MISS-ABMS

Multi-platform International Summer School

on Agent-Based Modeling and Simulation

for Renewable Resource Management

September 4 – 15, 2017

Agropolis International,
Montpellier France

Mountain Sentinels Virtual
Coffee Presentation

October 26, 2017

By Cara Steger

Virtual Coffee Overview

AGROPOLIS INTERNATIONAL — Who, What, and Where: Description of the training

CommMod — Why I chose this training: Cormas and the Companion Modeling Approach

cormas — How: A short demonstration of the software

MOUNTAIN SENTINELS — Questions and Discussion

Trainers and Location

Hosted by Agropolis International

- a partnership between 47 member institutes working on agriculture, food, biodiversity, and environment

- Provides facilities and resources to support national and international collaboration, for research and between science and society

9 Trainers
- Geraldine Abrami - IRSTEA
- Pierre Bommel - CIRAD
- Bruno Bonte - IRSTEA
- Francois Bousquet - CIRAD
- Benoit Gaudou – Toulouse University
- Christophe Le Page - CIRAD
- Jean-Pierre Muller - CIRAD
- Damien Philippon - IRD
- Patrick Taillandier – Toulouse University

Participants

20 Participants

7 PhD students

6 Research Scientists

4 Professors

2 Master's students

1 private consultant

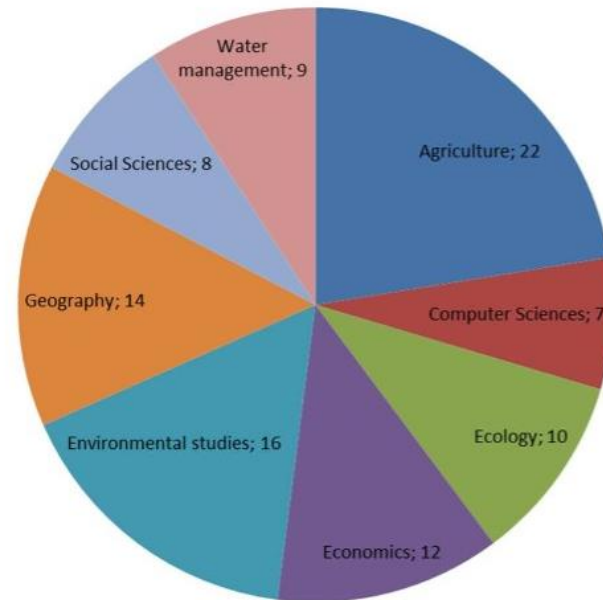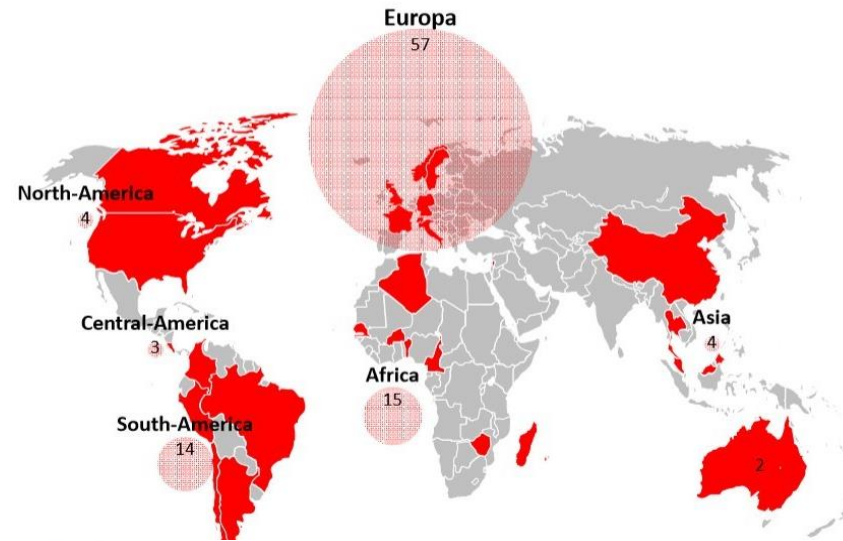**5 Continents**

