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citizens for sustainable  
development

# Building a prospective participatory approach for a long-term agricultural sustainability in the Lezíria do Tejo region (Portugal)

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# Conceptual background and research context

**Agriculture in periurban contexts plays a fundamental role** in ensuring local food supply, urban-rural linkages or preserving natural and cultural heritage from urban encroachment.

Preserving and **boosting sustainable agriculture** in these areas is a challenge for spatial planning and territorial development that **must involve new interactions between local stakeholders and new multilevel governance** mechanisms.

We explore a **participatory prospective process** linking local stakeholders and researchers in an **agricultural periurban area, the Lezíria do Tejo**.

The research was conducted for the **international DAUME project** aiming to build participatory prospective territorial scenarios towards sustainable agro-urban systems in France, Italy, Portugal, Morocco, and Algeria.



## Research aims

In this research we link methods such as **Participatory Action Research, GIS and Geographical Modelling** to engage interaction between local stakeholders and researchers toward collaborative knowledge production.

The aims are to question local stakeholders about agriculture and its challenges for the future, build possible land use/cover (LUC) scenarios and invite stakeholders to observe and discuss a set of plausible spatial representations of the future so to build common proposals.

The use of these research methods together can **promote dialogue and exchange in a community**, conducive to the articulation of territorial issues and to the collective search for solutions => ***Participatory prospective “geographical modelling” approach***

# Methodological steps

## The participatory prospective “geomodelling” approach

1

Case study  
selection for  
Interview sites

GIS  
Spatial  
Analysis

2

Local workshops

Sociologic approach  
“co-active approach”

Interpreting results

3

Synthetic matrix =>  
3 LUC scenarios

GIS  
Advanced  
geomodelling

Validating and Discussing results

4

Proposals towards spatial planning and territorial development  
decision-making

# Territorial framework



- Lezíria do Tejo region  
(statistical sub-region, NUTS III)

- 247,000 inhabitants

- Extending over 4,275 km<sup>2</sup>

- Composed of eleven municipalities, where Santarém (80 km from Lisbon) is the main city with about 62,000 inhabitants.

- Agriculture and food processing industries are fundamental in the region's economy.

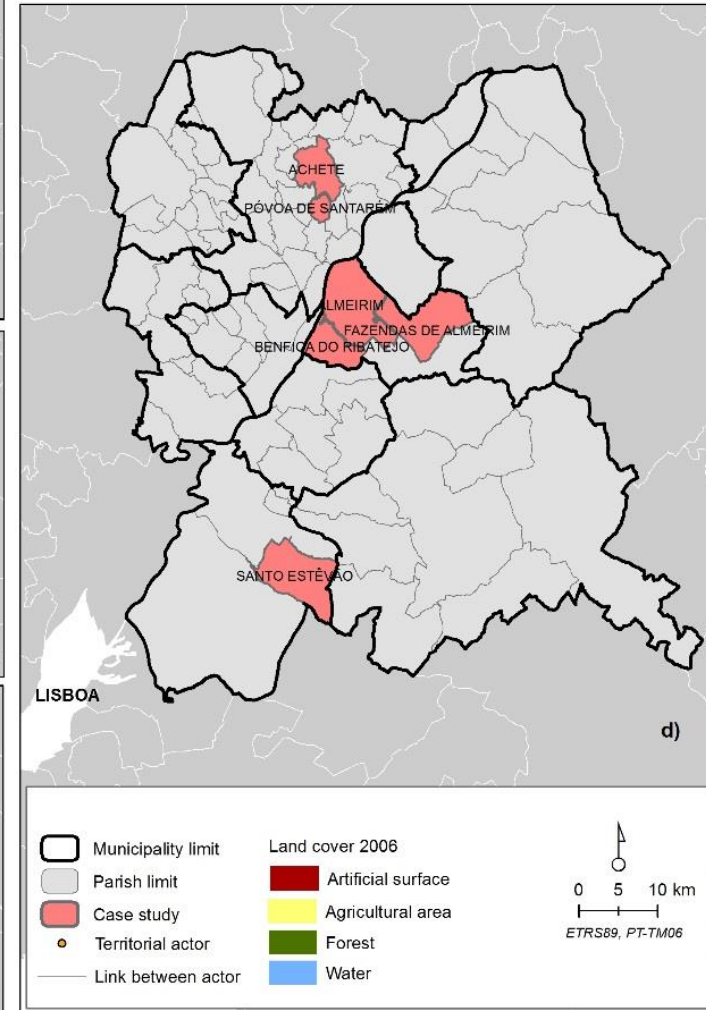
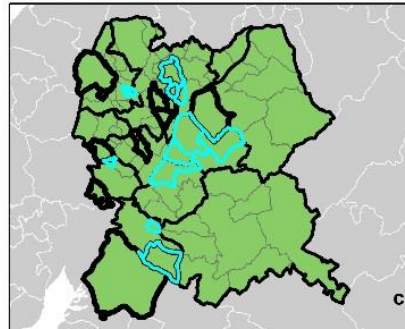
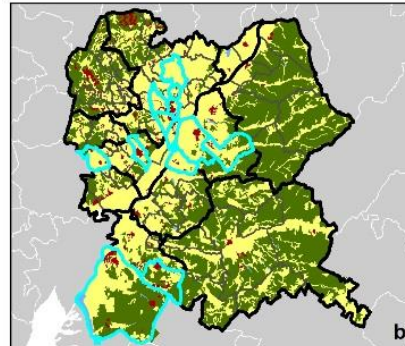
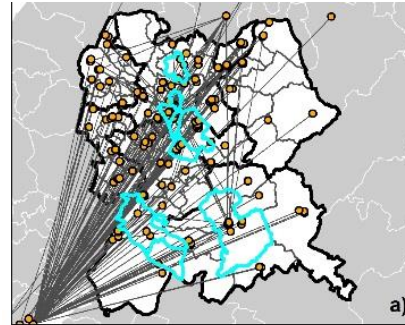
- This agricultural context is also reflected in a dynamic network of agricultural actors (farmers, associations, unions...).

