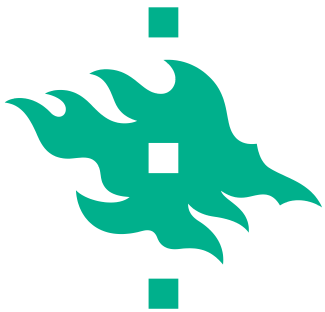




Legumes in Finland and the world

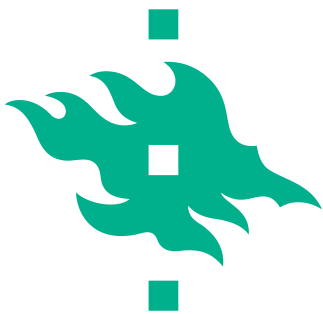
Frederick Stoddard



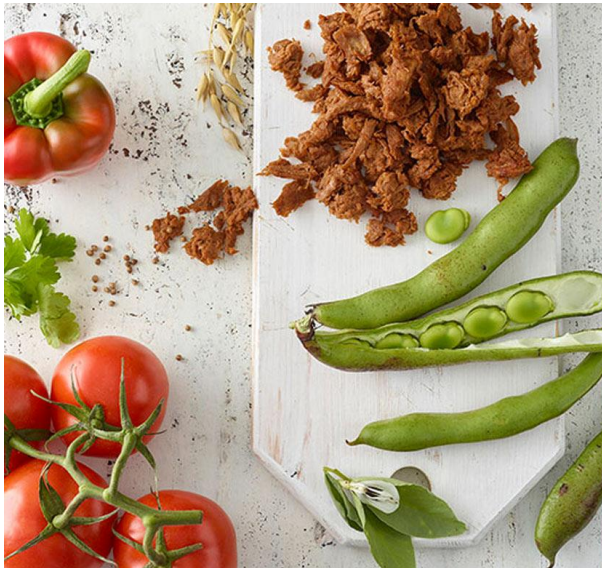
What could be better than a legume?

- It's delicious fresh...
- Or ripe, dry and stewed...





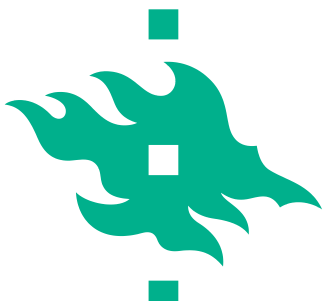
Processed...



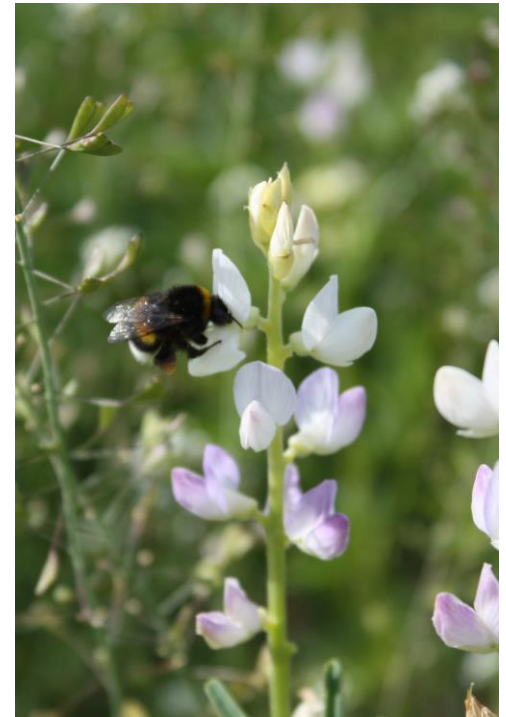
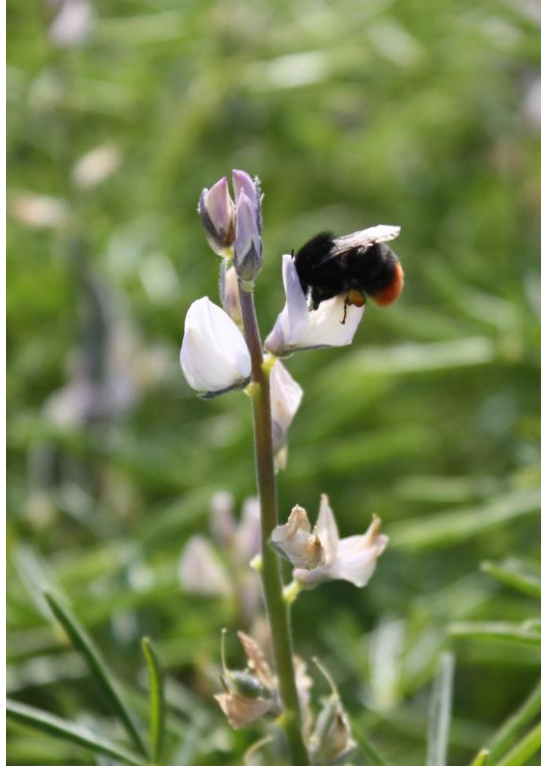


