# Results of the protein crops FG

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# The challenge: EU balance of protein rich feed

72% of feed stuff is EU produced

| Raw material | EU production | | EU consumption | | self-sufficiency |
|---|---|---|---|---|---|
| | products | proteins | products | proteins | % |
| Soyabeans / meal | 1.189 | 452 | 34.134 | 15.904 | 2,8% |
| Rapeseed and sunflower seed / meals | 27.481 | 5.213 | 19.721 | 6.329 | 82,4% |
| Pulses | 3.045 | 670 | 2.800 | 616 | 108,8% |
| Dried forage | 4.056 | 771 | 3.900 | 741 | 104,0% |
| Miscellaneous | 2.877 | 654 | 5.859 | 1.260 | 51,9% |
| sub-total | 38.648 | 7.760 | 66.414 | 24.850 | 31,2% |
| fish-meal | 398 | 275 | 599 | 433 | 63,5% |
| total | 39.046 | 8.035 | 67.013 | 25.283 | 31,8% |

Source: FEFAC/PROLEA, 2012 data

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# Value of soya

- High protein content
- High (ileal) digestibility of lysine
- Low competitiveness of European alternatives
- Availability of large and reliable volumes to the industry

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# Quality of protein crops

| Crop | Amino acid content of protein (%) | | | | Protein content of co-product (%, DM basis |
|---|---|---|---|---|---|
| | Lysine | Methionine | Cysteine | (M+C)/L | |
| Soya | 6.3 | 1.4 | 1.6 | 48 | 53% |
| Rapeseed | 5.5 | 2.1 | 2.2 | 79 | 40% |
| Sunflower | 3.9 | 2.0 | 1.8 | 97 | 33% |
| Lupin | 4.5 | 0.6 | 1.2 | 40 | 42% |
| Pea | 7.2 | 1.0 | 1.4 | 33 | 49% |
| Faba bean | 6.3 | 0.8 | 1.2 | 32 | 52% |
| Maize | 3.1 | 2.1 | 2.0 | 132 | 34% |
| Wheat | 2.9 | 1.6 | 2.0 | 124 | 41% |

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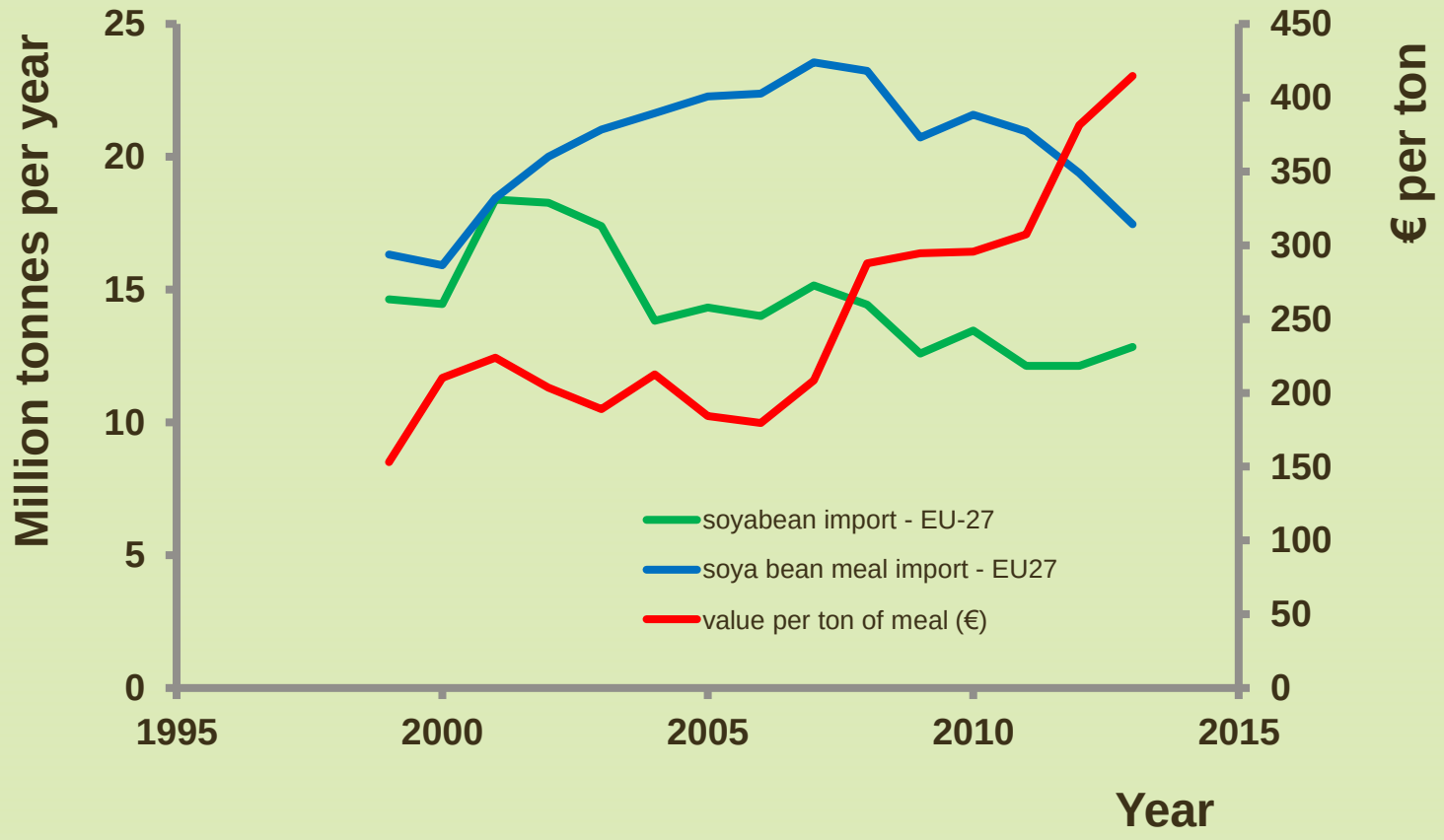
# EU soya imports and CBOT prices