4 Central & South America
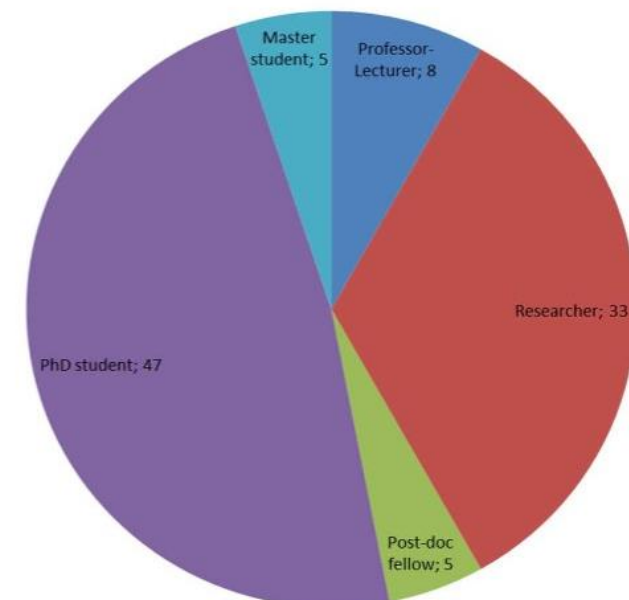
2 North America

12 Europe

1 Asia

1 Africa

Images from MISS-ABMS website http://www.agropolis.org/miss-abms/

67 hours of theory and practice

Week 1

12 hours of lecture on topics such as: concepts and definitions of modeling; the use of ABM in social-ecological systems; designing a model with UML (unified modeling language); model exploration through simulations and visualization

8 hours of large group welcome (including a role-playing game, ReHab) and theoretical discussions

16 hours large group coding and UML exercises

Week 2

2 hours of lecture on: model calibration and sensitivity analysis; documentation and communication; model validation

23 hours of small group work and individual model development

3 hours of case study presentations

3 hours of concluding sessions

Small groups working across platforms

Divided by research question/ type of model rather than resource type

http://gama-platform.org/

http://cormas.cirad.fr

https://ccl.northwestern.edu/netlogo/

Why MISS-ABM?

Companion modeling with Cormas software
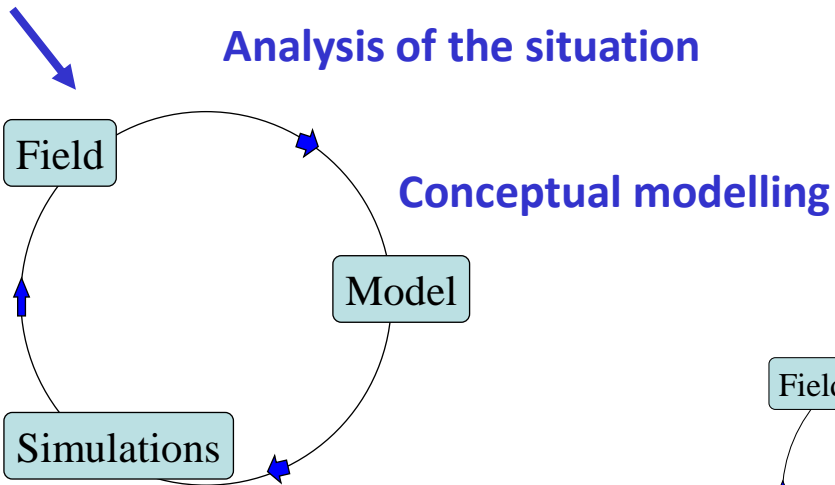
The **objectives** of companion modeling are:

To facilitate dialogue, shared learning, & collective decision-making

And to strengthen the adaptive management capacity of communities

through integrative collaborative modelling.

The **tools** of companion modeling include:

Conceptual modeling (using ARDI and UML), role-playing games, and

computerized simulations.

