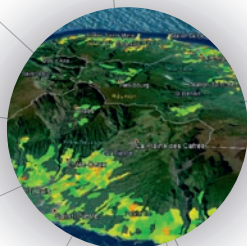
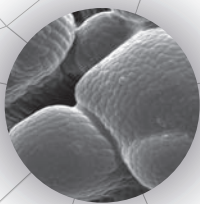


*les dossiers*  
**d'AGROPOLIS**  
INTERNATIONAL

*Expertise of the scientific community  
in the Occitanie area (France)*

**COMPLEX SYSTEMS**  
*From biology to landscapes*



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## Urban communal gardens are pivotal for studying transdisciplinary research-training on environment-health topics

The ecological transition is being forged in the dynamics of territories in which civil society plays a major role, particularly in the urban agriculture (UA) field. The UA boom must be placed in the context of social concerns regarding sustainable development and nature, as well as food confidence crises. It also challenges the forms and locations of food production. Cities become 'gardened' territories embellished with small vegetable gardens or huge market gardening areas. Meanwhile people worldwide mainly reside in cities (80% in 2050, according to projections) and 40% of urban growth is concentrated in slums (FAO, 2015; WEF, 2015).

The growing awareness among urban dwellers of the crucial importance of places of human activity (such as communal gardens), sustainable food and biodiversity preservation contributes to UA development as a vehicle for democratic ecology. Pollution nevertheless often prevails in highly anthropized urban areas, with inevitable repercussions on food crop quality. Due to the complexity of the biogeochemical mechanisms involved in the transfer of substances to terrestrial ecosystems and the diverse range of exposure scenarios, scientists seldom have a straightforward answer to questions regarding human exposure to pollutants in places such as urban gardens. Promoting the development of sociotechnical methodologies to avoid, reduce and remedy the impact of urban pollution is hence a major scientific and societal challenge that requires operational collaboration between researchers, citizens and managers. Environmental regulations are indeed still incomplete. The AgriVille Network aims to promote UA in tandem with ecological transition, particularly by fostering innovative and inclusive dynamics between the different university, public and business stakeholders.



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**For further information on the Network-AgriVille:** <http://reseau-agriville.com>

◀ *The various functions of UA.*  
 From Dumat C., 2017.

## CORMAS simulation platform and training in support of a community of practice

With the aim of introducing agent-based simulation to researchers working on renewable resource management and who were not necessarily modelling specialists, in the late 1990s the GREEN research unit of CIRAD designed a 2-week training course on multiagent systems (MASs) to introduce the agent-based paradigm by relating it to other modelling approaches used in this field. A progression towards MASs was proposed based on cellular automata and game theory. This training focused on demonstrations and hands-on exercises with agent-based simulation models implemented using the CORMAS platform. Participants were encouraged to work in small groups to develop prototypes with CORMAS that could potentially be applied to their research issues. A library of educational models illustrated the main concepts taught (e.g. modelling the spread of a forest fire being fought by a fire brigade). In the 2000s, new generic platforms emerged in



▲ *Discussion between participants to form groups of 2 to 4 people depending on the similarities between the research themes with the aim of jointly designing an agent-based prototype model.* © Pierre Bommel

France, supported by researchers with an interest in applications to the environmental management field and participating in discussions on companion modelling. Each of these platforms focuses on the development of agent-based simulation models from specific angles:

- Mimosa covers all phases, from conceptual modelling to implementation.
- GAMA (see p. 50) focuses on coupling with geographic information systems and is based on an architecture that supports multilevel support.
- NetLogo, initially designed as an active pedagogical tool to teach complexity, has become an international reference platform.

The training was initially based on a single platform, but was subsequently adapted to encompass several platforms. It has been focused on the CORMAS, NetLogo and Mimosa platforms since 2011, while GAMA replaced Mimosa in 2013. Trainers from different institutions conduct this training, which is offered every summer in Montpellier (France).

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**For further information on the MISS-ABMS summer school - Multi-platform International Summer School on Agent-Based Modelling & Simulation for Renewable Resources Management:** [www.agropolis.org/miss-abms](http://www.agropolis.org/miss-abms)