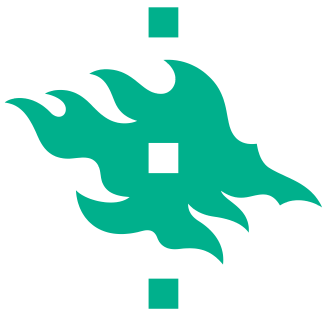
Or indirectly as an animal product





It's good for pollinators

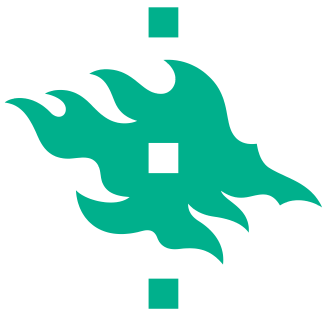




It fixes nitrogen with its nodule bacteria

- So it needs only a little nitrogen fertilization

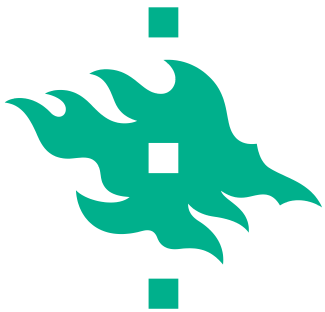




The pre-crop effects add profit in the following year

- Reduced N fertilization of the following crop (but risk of leaching)
- Soil-borne root diseases of cereals die
- Beneficial soil microbes multiply
- Its thick roots make wide biopores in the soil, aiding penetration of rain



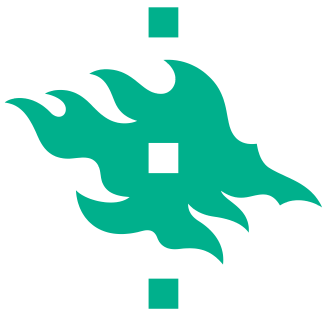


Its seeds are rich in protein

Species	Protein concentration (% dm)
Mung bean	17
Chickpea	22
Pea	23
Kidney bean	25
Lentil	27
Faba bean	29
NL lupin	34
Soybean	39

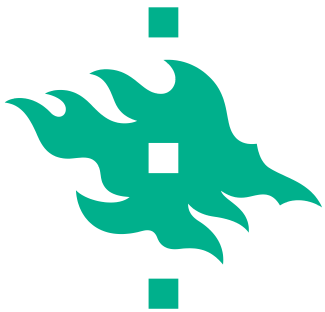
Soy arrives in Netherlands





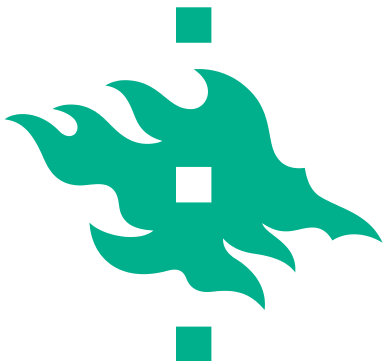
It has been part of agriculture for 10 000 years

- The first crops in the Fertile Crescent were:
 - Einkorn wheat
 - Emmer wheat
 - Barley
 - Pea
 - Lentil
 - Faba bean
- Every agricultural society started with a cereal AND a legume
 - Rice and soy
 - Maize and common bean

