Use of the French Land Parcel Identification System for inter farms new organisation design

Philippe Martin – Lucie Martin – Davide Rizzo – Elisa Marraccini
Inter farms new organization
A new perspective on natural resource management?

Cropping (farming) system design is the mainstream agronomic approach
Crop-livestock integration through cooperation among specialized farms
Crop-crop integration through dynamic field exchange among arable farms

from system agronomy to landscape agronomy

Goal: to observe of actual crop-crop integration in terms of field exchanges and to characterize new inter farms organization (cluster farming)

French LPIS to observe farm area dynamics

**materials**

LPIS – Land parcel identification system, the geographic database used to control the eligibility to Common Agricultural Policy subsidies

**Study period** 2007 – 2014

**Tool**: RPG Explorer\(^1\) (research software)

---

**method**

**FARM AREA DYNAMICS**

- **Stability**
- **Enlargement / reduction**
- **Reconfiguration** \(\rightarrow\) both gains and losses of fields between year \(n\) and year \(n+1\) keeping the same total farm area\(^2\)

---


Cluster farming to overcome crop constraints

Some crops have **high constraints** such as long return period and agronomic requirements (type of soil, preceding crop…).

To overcome these constraints, farmers may engage in temporary (dynamic) farm land reconfigurations. This results in what we call “**cluster farming**”

We focused on three “**special crops**” characterized by these constraints and a high added value.
Cluster farming

- Farm
- Bilateral exchange of fields
- One-side transfer of fields

Hub farm

Hub farm's partners

Satellite farms
  (level 1)
  (level x)

Field = French LPIS farmers' block

ESA CONGRESS 2018 – MARTIN et al. – PS-9.1-04
Study areas => special crops ha

2 small agricultural regions (SAR)

Focus on farms undergoing a reconfiguration at least 5 years in the study period

Hub farms and partners both grow “special crop”

<table>
<thead>
<tr>
<th></th>
<th>Vexin N.</th>
<th>Soissonais</th>
<th>France</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cropland, ha (LPIS 2016)</td>
<td>38 630</td>
<td>88 755</td>
<td>(SAA 2016)</td>
</tr>
<tr>
<td>Flax</td>
<td>7.11%</td>
<td>0.84 %</td>
<td>0.05 %</td>
</tr>
<tr>
<td>Potato</td>
<td>3.20 %</td>
<td>3.11 %</td>
<td>0.80 %</td>
</tr>
<tr>
<td>Sugar beet</td>
<td>8.55 %</td>
<td>16.65 %</td>
<td>2.00 %</td>
</tr>
<tr>
<td>N. of farms (LPIS 2014)</td>
<td>237</td>
<td>761</td>
<td></td>
</tr>
</tbody>
</table>
Results
Observations of farm reconfigurations (LPIS data)

<table>
<thead>
<tr>
<th>Farms</th>
<th>total</th>
<th>Vexin Normand</th>
<th>Soissonnais</th>
</tr>
</thead>
<tbody>
<tr>
<td>... with reconfiguration</td>
<td>43</td>
<td>18 %</td>
<td>103</td>
</tr>
</tbody>
</table>
Reconfigurations increase with flax area

Reconfiguration dynamics appears proportional to length of the return period

% of special crop in farm's crop rotation

Vexin Normand area, 43 farms
### Observations of farm reconfigurations (LPIS data)

<table>
<thead>
<tr>
<th></th>
<th>Vexin Normand</th>
<th>Soissonnais</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Farms</strong></td>
<td>total</td>
<td>237</td>
</tr>
<tr>
<td>... with reconfiguration (% on total)</td>
<td>43 (18 %)</td>
<td>103 (14 %)</td>
</tr>
<tr>
<td>... with reconfiguration at least 5 out of 7 years</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td><strong>Cluster farming</strong></td>
<td>Number</td>
<td>12</td>
</tr>
<tr>
<td>Farms included</td>
<td>91</td>
<td>138</td>
</tr>
<tr>
<td>Min - max</td>
<td>2 - 18</td>
<td>2 - 24</td>
</tr>
</tbody>
</table>

Farms with reconfigurations might be part of the same cluster.

**Hub farms** have high number of reconfigurations:
- **Vexin**: 66 % of the cases
- **Soissonnais**: 100% of the cases

High variability of the number of farms by cluster.
Cluster farming (example from Vexin Normand)

Total exchanged area: 7.2 ha 7 years out of 7

<table>
<thead>
<tr>
<th></th>
<th>Total hectares</th>
<th>Flax (% tot)</th>
<th>Potato (% tot)</th>
<th>Sugar beet (% tot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub farm</td>
<td>147</td>
<td>23.0 (16 %)</td>
<td>-</td>
<td>11 (7 %)</td>
</tr>
<tr>
<td>Partner 1</td>
<td>285</td>
<td>12.5 (4 %)</td>
<td>49 (17 %)</td>
<td>40 (14 %)</td>
</tr>
</tbody>
</table>

Year N → Year N+1

<table>
<thead>
<tr>
<th>Exchange of fields</th>
<th>Year N</th>
<th>Year N+1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub farm -&gt; Partner 1</td>
<td>Flax (1/7 years)</td>
<td>Potato (7/7 years)</td>
</tr>
<tr>
<td>Partner 1 -&gt; Hub farm</td>
<td>Potato (7/7 years)</td>
<td>Flax (2/7 years)</td>
</tr>
</tbody>
</table>
Cluster farming: a first typology

Criteria used to characterize the observed dynamics

- Number of involved farms
- Special crop area
- Bilateral exchange of fields:
  - Average
  - Frequency

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub farm AND partners</td>
<td>the same</td>
<td>36.0 %</td>
<td>44 %</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>not the same</td>
<td>27.0 %</td>
<td>6 %</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>several</td>
<td>18.5 %</td>
<td>33 %</td>
<td>+++</td>
</tr>
<tr>
<td>Hub farm OR partners</td>
<td>One or several</td>
<td>18.5 %</td>
<td>17 %</td>
<td>+++</td>
</tr>
</tbody>
</table>

Wide variability of the number of farms for each type

Activities

• Number of involved farms
• Special crop area
• Bilateral exchange of fields:
  ➢ Average
  ➢ Frequency
Discussion et conclusion

Cluster farming is real and we can observe it with available databases (LPIS for European level)

Though, we need on-farm surveys to understand the underpinning rational

Special crops have a role in cluster constitution for farms with a high number of reconfigurations

In perspective, could we pick environmental relevant crops to design new clusters?
Thanks for your attention

Any question?

Reconfigurations increase with flax and potato areas

Reconfiguration dynamics appears proportional to length of the return period

Soissonnais area, 103 farms