From Bousquet (2017)

ComMod methodology

Initiation of the process

Analysis of the situation

Conceptual modelling

Field

Model

Simulations

Role-playing game sessions

Interactive agent-based simulations

The ComMod process is supposed to be iterative – researchers and stakeholders evaluate and revise the model together over time as equal partners ("companions").
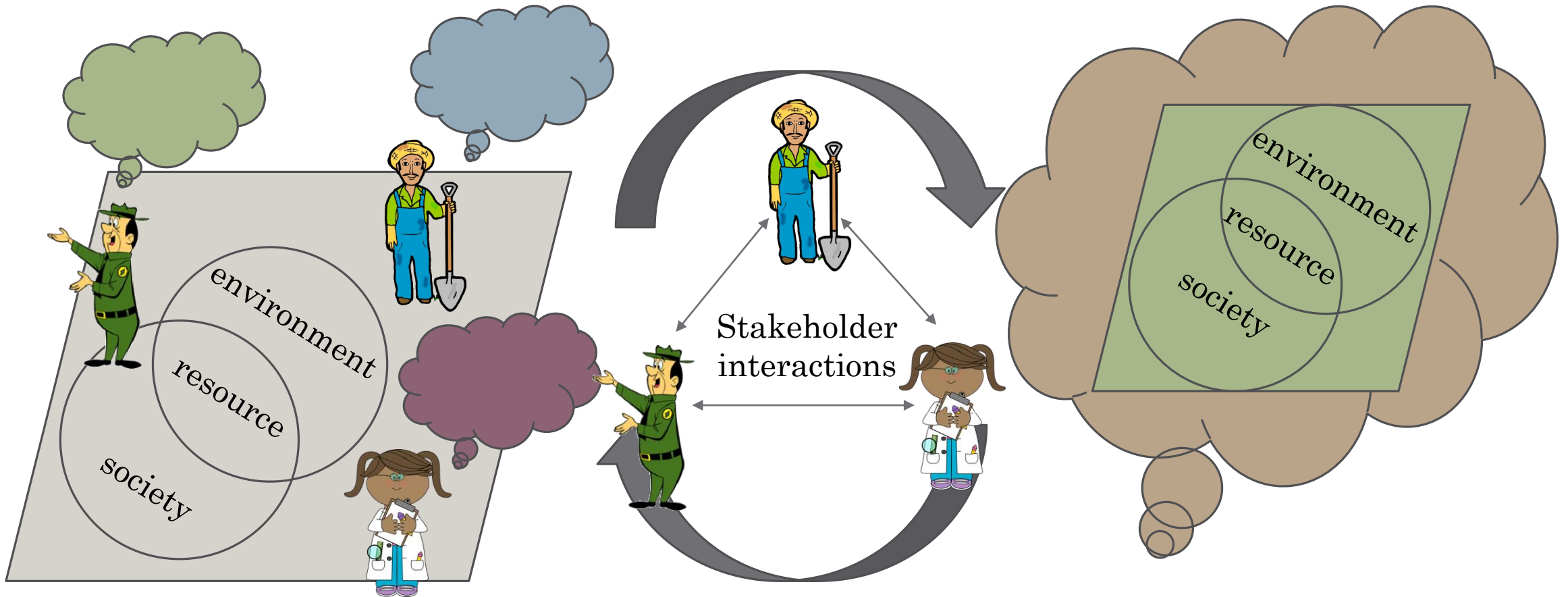
Field