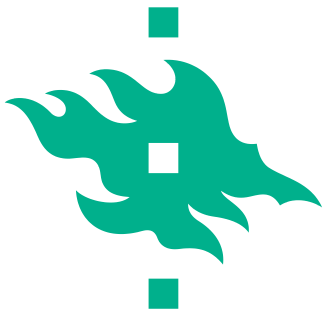


But on its own, it is not perfect

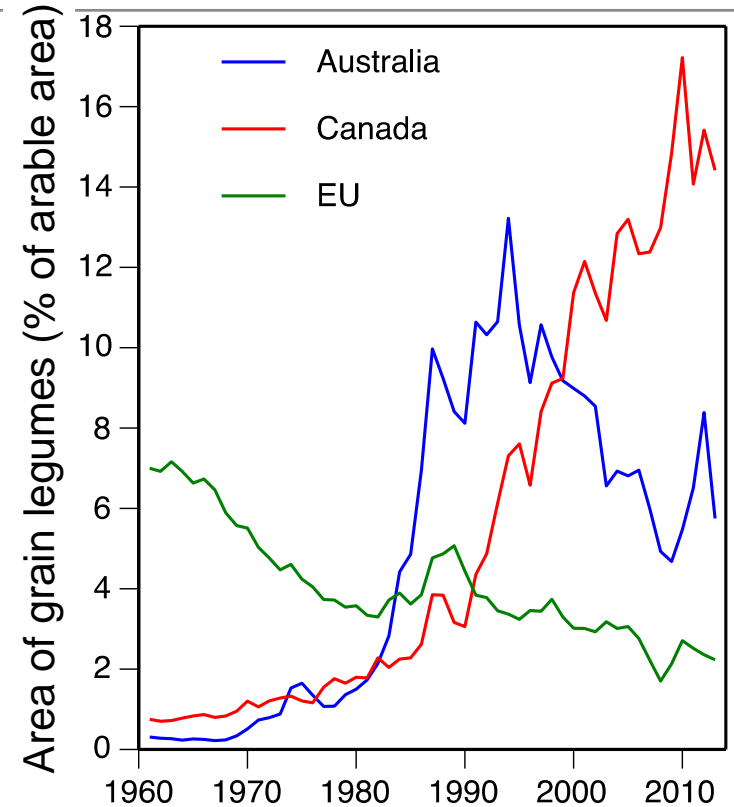
- Low in sulphur-containing amino acids (cysteine, methionine)
 - Cereals have these, but not enough lysine
 - People, chickens, pigs and other monogastric animals need both
- Legumes have their own root diseases
- Crop rotation is necessary

