



**HAL**  
open science

## **MAELIA multiagent platform - modelling and simulation of socioagroecosystems**

Olivier Therond, Jean Villerd, Patrick Taillandier, Benoit Gaudou, Clément Murgue, Bernard Lacroix, Delphine Burger-Leenhardt

### ► **To cite this version:**

Olivier Therond, Jean Villerd, Patrick Taillandier, Benoit Gaudou, Clément Murgue, et al.. MAELIA multiagent platform - modelling and simulation of socioagroecosystems. *Dossiers d'Agropolis International - COMPLEX SYSTEMS - From biology to landscapes*, 2019. <hal-03097088>

**HAL Id: hal-03097088**

**<https://hal.science/hal-03097088v1>**

Submitted on 5 Jan 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

## MAELIA multiagent platform – modelling and simulation of socioagroecosystems

Designing sustainable natural resource management strategies within rural territories in an uncertain global change context is a major challenge in the Global North and South. MAELIA is a multiagent modelling and simulation platform for assessing—at the territorial level—environmental, economic and social impacts of scenarios of combined changes regarding natural resource management, agricultural activities and global change (demography, markets and agricultural policies, land-use dynamics and climate change). MAELIA provides a unique way of representing functioning of and interactions between the four major subsystems of a 'social-ecological system': (i) ecosystems, (ii) systems of resources generated by these ecosystems, (iii) activities of users of those resources, and (iv) systems of governance of user-resource interactions. MAELIA can currently be used to model and simulate—at fine spatial and temporal resolution—interactions between agricultural activities (choice of crop rotation, management of cropping systems within each farming system), hydrological

aspects of various water resources (based on SWAT® formalisms) and water resource management (dam releases, water use restrictions). More generally, MAELIA provides a software architecture developed under GAMA® to represent interactions between agricultural activities, agricultural landscape dynamics and natural resource management at the territorial level. Projects designed to extend MAELIA's functionalities are addressing issues related to interactions between field crop and livestock farming systems, biogeochemical cycles, biological regulations, territorial management of organic waste products and agroforestry and agroecological systems. The MAELIA development contributors' club currently includes research laboratories (INRA, CNRS, universities, CIRAD), ARVALIS, the *Compagnie d'Aménagement des Coteaux de Gascogne* and the *Association pour la Relance Agronomique en Alsace*.

**Contacts:** O. Therond (Agronomy and Environment Laboratory, UMR LAE), [olivier.therond@inra.fr](mailto:olivier.therond@inra.fr), J. Villerd (UMR LAE), [jean.villerd@inra.fr](mailto:jean.villerd@inra.fr), P. Taillandier (UR MIAT), [patrick.taillandier@gmail.com](mailto:patrick.taillandier@gmail.com), B. Gaudou (UMR IRIT), [benoit.gaudou@ut-capitole.fr](mailto:benoit.gaudou@ut-capitole.fr)

**Collaborators:** C. Murgue (*Compagnie d'Aménagement des Coteaux de Gascogne*, CACG), B. Lacroix (ARVALIS Institut du Végétal), D. Leenhardt (UMR AGIR)

**For further information:** <http://maelia-platform.inra.fr>

