Success and failure factors of crop diversification across Europe

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DiverIMPACTS project

- Diversification through Rotation, Intercropping, Multiple Cropping, Promoted with Actors and value-Chains towards Sustainability

- Horizon 2020 research project (RUR-06-2016)
- 2016-2021
- 34 partners across Europe, coordinated by Antoine Messéan, INRA
Survey was conducted with local experts (advisors, researchers, farmers, etc.) between **Januar-April 2018** to document CDEs.

**Rotation, Intercropping, Multiple Cropping** in arable production.

**Aims of analyses:**

a) **List of success and failure factors of experiences**

b) **Understanding connections between these factors and the main characteristics of Crop Diversification Experiences**
About the survey

• Lime Survey tool was used
• Survey had 3 sections, 72 questions and subquestions:
  a) Section A: **Description** of CDE (34 questions)
  b) Section B: **Evaluation** of CDE (24 questions)
  c) Section C: **Dynamics** of CDE (14 questions)

Lot of conditional questions, only few open-end questions.
### 3. Dynamics of your diversification initiative

3.4 Did the diversification initiative encounter any drawbacks or enablers during its lifetime? Please rate the following potential drawbacks/enablers on both scales.

<table>
<thead>
<tr>
<th></th>
<th>Drawbacks</th>
<th>Enablers</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>slightly relevant</td>
<td>moderately relevant</td>
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<tr>
<td>Agronomic (e.g., water availability)</td>
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<tr>
<td>Economic (e.g., product price)</td>
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<td>Public policy (e.g., regulations)</td>
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<td>Personal interactions (e.g., teamwork)</td>
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Results & Statistics

• **129 valid responses** were received from **15 European countries**: Belgium, France, Germany, Hungary, Italy, the Netherlands, Poland, Romania, Sweden, Switzerland, and UK, but also from Denmark, Finland, Luxemburg and Spain.

• Statistics were performed with SPSS Version 22
  
a) Spearman’s Correlations (relations between variables)
   b) Kruskal Wallis H test (differences between variable groups)
   c) Two-step cluster analysis (grouping of dataset according to factors)
Certification status of CDE areas

- **No, the area was not certified organic**: 52 (41.27%)
- **No, the area was not certified organic, but no pesticide and chemical fertilizers were applied**: 6 (4.76%)
- **Yes, the area was certified organic completely**: 48 (38.10%)
- **Both organic and non-organic areas were involved**: 20 (15.87%)
Diversification status before the reported crop diversification initiative

![Bar chart showing the diversification status among different farming practices.](chart.png)
Introduced types of diversification

- Rotation: 65 (51.59%)
- Multicropping: 15 (11.90%)
- Intercropping: 20 (15.87%)
- Rotation and Multicropping: 9 (7.14%)
- Multicropping and Intercropping: 1 (0.79%)
- Rotation and Intercropping: 5 (3.97%)
- All: 11 (8.73%)
Regional distribution of CDEs

Regions of Europe according to the UN (source: Wikimedia)
Was the CDE successful? Self evaluation

- Not at all successful: 1 (0.79%)
- Slightly successful: 13 (10.32%)
- Moderately successful: 28 (22.22%)
- Successful: 73 (57.94%)
- Overwhelmingly successful: 11 (8.73%)
1. Environmental preservation (62% of CDEs)

2. Improved crop production stability (52% of CDEs)

3. Higher economic income (52% of CDEs)
More targeted outcomes, higher success

Spearman’s Rho: 0.238**
Correlation is significant at the 0.01 level

<table>
<thead>
<tr>
<th>Number of selected targeted outcomes</th>
<th>Mean success rating of targeted outcomes</th>
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Spearman’s Rho: $0.238^{**}$
Correlation is significant at the 0.01 level
Factors of failure and success
Experienced drawbacks and enablers

- Personal interactions play a key role!
### Relevance of drawbacks and enablers I

- **Western European CDEs**: drawbacks moderately relevant, enablers very to slightly relevant.

- **Eastern European CDEs**: drawback and enablers both overwhelmingly relevant.

- **Northern European CDEs**: drawback and enablers both lowest relevance.

- **Southern European CDEs**: drawbacks and enablers mostly considerably relevant.

### Drawbacks

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<tr>
<th>Region</th>
<th>Size</th>
<th>1.2 Regions</th>
<th>3.4Dm</th>
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<tbody>
<tr>
<td>West</td>
<td>42.1% (53)</td>
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<tr>
<td>East</td>
<td>26.2% (33)</td>
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<tr>
<td>South</td>
<td>17.5% (22)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>North</td>
<td>14.3% (10)</td>
<td>1</td>
<td>2</td>
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### Enablers

<table>
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<th>1.2 Regions</th>
<th>3.4Enm</th>
</tr>
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<tbody>
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<tr>
<td>East</td>
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Environmental preservation – target reached?

• Vast majority of **rotation-only initiatives** show the lowest improved environmental preservation

• CDEs that **combined all three diversification types**, rotation, multicropping and intercropping, have the **highest value** for improvement of environmental preservation

• Rotation-only type was more common in **non-organic** CDEs
Conclusions I

• The more targeted outcomes, the higher success evaluation, and the better distribution of results to practice

• People are the most important success factors – Professional knowledge, engagement, cooperation

• The more types of actors involved, the better dissemination to practice (initiatives from Western Europe were the most successful in up-scaling)
• The most important **drawbacks** are **economic**, **market** and **policy** related.

• **East European initiatives** have evaluated enablers and drawbacks as very important factors. **North European** have evaluated both as not so important.

• **Rotation-only** initiatives show the lowest improved environmental preservation CDEs that **combined all three diversification types** show the highest.
Thank you for your attention!

Dóra Mészáros
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on behalf of

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