

## GAMS Training Course

# Agro-Economic Modelling with GAMS

20-24 June 2016, ETSIA-UPM, Madrid (Spain)

Introductory GAMS course targeted to academic researchers and policy analysts in the fields of agrifood and environmental policies (i.e. postgraduate students, researchers, consultants, government staff). Some familiarity with basic microeconomics and basic statistics is assumed. Knowledge of modelling languages is not required.

### Objective

Because of its great flexibility and its potential for solving complex problems, GAMS has become a modelling language widely used in the area of agricultural economics. This training course is designed to provide an introduction into agro-economic models designed for the analysis of agricultural, trade and environmental policies. The thematic focus will be on key policy issues, such as agricultural support schemes, agritrade policies and environmental concerns.

We propose an intensive course (previous knowledge of GAMS language is not required) where, beginning with the basic rules of model design, we gradually incorporate more advanced area-specific modelling techniques and GAMS language features. The 30 hours course will provide the participants with the basic skills needed to conduct quantitative impact analysis of agrifood and agri-environmental policies.

### Course presentation method

GAMS is a language and, like any other language, it is best learnt through practice. Hence, the course will consist on a mix of lectures and computer lab sessions. Through a combination of lectures and computer exercises, participants will learn not only the GAMS language but also the logic behind agro-economic models. The trainer will provide step-by-step guidance to develop agro-economic models and apply them to policy impact assessment.

All sessions will be held in a computer room and there will be one laptop available per participant. Participants will receive an USB-stick with all the course materials and GAMS files of the models covered during the course.

### Instructor

Maria Blanco is Associate Professor of Agricultural and Resource Economics at the Technical University of Madrid, where she coordinates the AgEcoMod group. She is largely experienced in quantitative analysis of agricultural policies, development of

agro-economic modelling tools for policy impact assessment as well as integrated assessment of environmental and agrifood policies. She contributes to the development of large agro-economic models and has extensive experience in linkage of biophysical and economic models, in particular in the fields of bioenergy, water and climate change impact assessment. She has been working with GAMS for more than 20 years. Since 1996 she regularly conducts courses on Agro-Economic Modelling using the GAMS system.

## Course outline

### Monday, June 20: Section 1 – Introduction

- 14:30 – 15:00 Quantitative economic modelling: Mathematical programming approach
- 15:00 – 15:30 Introduction to the GAMS modelling language
- 15:30 – 17:30 Hands-on session: Writing a first model in GAMS language  
Basic structure of a GAMS model: Sets, parameters, variables and equations

### Tuesday, June 21: Section 2 – Farm level modelling

- 09:00 – 11:00 Hands-on session: Modelling exercises based on the first GAMS model  
GAMS features: Interpretation of result files, display, data handling, GDX viewer
- 11:00 – 11:30 Coffee break
- 11:30 – 12:30 Farm level modelling. Building farm models with GAMS
- 12:30 – 13:15 Hands-on session: Farm level modelling (resource constraints)  
GAMS features: multi-dimensional parameters, \$include, subsets, dynamic sets, \$ operator
- 13:15 – 14:30 Lunch break
- 14:30 – 16:30 Hands-on session: Farm level modelling (production activities, institutional framework)  
GAMS features: conditional expressions, GDX utilities

### Wednesday, June 22: Section 2 – Farm level impact assessment

- 09:00 – 10:00 Calibration of farm models.
- 10:00 – 11:00 Hands-on session: Calibration of farm models  
GAMS features: non-linear models, initial values

- 11:00 – 11:30 Coffee break
- 11:30 – 13:15 Hands-on session: Calibration of farm models (PMP approaches)  
GAMS features: functions, modular structure
- 13:15 – 14:30 Lunch break
- 14:30 – 16:30 Hands-on session: Farm level policy analysis (modelling of agricultural support schemes, agri-environmental measures, etc.)  
GAMS features: LOOP statement, result parameters, conditional statements, binary variables

#### **Thursday, June 23: Section 4 – Sector level modelling**

- 09:00 – 10:00 Partial equilibrium analysis (spatial equilibrium, multi-commodity models)
- 10:00 – 11:00 Hands-on session: Spatial equilibrium models  
GAMS features: Option statement, dollar commands affecting the output
- 11:00 – 11:30 Coffee break
- 11:30 – 13:15 Hands-on session: Agricultural sector programming models  
GAMS features: Dollar control options
- 13:15 – 14:30 Lunch break
- 14:30 – 16:30 Hands-on session: Multi-market multi-region partial equilibrium models  
GAMS features: Model attributes, conditional compilation

#### **Friday, June 24: Section 5 – Scenario analysis and data handling**

- 09:00 – 10:00 Partial equilibrium models for agricultural and trade policy analysis
- 10:00 – 11:00 Hands-on session: Model building and calibration  
GAMS features: modular structure, save and restart, efficient use of memory
- 11:00 – 11:30 Coffee break
- 11:30 – 13:15 Hands-on session: Simulation of alternative policy options  
GAMS features: Conditionals, output reports
- 13:15 – 14:30 Lunch break
- 14:30 – 16:30 Hands-on session: Sensitivity analysis  
GAMS features: Grid computing, solver options

Please note the agenda may vary slightly depending on the interest of participants.

## Course venue

The course will take place at the School of Agricultural Engineering (ETSIA), Technical University of Madrid, Avda. Complutense 3 – 28040 Madrid.

See [location plan](#)

## Registration

Enrolment is limited to 12 participants to ensure one-on-one attention and interaction with the instructor. Course admission will be done in a first-paid, first-served basis.

Participants attending to all sessions will receive a Course Certificate.

The course fee is:

	Course fee*
Payment before May 15 <sup>th</sup> 2016	1000 €
Payment after May 15 <sup>th</sup> 2016	1350 €

(\*) A 20% discount is offered for group registration (two or more participants from the same institution).

The course fee covers tuition, course materials and lunches from Tuesday to Friday at the ETSIA's cafeteria. Participants will be responsible for any other drinks and meals, as well as accommodation and travel expenses.

To register, please complete the [registration form](#) and email it to Pilar Martínez ([mpilar.martinez@upm.es](mailto:mpilar.martinez@upm.es)).

## Further information

For more information about the content of the course please contact:

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For information about logistics you can contact:

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