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

Patrícia Abrantes\textsuperscript{a}, Margarida Queirós\textsuperscript{a}, Guilhem Mousselin\textsuperscript{b}, Claire Ruault\textsuperscript{c}, Étienne Anginot\textsuperscript{d}

\textsuperscript{a}IGOT-ULisboa, Portugal; \textsuperscript{b}Université Bordeaux Montaigne, France; \textsuperscript{c}GERDAL; \textsuperscript{d}LEADER, France

12\textsuperscript{th} International Symposium on Urban Planning and Environment
1\textsuperscript{st} UPE Lusophone Symposium
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

1. Case study selection for Interview sites
2. Local workshops
3. Synthetic matrix => 3 LUC scenarios
4. Proposals towards spatial planning and territorial development decision-making

Interpreting results

GIS Spatial Analysis

Sociologic approach “co-active approach”

Validating and Discussing results

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

- 247,000 inhabitants

- Extending over 4,275 km²

- 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 to artificial LUC grew above average
c) Parishes were 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.
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

| Agriculture production | 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?  
| Commercialization | 4. How should small-circuit chains be valued?  
| | 5. How can small farmers compete large with supermarkets?  
| Natural resources and climate change | 6. How should natural resources be preserved and how should we adapt to climate change?  
| Land use access and management | 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? |
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)

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

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

- **Triggering legal provisions to reduce fluctuations in prices**
- **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**

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.
...And coffee-break!!!

patricia.abrantes@campus.ul.pt