# Step 1 – Selecting the interview sites

## Geographical information overlay analysis:

- a) Parishes with the largest number of connected actors
- b) Parishes where agricultural LUC grew above average
- c) Parishes where the number of farms, UAA and farmers declined above average

- 2 parishes in Santarém municipality
- 3 parishes in Almeirim municipality
- 1 parish in Benavente municipality



## Step 1 – Selecting the interview sites

**34 in-depth interviews**, ranging from one to three hours:

- Farmers ( $n=25$ )
- Farmers' unions and associations ( $n=5$ )
- Spatial planning technicians and policy-makers ( $n=3$ )

Questions were divided in **5 topics**:

- 1) type of farm and family characteristics;
- 2) farming technical procedures;
- 3) logic of activity and labour force;
- 4) commercialization problems and capabilities;
- 5) **issues and challenges for the future**, namely identification of changes occurred in recent years in farmland and the impacts on the farmer's activity and the interviewee's visions for the future of local and regional agriculture.

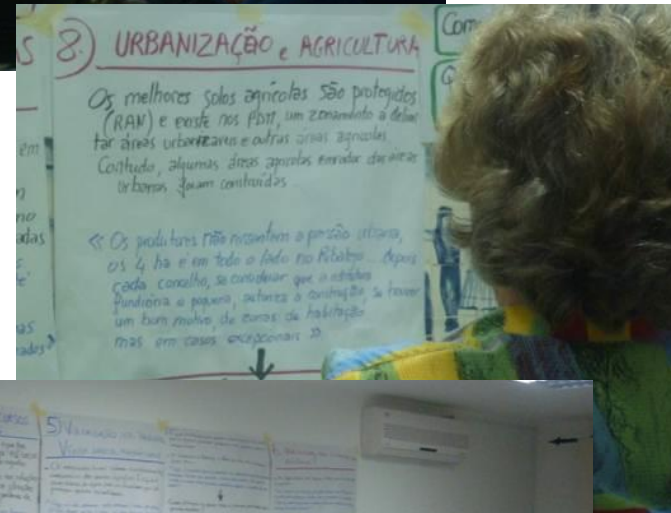
## Step 2 – Local workshops

2 participatory prospective workshops on the topic ‘the future of agriculture in our area, problems and prospects’

- Almeirim and Santarém

Critical problems and challenges raised up from the interviews were transformed into **eight priority questions** to be discussed

Alternative solutions and options to deal with those key problems and challenges were also discussed





