Focus Group ‘Production of protein crops under climate change’

Berlin, Germany
20-21 November 2024

Starting paper and results of the inventory

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European CAP Network
Innovation & Knowledge Exchange I EIP-AGRI

Focus Group 'Production of protein crops under climate change' 1st meeting | Berlin, Germany | 20 November 2024

Focus Group 53

Production of protein crops under climate change

Starting paper and results of the inventory

First meeting
20-21 November 2024
Berlin

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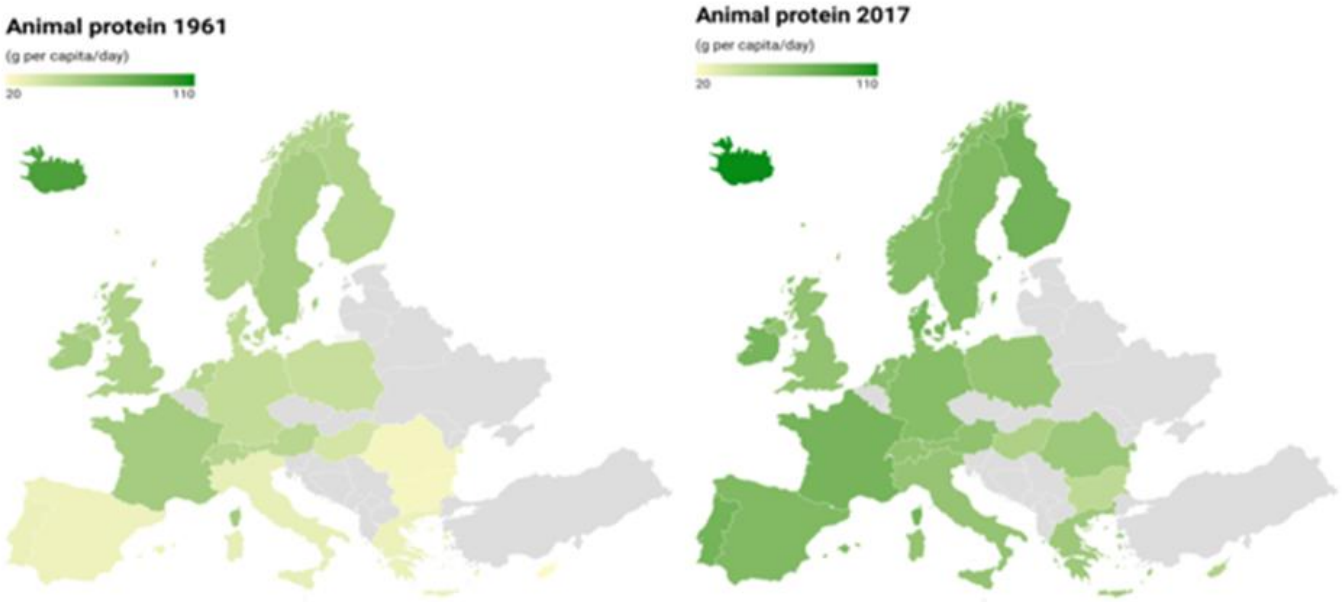
Focus Group 53

How to increase European plant protein self-sufficiency by integrating sustainable production of plant-based protein in different value chains and regions, taking climate change into account?

- identify examples of new, existing and forgotten protein crop cultivation in the EU;
- map the potential and challenges of protein crop cultivation and value chain development in different EU regions;
- assess the effect of the most promising good agricultural practices on environment, farm productivity and profitability, and identify barriers to their implementation;
- discuss solutions and explore the role of innovation and knowledge exchange in addressing the challenges identified;
- propose potential innovative actions and ideas for Operational Groups to stimulate the use and improvement of robustness-related practices at field and farm level;
- Identify needs from practice and possible gaps in knowledge which may be solved by further research.

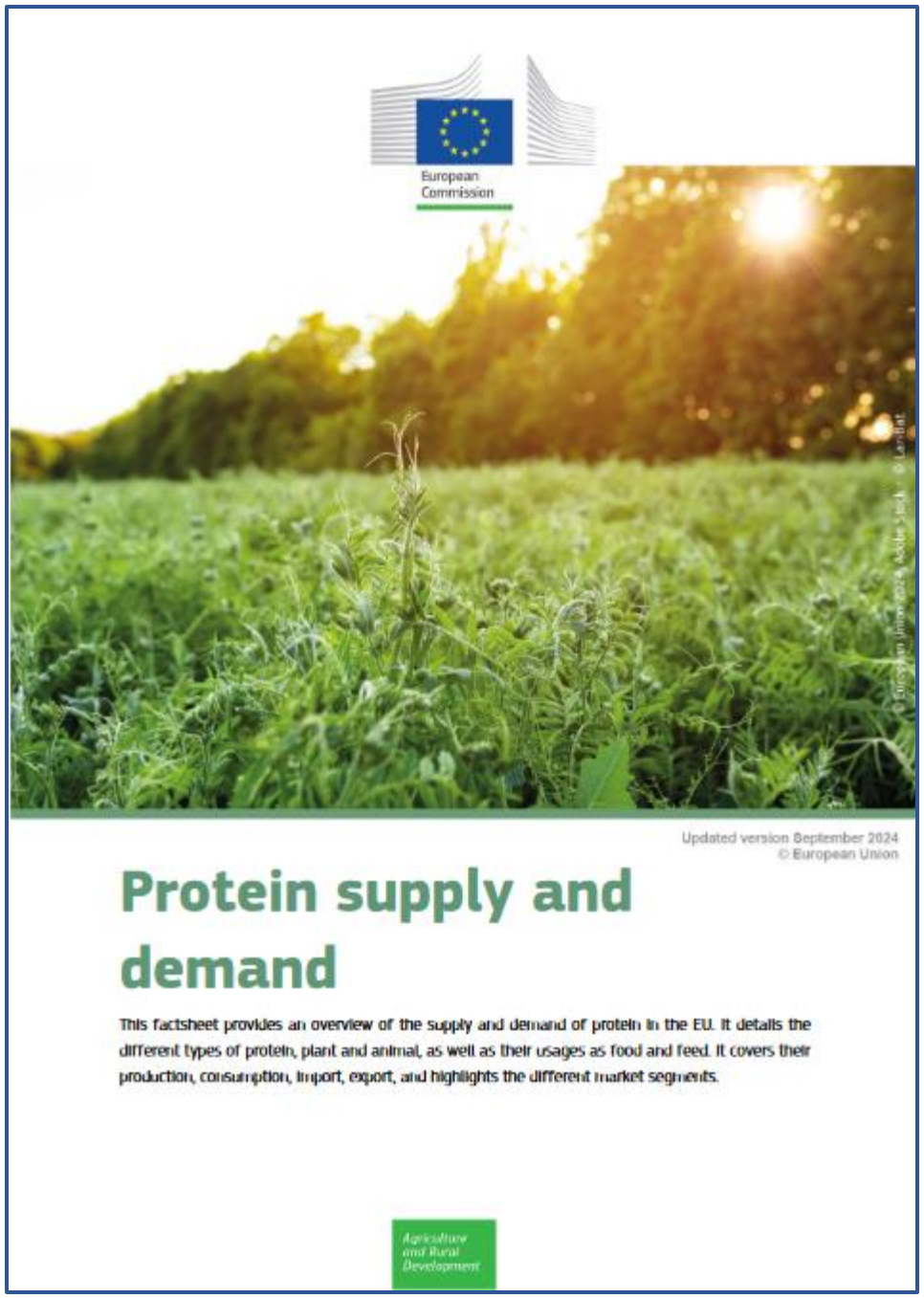
The challenges of increasing protein crop production in the EU are diverse - therefore the possible solutions also need to be diverse

Historic development: Protein crops in the EU



Comparison of the animal protein consumption in Europe between 1961 and 2017. Source: PROCHAZKA, Petr, et al. Protein consumption in Europe: Sustainability, tradition, and policy implications. Sustainable Development, 2024.