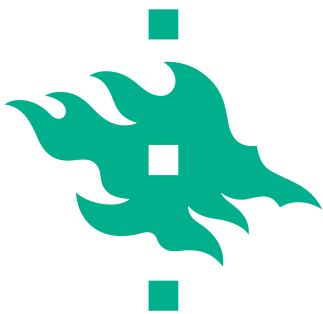


The current situation

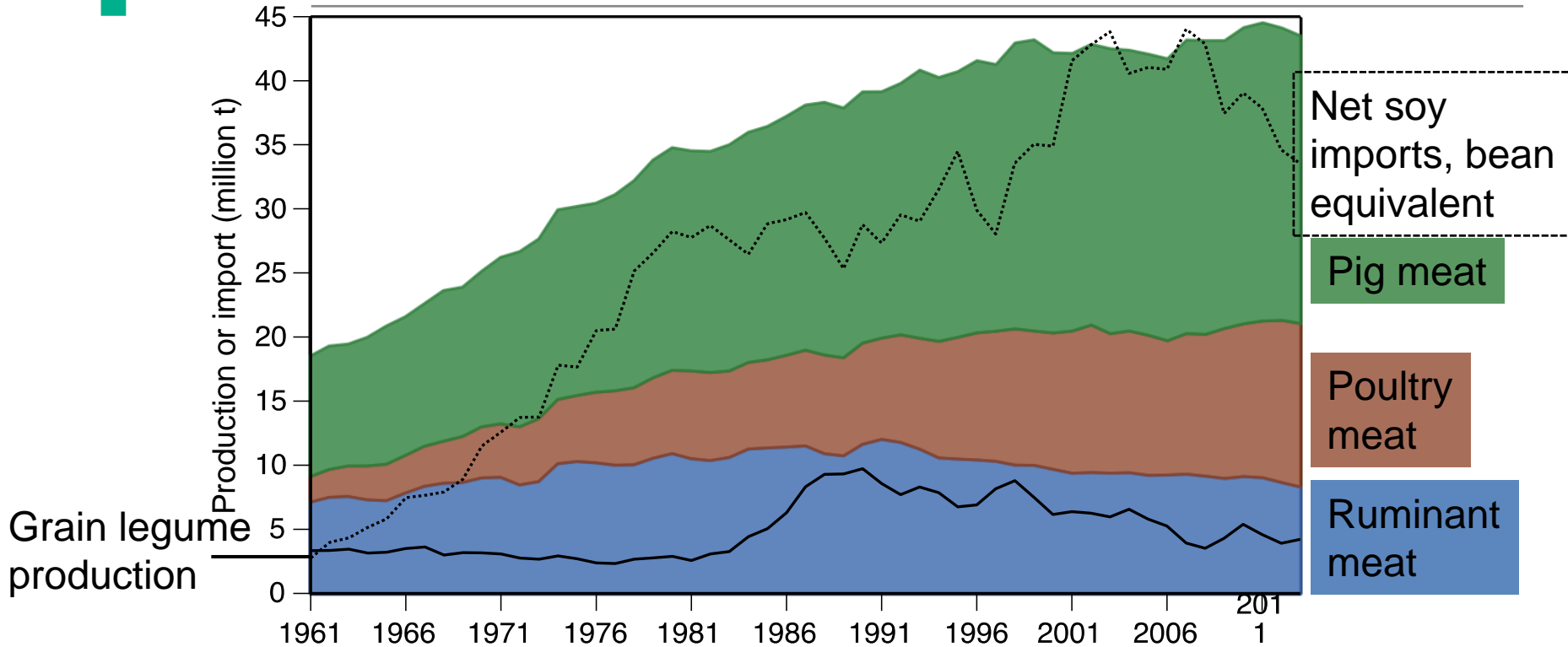


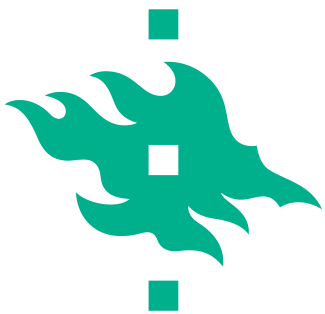
- In Australia and Canada (among others) the area sown to legumes increases
- In Europe it goes down





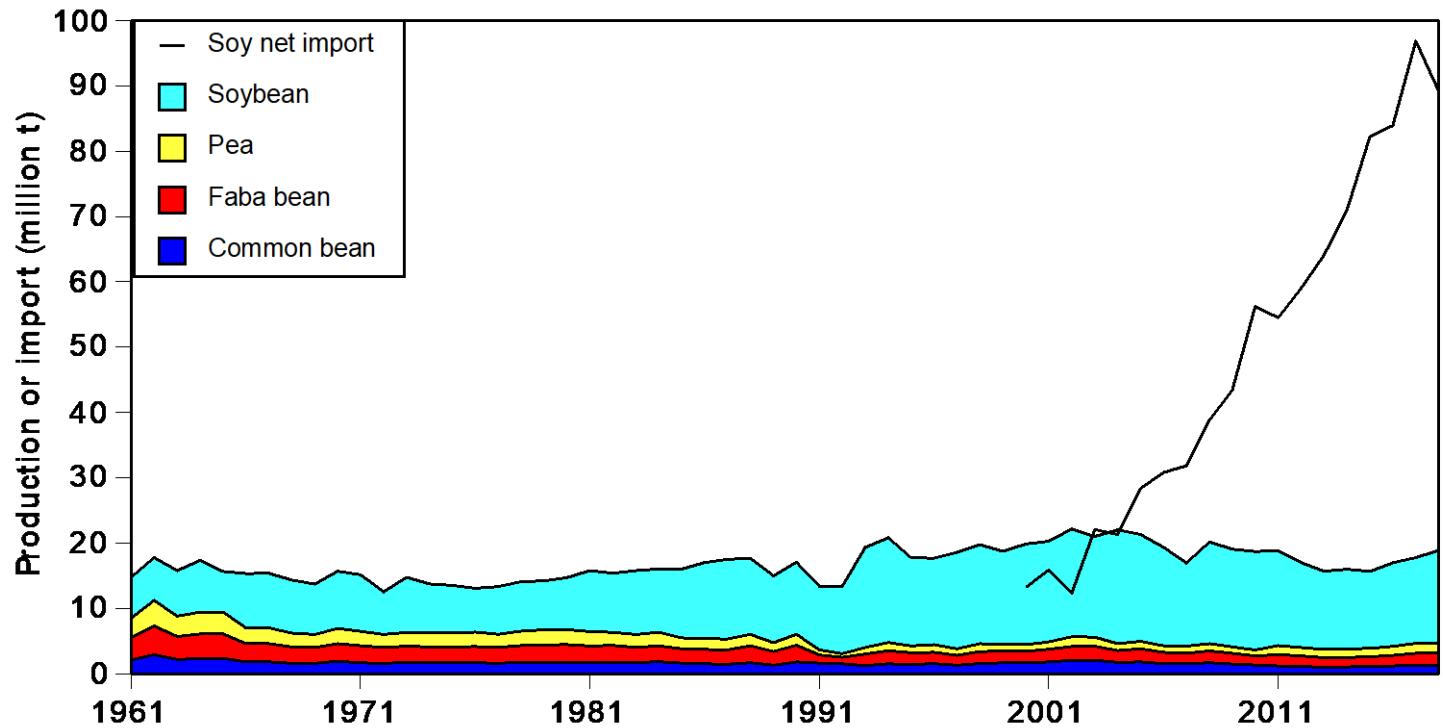
Europe's meat production and soy imports depend on each other

