

Cultivation of protein crops in Denmark

Annual Meeting, Danish Cereal Network, 18th of March 2019

v. Jon Birger Pedersen, Senior Specialist, Crop Innovation

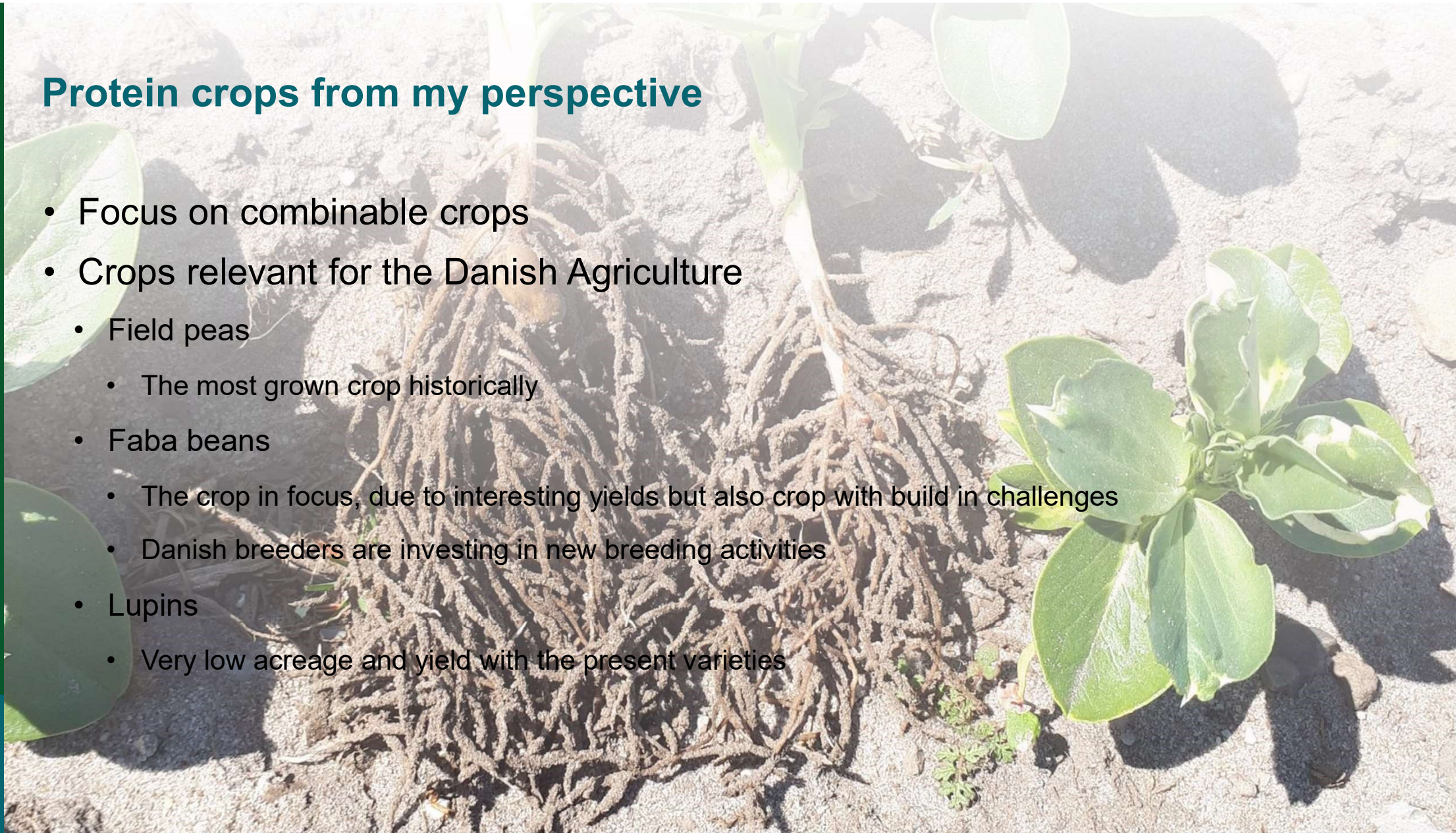
SEGES

STØTTET AF
Promilleafgiftsfonden for landbrug



Protein crops from my perspective

- Focus on combinable crops
- Crops relevant for the Danish Agriculture
 - Field peas
 - The most grown crop historically
 - Faba beans
 - The crop in focus, due to interesting yields but also crop with build in challenges
 - Danish breeders are investing in new breeding activities
 - Lupins
 - Very low acreage and yield with the present varieties

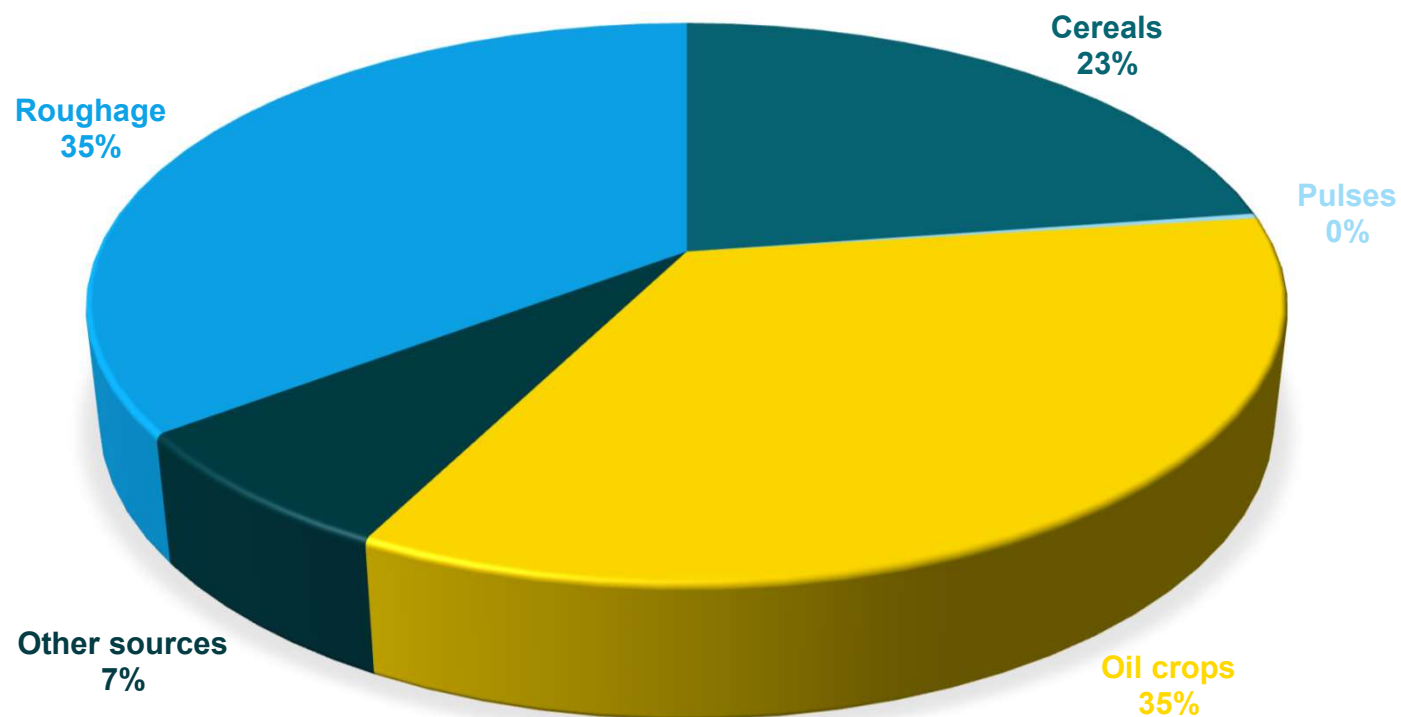


Pulses in Denmark

- As a protein rich crop for feeding of pigs, cows and other farm animals
- Increased interest:
 - Arlas focus on non-GMO feed for the production of drinking milk
 - Focus on locally produced and documented feed
 - General focus on reduction in imports
 - Climate footprint
- Other interesting uses of pulses:
 - For fish and other non-traditional productions
 - For direct human consumption