- Consumption of animal proteins increased
- Consumption of plant proteins decreased
- Import of protein feed increased



Protein crops in the EU today

Factsheet: Supply and demand of proteins for food and feed

8 OCTOBER 2024

Protein crops in the EU today – Production

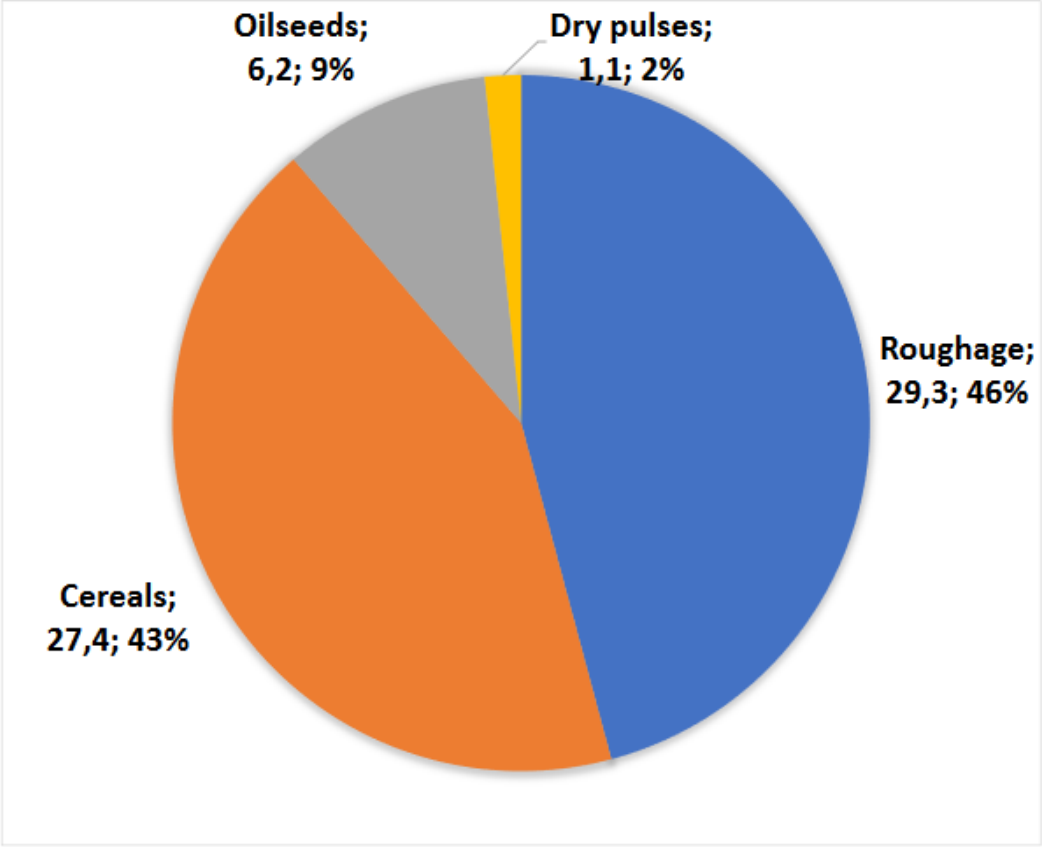


Figure 2: EU plant protein production in marketing year 2023/24 (million tonnes of crude protein and share)

Source: DG AGRI/EUROSTAT/MS

Protein crops in the EU today – Food versus feed

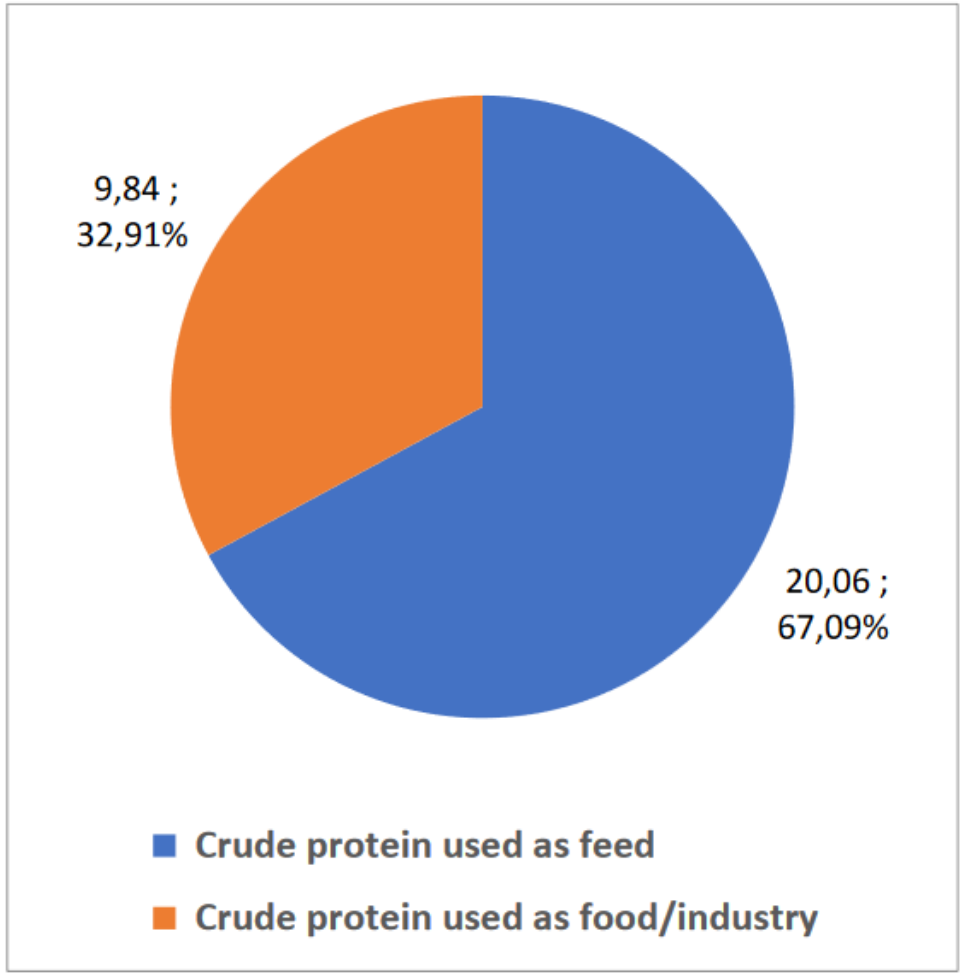


Figure 11: Crude protein of crops produced and used in the EU (million tonnes and share)

