Grain legumes
Chances of Protein Supply and Innovative Cropping Systems

Improving European Plant Protein Supplies
European Parliament – Brussels

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Structure

1. Evolution of production areas
2. Benefits of legumes for food
3. Benefits of legumes in innovative cropping systems
4. Limitation: Registration of pesticides
5. Limitation: Market for conventional farming
6. Recommendation for EU policy
Evolution of production areas

Production areas within selected EU-member states
Peas, Beans, Lupins and Soy

Source: Eurostat, 2016
EU-27 Imbalance for protein rich feed materials 2012/2013
Demand of arable land outside the EU: 28-30 Mio ha

Evolution of production areas

Quelle: Feed & Food Statistical Yearbook 2014
• Slightly increasing cultivated area since CAP-reform in 2014 due to “Greening”
• Organic farmers usually have maximized the proportion of legumes in their crop rotations
• Therefore a significant additional growth of the production area can only be initiated by conventional farmers
• A higher weighting factor of nitrogen-fixing crops for the ecological focus area (1:1 instead of 0.7:1) would encourage farmers to grow more Grain Legumes (1,0 m² legumes = 1 m² EFA)
Benefits of legumes for food

Health benefits for human nutrition become more and more popular:

– Promoting a feeling of satiety
– Lowering blood pressure
– Substitution of carbohydrate in cereal flour
– Reduction of cholesterol synthesis and cancer risk
– Relevant source for:  - Magnesium (Mg)
                          - Iron (Fe)
                          - Zinc (Zn)
                          - Vitamine B, E
                          - Carotinoids

Conclusion:
Increasing market for innovative food with legume protein!
### Benefits of legumes for food

Substitution of meat by legume proteins enhance water- and fuel-efficiency and reduce GHG emissions

<table>
<thead>
<tr>
<th>Foodstuff</th>
<th>GHG emissions [kg CO$_2$e]</th>
<th>Water footprint [l/kg]</th>
<th>Fossil fuel input [MJ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>6.3-37</td>
<td>15,500</td>
<td>15-56</td>
</tr>
<tr>
<td>Pig meat</td>
<td>3.6-6.4</td>
<td>4,460-4,900</td>
<td>17-21,1</td>
</tr>
<tr>
<td>Poultry</td>
<td>1.1-4.6</td>
<td>2,390-4,500</td>
<td>12-25</td>
</tr>
<tr>
<td>Soy beans</td>
<td>0.9</td>
<td>1,800</td>
<td>5.9</td>
</tr>
<tr>
<td>Wheat</td>
<td>0.3</td>
<td>1,300</td>
<td>2.1-2.8</td>
</tr>
</tbody>
</table>

**Conclusion:**
Grain Legumes support benefits and enhance sustainability of human nutrition

Source: EP, STOA 2009
Benefits of legumes in innovative cropping systems

GHG-Potential by cultivating faba beans and oats
Trial-Farm Merklingsen (Soester Börde) 2013

Source: unpublished Lütke Börding 2013
Benefits of legumes in innovative cropping systems

- Reduction of input requirements:
  - fertilizer
  - pesticides
  - tillage
  
  Reduction of energy costs → minimize greenhouse gas production

- Important element of breaking up crop rotations

- Yield enhancement of subsequent crops

- Improving soil structure and root growth → Support resource-saving measures like direct or mulch sowing

- Breaking of pest cycles

- Enhancement of Biodiversity

- Positive effects on earthworm population
Benefits of legumes in innovative cropping systems

- Conservation tillage
  - Widening of crop rotation
  - No ploughing necessary

- Significant savings of pesticides compared to other crops

- Legumes can help to avoid increasing resistance problems with pesticides especially with weeds e.g. Black grass

Conclusion:
Grain Legumes enhance the sustainability of innovative cropping systems
Benefits of legumes in innovative cropping systems

Effects of different crop rotations and tillage on weed density

Source: Verschwele 2013, JKI
Limitation: Registration of pesticides

For example Germany:

- **Herbicides**: only a few herbicides against dicotyledonous weeds in peas and faba beans, in future no postemergence agents:
  - **Bentazon**: no reregistration
  - **Prosulfocarb, Pendimethalin, Aclonifen**: reregistration uncertain
  - **Clomazone**: registration with high restrictions

- **Insecticides**:
  - **Pirimicarb**: no reregistration in Grain Legumes - no effective instrument to control *Aphis fabae* (Aphid) in faba beans
Limitation: market for conventional farming

- Weak competitiveness
- Low market prices (often below the feed value)
- No sufficient mass for special market segments
- Uncertain knowledge about application possibilities
- Soy is standard, quality is well known, good availability
- Missing or intransparent value chain
Recommendation for EU policy

1. Simplification and harmonisation of pesticide registration

2. Increase the weighting factor of ecological focus area for Grain Legumes up 1:1

3. Promotion of new value chains especially for innovative food

4. Incentivise the substitution of oversea soy by use of Grain Legumes from the EU
Thank you for your attention!