



PhD proposal in economics – EDEG – University of Montpellier

## **Economic approaches for the analysis and transformation of agricultural systems in the face of global change**

**Supervisor: Nina Graveline - UMR Innovation, INRAE**

**Formal PhD supervisor: Arnaud Reynaud, Toulouse School of Economics (TSE), INRAE**

### **Context**

Agriculture is facing urgent stakes : feed people, limit its impact on ecosystems, or even be integrated into ecosystems and contribute to the GHG mitigation effort while adapting to the effects of climate change. This thesis is part of the TALANOIA-Water project (Prima 2021-2024), which proposes to combine the development of hydro-socio-economic modelling tools with participatory methods (such as the Talanoia dialogue used during discussions on the Nationally Determined Contributions) with the stakeholders of the territories studied to explore the feasibility of 'transformative' adaptations of water use. Partners and case studies of the project are present in Lebanon, Tunisia, Egypt, Italy, France and Spain.

### **Scientific objective**

This PhD questions the socio-economic conditions of the agro-ecological transition of farming in the context of climate change and integrates a broader vision of the *value* of agricultural activities in economic approaches. To this end, agriculture will be modelled to explore the feasibility of alternative scenarios under uncertain future conditions: this economic, ecological and social model will allow assessing the relevance of certain non-reversible investment choices (e.g. water networks/reservoirs) and of public policy instruments for the agro-ecological transition, especially in the context of perennial crops such as vineyards.

This thesis raises important questions for the development or adaptation of approaches and tools in economics: classical economic tools such as econometrics or partial equilibrium/mathematical programming are not well adapted to apprehend more structural changes in farms and farming systems, but a combination of these tools with each other and with other approaches (e.g. participative scenario building) should allow the analysis of current systems and the consideration of the conditions for their transformation.

### **Proposed approach**

#### **1. Ex-post analysis of water use and economic impact of access to water and irrigation**

Depending on the data available, one or more econometric approaches will be developed. The case studies will be defined during the first 6 months of the thesis that will accompany the start of the TALANOIA project. Several options are to be considered (i) several fields in France on the scale of the catchment area, (ii) a large field such as the Languedoc, (iii) one or more fields in Occitania and abroad among the case studies of the PRIMA project (Lebanon, Tunisia, Egypt, Spain, Italy).

#### **2. Agricultural production model**

This model aims to represent and understand the mechanisms that enable the interactions between farmers' decisions (micro-economic), prices/markets (macro-economic if relevant), the water resource and its management, other uses and ecosystem services. This model will allow modelling of the decision



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to allocate inputs (land, water, possibly fertilisers, labour) and some crops (with and without access to a secure resource) as a function of resource access and « rights ».

For the calibration of this model on one or more fields to be defined, data will be collected from public statistics and interviews/surveys. Eventually, some experiments based on simple games will be carried out. A coupling with existing hydrological and/or ecological models will be envisaged depending on the territory and the issues at stake.

### **3- Possible trajectories of agriculture & instruments for transformation**

The participation of the candidate in the participative workshops involving local stakeholders will be determined during the project, but the candidate will be able to model the scenarios/trajectories produced in the participatory workshops of the TALANOA project and their impact in terms of ecological and social indicators. A reflection on the articulation between individual and collective trajectories will be integrated (and if possible modelled, for example exchanges of products/inputs). Interannual flexibility will be considered in order to enhance the water transfer options between uses or places.

#### **INRAE researchers involved in the project or PhD advisory committee**

Guillaume Thirel (hydrology); Marta Debolini (agronomy); Marc Moraine (agronomy); Sébastien Loubier (economist); Katrin Erdlenbruch (economist); Sophie Thoyer (economist); Jean-Marc Touzard (economist)

Project coordinator (economist), University of Salamanca, Dep. of economics: Dioniso Perez Blanco

#### **Practical information**

The PhD student will be hosted at the Innovation joint research lab of INRAE, on the Gaillarde campus in Montpellier. The doctoral school of affiliation is the 'Ecole Doctorale Economie Gestion Montpellier (EDEG) (umontpellier.fr). The funding allows to pay the whole cost of the PhD for 3 years (and travel), the wage is 1850€ brut.

The possibility of a long stay at one of the project partners either for an exchange of scientific skills or to work on a foreign/partner's case study could be considered.

For more information or a longer version of the thesis proposal and the TALANOA Water project document, please contact Nina Graveline, Research Fellow in Economics, UMR Innovation [nina.graveline@inrae.fr](mailto:nina.graveline@inrae.fr)

Application: send curriculum + cover letter to [nina.graveline@inrae.fr](mailto:nina.graveline@inrae.fr) ; (Subject: PhD application) before June 28 2021.