Source: DG AGRI - EU Feed Protein Balance Sheet –2022/23

Protein crops in the EU today – Food versus feed

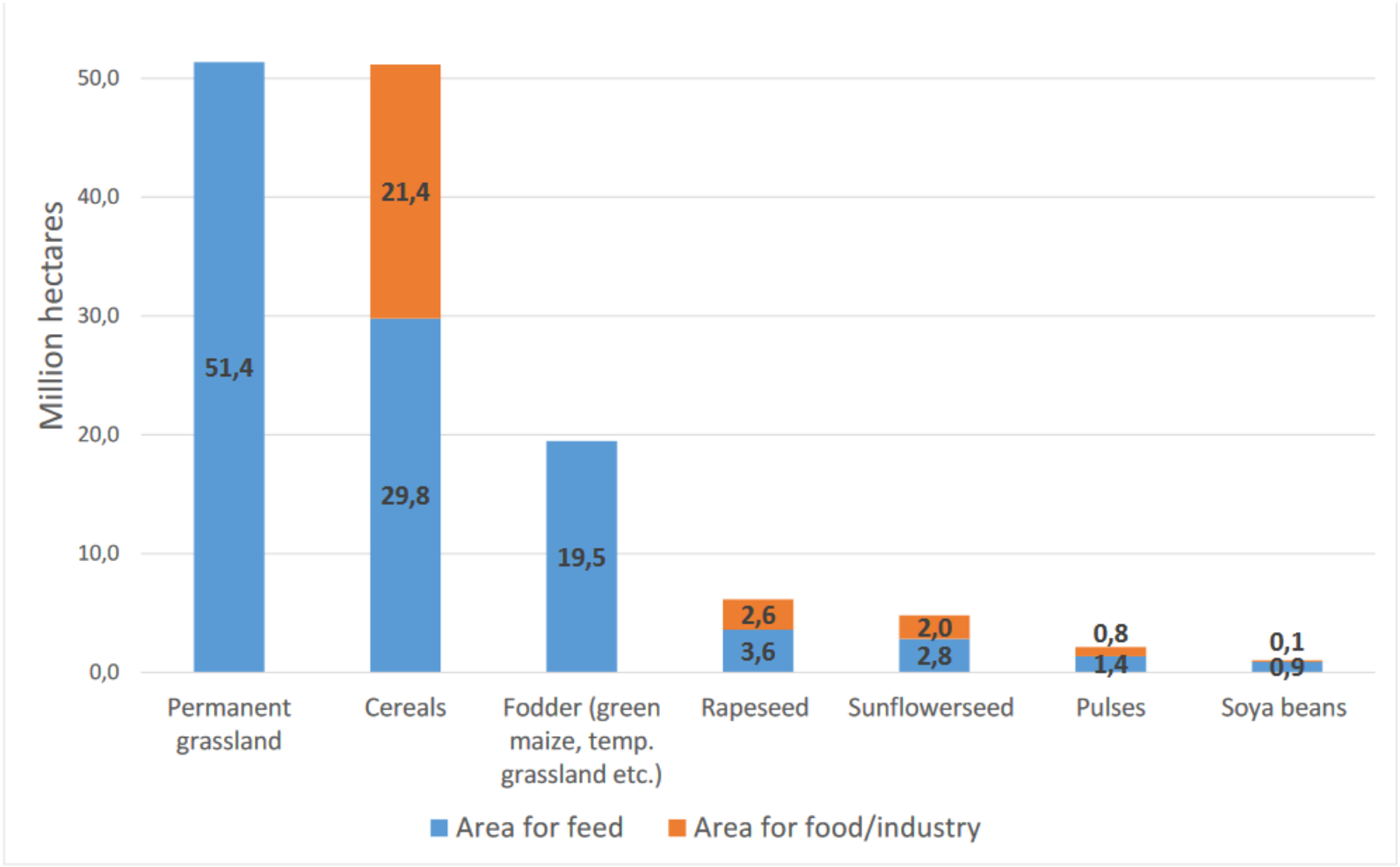


Figure 51: Agricultural area used for feed, food and industry (in Mha) (2023)

