



# SEAMLESS Newsletter

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



SEAMLESS is an integrated project under FP 6 Global Change and Ecosystems. The SEAMLESS project (2005-2008) develops a computerized and integrated framework (SEAMLESS-IF) to compare alternative agricultural and environmental policy options.

Contract no. 010036-2



## Welcome to the 5th SEAMLESS newsletter!

It is time for an update about the SEAMLESS project which aims at developing research tools for integrated assessment of agriculture. In September we delivered the 2nd Prototype of our tool, in October we held a project meeting in which we evaluated this prototype and set the priorities for the last phase, and in November we held our annual meeting with the Scientific Advisory Board (SAB) and a meeting with users in Brussels. This logical sequence of events helped us to think through where we are after three years and what is the feasible target for the final phase of the project.

The project uses the so-called Prototypes to develop the SEAMLESS Integrated Framework (SEAMLESS-IF). The prototypes are intermediate versions of the final version with increasing functionality but with yet restricted practical applicability. The prototypes are crucial for the integration of research components throughout the development process. Prototype 2 includes an integrated database with pan-European data for modelling agricultural systems (see the article in this newsletter). The model components which are part of Prototype 2, though not all fully integrated yet, are the agricultural production and externality simulator (APES; see the article in this newsletter), a bio-economic farm model (FSSIM), a market model (CAPRI) and a statistical extrapolation procedure to link the farm and market models (micro-macro analysis).

The meeting with the SAB was also instrumental in completing the 1st Announcement of the International Conference on Integrated Assessment of Agriculture and Sustainable Development; Setting the Agenda for Science and Society. This Conference initiated by, but not restricted to, the SEAMLESS project will be held on March 10-12, 2009 in Egmond aan Zee, close to Amsterdam. Please find the 1st announcement on page 4 and on [www.seamless-ip.org](http://www.seamless-ip.org) Finally, for your information, last month a peer reviewed overview article of the SEAMLESS approach has been published: Van Ittersum et al., 2008. *Agricultural Systems* 96, 150-165. We welcome your ideas and feedback as to this newsletter and the international conference!

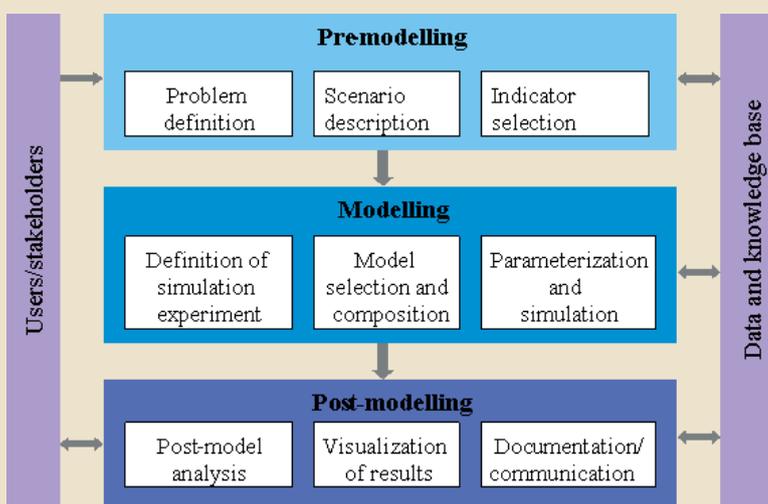
*Martin van Ittersum, project coordinator*

## Procedure for Impact assessment in SEAMLESS-IF

The SEAMLESS-IF impact assessment procedure includes three main phases: pre-modelling, modelling and post-modelling. During the pre-modelling phase the issue at stake and the associated spatial and temporal scales are defined. The future driving forces at a given time horizon are anticipated and indicators are selected. The choices and selections made during this phase will express the interests, values and motivations of the organisation that has initiated the assessment of a policy or technological changes. Different options for one policy area can steer the assessment in various directions.

During the next step the modelling phase selections are made among the tools provided by the scientists. An appropriate model chain has to be chosen – e.g. FSSIM-EXPAMOD-CAPRI (farm-market modelling chain), the relevant databases to be used identified and the preferred visualisation of the outputs. Once selected, the indicators are calculated.

During the post-modelling phase the impacts of tested policy options and technological changes are analysed and explored, including their institutional compatibility



and comparison between various policy options. Finally, the various results, newly constructed indicators and models are stored for future retrieval and reuse in a knowledge base, together with annotations, and other process related documents.