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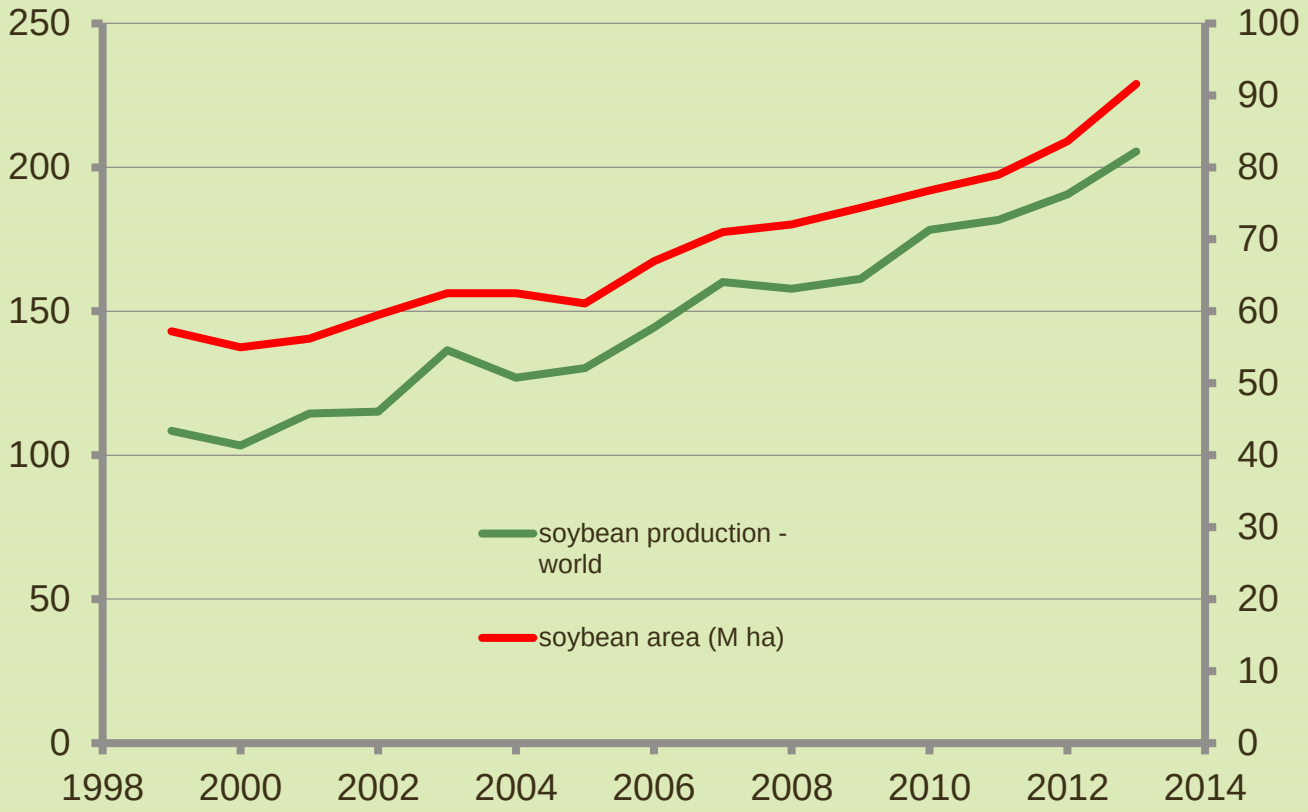
# Worldwide soybean production