Source: DG AGRI - Medium term outlook

Protein crops in the EU today – Food versus feed

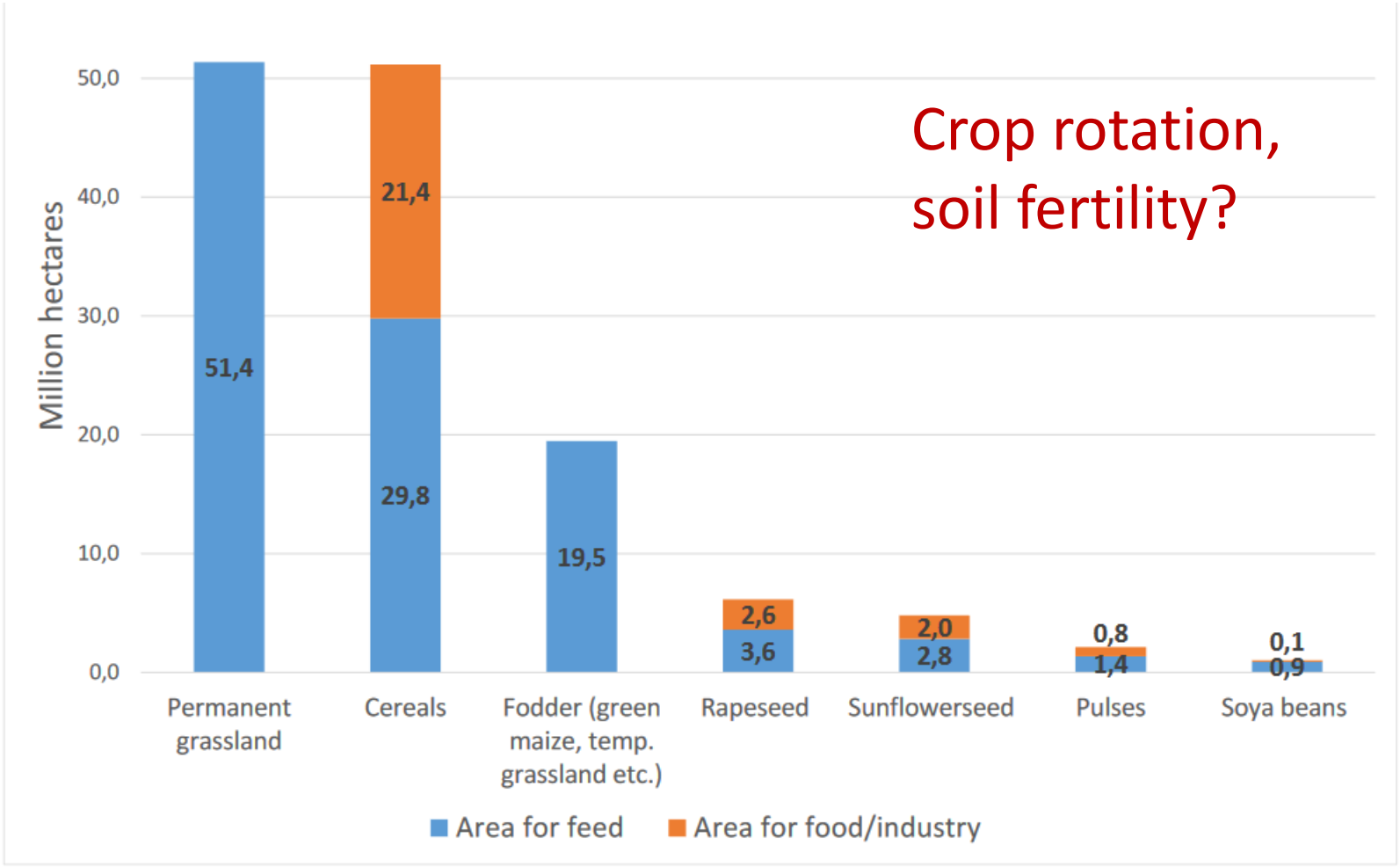
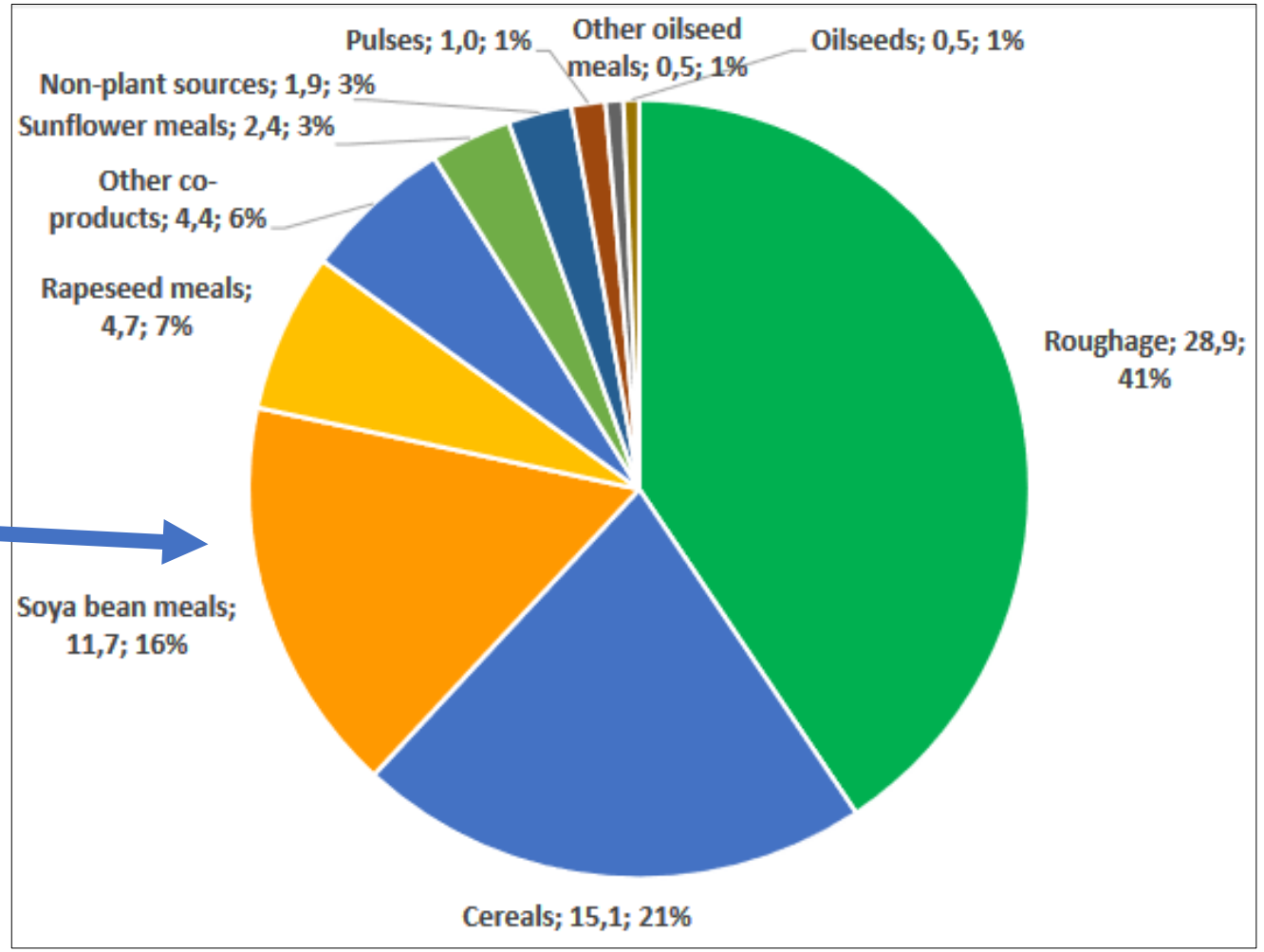


Figure 51: Agricultural area used for feed, food and industry (in Mha) (2023)

Source: DG AGRI - Medium term outlook

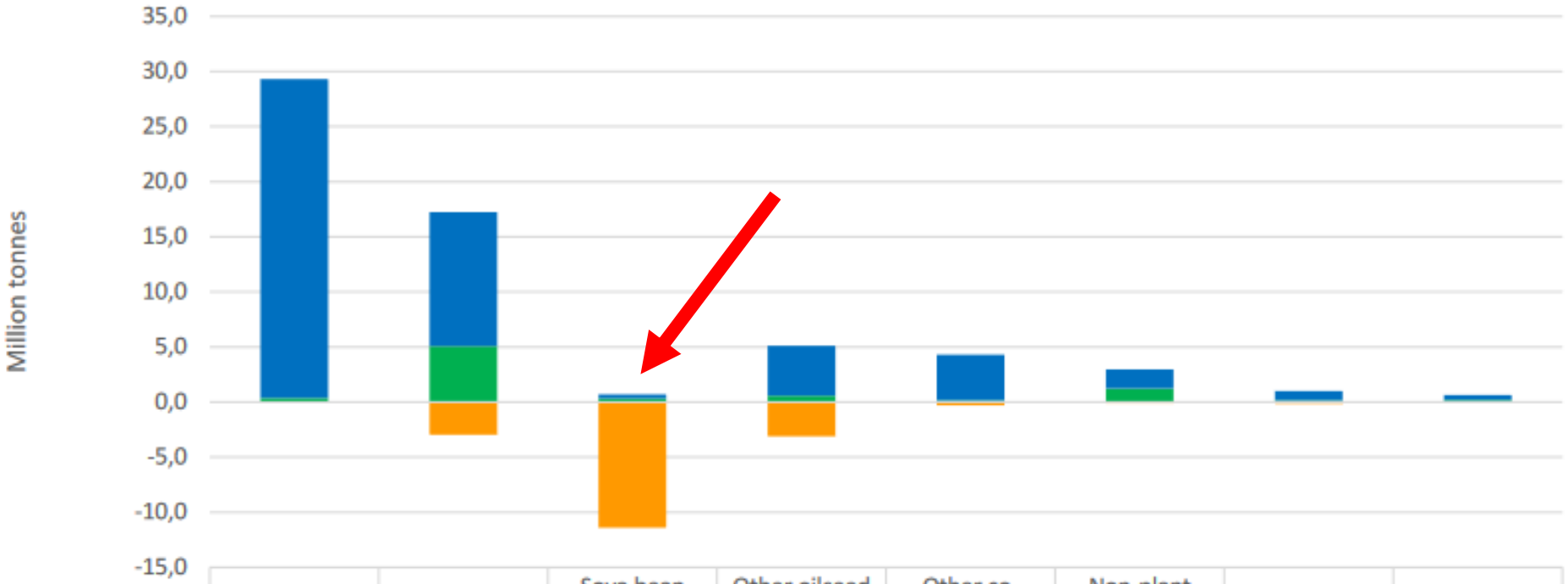
Protein crops in the EU today – Feed (with Imports)

