Which agrosystems and public policies for a sustainable management of water resources?

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**Rationale**

**Water scarcity and water pollution questions the sustainability of present uses of water resources.**

- in rural areas, agriculture is the main user of water and land resources
- links between agrosystems and water resources are to be considered at a regional scale
- sustainable development implies multi-criteria and participative evaluations

**Spatial Water Management** (Narcy and Memet, 2003) & **Integrated Catchment Management** (Gorredale, 1992)

- aim at considering jointly land and water management at a regional scale
- promote the use of models and scenarios to support decisions for allocating water and land between all users

**Objective of the project:**

Developing **tools and methods** based on **mathematical modelling** to evaluate **scenarios** for a better **planning of both agricultural activities and water resources.**

**Organisation of the project**

3 kinds of activities &

- building scenarios
- developing models
- evaluating scenarios

2 approaches

- participative
- with targeted partners

3 work packages

**WP1**
Problem: water scarcity
Area: south-western France (Neste System)
Objective: Modelling water allocation between uses

**WP2**
Problem: diffuse pollution of surface water (nitrate & pesticides)
Area: Brittany (France)
Objective: Assessing impact of agrosystems on water pollution

**WP3**
Problems: water scarcity and water pollution
Areas: South-western and South-eastern France
Objective: Developing a participative approach for building integrated models adapted to evaluate scenarios emerging from collective organisations

**WP4**

First results

1. **Models**

- A conceptual **model for water allocation** between uses: MOGIRE (Reynaud and Leenhardt - this conference)
- It integrates: models in agronomy and economy; all water uses (agricultural, domestic, industrial, environmental)
- Two models to study the **effect of landscape structure and agricultural management practices on water quality**: TNT2 for nitrate, SACADEAU for pesticides; TNT2 has been validated in Brittany and used to compare scenarios (Salmon-Monviola et al., 2008) It is modified to extend its application domain to south-western France

2. **Scenarios**

The word "scenario" is extensively used. For us, a scenario is a set of (biophysical or agro-economic) model input data.

**Agricultural scenarios** are descriptions of land use, including management techniques.

- We study the use of remote-sensing techniques for improving the construction of scenarios
- We develop a method for building and evaluating scenarios proposed by stakeholders (Clavel and Leenhardt, 2008)
- We study artificial intelligence methods to improve the usability of scenario results by stakeholders

To build **economic scenarios**, we are developing a new pricing device (Terreaux and Tidball - this conference)

3. **Interaction with stakeholders**

- Methods and techniques for improving interaction with stakeholders are studied
- A whole participative approach is currently implemented (Le Grusse et al.; Gonzalès-Camacho et al., this conf.)