Conservation Agriculture in Organic Farming
Motivations of European Farmers and Diversity of Practices

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Outline of the presentation

• Context
• Material and methods
• Results
  – Farmers’ motivations and problems
  – Diversity of practices in Europe
• Conclusion
Context of TILMAN-Org Project

• Conservation agriculture and organic farming

Minimum soil disturbance  
Permanent soil cover  
Diversified crop rotation

• Constraints of application
• TILMAN-ORG project
Context of TILMAN Survey

• Survey: Current farmers’ practices in Europe?

Green manure (GM)

Reduced tillage (RT)
No tillage (NT)

• Objectives of the survey
  – Motivations and problems
  – Diversity of practices
  – Farmers’ profiles
Material and methods
Farmers’ questionnaires

- List of 12 possible motivations and problems for each technique
- Lickert scale ranging from 1 to 5

Example: motivation for applying GM « improving general biodiversity »

<table>
<thead>
<tr>
<th>Not at all important</th>
<th>Of minor importance</th>
<th>Moderately Important</th>
<th>Very important</th>
<th>Extremely important</th>
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Material and methods
Farmers’ questionnaires

- Crop management
- Statistical analysis

Farmers’ profiles of crop management

Winter crop
Spring crop

Before sowing
After harvest

PRACTICES

CORE organic II

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Results
Interviewed farmers

- 10 countries
- 159 farmers
Results

Conservation practices

% of the total interviewed farmers

- no tillage
- reduced tillage
- green manure

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### Results

Main motivations and problems

- **No Tillage, Reduced Tillage** and **Green Manure**

<table>
<thead>
<tr>
<th>MOTIVATIONS</th>
<th>Soil conservation</th>
<th>Environment</th>
<th>Agronomic conditions &amp; crop management</th>
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</thead>
</table>
| Socio-economics | • Improving soil structure  
                   • Improving biological soil quality  
                   • Limiting soil erosion  
                   • Increasing soil OM | • Limiting N leaching  
                   • Improving biodiversity | • Limiting weeds, pest and diseases |
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                   • Improving biological soil quality  
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<tr>
<th>PROBLEMS</th>
<th>Soil conservation</th>
<th>Technical limits</th>
<th>Agronomic conditions &amp; crop management</th>
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</table>
| Socio-economics | • Increasing labor requirements  
                   • Yield stability | • Machinery | • Weed infestation and management  
                   • Destroying preceding crop and/or green manure |
| Soil conservation | • Improving soil structure  
                   • Improving biological soil quality  
                   • Limiting soil erosion  
                   • Increasing soil OM | • Machinery | • Weed infestation and management  
                   • Destroying preceding crop and/or green manure |
| Technical limits | • Improving soil structure  
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                   • Destroying preceding crop and/or green manure |

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Results

Main motivations and problems

• 2 main types of farmers:
  – Soil conservationists
  – Agro-technically challenged
Results
Winter crops: management options

117 farmers

<table>
<thead>
<tr>
<th>Month</th>
<th>Action</th>
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<tbody>
<tr>
<td>Aug</td>
<td>Sowing</td>
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<tr>
<td>Sep</td>
<td>Destroying</td>
</tr>
<tr>
<td>Oct</td>
<td>Tillage: Stubble tillage, ploughing, non-inversion, weeding</td>
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<tr>
<td>Nov</td>
<td>Weeding</td>
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<tr>
<td>Dec</td>
<td>Harvest</td>
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<tr>
<td>Jan</td>
<td>Sowing with main crop</td>
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<tr>
<td>Feb</td>
<td>Weeding</td>
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<tr>
<td>Mar</td>
<td>Destroying</td>
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<tr>
<td>Apr</td>
<td>Left as cover crop</td>
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<tr>
<td>May</td>
<td>Sowing of new cover crop</td>
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<td>June</td>
<td>Intercrop as cover crop</td>
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<td>July</td>
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Results

Spring crops: management options

125 farmers

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<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
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**Green manure**
- Sowing
- Destroying

**Tillage**
- Stubble tillage, ploughing, non-inversion, weeding

**Main crop**
- Sowing
- Weeding
- Harvest

**Intercrop**
- Sowing with main crop
- Undersown
- Destroying
- Left as cover crop

**Cover crop**
- Intercrop as cover crop
- Sowing of new cover crop

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• 2 main types of farmers:
  – Low soil cover farmers
  – Soil conservationists

**Results**

Farmers’ profiles for crop management

- **Spring Crops (n=14)**
  - Green manure before main crop
  - Intercrop and/or cover crop
  - Estonia, Northern farms
  - High tillage frequency with shallow management
  - Low weeding frequency before and during crop cycle

- **Winter Crops (n=55)**
  - Intercrop and cover crop
  - Soil conservationists
  - France, Austria, Switzerland
  - No or reduced tillage
  - Combined seeder
  - Leguminous intercropping

- **Spring Crops (n=55)**
  - No green manure before main crop
  - No intercrop or cover crop
  - Group 1 (n=27)
    - Other countries
    - High tillage frequency, shallow management
    - No ploughing
  - Group 2 (n=24)
    - Germany, SW Others
    - High rainfall, low rainfall
    - High weeding frequency before and during crop cycle
    - No ploughing

- **Winter Crops**
  - No ploughing
  - High tillage with shallow management
  - Low weeding frequency before and during crop cycle
  - Group 1 (n=27)
    - Other countries
    - No or reduced tillage
  - Group 2 (n=14)
    - Estonia, Spain
    - Combined seeder
    - Leguminous intercropping
  - Group 3 (n=21)
    - Other countries
    - Undersowing of intercrop

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Conclusion and perspectives

• First overview of European practices
• Results are dependant on farm location

• Problems => challenges for further research

• Diversity of practices is inspiring for designing new cropping systems that combine CA and OF