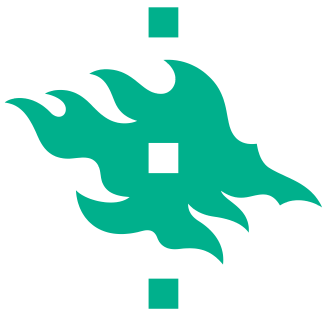




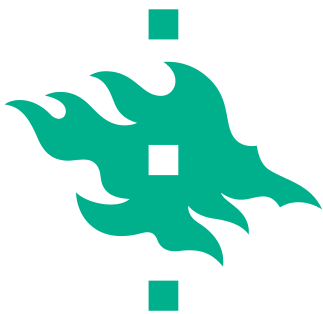
China's demand for soy increases

- Now > 2x Europe's
- FAOstat data





-
- Europe imports ~40 M t of soy to supplement feeds of pigs and chickens
 - = ~13.5 M ha of USA, Brazil, Argentina
 - = 70% of protein supplements
 - 85% in Finland
 - = 16% of total livestock protein feed
 - Less than 1% goes directly into food



We spoke to the EP in 2013

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT B
STRUCTURAL AND COHESION POLICIES

EUROPEAN PARLIAMENT

The Environmental Role of Protein Crops in the New Common Agricultural Policy

Presentation: Christine Watson
Donal Murphy-Bokern
Andrea Bues
Sara Preißel
Fred Stoddard
Peter Zander

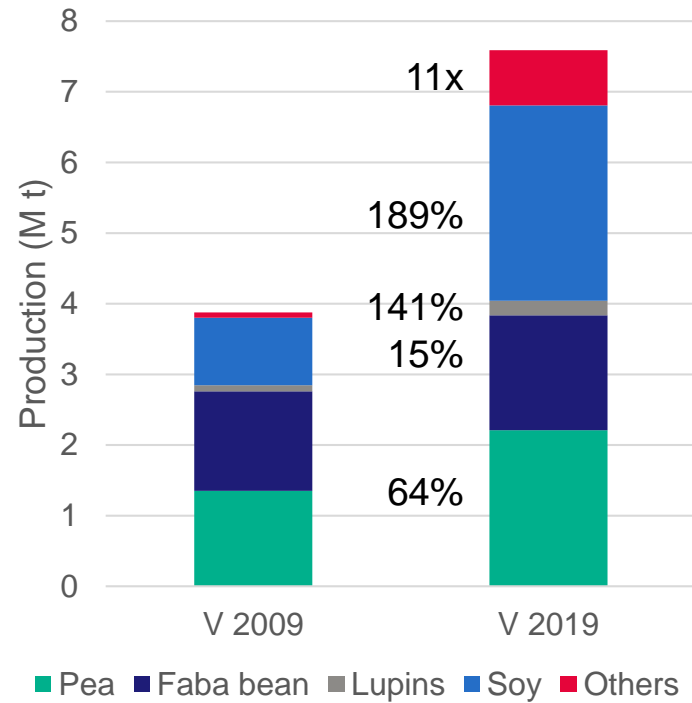
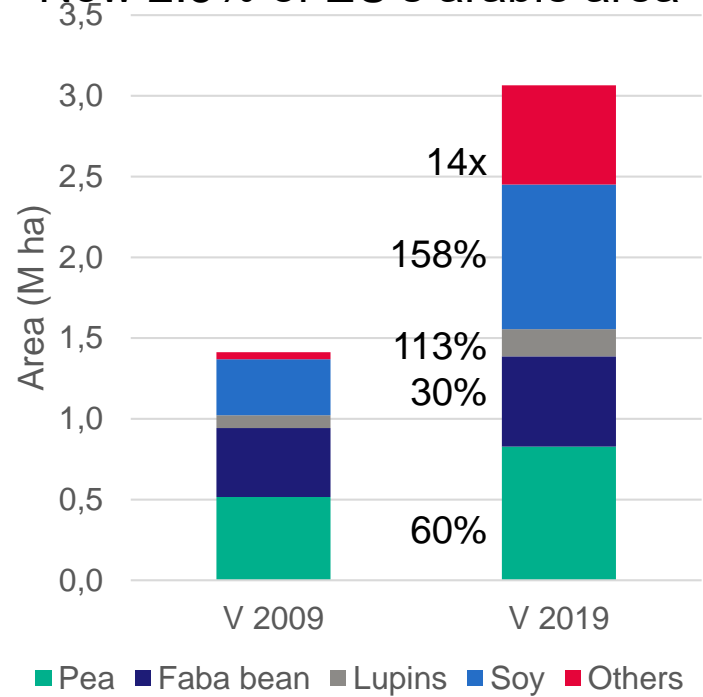
Absent co-authors
Tom Kuhlman
Kristina Lindström