18 million tons are imported, which corresponds to 25% of the protein used to feed EU livestock



Share of main feed sources (in million tonnes of crude protein; share of total amount of crude protein used for feed) Source: DG AGRI - EU Feed Protein Balance Sheet –2022/2

Current situation of protein crops in the EU – Feed imports



	Roughage	Cereals	Soya bean meals	Other oilseed meals	Other co-products	Non-plant sources	Pulses	Oilseeds
non-EU Origin	0,0	-3,0	-11,4	-3,1	-0,3	-0,1	-0,2	0,0
EU Origin	28,9	12,2	0,3	4,5	4,1	1,8	0,8	0,5
EU Exports	0,4	5,1	0,3	0,6	0,2	1,2	0,1	0,2

Figure 24: Origin of protein used for feeding EU livestock and exports of those products (in million tonnes of protein)

Source: DG AGRI - EU Feed Protein Balance Sheet –2022/23

Current situation of protein crops in the EU – Feed imports

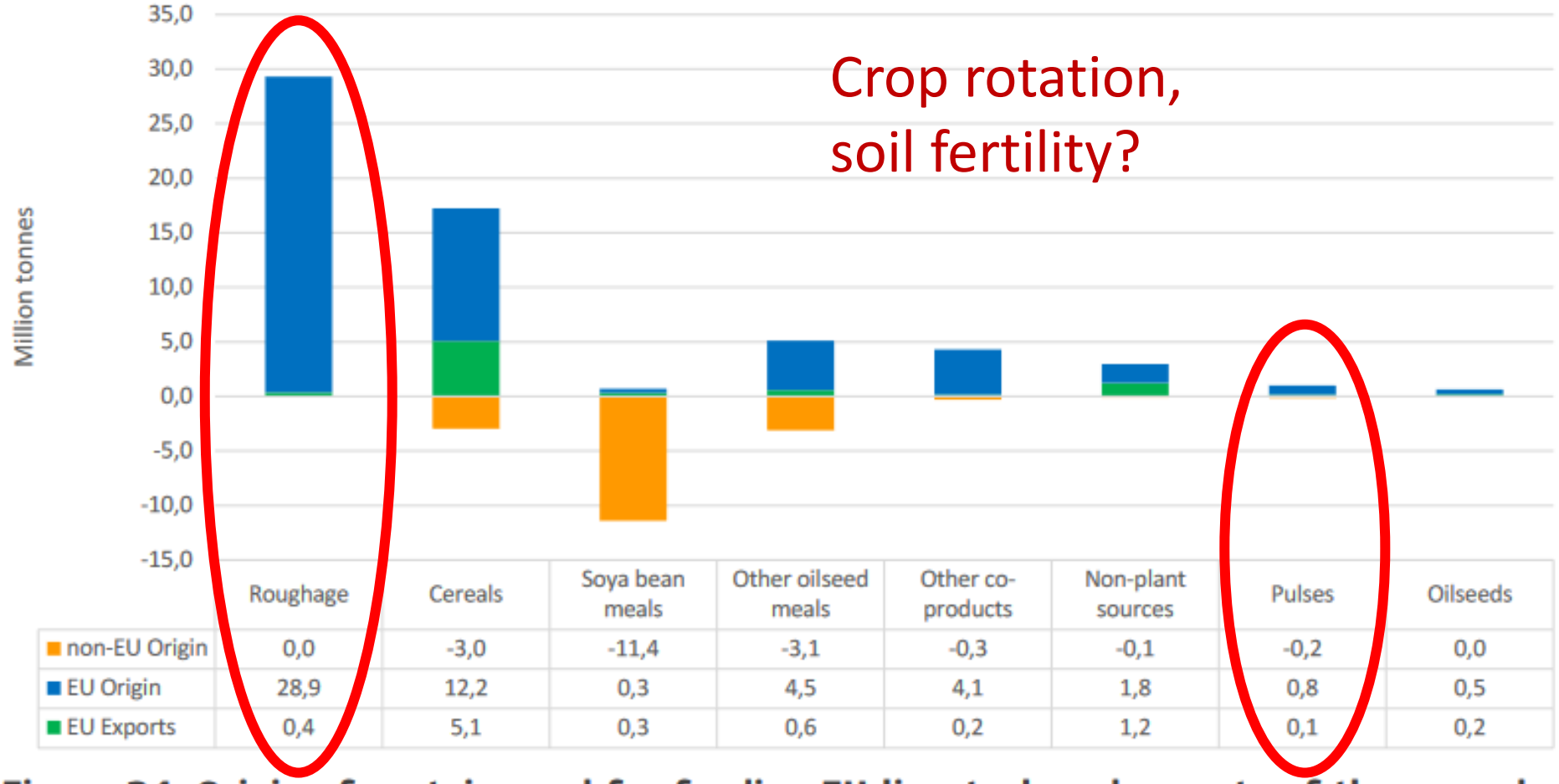


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Figure 24: Origin of protein used for feeding EU livestock and exports of those products (in million tonnes of protein)

Source: DG AGRI - EU Feed Protein Balance Sheet –2022/23

3. Which crops are cultivated as a source of plant protein for animal feed in your region?

	Italy	Romania	Italy	Germany	Poland	Belgium	Poland	Belgium	Ireland	Spain	Netherlands	Sweden	Portugal	Greece	Germany	Estonia	Scotland, UK
Cereals for feed	5	5	5	5	5	5	5	5	5	5	5	5	5	4	3	3	3
Maize	5	5	5	5	5	5	5	5	5	5	4	4	4	3	2	2	1
Grasses	5	5	5	5	5	5	5	5	4	4	4	4	4	3	3	2	2
Oilseeds	5	5	5	5	5	5	5	4	3	3	3	3	3	2	2	1	1
Clover / alfalfa	5	5	5	5	5	5	5	4	4	4	3	3	3	3	3	1	1
Grain legumes except soya	5	5	5	5	4	4	4	4	3	3	3	3	3	2	2	2	2
Soya	4	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1

5	frequently cultivated
1	not cultivated

+ carob, moranga

3. Which crops are cultivated as a source of plant protein for animal feed in your region?

Carob and Moranga

Current situation of protein crops in the EU – Challenges Feed

5. What challenges do you associate with the cultivation and use of protein crops in your country / region?

Import of protein crops as feed for livestock in my region is associated with negative environmental impacts.

5 5 5 5 5 5 5 5 4 4 4 4 4 2 2 1 1

Price fluctuations of imported protein-rich feed pose challenges for livestock farmers and lead to economic insecurities.

