SEAMLESS Newsletter

Content

SEAMLESS - System for Environmental and Agricultural Modelling; Linking European Science and Society

SEAMLESS is an integrated project under FP 6 Global Change and Ecosystems. It started in January 2005 and will end in December 2008.

Contract no. 010036-2

Welcome to SEAMLESS Newsletter no. 3!

The drivers that affect agricultural systems and rural areas in Europe are diverse and challenging. Many factors lead to changes in European agriculture, including enlargement of the European Union, agro-technological development, societal demands for new functions, climate change and liberalisation of global markets. Agricultural and environmental policies in the European Union must co-evolve to ensure their effective contribution to sustainability in agriculture and contributions of agriculture to sustainable development of society at large. Assessing the strengths and weaknesses of new policies and innovations prior to their introduction, i.e., 'ex-ante integrated assessment', is vital to target policy development for sustainable development.

The SEAMLESS integrated project develops a computerized and integrated framework (SEAMLESS-IF) to compare alternative agricultural and environmental policy options. The framework will enable assessment of key indicators through quantitative models, pan-European databases and qualitative procedures to simulate the impact on society of biophysical, economic and behavioural changes. The framework uses innovative software architecture that allows linkage of individual knowledge sources (models, databases, indicators) to assess indicators at the full range of scales, from global to the field scale.

SEAMLESS brings together ca. 30 partners from 13 countries, with a rich knowledge and expertise from economic, environmental, agronomic, social science and information technology disciplines.

The project aims at delivering the SEAMLESS integrated framework by the end of 2008; during the lifetime of the project it develops progressive prototypes of this framework. In July of this year we issued our Prototype 1 and this newsletter will provide the readers with its key features which will give a vision of the final product. Further, the newsletter will also provide some insight on specific topics related to the project. We hope you will enjoy our 3rd newsletter and welcome any feedback. Please assist us in disseminating the newsletter by providing us names of colleagues who might be interested.

Martin van Ittersum, project coordinator

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Prototype 1

Prototypes are key milestones in the development of the SEAMLESS integrated framework (IF). They have limited functionality but represent visions about features of the final version of the integrated framework.

Prototype 1 of SEAMLESS-IF was completed and delivered to the European Commission (EC) at the end of July this year. A video with instructions on how to use Prototype 1 and the reports on the underlying concepts and methodologies can be downloaded from the News page of the project website: http://www.seamless-ip.org/News.htm.

Next to the software, the Prototype includes additional stand-alone tools with accompanying documentation. Among the stand-alone tools the users can find the first releases of (a) Agricultural Production and Externalities Simulator (APES) with several modules for Climate, Soils, Crops and Agricultural Management to be used at field level, (b) Survey Tool application to collect data on the management of current arable crops in a given region, (c) Farm Data application that allows generating a set of alternative agricultural activities for a specific farm type to be further used as input data to farm optimization model and (d) nine databases on typologies, climate and farm characteristics.

The user interface of Prototype 1 allows the use of SEAMLESS-IF for a project following the steps of the assessment procedure: problem formulation -->scenarios definition and indicator selection --> model chain and links to the indicators -->calculation-->analysis of results.

The main role of the user interface is to visualize and communicate our present understanding of SEAMLESS-IF including its functionalities and potential role in the impact assessment process to users and partners in the project.

Prototype 1 is delivered together with sample project files that allow browsing through the results of the model chain simulations. The Policy Scenario "Trade liberalization in 2012" is a sample project which illustrates the workability of SEAMLESS-IF by addressing the policy question: "What will happen to the sustainability of agriculture and the impact of agriculture on sustainable development if there is a WTO induced trade liberalization?". The chain of models fully works with three farm types from NUTS2 region Flevoland (NL), 5 crops (sunflower, maize, soft spring wheat, potatoes, sugar beet) and is linked in the following sequence: data loader, production enterprise generator (PEG), production technique generator (PTG), biophysical field- level model (APES), technical coefficient generator (TCG), farm optimization model (FSSIM), extrapolation model from farm to region (EXPAMOD) and market equilibrium model (CAPRI).