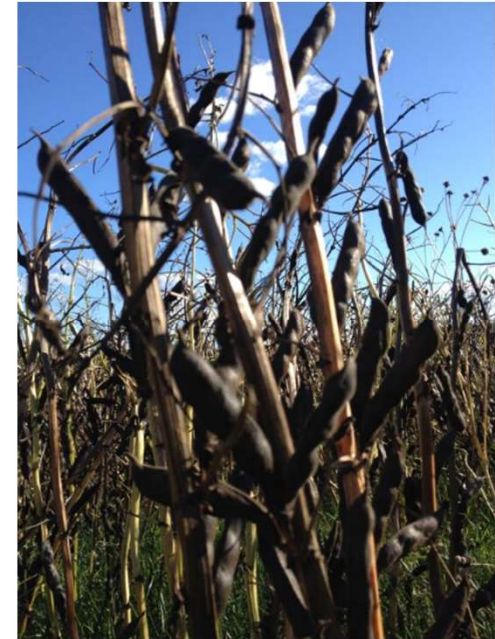
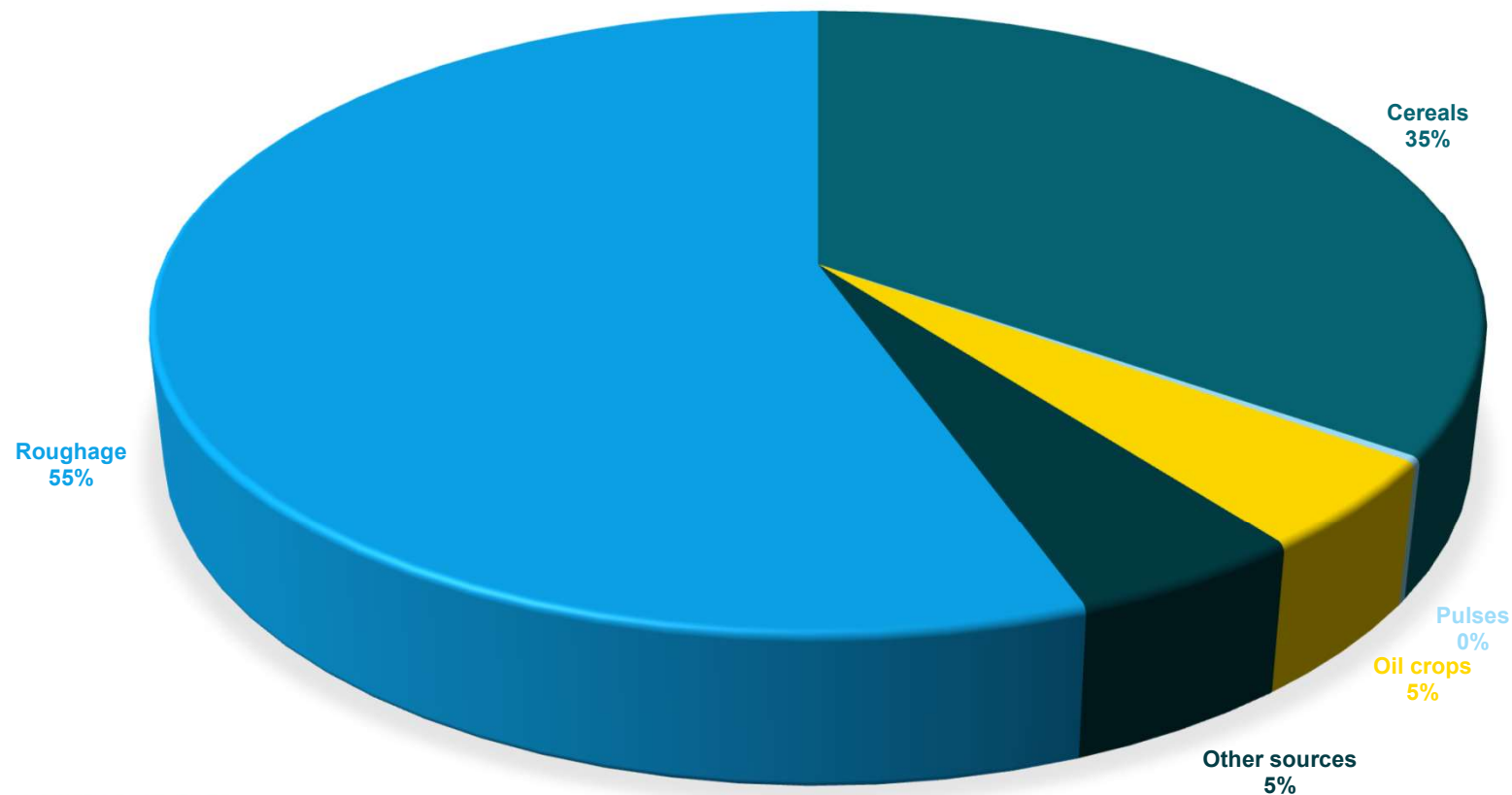
Annual consumption of protein for Danish livestock, app. 2.7 mill. tons pr. year



SEGES



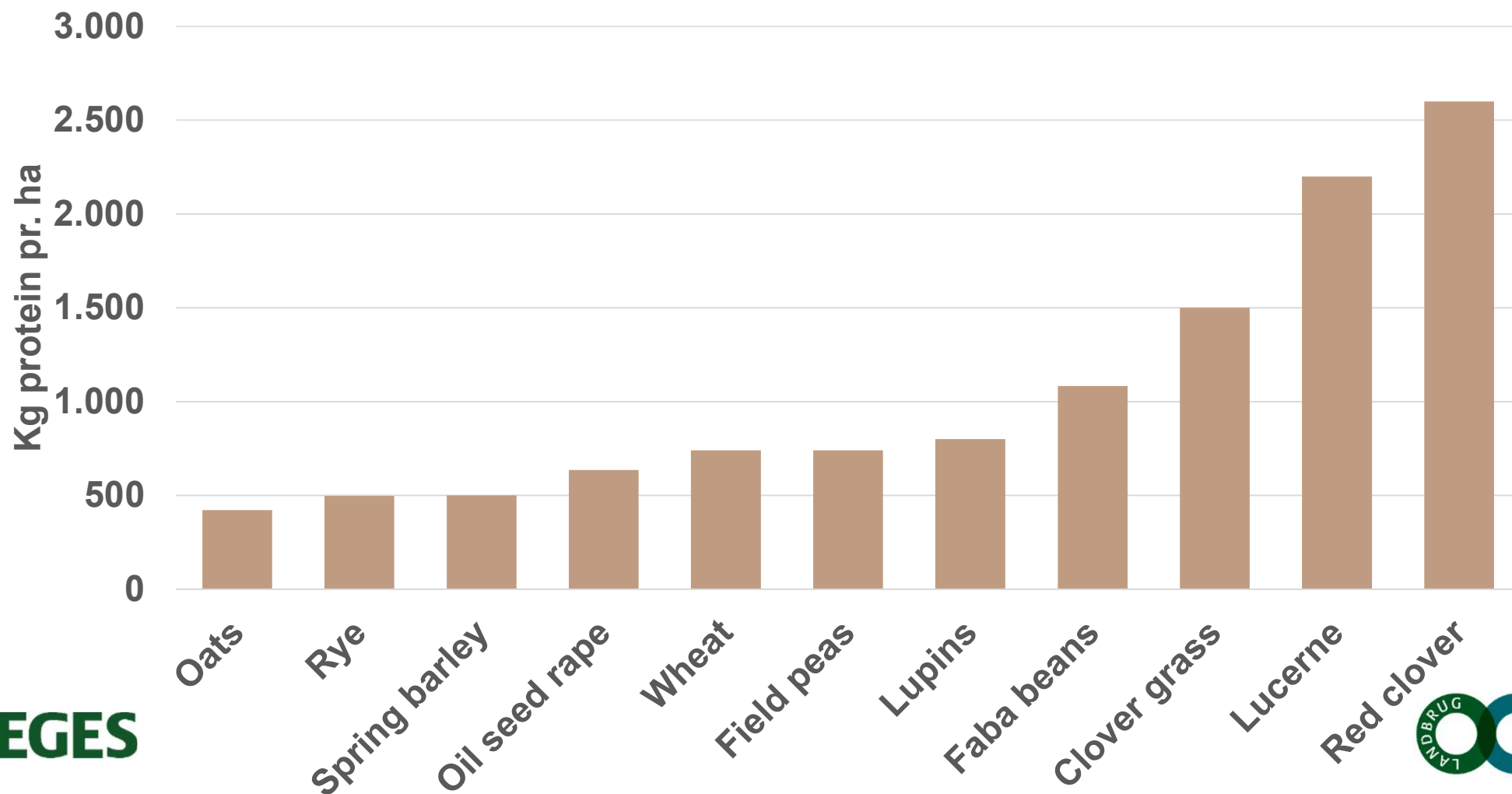
Annual Danish production of protein for Danish Livestock, app. 1.7 mil. tons