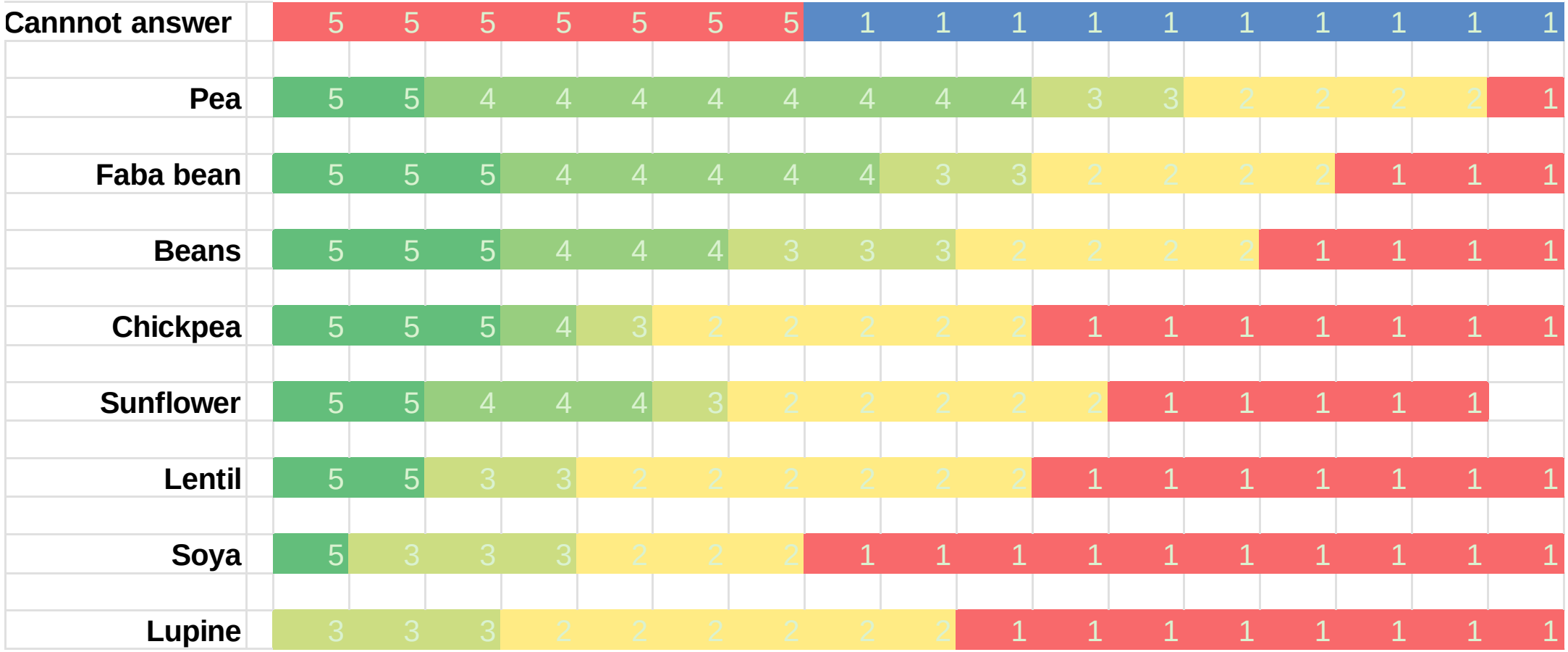
5 5 5 5 5 4 4 3 3 3 2 2 2 2 2 1

The lack of or unstable regional value chains for protein crops are a reason for farmers not to increase their production.

5 5 5 5 5 5 5 4 4 4 3 3 3 3 2 1 1

Protein crops in the EU – Food

Which protein crops are cultivated for protein-rich foods in your region?



+ Quinoa, rape seed, roveja, grass pea, cow pea

Protein crops in the EU today – Feed vs Food

Fact #V.2: Cereals are the main source of food plant-based protein

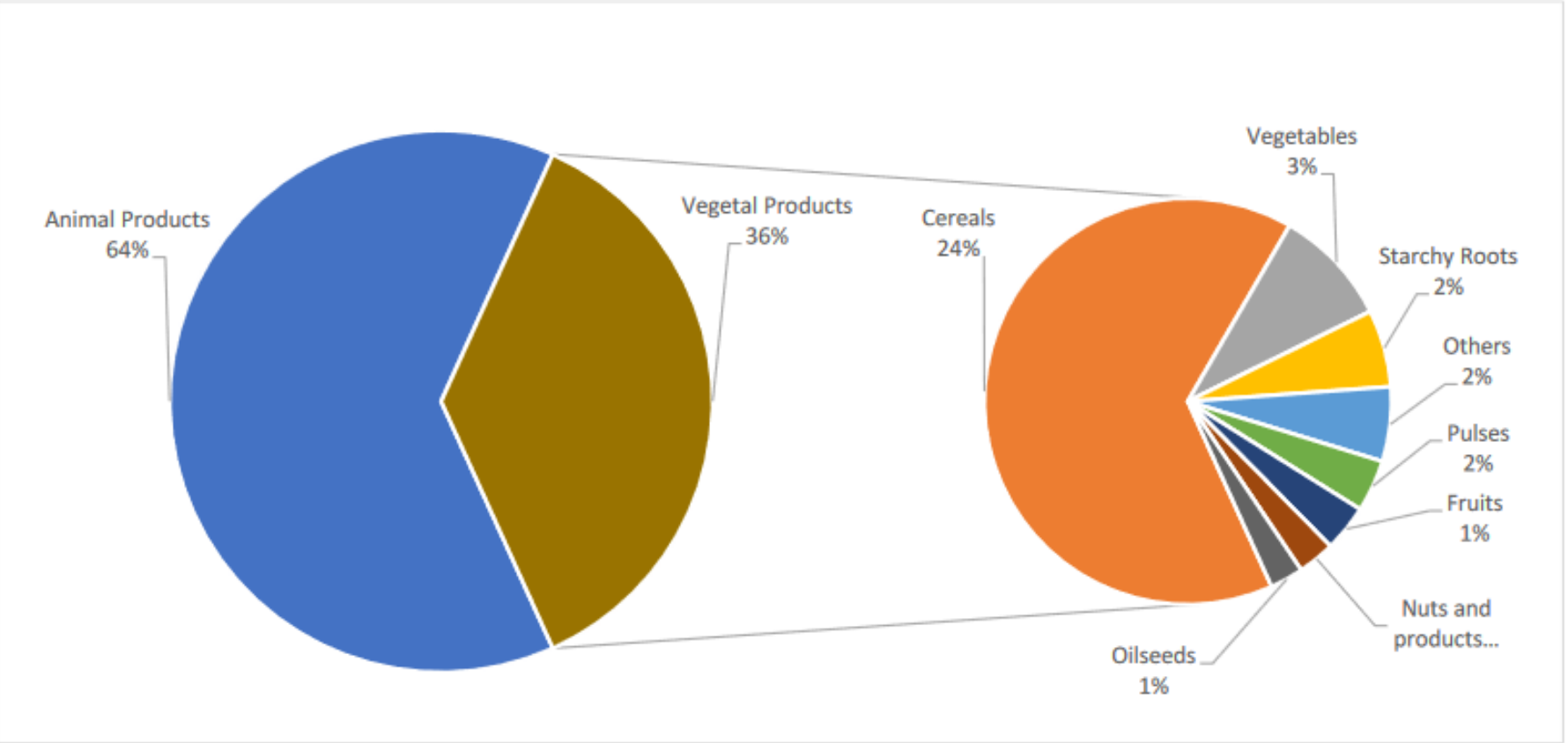


Figure 59: EU Protein supply quantity per product (g/capita/day) (2021)[14]

Source: FAO - Food Balances – 2021.