In addition to the option of viewing results from a sample project, users can create their own projects, select indicators, compose smaller model chains by linking the model boxes, run calculations and view the results from these calculations. Configuring model chains can be done for different models by selecting types of farms, crop rotation filters, water-, nutrient- and general-management generators and crops. The CAPRI scenario editor allows modifying the values of import tariffs, export subsidies and tariff rate quotas.

Detailed indicator factsheets accompany the nine indicators selected for Prototype 1: agricultural income, budgetary expenses, energy consumption, global warming potential, nitrate leaching, money metric (consumer surplus), profits of processing industry, total welfare, tariff revenues. These indicators are derived at the farm or NUTS2 level and, as for the latter, can be visualised in maps and tables.

Prototype 1 has been evaluated and tested for its capability to be used by prime users (EU DG) to conduct policy impact assessment against the Triple I concept of SEAMLESS; Integrated framework for impact assessment, Individual components and Infrastructure software. The evaluation was performed by researchers from the project not directly involved in the Prototype development who tested the prototype from a Policy-maker perspective.

This evaluation will serve as the basis for the specifications of the next prototype, Prototype 2. The emphasis for Prototype 2 is on the group of Tool Experts, although other users will not be ignored. The Tool Expert is a group of agricultural experts from various agricultural research institutions who we think would able to use the framework with all its features, e.g. for performing detailed impact assessments.

Prototype 2 will focus on the backbone models (APES, FSSIM, EXPAMOD, CAPRI) including a calculator for simple indicators. These models will be fully integrated and functional within the framework including operational links to the database, and making full use of the knowledge base. Complete integration of other models such as GTAP, territorial, rural employment and developing countries will start after Prototype 2 has been delivered.

The conceptual testing of components will be done continuously throughout the process of component development. There will also be a final testing of Prototype 2 within the project before its delivery to the EC. Prototype 2 will become available for testing in May 2007 and finally delivered to the EC in August 2007.

Irina Bezlepkina and Frank Ewert

Screen-shots of Prototype 1
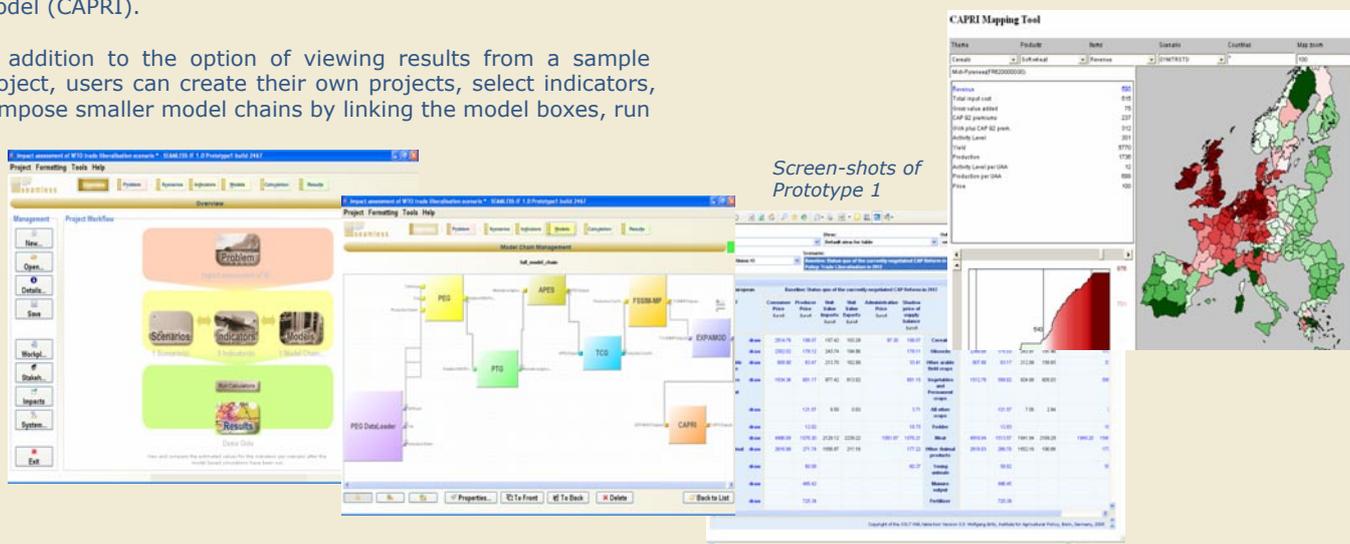
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## Assessing farm responses to policies and technical development

The variety of farming systems across the EU is impressive. A typology of farms developed within SEAMLESS discriminates farms based on their size, intensity, specialization and land use, yielding ca. 190 farm types. In SEAMLESS we try to assess the behaviour of these farm types across the EU in response to policies and technical development, using a so-called bio-economic farm model.