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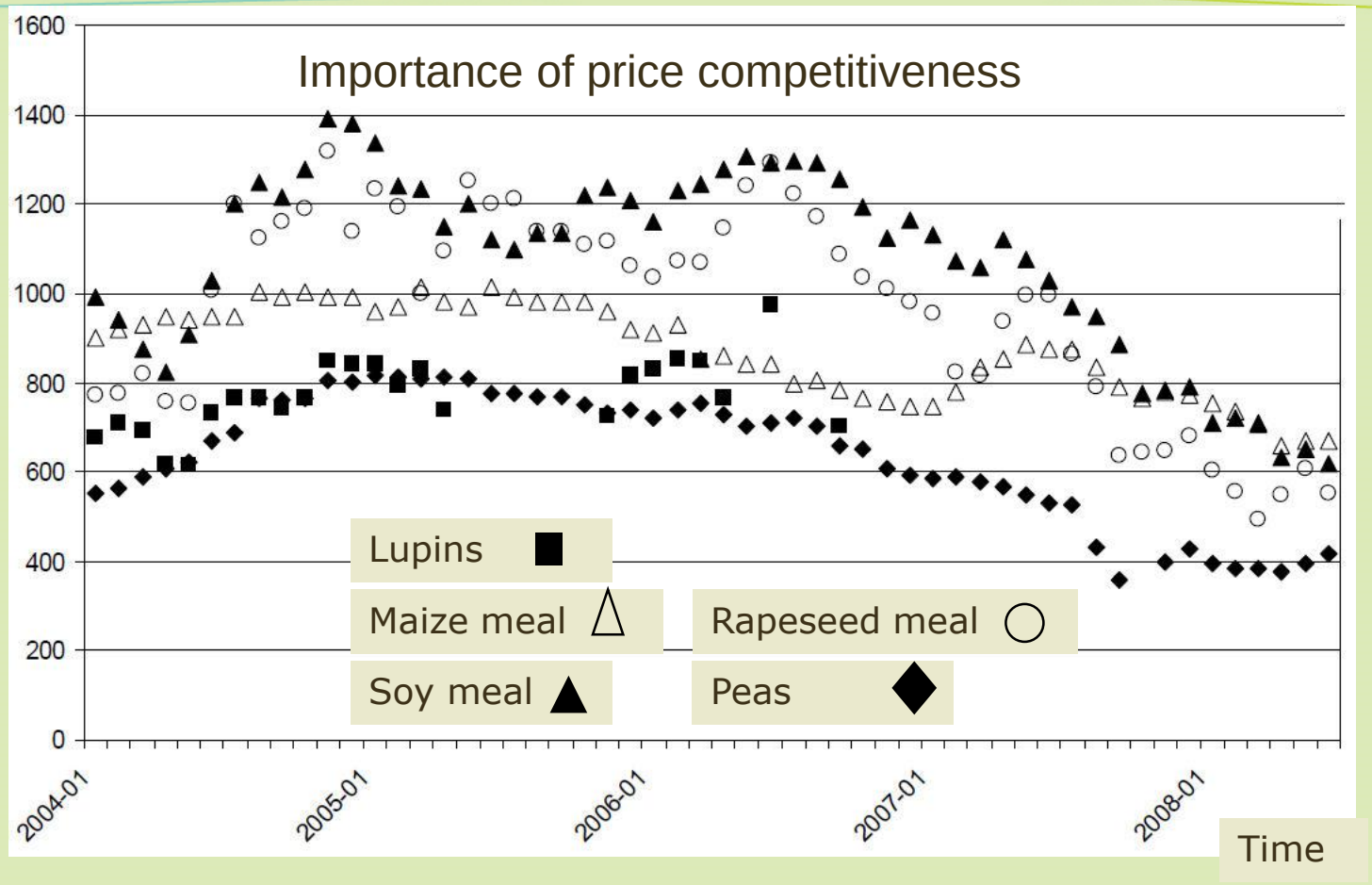
# Ratio digestibility/price level




