for a 1 person room

Address: Dolderstraat 64, 6706 JG Wageningen

Phone.:+31 317-411994

E-mail: janny.wijbo@chello.nl

Knollywood Bed & Breakfast: 35 euro for a 1 person room

Address: L. Roggeveenstraat 39, 6708 SL Wageningen

Phone: +31 317-420970

E-mail: Knollywood@hetnet.nl

De Herbergh Bed & Breakfast: 45 euro for a 1 person room

Address: Generaal Foulkesweg 8, 6703 BR Wageningen

Phone: +31 317-410747

E-mail: glindenbergh@wanadoo.nl

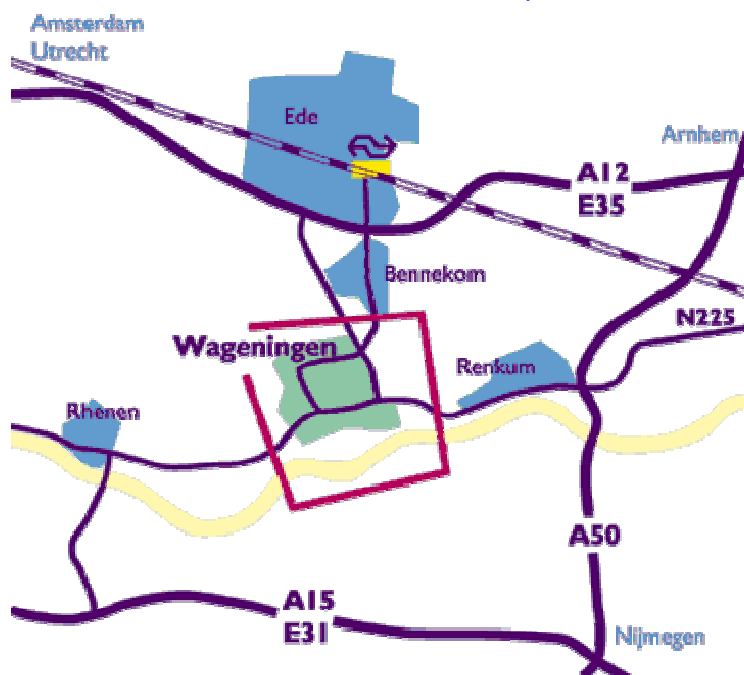
From Schiphol Airport Amsterdam to Wageningen

At the Airport you can buy a train ticket in the 'arrivals' area. You will see the sign "Train tickets" near the exit. Then follow the signs 'Nederlandse Spoorwegen' (www.ns.nl) or 'Trains and busses' to the railway station.

Purchase a one-way ticket to the Ede-Wageningen train station, this will cost € 13,40 (plus € 0,50 service charge if you buy the ticket at the ticket counter). It is also possible to buy the ticket from the ticket vending machines in the station.

There will be a train leaving every 15 minutes from Schiphol. Every there are direct connections to Ede-Wageningen, usually leaving from platform 3 (twice an hour). Also, twice an hour there is a connection via Utrecht (where you have to change trains). At Schiphol, the train usually departs from platform 1-2. At Utrecht, you have to change trains from platform 15 to 14. On the platform, you will see signs hanging from the ceiling with all names of the different stations where the train will stop. Check for the names Ede Wageningen or Utrecht and board the train. The trip from Schiphol to Ede-Wageningen takes you a bit more than one hour.

For Dutch train connections use www.ns.nl, www.thalys.com, www.db.de



Wageningen has no railway station. This lack is fully compensated by accurate means of buses and taxis, as described next.

For information about tickets to some 1400 European destinations and to order them, call Teleservice NS Internationaal: +31 (0)900 92 96 (0.35 euro per minute). You can pay by credit card (EuroCard, MasterCard, VISA or American Express), or by remittance. [On-line booking](#) for NS trains (choose station Ede-Wageningen): pre-registration with NS electronic system is required. Prices are mentioned there as well.

From railway station Ede-Wageningen you can take a taxi (approx. 15 min.) Taxis leave at the north side of the station. You can also come by bus (bus 86 (direction Arnhem) or bus 88 (Valleilijn, direction Wageningen). Bus 86 leaves at the north side of the station, bus 88 leaves at the South side of the station. You have to purchase a bus "strippenkaart" at the Kiosk (in the bus itself the "strippenkaart" is more expensive). Those coming to the Wageningen International Centre have to get off the bus at the bus stop "Busstation". The WIR hotel is situated next to the bus terminal and the WICC hotel approximately 250 meters to the west.