SEGES



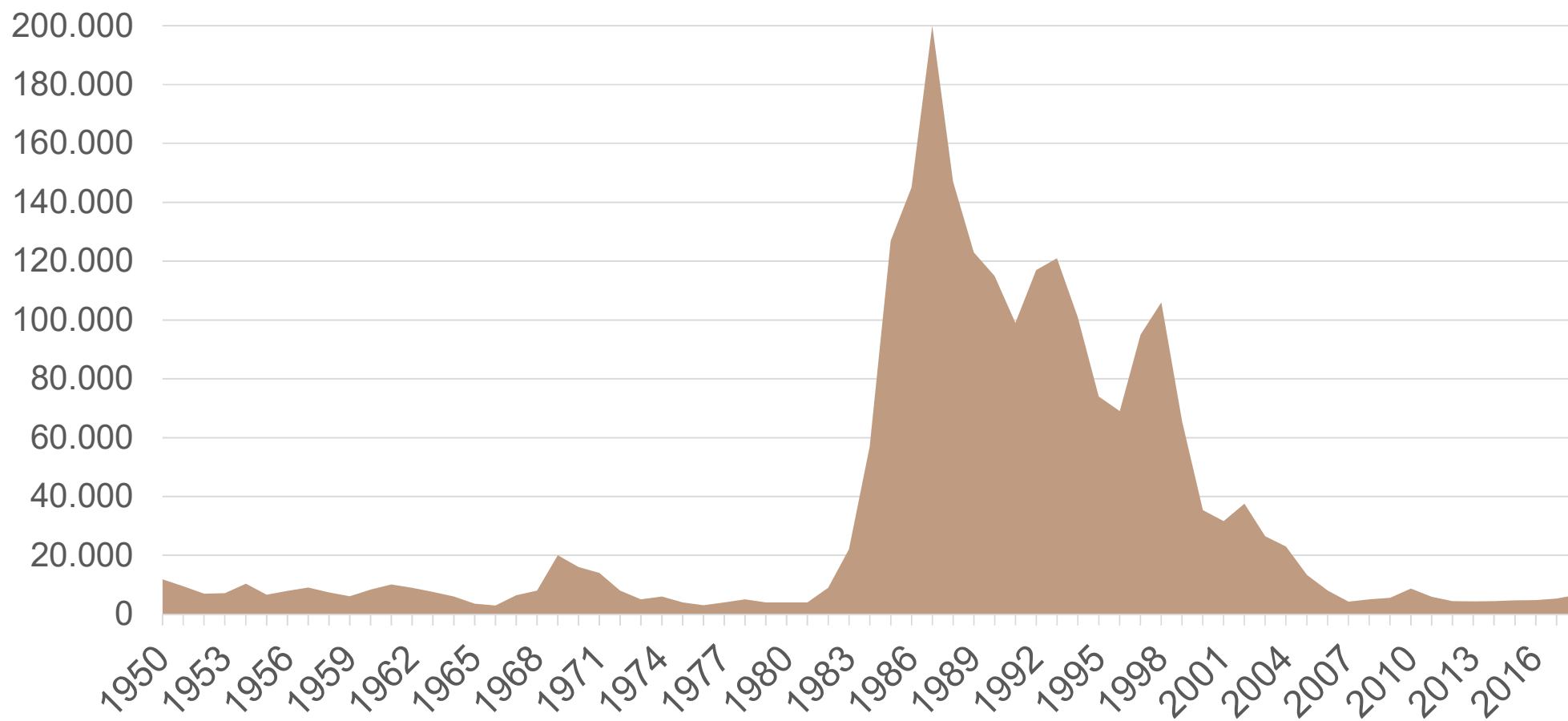
Level of protein yield in Danish crops



SEGES



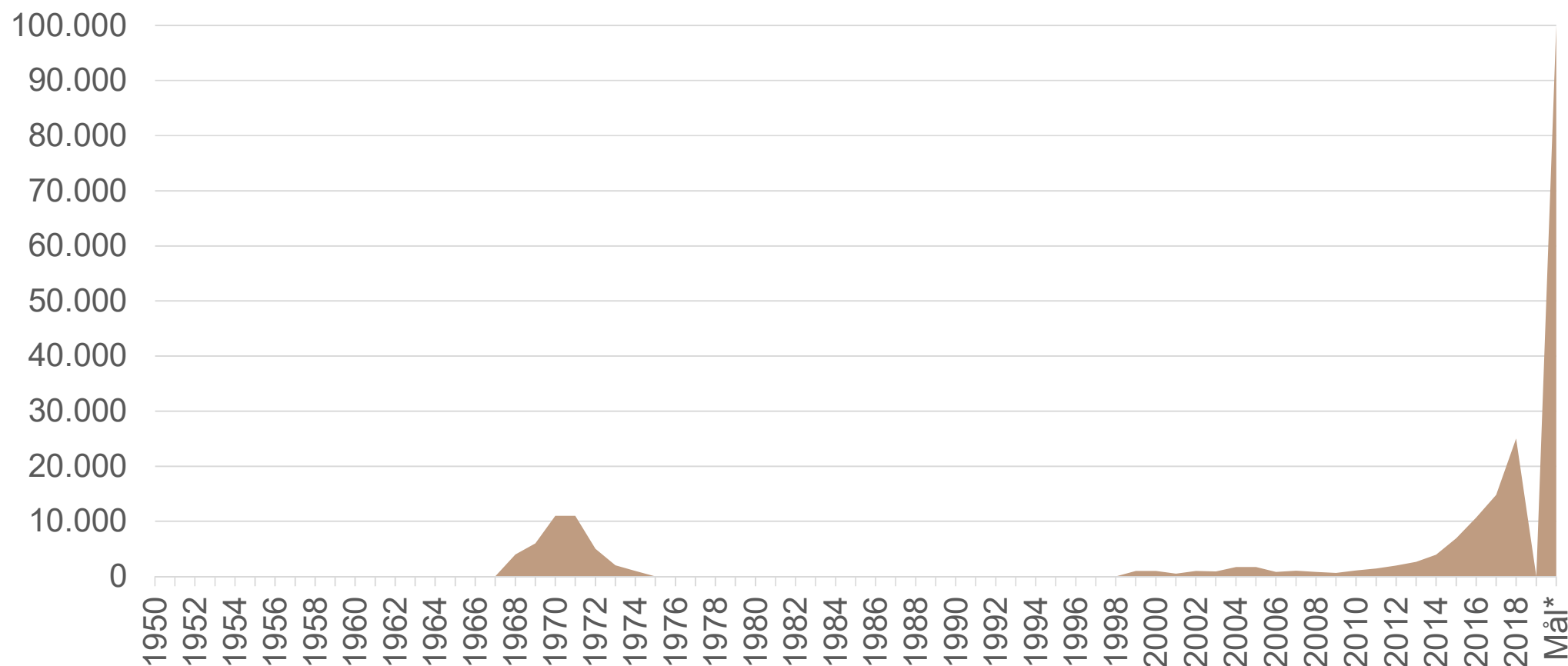
Field peas in Denmark, 1950-2018, ha



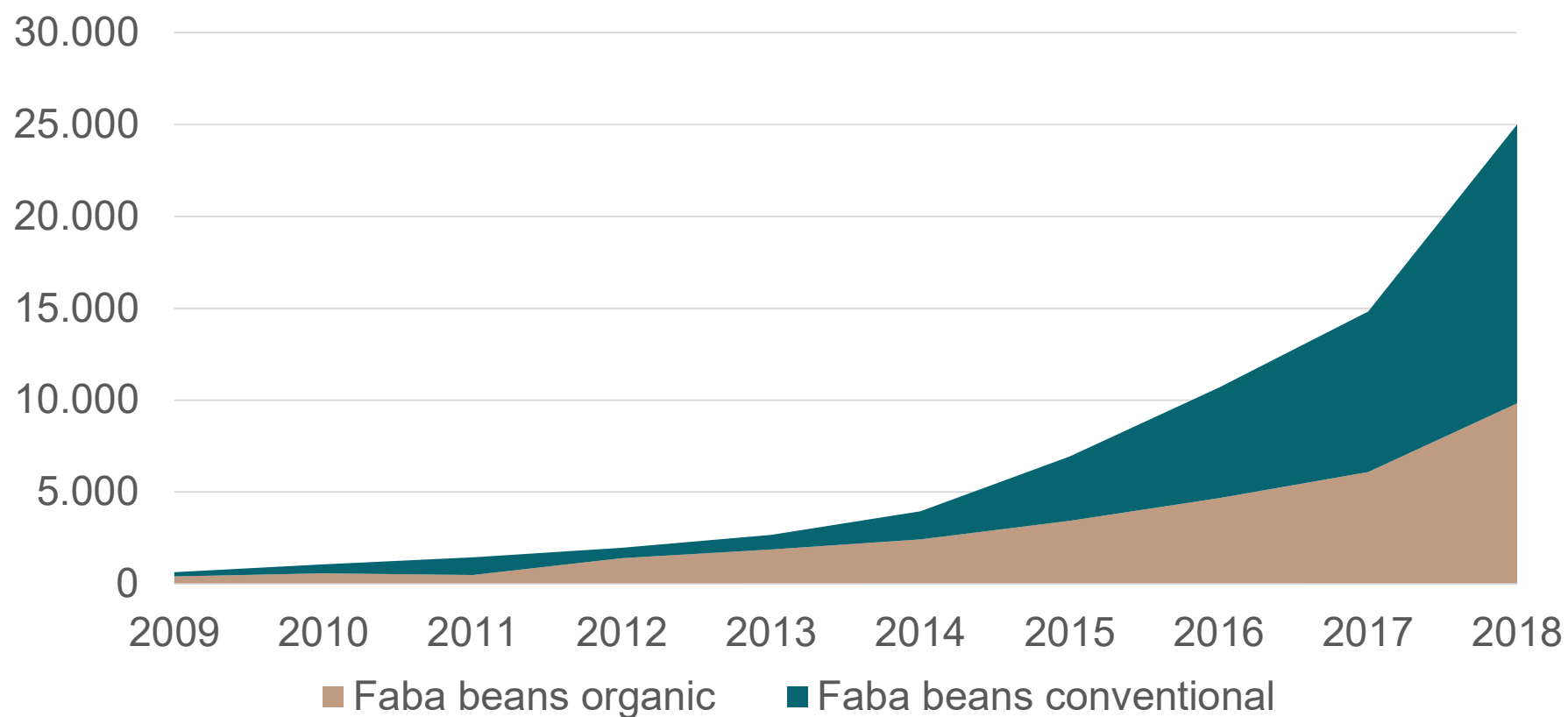
SEGES