Both the pre and post-modelling phases require comprehensive interaction between the two types of actors: Policy experts and Integrative modellers. Policy experts express the problem to be assessed according to their interest and the political role of their organisation, and thus influence the assessment (definition of problem, policy options, indicators) in a way that supports their stake. Integrative modellers run the SEAMLESS framework. As providers of knowledge, data and analysis, they feed scientific knowledge into the policy process. This makes that the SEAMLESS-IF procedure can be viewed as a 'optimal' process-oriented science-policy interface.

The main reason for this stems from the fact that the SEAMLESS-IF procedure recognises interdependence between values expressed by organisations and techniques to satisfy scientific value-oriented needs. The identification of the issue at stake, the choice of relevant disciplines, methodologies, scales, variables, and boundaries, and the strategies to articulate them



are elements of the scientific process that are in no way isolated from the socio-political context. In other words, the framing of the question to be considered in the assessment involves value judgements and decisions about what will be considered and what not – from Policy experts, and about who will be involved and how – from Integrative modellers. In addition, in the SEAMLESS-IF procedure, the selection process of models and indicators belongs both to the scientific process and to the policy process. Policy experts may influence the scientific validation process in the direction of interest and values of their organisations. Integrative modellers might feed scientific knowledge into the policy process in accordance with values of the scientific networks by which 'scientists build up their cognitive authority'. This makes that the SEAMLESS-IF procedure can be viewed as a plan for institutionalisation of 'deliberation', in which scientific networks may be used as powerful vehicles for channelling scientific input to policy-making.

*Jean-Paul Bousset*



## Database of SEAMLESS

Although the database in SEAMLESS is primarily developed to feed the core models and store their results it will also be developed as a stand-alone application. This stand-alone application should be available for both internal and external use during and after the lifetime of the SEAMLESS project providing a rich source of European farm and environmental data. The data contained in this database include:

**1) Farm data from the EU** wide dataset Farm Accountancy Data Network (FADN) organized in different farm types per region (NUTS1/2). The typology is based on a combination of three different dimensions, size, combined specialisation and land use and intensity. Per farm type per region more than 1000 variables are available referring to the economic, production, size, labour and structural characteristics. The farm information is specified at different spatial levels ranging from river basins, Nitrate Vulnerable Zones, HNV farmland to administrative boundaries.

**2) Farm activity data** for the main farming types in a selection of SEAMLESS sample regions providing a detailed understanding of the farming practices and main environmental characteristics.

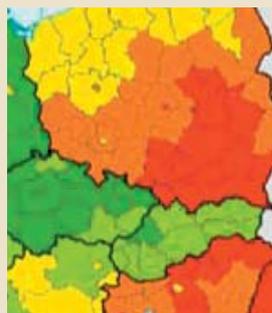
**3) European wide environmental data** on climate, soil and topography at different spatial levels from grid to region.

**4) Socio-economic and demographic information** for all NUTS-2 regions in the EU.

**5) Global data** on farming and agricultural markets.

**6) SEAMLESS modelled output** results organized according to a long list of pressure and state indicators.

*Berien Elbersen and Erling Andersen*

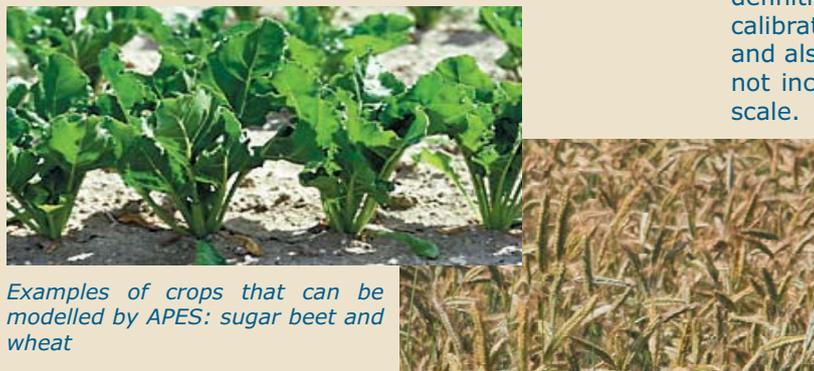


idregion	idlivestock	name	u
686	100002	MilkProduction	[kg/heac
686	100002	SizeOfHerd	[ ]
686	100002	SoldMilk	[kg/heac
686	100002	PriceForMilk	[EUR/kg]
686	100002	RevenuesFromMilk	[EUR/he:
686	100002	WeightOfCalveAtBirth	[kg/heac
686	100002	WeightOfCalveAtSelling	[kg/heac
686	100002	PriceForMaleCalvesAtSelling	[EUR/he:
686	100002	PriceForFemaleCalvesAtSelling	[EUR/he:

## Introduction to APES - the field level model in SEAMLESS

APES (Agricultural Production and Externalities Simulator) simulates the biophysical behaviour of agricultural production systems at the field scale in response to weather, soil and management.