Model

Simulations

Field

Model

Simulations

Field

Model

Simulations
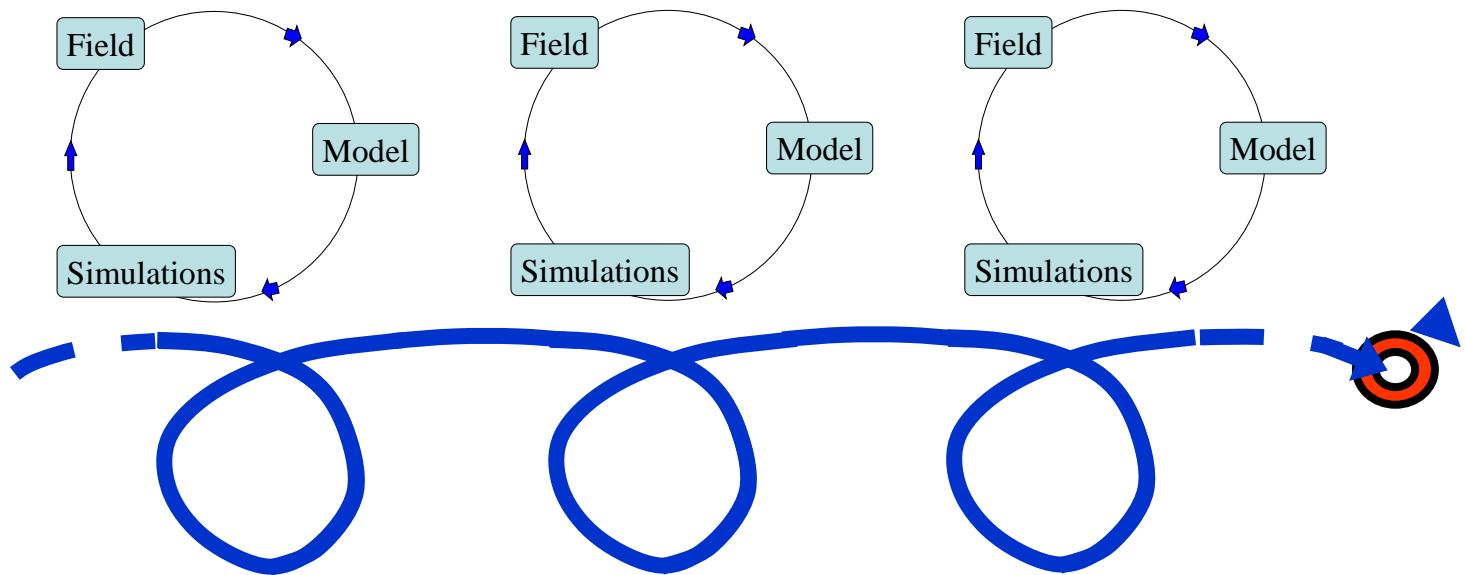
How to model & integrate different stakeholders' perceptions to support collective action?

Using conceptual modeling to move from individual perceptions of a system to a shared representation of the system to be studied.
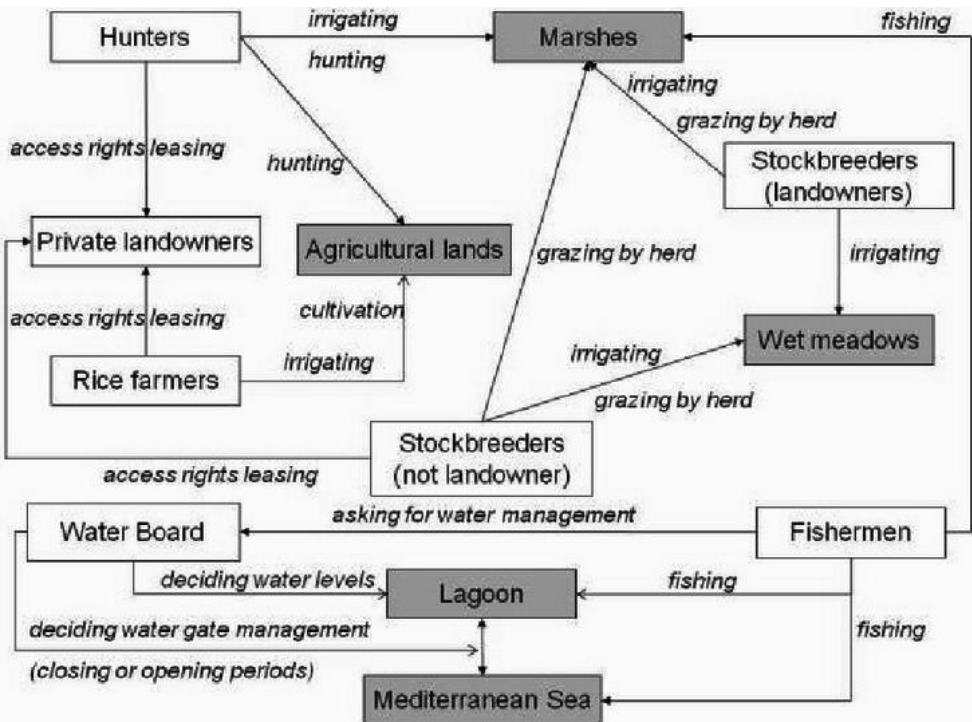