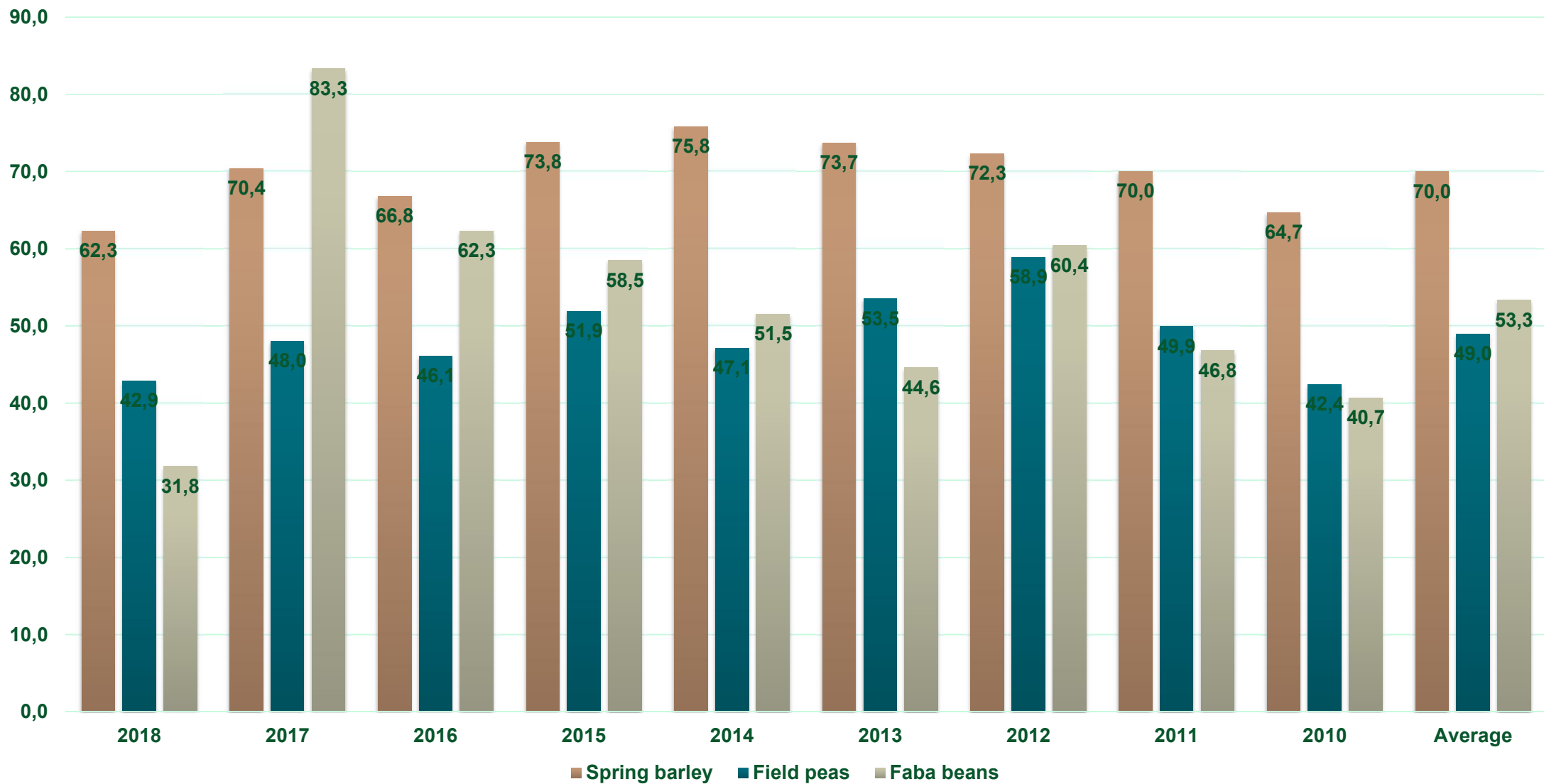
Faba beans in Denmark, ha 1950-2018



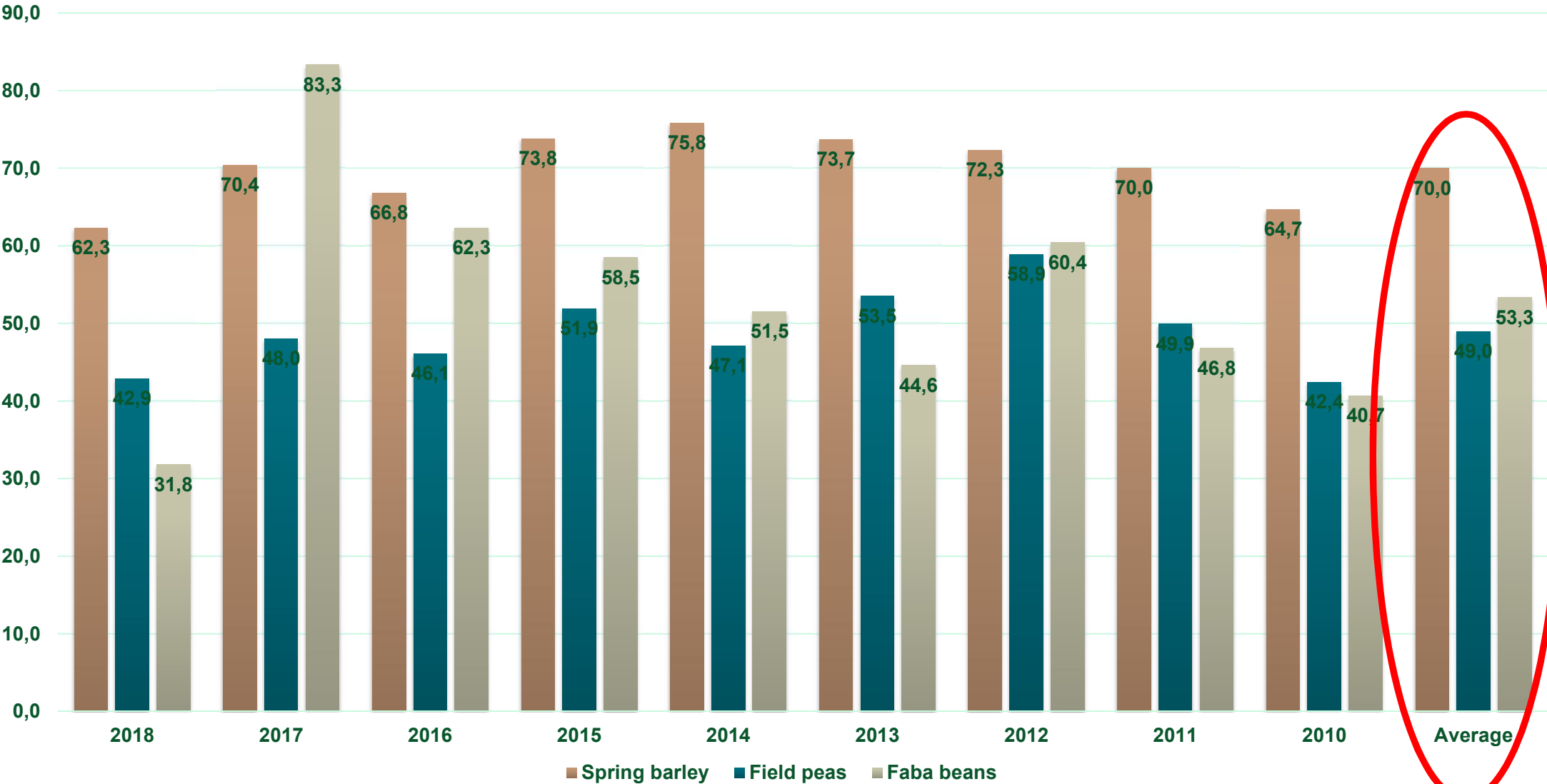
Faba beans in Denmark, organic plus conventional, ha



Yield: Spring barley, field peas and faba beans. Variety trials 2010-2018



Yield: Spring barley, field peas and faba beans. Variety trials 2010-2018



Field peas and lupins

- **Field peas**
 - Well known crop
 - OK yield, but very varying
- **Lupins**
 - Well known crop
 - Yield to low
 - Interest in organic production