Current situation of protein crops in the EU – Feed vs Food

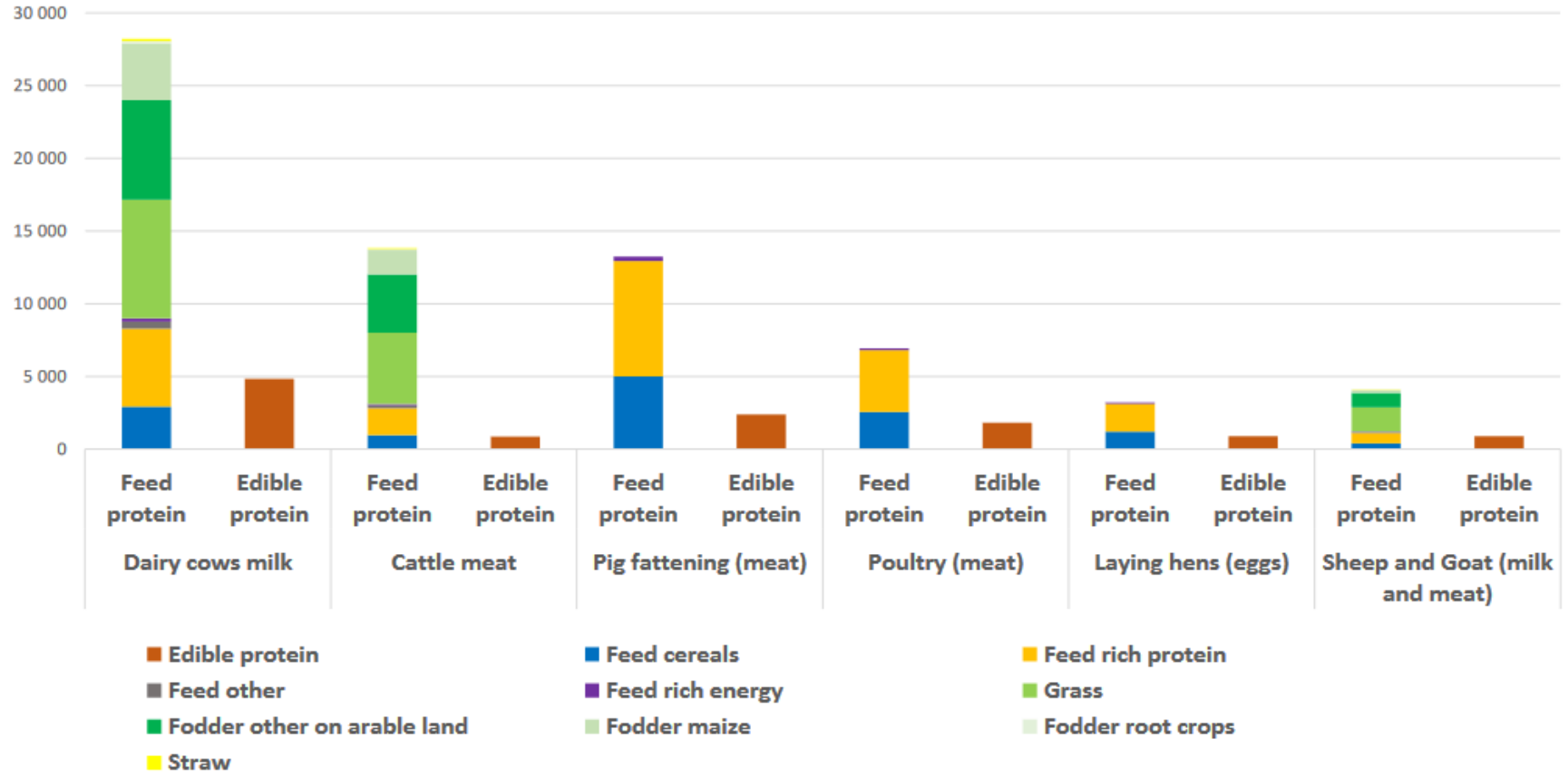


Figure 33: Conversion of feed protein (per feed source) and edible protein for each livestock sector in the EU in million tonnes, for 2022

Protein crops in the EU today – Feed vs Food

64% of pulses consumed in the EU is used to feed the EU livestock.