Source: Kamp et al, 2008

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# Task of the focus group

- Analysing the demand for protein crops in Europe
- Assessing the potential of relevant crops and forage which are rich in protein.
- Looking into the value of protein crops in the crop rotation
- Suggesting how to increase productivity and protein content of protein crops

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# The route to the end report

- Experts from 11 EU countries
- Workshop Oss September 2013 (Agrifirm)
  - Constraints and opportunities
- Housework:
  - Elaboration on constraints
- Workshop Valladolid January 2014 (CARTIF)
  - Innovation challenges
- Reporting

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# The results

- Constraints and opportunities
- Breeding chain and genomics
- Yield improvement and stability
- Transition: developing or adapting a value chain
- Crop diversity
- Mixed cropping
- Extension and farmer's unfamiliarity with protein crops
- Diversification of the livestock chain
- Sustainability and transparency demands.

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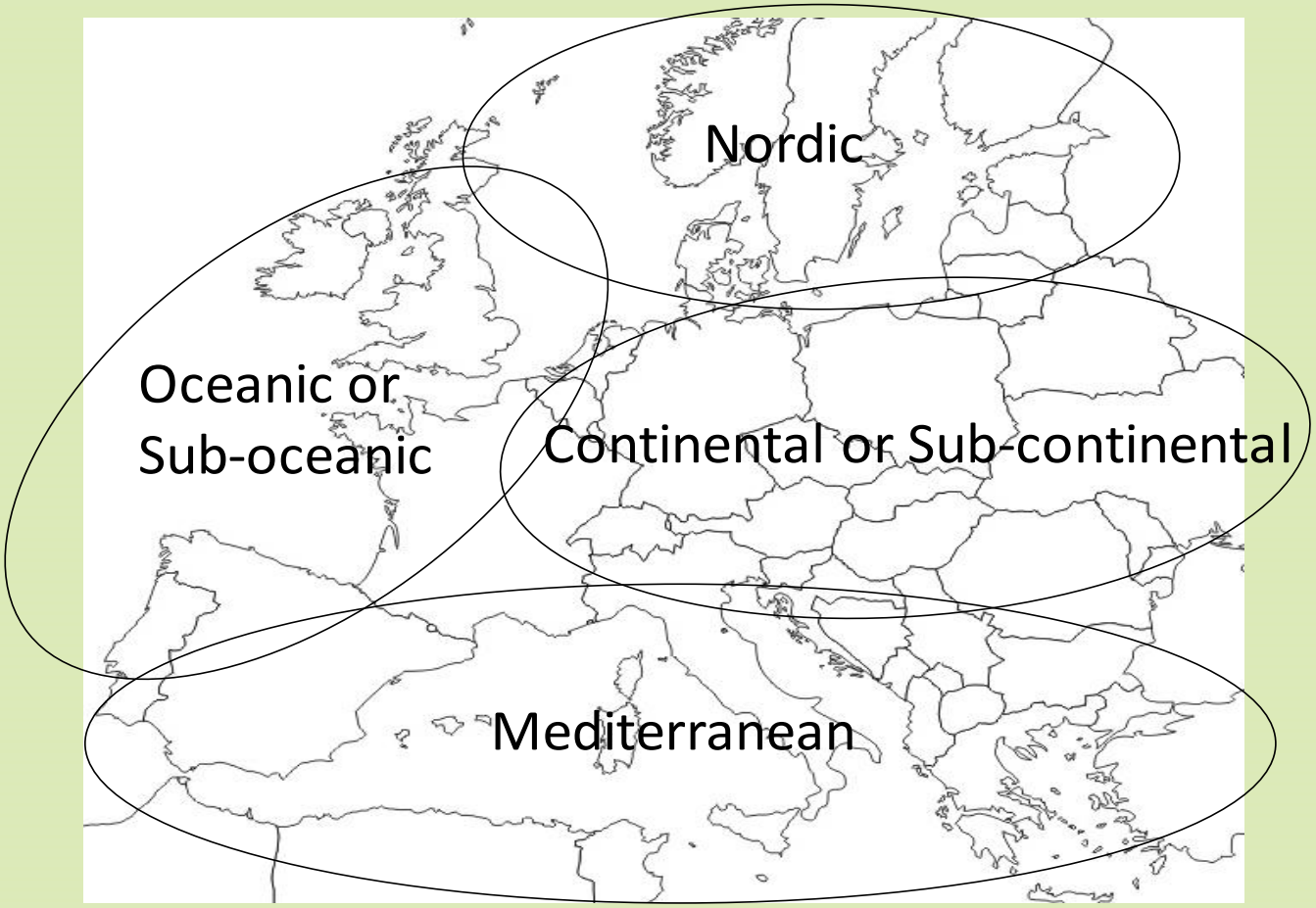
# Diversity in Europe