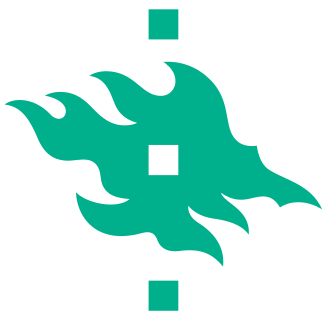




The revised CAP (2013) resulted in increased legume production

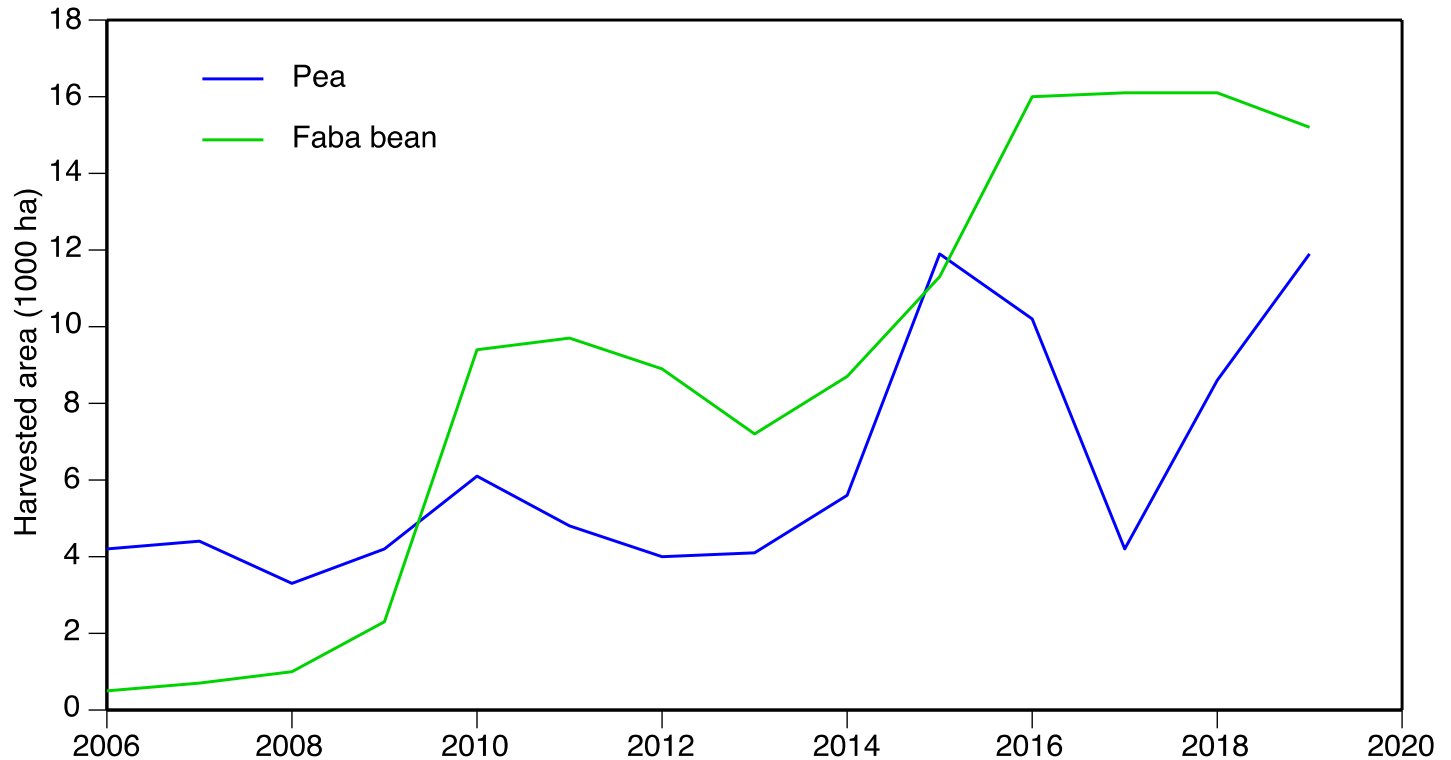
Now 2.5% of EU's arable area