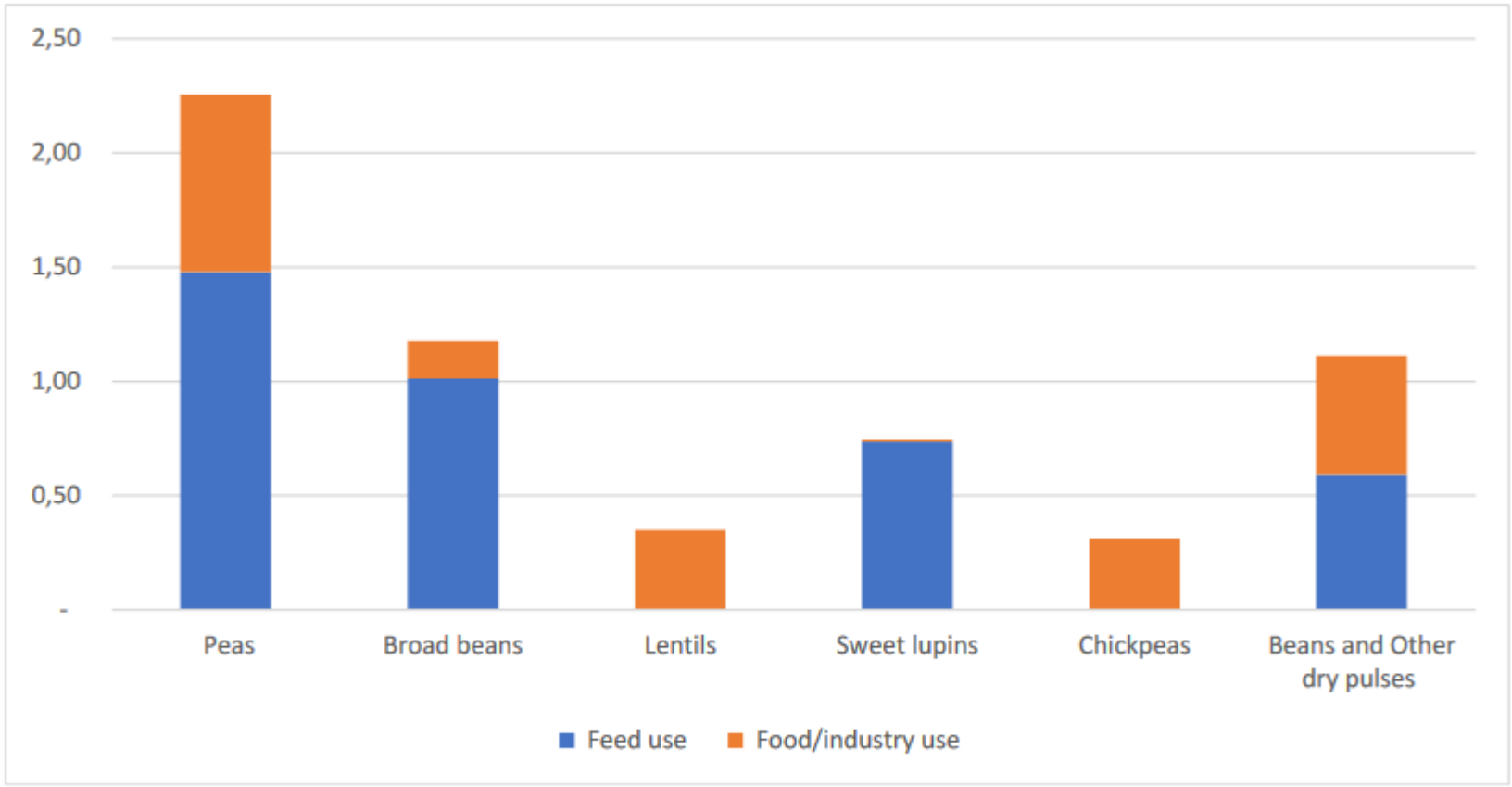


Figure 19: Use of Pulses in the EU (volume in million tonnes of raw materials)

Source: DG AGRI - EU Feed Protein Balance Sheet –2022/23

Barriers: Production for Food/Feed

Institutional Environment
- Policy support
- Regulations

Upstream of farm

- *Lack of seeds (2)*
- *Lack of adapted varieties (5)*
- *Lack of adapted machinery (2)*
- *Ban of GMO-crops (2)*

Farm-level

- *Insufficient know how for cultivation and lack of experts (7)*
- *Lack of affordable on-farm and/or post-farm gate processing facilities (4)*
- *High production costs (5)*
- *Climatic changes (7)*
- *Yield fluctuations (4)*
- *Crop lodging (2)*

Downstream of farm

- *Low price/profitability (5)*
- *Other value chains of cash crops are more competitive (3)*
- *Value chain is not complete, for instance, regarding human food uses (e.g. lack of industrial facilities to extract protein)*
- *Shortage of demand for plant-based diets through cultural/historic reasons*
- *Culture and food habits (2)*

Current situation of protein crops in the EU – Opportunities

6. What opportunities do you associate with the cultivation and use of protein crops in your country / region?

Increasing local production of protein crops for feed or food can improve the agronomic conditions of farms, e.g. by diversifying crop rotations, controlling pests and improving soil fertility.

5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 4 2

Increasing the self-sufficiency of the farm or region with locally produced protein crops can contribute to the economic stability of the farm.

5 5 5 5 5 5 5 5 4 4 4 3 3 3 2 2 2

Increasing production of protein crops for food can contribute to the ecological sustainability of the agricultural and food system.

5 5 5 5 5 5 5 5 5 5 5 4 4 4 4 4 2

Current situation of protein crops in the EU – Opportunities

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Increasing local production of protein crops for feed or food can improve the agronomic conditions of farms, e.g. by diversifying crop rotations, controlling pests and improving soil fertility.

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Increasing the self-sufficiency of the farm or region with locally produced protein crops can contribute to the economic stability of the farm.

5 5 5 5 5 5 5 5 4 4 4 3 3 3 2 2 2

Increasing production of protein crops for food can contribute to the ecological sustainability of the agricultural and food system.

5 5 5 5 5 5 5 5 5 5 5 4 4 4 4 4 2

How can positive ecological and agronomic effects become economically profitable?

Enablers: Production for Food/Feed

More plant protection measures which are cheap or effective, implementation of GMO varieties, […] more activity of protein form by products like oil rape meal.

Recovery of native and old varieties, contributing to biodiversity

Creation of local and regional groups of protein crop producers.

Educating the farmers to be able to produce on-farm protein crops with new techniques at a low cost

We need more diversity in crop rotations, and protein crops offer this.

Shortening supply chains by promoting protein crop processing at the farm/producers groups level.

production of end products with higher added value in the EU.

More social integration through local food networks; food education (need and consequence)

Human health and ecological services to the regional environment

Barriers: Production for Food/Feed

Livestock farmers expect feed suppliers to have a **consistent quality and composition of feed**. That is why feed producers are **not interested in purchasing small-scale crops**, because **changing the raw material requires changing the feed formula** and changes the composition of feed mixtures. The solution is large batches of uniform quality raw material. On the other hand, for a farmer, **starting production of a new crop on a large scale is associated with a high risk**. It often requires investment in specialist equipment, acquiring new knowledge, and gaining new experience. This also increases the risk of crop failure.

Boosting cultivation of protein crops could:
- allow the **recovery of native and old varieties**, contributing to biodiversity
- **bring diversity, improve soil health**,
- catalyze research and **development of new varieties** and study of climate change adapted crops
- boost the creation of **new value chains**

How can the transition work?

Protein crops in the EU – Climate Change

7. What current and future effects of climate change do you expect for the production of protein crops?

Climate change will affect the production of protein crops internationally and lead to increased volatility in global protein crop supply chains.

5	5	5	5	5	5	5	5	5	4	4	4	3	3	3	3	2

Abiotic growing conditions, such as water supply and temperature, (will) change and require adaptations in the cultivation of protein crops in my region.

5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	3

Biotic growing conditions, such as diseases and pests, (will) change and require an adaptation of the cultivation strategies of protein crops in my region.

5	5	5	5	5	5	4	4	4	4	4	4	3	3	2	2	2

Climate change creates opportunities for diversifying regional production of protein crops, e.g. by introducing new plant species.

5	5	5	5	5	5	5	5	5	4	4	4	4	3	3	2	1

Climate change will influence the way protein crops are utilised, e.g. their increased use for food instead of feed.

5	5	4	4	4	4	4	4	3	3	3	3	3	3	3	2	2

Protein crops in the EU – Climate Change

The effects of climate change differ between regions and are hard to forecast

- *Lack of Water, early spring drought, heat*
- *No irrigation available*
- *Increased pest- and disease pressure*
- *Increased weather extremes (heavy rains)*
- *higher temperatures in summer is impacting on pod fill and therefore crop yield*

- *Exploitation of new protein crops for feed and food.*
- *Shifting to the cultivation of protein crops from other non-profitable crops that are affected more by climate change.*
- *Climate change will cause a shift of areas typical for some crops towards the north.*
- *Climate change will open up new opportunities for crops with less soil and water requirements*

Protein crops in the EU – Climate Change

Exploitation of new protein crops for feed and food

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How to increase European plant protein self-sufficiency by integrating sustainable production of plant-based protein in different value chains and regions, taking climate change into account?

- What are examples of new, existing and forgotten protein crops?
- What are the potentials and challenges of protein crop cultivation and value chain development in regions?
- Which are the most promising agricultural practices on environment, farm productivity and profitability? What are barriers to their implementation?
- How can innovation and knowledge sharing contribute to overcoming these challenges?


Thank you for your attention!

EU CAP Network Focus Group
‘Production of protein crops under climate change’

20-21 November 2024 | **Berlin, Germany**

All information on the Focus Group is available on the webpage:
https://eu-cap-network.ec.europa.eu/focus-group-production-protein-crops-under-climate-change