Economical Success Factors of Pesticide Reduction in Grape Growing

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1. Introduction

Pesticides are the dominant technology, but problematic, in vineyard protection
- An intensive use of pesticides in grape growing (fungicides): 20% in volume for 3% of agricultural areas
- They cause many environmental and health problems

An increasing need of integrating environmental stakes in grape growing
- The institutional context is favorable to change :
  - 50 % by 2018 (Paillotin, 2008)
  - They are rejected by the society and consumers

The grape growers are embedded in a technological lock-in, as the other actors of the sector (Cowan and Gunby, 1996)

2. Theoretical framework

The determinants of environmental innovations:
conceptualization from two different frameworks

1. Introduction
2. Theoretical framework
3. Data & methods
4. Results & Discussion
5. Conclusion

The evolutionary framework about environmental innovations adoption and change

The literature about collective approaches and extension services in agriculture

Question:
What are the economical success factors of pesticide reduction in grape growing?
Technological change in vineyard protection to reduce pesticides used

**Definition and characterization through the concept of environmental innovation**
Renning, 2000

**Analysis of the evolutionary determinants of environmental innovations**
Oltra, 2008

Environmental regulation
- 50% of pesticides used by 2018

**Demand**
- From consumers
  - Bazochet et al., 2008

Technological opportunities
- Appropriation?

**LEARNING PROCESSES**
- Collective construction of innovations in agriculture
  - Labarthe, 2006
  - Darré, 1996

**Agricultural Economics**
- Characteristics of innovators/leaders in agriculture
  - Fernandez: Cornejo, 1998
  - Cazals, 2006

Economically, performance? (Alonso Ugaglia, 2011)

An example: Mildium®, an innovation to reduce fungicide use in grape growing

**Regression trees:**
- To explain the choice to implement Mildium® or not (= explaining the values taken by the dependant variable: \( PIMM \))
- To hierarchize the determinants of pesticide reduction

-C&RT method (Breiman et al., 1984; Ripley, 1996) via XLSTAT®

**Economical Success Factors of Pesticide Reduction in Grape Growing**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Ecart-type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>25</td>
<td>65</td>
<td>53.133</td>
<td>8.958</td>
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<tr>
<td>Area</td>
<td>3</td>
<td>200</td>
<td>35.533</td>
<td>32.117</td>
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<td>Labour Force</td>
<td>1</td>
<td>39</td>
<td>5.493</td>
<td>8.411</td>
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<tr>
<td>Turnover (K€)</td>
<td>5534</td>
<td>140807</td>
<td>2328,766</td>
<td>16237,932</td>
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<tr>
<td>Result (K€)</td>
<td>-453,757</td>
<td>38486</td>
<td>564,974</td>
<td>4445,617</td>
</tr>
</tbody>
</table>

**Qualitative variable**
- DEV: 0 49 65.3
- ACCOMP: 0 26 34.7
• Few growers agree with the adoption of Mildium® (because of the need of new skills and learning process, cf. Alonso Ugaglia, 2011)

• Importance of the extension services, particularly for growers who are not leaders

• To achieve the goal of -50% by 2018 : necessity to develop extension services for Mildium® or other methods

The goal of the paper was to better understand the determinants of pesticide reduction in grape growing

We highlight a hierarchy between determinants and major role of extension services

Some other questions still have to be adressed (other technologies, combination of technologies, structuration of extension services...)

Thanks for attention