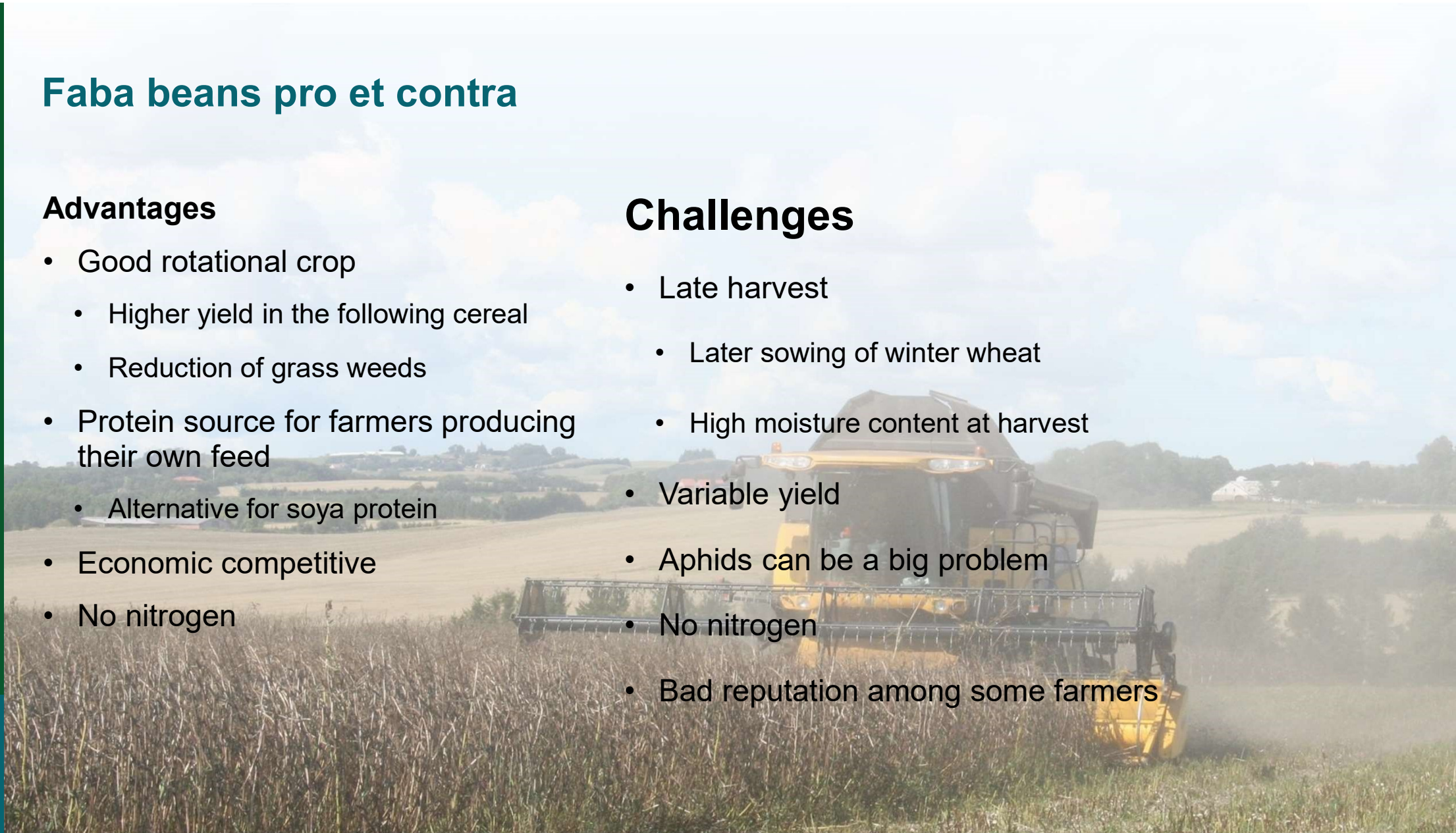
Faba beans pro et contra

Advantages

- Good rotational crop
 - Higher yield in the following cereal
 - Reduction of grass weeds
- Protein source for farmers producing their own feed
 - Alternative for soya protein
- Economic competitive
- No nitrogen

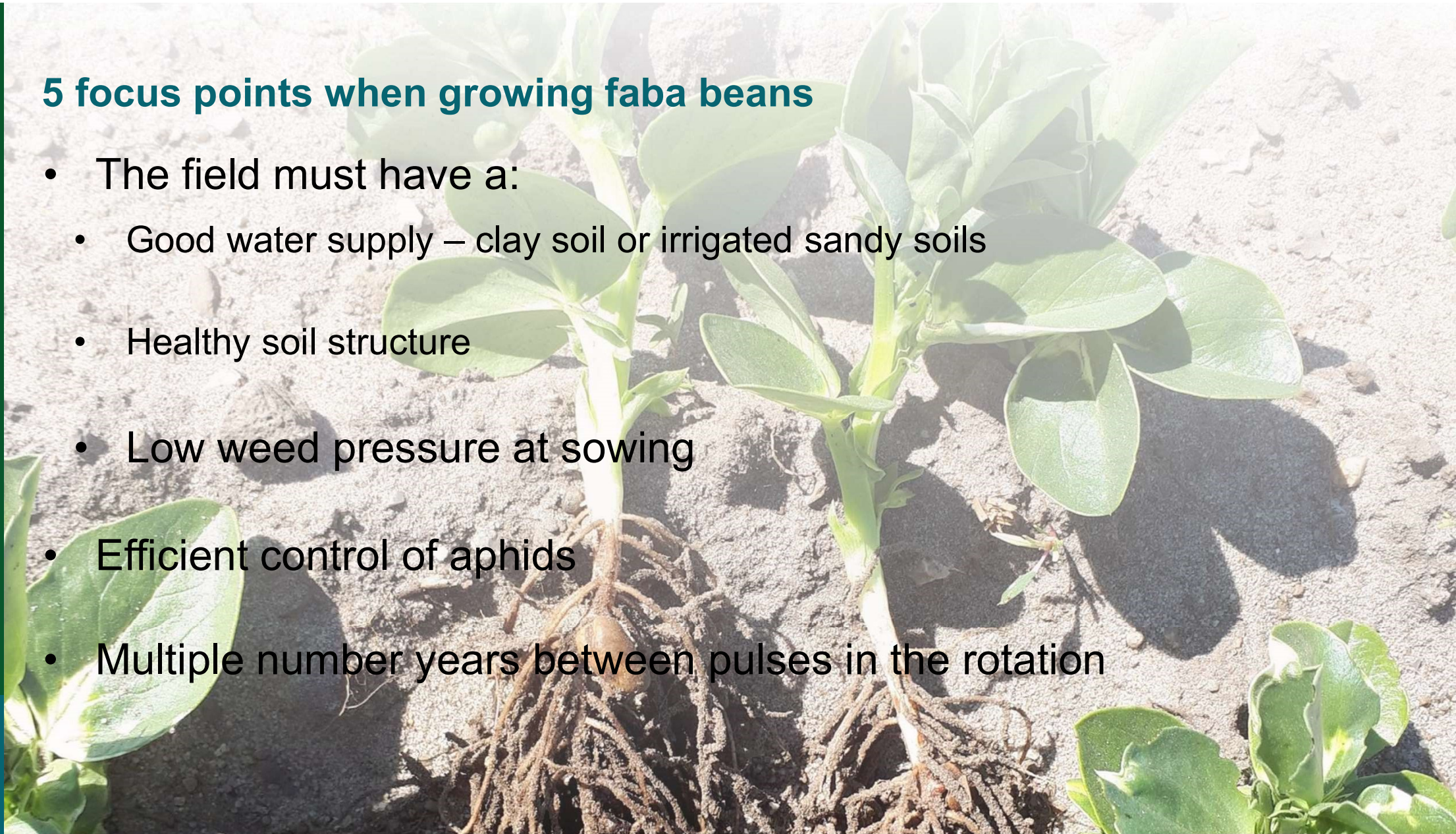
Challenges

- Late harvest
 - Later sowing of winter wheat
- High moisture content at harvest
- Variable yield
- Aphids can be a big problem
- No nitrogen
- Bad reputation among some farmers



