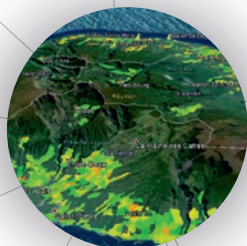
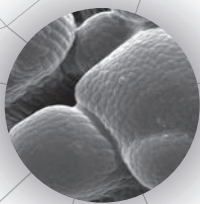


les dossiers
d'AGROPOLIS
INTERNATIONAL

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

COMPLEX SYSTEMS
From biology to landscapes



Number 23
February 2019

Participation and consultation

Role of companion modelling in social change

From a complexity perspective, the research object is considered as a set of individuals and groups interacting with each other and with their environment—which has its own specific dynamics. The future of the system is thus impossible to foresee but the system is an evolving organization which will evolve from pattern to pattern, some of which are more ephemeral or stable than others. The scientist's work is in keeping with this uncertainty and aims to support decision-making processes for change towards new forms of organization or maintenance of the current situation, if this is the wish of individuals and social groups. Companion modelling supports decision-making processes by pooling the aims and knowledge of all stakeholders—including scientists—through methods and tools designed for modelling and investigating future scenarios (theatre, role-playing and computer simulation). Various experiments in France, Senegal, Bhutan, etc., have shown how groups can develop new forms of organization (management committees, laws, rules, land use, etc.) that change their relationships with the environment. Long-term monitoring also highlights that, when the context and problems change, groups apply the method and tools on different topics when new collective decisions are needed. The GREEN internal research unit (UPR) and the ComMod network

propose companion modelling methods, training and tools based on almost 20 years of research on this issue.

Contacts: F. Bousquet, francois.bousquet@cirad.fr and W. Daré, william's.dare@cirad.fr (UPR GREEN)

For further information on the Companion Modelling (ComMod) network: www.commod.org



▲ Bagrépoly role-playing game in Burkina Faso (Nov. 2016). © Farid Traoré

Companion modelling to gain insight into interactions between water use and territorial dynamics

Sectoral policies and development choices each have an impact on the availability, quality and uses of water in a given area. Understanding the interactions between water- and land-use dynamics is essential to forestall potential inefficiencies or conflicts. 'Hydrological territories' refer to socioecological systems that are suitable settings for people in relation to water resources, while combining multiple viewpoints and interactions. Modelling these systems can generate tools to probe their dynamics under different scenarios. Companion modelling—based on multiagent systems and role-playing games—provides a framework to take heterogeneous viewpoints of both experts and laypeople

into account and incorporate them in representation tools that are understandable and amendable by everyone.

For instance, we investigated the implications—in terms of drinking water supply risks—of intermunicipal, urbanization policy and resource access security choice scenarios*. Based on technical models, the actors criticized the lack of consideration of urbanization policy issues for mayors of municipalities located in the vicinity of large urban areas. These decision-making elements were added to the territorial dynamics in the modelling process. In some cases, role-playing games help participants understand these models by providing a more straightforward representation format. Participants, i.e. both observers and simulation stakeholders, discuss the representativeness of the levers at their disposal in the action (see *opposite*). These collaborative modeling approaches raise questions regarding the underlying power games and the terms of use of the produced models, while accounting for and highlighting the uncertainties. These methods can also be developed to deal with issues other than those related to water but, due to the many uses, resources and management territories involved, hydrological territories represent a particularly relevant focus for these methods.

Contacts: O. Barreateau, olivier.barreateau@irstea.fr and B. Bonté, bruno.bonte@irstea.fr (UMR G-EAU)

* SURGE project: Solidarité Urbain-Rural et Gestion de l'Eau (urban-rural solidarity and water management)



▲ Interactive simulation in the city of George, South Africa. © C. Simi