## Step 2 – Local workshops

<b>Agriculture production</b>	<ol style="list-style-type: none"><li>1. How can the viability of horticulture in a competitive market be ensured?</li><li>2. What is the future of animal husbandry and the olive grove?</li><li>3. In the vine sector, what role must cooperatives and associations play?</li></ol>
<b>Commercialization</b>	<ol style="list-style-type: none"><li>4. How should small-circuit chains be valued?</li><li>5. How can small farmers compete large with supermarkets?</li></ol>
<b>Natural resources and climate change</b>	<ol style="list-style-type: none"><li>6. How should natural resources be preserved and how should we adapt to climate change?</li></ol>
<b>Land use access and management</b>	<ol style="list-style-type: none"><li>7. How can we manage the land better? How can we make land available for young farmers that want to establish themselves in the region?</li><li>8. How can we preserve plots of land that are suitable for agriculture but are currently facing reforestation and abandonment?</li></ol>

## Step 3 – Interpreting results and building LUC scenarios

- Categorizing information
- Structuring critical categories of solutions for the future of agriculture in the region
- Identifying the potential factors of LUC change, and suggesting scenarios to support stakeholders questions/ solutions and future proposals in relation with public policies in the region

As outputs:

- a) a synthetic matrix
- b) three LUC scenarios

# a) Matrix relating questions (8) and solutions (15)

Questions raised \ Solutions / policy	Triggering legal provisions to reduce fluctuations in prices	Decreasing payment terms (advancing) of agribusinesses to	Increasing association and restructuring existing producers'	Creating a producer database and a land cadastre database	Reorganizing the whole productive process	Creating new models of negotiation	Introducing innovations in the production of varieties	Differentiating products, organic production	Encouraging tourism in the area	Investing in local markets	Using PDR 2020 better	Small producers cooperating with large producers	Increasing crop rotation and manure	Increasing and publicizing public land stocks; creating the	Planning and controlling land uses
1. How can the viability of horticulture in a competitive market be ensured?	■	■	■	■				■		■	■	■	■	■	■
2. What is the future of animal husbandry and the olive grove?					■	■		■		■	■	■	■	■	■
3. In the vine sector, what role must cooperatives and associations play?					■		■	■	■					■	■
4. How should small-circuit chains be valued?										■	■	■			
5. How can farmers compete with supermarkets?												■			
6. How should natural resources be preserved and how should we adapt to climate change?													■		
7. How can we manage the land better? How can we make land available for young farmers that want to establish themselves in the region?				■										■	■
8. How can we preserve plots of land that are suitable for agriculture but are currently facing reforestation and abandonment?				■										■	■

■ Solutions for a specific question/challenge - proposed by the stakeholders in the workshop

■ Relating other proposed solutions to a specific question/challenge - proposed by researchers from a reflection and interpretation of the workshops' discussion – *Ongoing discussion with stakeholders*