Meanwhile, in Finland: areas up

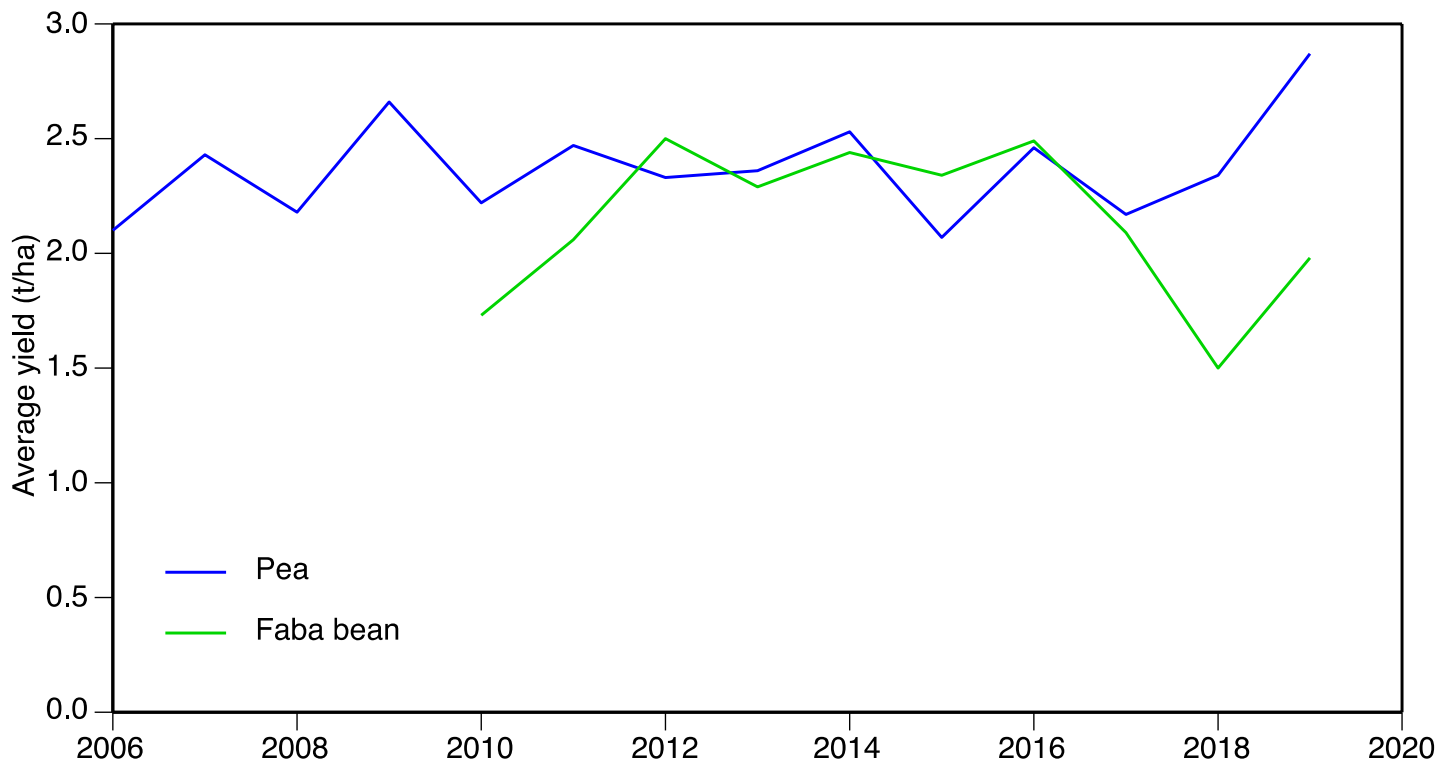
- Consistent demand for soup pea
- Feed compounders interested in faba first, then pea