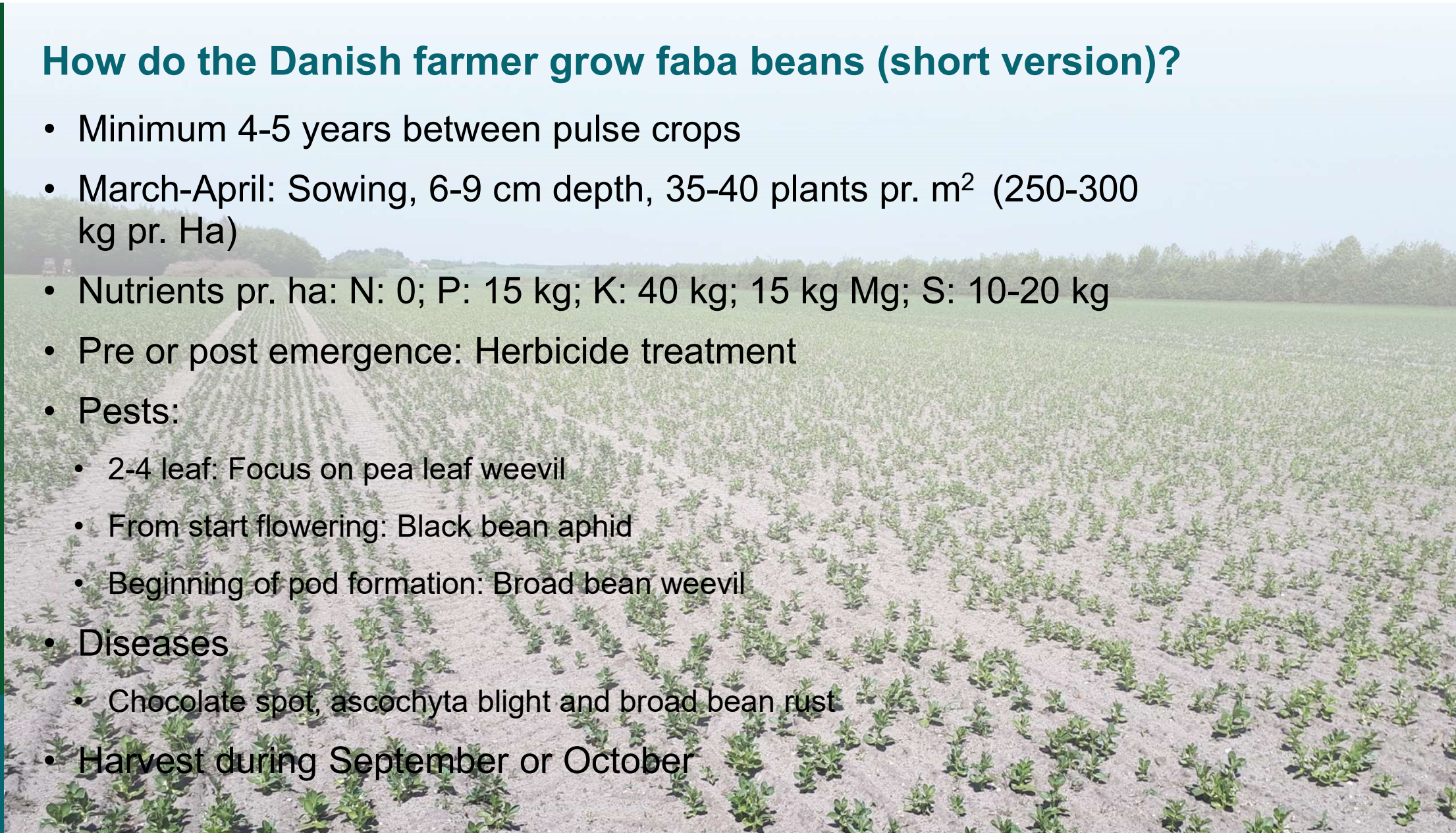
5 focus points when growing faba beans

- The field must have a:
 - Good water supply – clay soil or irrigated sandy soils
 - Healthy soil structure
 - Low weed pressure at sowing
- Efficient control of aphids
- Multiple number years between pulses in the rotation



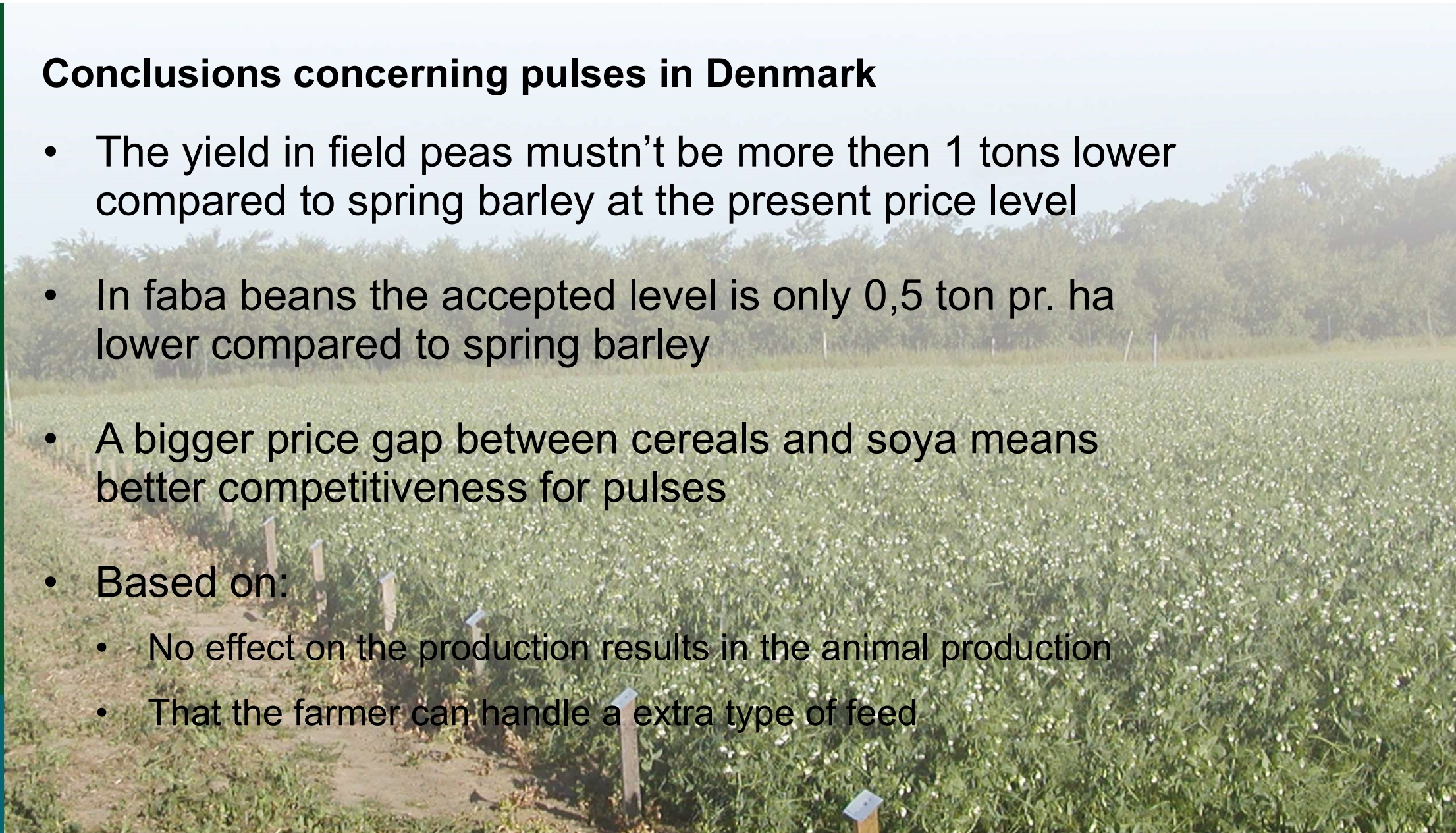
How do the Danish farmer grow faba beans (short version)?

- Minimum 4-5 years between pulse crops
- March-April: Sowing, 6-9 cm depth, 35-40 plants pr. m² (250-300 kg pr. Ha)
- Nutrients pr. ha: N: 0; P: 15 kg; K: 40 kg; 15 kg Mg; S: 10-20 kg
- Pre or post emergence: Herbicide treatment
- Pests:
 - 2-4 leaf: Focus on pea leaf weevil
 - From start flowering: Black bean aphid
 - Beginning of pod formation: Broad bean weevil
- Diseases
 - Chocolate spot, ascochyta blight and broad bean rust
- Harvest during September or October



Conclusions concerning pulses in Denmark

- The yield in field peas mustn't be more than 1 tons lower compared to spring barley at the present price level
- In faba beans the accepted level is only 0,5 ton pr. ha lower compared to spring barley
- A bigger price gap between cereals and soya means better competitiveness for pulses
- Based on:
 - No effect on the production results in the animal production
 - That the farmer can handle an extra type of feed