## b) LUC scenarios

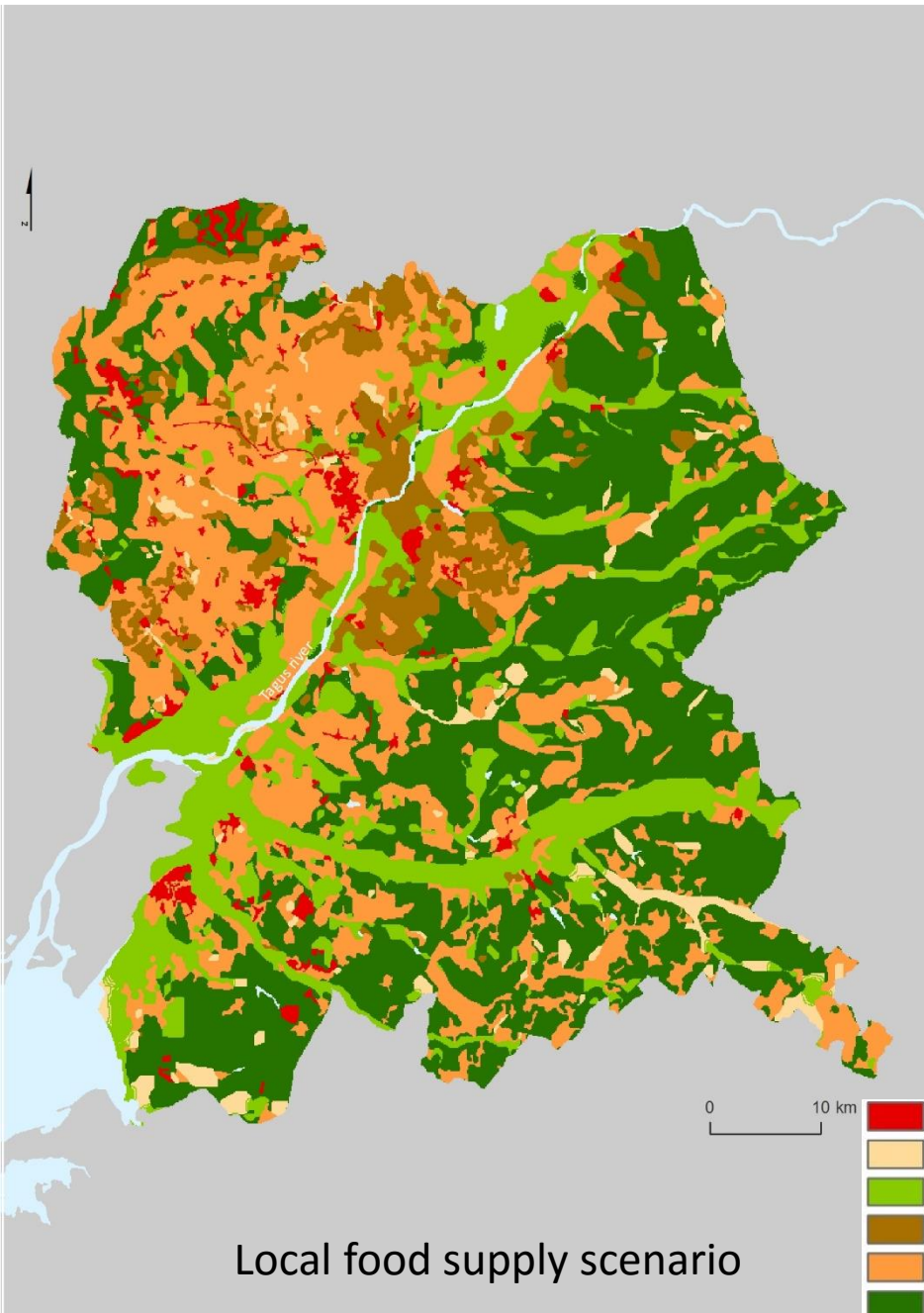
Not every identified question/challenge could be transformed into a LUC scenario due to its non-spatial character. **Three scenarios (2020):**

1) **Business as usual (BAU)**

2) **Climate change.** E.g. stakeholders considered that crop systems are changing. Also extreme phenomena have impacts on those systems. So what are the impacts on LUC if the variable temperature goes up by 2°C?

3) **Local food production.** E.g. Stakeholders consider that it is important to value small-circuit chains and diversify their activity to increase agriculture in the region. But productive land is scarce. What are the impacts on LUC if we increase the variables utilised agricultural area, number of small farmers, and farm diversification?

*Method - Multilayer Perceptron (ANN) and Cellular Automata based on LUC data from two periods (1990, 2006) and a list of 22 other variables.*

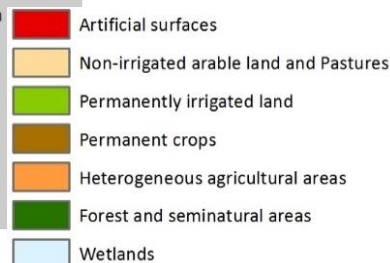


**BAU scenario** => main changes from non-irrigated arable land and from pastures to permanently irrigated land (30%).

**Climate change scenario** => non-irrigated arable land, pastures and heterogeneous agricultural areas increased over permanently irrigated land that decreased of 50% => **Stakeholders validated this scenario and were very concerned by it.**

**Local food supply scenario** => permanently irrigated land and heterogeneous agricultural areas increased from classes of non-irrigated arable land and pastures, and from forest and semi-natural areas.

In all scenarios artificial surfaces increased by around 2.0%



## Limits to the research & general conclusions

- Low attendance to the workshops when compared with the number of interviewees.
- From a methodological perspective: difficulty of farmers to understand results at such large spatial scale (need to work at a more detailed scale) and also to understand how the geomodelling process works
- Difficulty in bridging the gap between academia and practitioners.

**But...** participants in the workshops were very engaged and the content of the debates and knowledge generation was very good, with several stakeholders proposing further debates (**ongoing**)

The collaborative research and the “territorially localized” exercise is enabling a fresh perspective on local/regional agriculture, i.e. on proposing a set of collective solutions (between farmers, politicians, researchers) for long-term agricultural sustainability => **contribution to strength research and action**