It provides a transparent and flexible modelling platform that can be easily extended and adapted to achieve different modelling goals. The system allows the subsequent incorporation of additional modules which might be needed to simulate processes not included in the existing version, such as plant diseases, and the replacement of modules with alternative versions.



Examples of crops that can be modelled by APES: sugar beet and wheat

To grow a crop in a field, even a model one, requires not only a crop model but also information about soil, weather and management decisions. Currently twelve crops plus permanent grass and vineyards are included but the list is being extended by modifying parameters.

The AgroManagement component is designed to represent farmers' decisions realistically, taking into account the state of the crop and the environment. We also have to consider multiple years to take account of rotations and varying weather patterns.

Modular models include many opportunities for introducing errors and APES includes a set of utilities to trap these. For example, there is an ontology engine that uses information about all the variables and parameters to ensure that communication between components is not compromised by changing definitions. Work is also proceeding on a utility for calibrating parameters that are difficult to measure and also outputs that need to be corrected for factors not included in the model or introduced by changing scale.

APES exists both as a stand-alone version and as a version integrated within SEAMLESS-IF. The Graphical User Interface allows users to explore the outputs of APES in response to changing inputs, and developers to modify the components themselves.

There is more information, including help files, on the APES website (<http://www.apesimulator.org> or through [www.seamless-ip.org](http://www.seamless-ip.org)). You can subscribe to the APES newsletter: [news-subscribe@apesimulator.org](mailto:news-subscribe@apesimulator.org) and to RSS feeds that will update you on progress.

*Marcello Donatelli and Graham Russell*

## Users' involvement in the testing of SEAMLESS-IF

Different groups of potential users evaluate SEAMLESS-IF during its design. Broadly these users can be categorised into two groups; policy makers or their advisors (so called policy experts) and SEAMLESS-IF specialists (Integrative modelers) who would perform assessments for and with the Policy experts. In addition to the regular User Forum interactions, these tests give useful information for the SEAMLESS-IF designers. The tests are also an opportunity for users to familiarize with SEAMLESS-IF and to anticipate its use in their activities.

For example, in 2007 possible user situations for SEAMLESS-IF were set up to test the problem-framing phase that precedes running the model chain. Eighteen Policy experts from France, Poland and Mali interacted with SEAMLESS scientists and their mission was to define and frame a problem to address with SEAMLESS-IF.

These tests have informed SEAMLESS-IF designers on several points. Users were for example positive to the structure proposed to frame a problem; they expressed

the need of being able to define combinations of many parameters, a finding that led the designers of the graphical user interface adapt the structure. Also the information to be included in the users' manual was defined and more information on the capacities of SEAMLESS-IF was requested.

The tests also helped the involved users to imagine their future use of SEAMLESS-IF. In particular, the SEAMLESS-IF specialists and developers now have more concrete knowledge on the different steps related to the role of setting up a policy impact assessment within SEAMLESS-IF in interaction with Policy experts.

Participatory prototype testing is time and coordination consuming but it highlights necessary improvements that would be more difficult to identify otherwise. Importantly, the actual testing also contributes to the dissemination of the future tool. The challenge is to target evaluations for which users' participation is the most relevant.

*Marie Taverne and Olivier Therond*



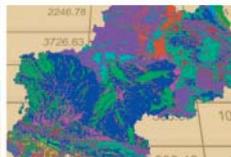
**First Announcement**



**International Conference**

**Integrated Assessment of Agriculture and Sustainable Development;  
Setting the Agenda for Science and Policy**

**March 10 – 12, 2009**  
**Hotel Zuiderduin, Egmond aan Zee, The Netherlands**



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The conference is the final event of SEAMLESS in which its outcomes and lessons learned will be discussed in the context of other international initiatives. Although initiated by SEAMLESS, the conference has a much wider scope and will be a broad international event. The conference will:

- Identify key challenges for modelling to support policy on agriculture and sustainable development;
- Present scientific progress and challenges related to integrated assessment, such as scaling, component-based modelling, assessing environmental, economic, social and institutional aspects and interdisciplinarity
- Present applications of modelling tools to evaluate impacts of agricultural innovations and policies;
- Present the use and relevance of integrative modelling frameworks.

A call for abstracts will be launched in May this year. Please check [www.seamless-ip.org](http://www.seamless-ip.org) for details!