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# Scale level and value chain


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# Indication of yield gap: crop competetiveness

| crop | actual yield (t/ha) | increased yield (t/ha) benchmark wheat | maize |
|---|---|---|---|
| Soya | 2,7 | 3,4 | 4,3 |
| Rape | 3,1 | 3,1 | 3,9 |
| Sunflower | 2,2 | 2,7 | 3,4 |
| Lupin | 1,0 | 4,1 | 5,1 |
| Pea | 2,7 | 4,8 | 6,0 |
| Field bean | 2,7 | 4,5 | 5,7 |
| Alfalfa | 40,2 | 43,6 | 54,5 |

Remarks:
- Rough indications
- Large variety from region to region

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# Considerations from the group

- Breeding:
  - Commercial breeding and market: chicken and egg
  - Public breeding to fill the gap
- Agronomy
  - Mixed cropping
  - Protein crops and rotations
  - Nitrogen and soil management
- Extension
  - Adoption depending on financial returns
  - Learning curve support through exchange of information

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# Consumers and sustainability

- Non-GM could be supporting the transition
- Indirect land-use change effects to be considered
- Integral sustainability on inputs (water, nutrients, surface, energy)
- GHG emission reduction?

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# Status in research on PC

- Large number of EU or country funded research projects identified
- Competitiveness and yield seldom the primary issue
- What is the cohesive strategy behind these projects?

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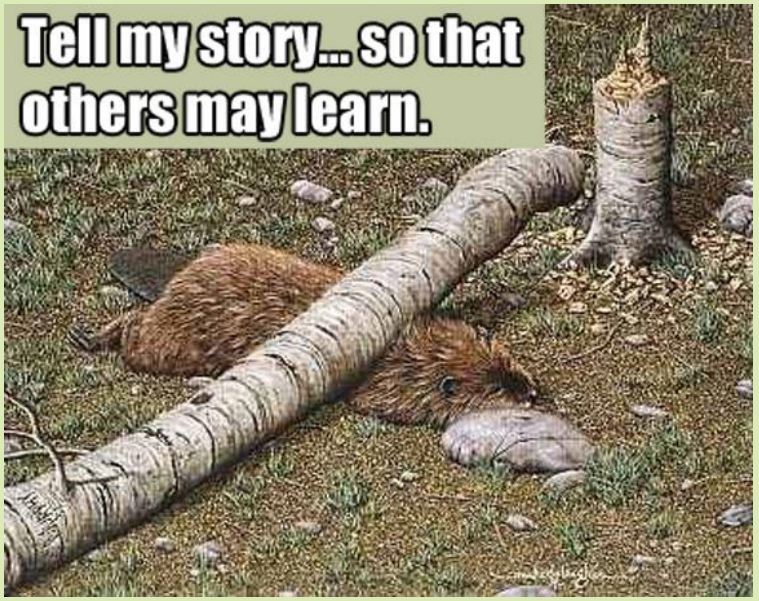
# Fail factors of innovation systems

- Knowledge infrastructure;
- Physical infrastructure;
- Legislation and regulation;
- Values, norms and symbols;
- Interaction;
- Market structure

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# Knowledge infrastructure

- Knowledge needed on:
  - Breeding and genetic diversity
  - Agronomy on crop and farm level
  - Potential of improvements in processing
- Distinguish between monogastrics and ruminants
- Combining knowledge: institutes, companies, farmers

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# Physical infrastructure

- Farm machinery
- Processing capacity installed
- Storage capacity
- Scaling up production and processing
- On-farm production of protein crops
- Leap in development: from local to industrial

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# Values and beliefs

- Non-GM: no issue from the viewpoint of breeding
- Non-GM: valuable as stepping stone in the development
- Protein crops could support sustainability of intensive farming systems
- European protein crops can be competitive

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# Co-operation and interaction

- Coherent R&D program required to tackle the challenge
- All chain partners and stakeholders to be involved
- Making use of knowledge throughout the value chain
- Exchange information, experience and knowledge

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# Market structure

- European future price level for protein crops
- Different scale levels depending on markets
  - How will consumer prerence develop?
- EU: low home-grown volumes and large demand
  - How to gradually match supply and demand?