Note: this process is iterative throughout the ComMod process

Adapted from Bousquet (2017)

Tools for conceptual modeling

Interviews with subsequent textual analysis

Jump straight to more complex diagrams

ARDI: Actor, Resource, Dynamics and Interactions (Etienne et al. 2011; Mathevet et al. 2011)
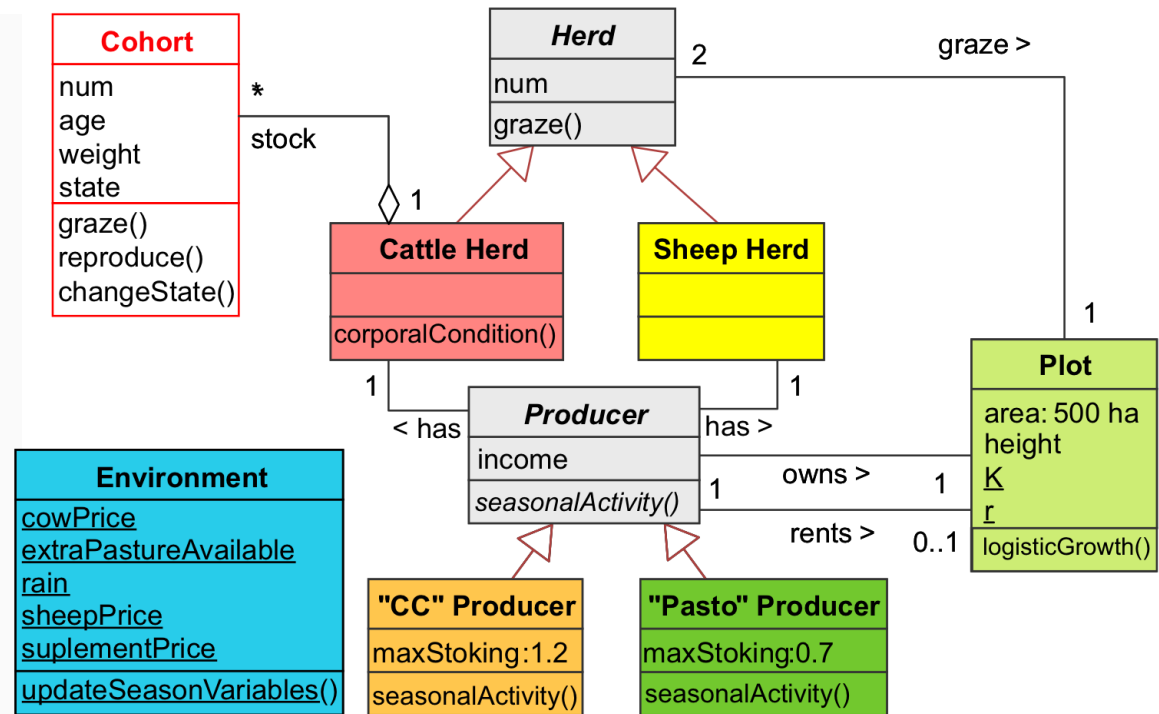
UML class, action, and sequence diagrams (Bommel et al. 2014)
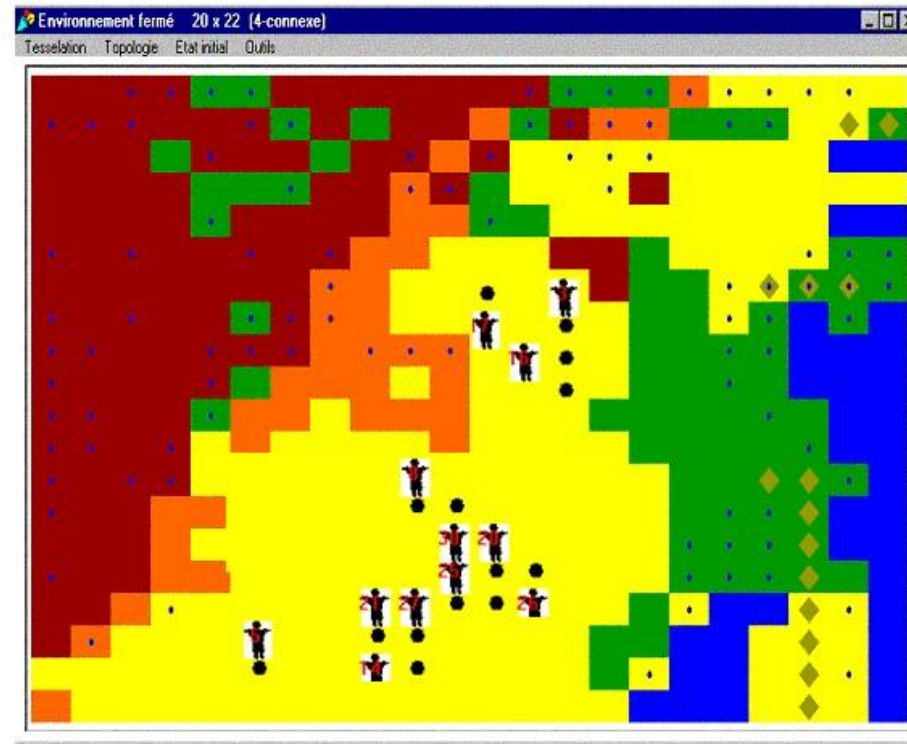
Tools for simulation