The farm model is named FSSIM, i.e. Farm System Simulator. Basically for each farm type the model integrates series of current agricultural activities and possible alternatives, farm resource endowment, policy and environmental constraints and the major farm objectives. The activities stand for the different ways in which farmers can grow arable crops (crop rotations), livestock systems and perennials systems (grassland, orchards, vineyards) in terms of their inputs (nutrients, labour, etc.), yields and externalities. Current activities are largely based on surveys and databases that monitor the agricultural activities of sampled farms across the EU25. Alternative activities are generated through a set of tools within SEAMLESS using agronomic knowledge and models. The model currently only considers expected income and risk as objectives; evidently there may be other objectives that drive farmer's decisions, but we assume that these two provide initial insight in the major responses of farm types.

A simulation for a specific farm type using FSSIM provides a set of indicators summarizing land use and selected production techniques, input use, yields, profit and externalities (e.g. nitrogen surplus, nitrate leaching, pesticide use, etc.) of the farm type. In the simulations prices are exogenous, i.e. they come from the market model used in SEAMLESS, i.e. CAPRI.

The set up of FSSIM is modular, with a generic structure, such that it can be easily adapted to simulate different farm types across the EU. The modules are programmed using object-oriented programming, relational databases and mathematical programming software package. Different teams involved in

1 indicates best level
0 indicates worst level

— ■ — baseline scenario
— ● — policy scenario
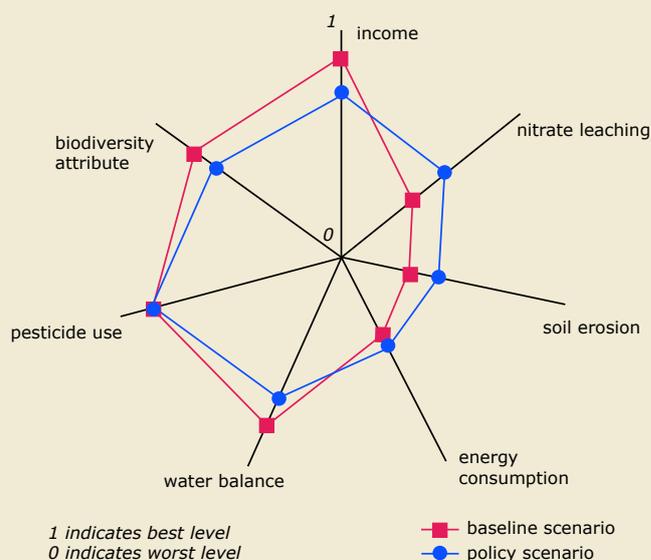
An example simulation of a specific farm type with FSSIM: baseline versus a policy scenario with new agri-environmental policies.

the development of FSSIM focus on challenging scientific and applied questions related to the evaluation of FSSIM, its modular set-up and its generic features.

Martin van Ittersum, Sander Janssen,
Guillermo Flichmann and Kamel Louhichi

Quality of Impact Assessment under scrutiny

The quality of Impact assessments performed by the Commission has been questioned by the research community. The critique is mainly targeting the lack of quantified measurements and rare use of social and sustainability variables. Nevertheless Impact Assessment is an established practice in the Commission and there is a firm belief that assessment procedures are a way forward in European policy making. The Commission is also taking steps to evaluate, control and mainstream the assessment procedures which at the moment are rather open and with great variations between DGs and the policy issues at hand. It is therefore likely that IA practices as well as quality are prone to develop.

The assessments performed so far vary considerably in comprehensiveness and stakeholder involvement from involvement of several hundred stakeholder organisations in the initial problem formulation to internet consultations at the end of the process. The former type, which typically concerns assessment of "thematic strategies" can be considered as a major political process, whereas the latter is more of a compulsory activity that has to be performed.