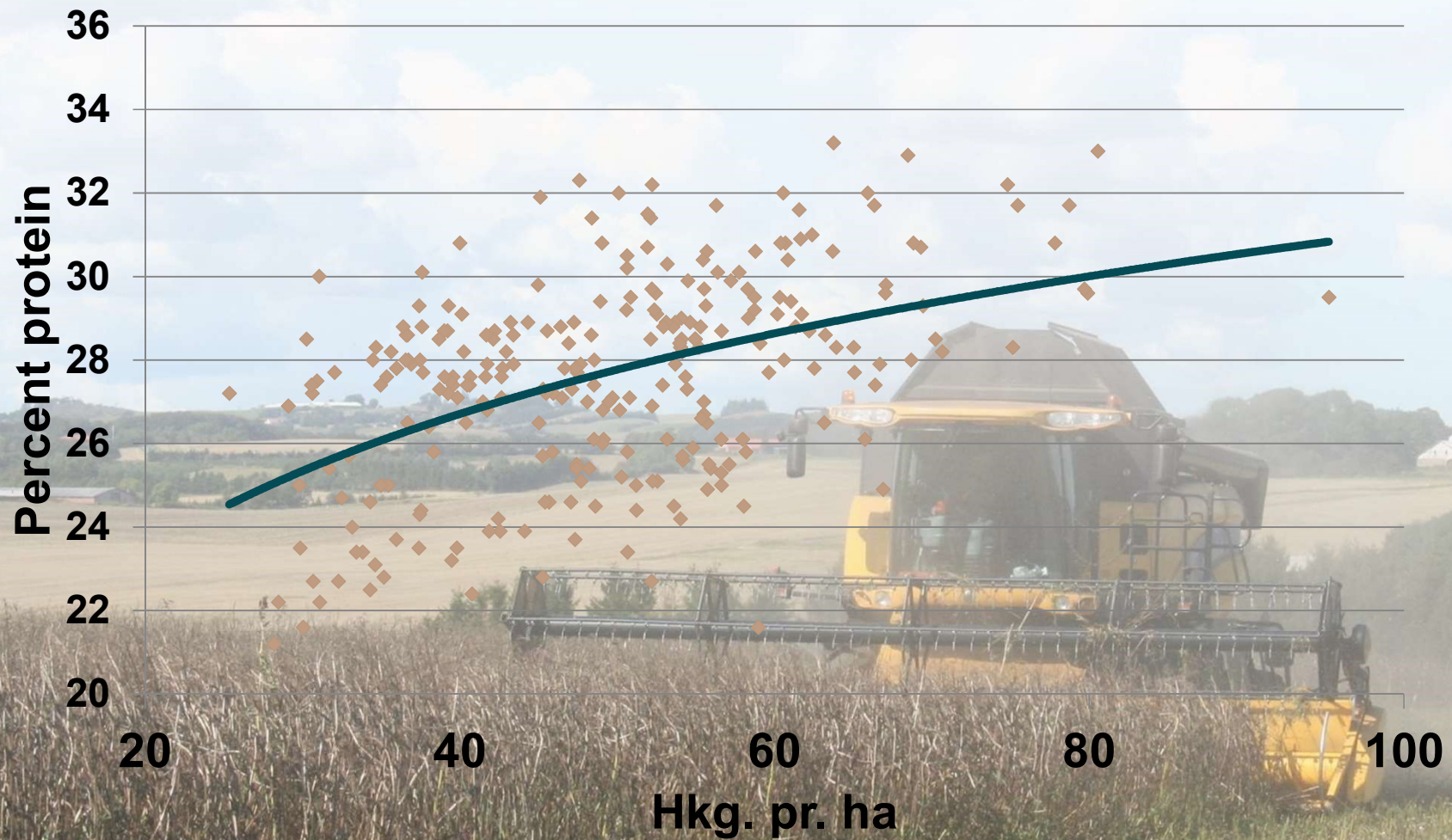
Conclusions concerning pulses (2)

- Field peas haven't generally been able to compete with spring barley
- Faba beans seems to have a better potential under Danish conditions



Yield and percent protein in faba beans

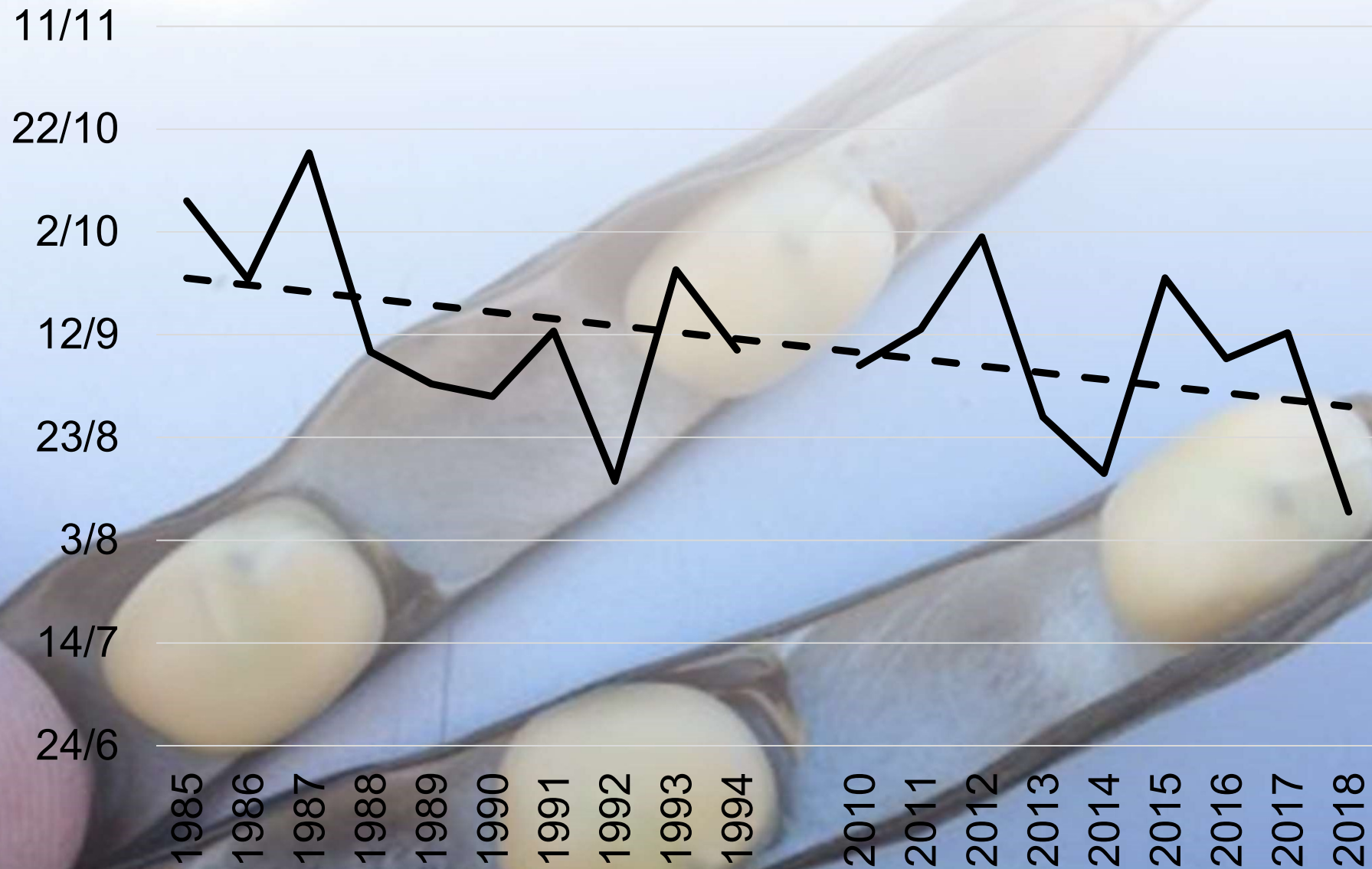
National field trials 2010-14



Yield, all varieties of faba beans 1970-2018, variety trials



Date of maturity in faba beans, variety trials 1985-2018



The background of the slide is a photograph of faba bean plants. The plants have large, dark green, trifoliate leaves. Several long, green, inflated seed pods (siliques) are visible, hanging from the stems. The lighting is bright, suggesting a sunny day in a field.

Increasing the production of faba beans in Denmark

- New and better varieties, work in progress:
 - Earlier varieties
 - Higher yielding varieties
 - Quality – protein content, content of tannins, vicin and convicin
 - Disease resistant varieties
- Producing faba beans:
 - Optimizing production: establishment-treatment during production-harvest-post harvest treatment
- Alternativ markets
 - Fish feed
 - Human consumption