Role-playing games

NomadSed – not a ComMod game, but the same idea (Dressler 2015)

Computer Models using Cormas (and other software)

D'Aquino et al. 2003

Negotiating model complexity

adapted from Sun et al. 2016, in Le Page and Perroton 2017

Transdisciplinarity?

Situation-oriented Science
Societal strategies
Adaptation & transformation

KILT
Stylized
models

Participatory
modelling
Social learning

Theory-oriented Science   Generic
models   Realistic
models   **Policy-oriented Science**

KISS   **KIDS**

Theory   Case studies
Conceptual foundation   *Links to empirical data*

adapted from Schlüter et al. 2013, in Le Page and Perroton 2017

References

Bommel, P., Dieguez, F., Bartaburu, D., Duarte, E., Montes, E., Machín, M.P., Corral, J., De Lucena, C.J.P. and Grosskopf, H.M., 2014. A further step towards participatory modelling. Fostering stakeholder involvement in designing models by using executable UML. *Journal of Artificial Societies and Social Simulation*, *17*(1), p.6.

D'Aquino, P., Le Page, C., Bousquet, F. and Bah, A., 2003. Using self-designed role-playing games and a multi-agent system to empower a local decision-making process for land use management: The SelfCormas experiment in Senegal. *Journal of artificial societies and social simulation*, *6*(3).
Dressler, 2015. http://www.polises.de/blog/playing-nomadsed-in-the-field.html

Etienne, M., Du Toit, D. and Pollard, S., 2011. ARDI: a co-construction method for participatory modeling in natural resources management. *Ecology and Society*, *16*(1).

Le Page, C., Perroton, A. 2017. KILT: a modelling approach based on participatory agent-based simulation of stylized socio-ecosystems to stimulate social learning with local stakeholders , Lecture Notes in Computer Sciences *forthcoming*

Mathevet, R., Etienne, M., Lynam, T. and Calvet, C., 2011. Water management in the Camargue Biosphere Reserve: insights from comparative mental models analysis. *Ecology and Society*, *16*(1).

MISS-ABMS website http://www.agropolis.org/miss-abms/

SCHLÜTER, M. Birgit Müller , Karin Frank   MORE – Modeling for Resilience Thinking and Ecosystem Stewardship SSRN Electronic Journal ·January 2012

Sun, Z., Lorscheid, I., Millington, J.D., Lauf, S., Magliocca, N.R., Groeneveld, J., Balbi, S., Nolzen, H., Müller, B., Schulze, J. and Buchmann, C.M., 2016. Simple or complicated agent-based models? A complicated issue. *Environmental Modelling & Software*, *86*, pp.56-67.