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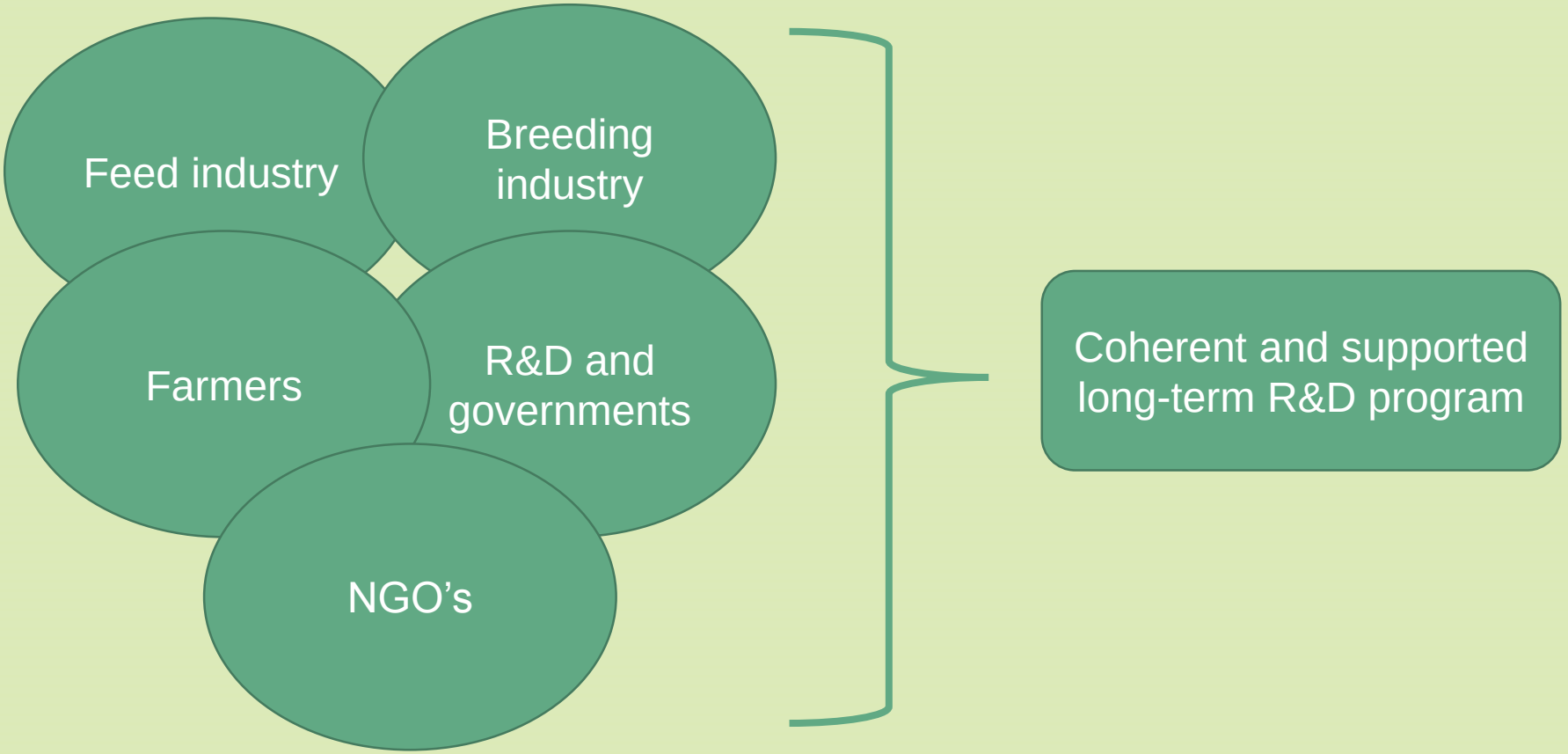
# Conclusion: integral approach

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