The responsible DG officers explain the shortcomings by the fact that it is difficult to find reliable modelling tools that are suitable for the task to estimate and quantify the outcome of anticipated changes as a result of different policy options. When proposing regulations DGs have to come across very forceful. In order to convince the European lobby the knowledge base for the policy proposed has to be known and the assessments to be transparent – concise and detailed!"

To meet the academic critique of the assessments the Commission has initiated an internal evaluation of the impact assessment work, which results are expected in February 2007.

Ann-Katrin Bäcklund

References:
Renda, A. (2006) *Impact Assessment in the EU – The state of the art and the art of the state.* CEPS.

Wilkinson, D. et. al. (2004) *Sustainable development in the European Commission's integrated impact assessment for 2003.* IEEP.

The Employment Model

SEAMLESS investigates European agriculture at many levels – from the field, to the farm, to the region, to the continent as a whole. While the focus is mainly on economic and environmental impacts of policies, the important social dimension is not left out. The employment model is one way in which SEAMLESS addresses this issue.

The employment model of SEAMLESS focuses on agricultural labour in regions across Europe. The main question that the model tries to answer is how labour inputs are allocated across the individual agricultural activities. Data on how much family and paid work is done on a farm is fairly commonplace but very little exists on how much labour is generally devoted to each production activity. We do not know very much, for example, about whether a hectare of wheat necessitates more labour in the north or south of Greece, or whether having 10 dairy cows necessitates more labour input in the east or west coast of Ireland.The employment model in SEAMLESS uses econometric techniques to try to answer questions like these.

The resulting activity specific data are called input coefficients. Input coefficients can be put to work in a number of interesting fields. Activity specific income indicators may be derived, for example, which should facilitate analyzing broader SEAMLESS results. Labour coefficients can also be used to calculate per capita income in the agricultural sector and to help forecast employment changes. Input coefficients are of most use when integrated into the body of a sectoral model, allowing to project changes in labour input depending on changes in the production structure. The version of the CAPRI model to be used in SEAMLESS will contain much of the information on input coefficients yielded by the SEAMLESS employment model.

Included also in the employment model are two useful additions. Work on gender in agriculture is underway, where the focus is to explore the gender balance in family labour, and how this differs across regions and activities. Also, a separate demographic module tracks demographic changes in farming over time at a regional level. This add-on to the employment model is useful on two fronts – for long term employment forecasting and, most especially, because it links agricultural employment to the wider economy.

Eoghan Garvey and Thomas Heckelei

	Austria	Germany	Denmark	Spain
	Family labour hours	*Family labour hours*	*Family labour hours*	*Family labour hours*
Soft Wheat	57.8	37.8	24.1	23.2
	4.0	*1.2*	*0.7*	*0.8*
Barley	69.0	44.7	28.0	24.0
	4.4	*1.2*	*0.55*	*0.46*
Durum wheat	54.7	0	0	20.4
	14	*0*	*0*	*0.89*
Rye	65.0	32.1	26.0	35.9
	8.8	*1.4*	*1.5*	*3.1*

The table shows a selection of National Family Labour Input Coefficients for Cereals. The coefficients are in hours per annum per hectare. Standard errors in italics.

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www.seamless-ip.org

Visit our website!

By visiting our website www.seamless-ip.org you can keep updated about what is going on in the project. There is information available about the background of the project, about the consortium and the work carried out in the different work-packages. You can download our repots, flyers and newsletters and read the latest news about SEAMLESS.

New users welcome!

Researchers, farmer's organizations, NGOs, or anyone else interested policy issues that concern how agriculture contributes to sustainable development, we welcome input from you!

SEAMLESS also strongly targets at the scientific community beyond the project, through development of its stand-alone knowledge sources, such as models, databases and indicators, and through the development of the software architecture (SeamFrame) that allows linkage of these individal sources. We strongly welcome feedback and interest from our colleagues.

Currently we are involved in a dialogue with the European Commission, but as our tool is developing we are interested in sharing our ideas with a broader group.

During 2007 we will organize information meetings for new groups of users. If you or anyone in your organization is interested - please contact us!

Liisa Martinson
SEAMLESS User Liaison Officer

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