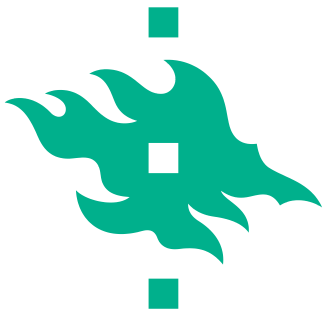




But average yields are not

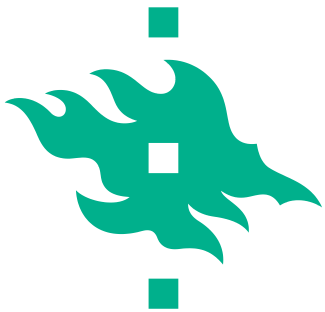
- 2017: cold wet summer
- 2018: drought





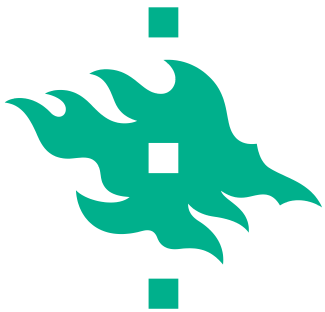
Limitations

- Weed control is hard
 - Not enough effective tools (chemical or mechanical)
- Not enough tolerance / resistance to diseases and stresses
- Extremes of weather
- Novelty: learning curve for a new-to-you crop
- Price: feed protein price determined by world soy
- Valuation of the break-crop effect



Recipe for success

- Farmer networks: peer-to-peer communication
- Attention to detail, e.g., soil
 - Faba needs moisture-retentive soil
 - Lupin needs well drained, acid soil
- Thinking outside the box
 - New food uses
- Public-sector science since profits are too low for private investment
- EU / Government support to farmers
- Patience: uptake of novel crops is slow and stepwise



Could soy import be completely replaced?

- At what level? The continent, the EU, a single country (Finland)?
- The EU's arable area is 105 M ha
- *IF* soy production were at current EU average, 3 t/ha, 13% of EU's arable area would be needed
- Non-EU countries on the continent could contribute e.g., Serbia, Ukraine
- Romania: only 2.5% of arable area to replace its imports
- Netherlands: 90% needed!
- Finland: 80 000 ha of faba bean would feed the nation's pig flock
 - = 4% of arable area
 - Oat – faba instead of barley – soy
- Dietary change



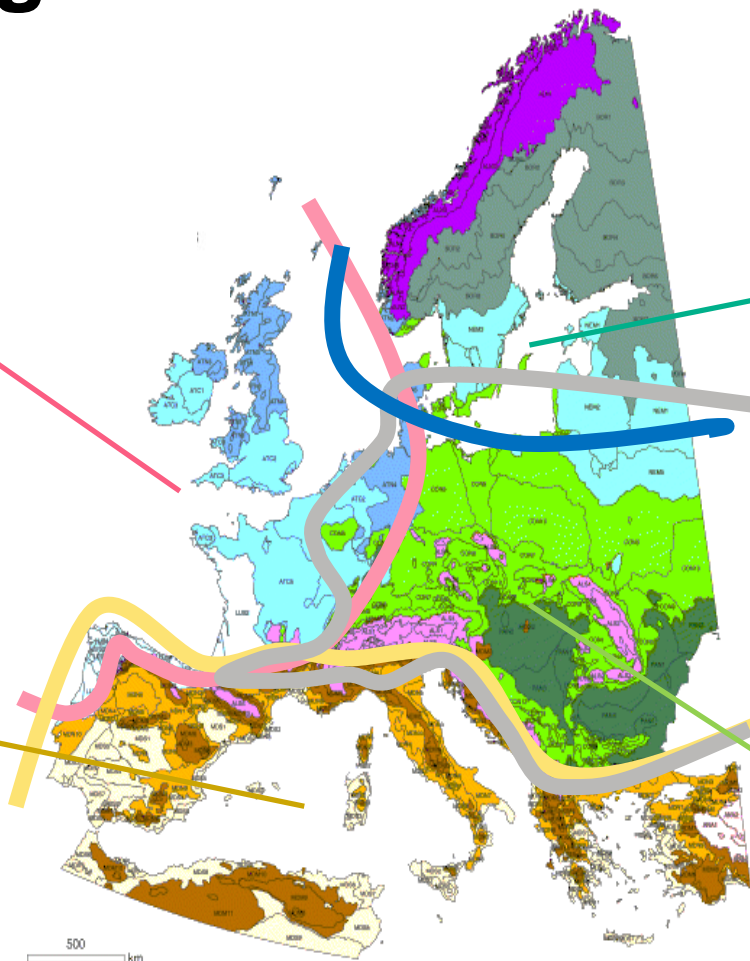
What grows where?

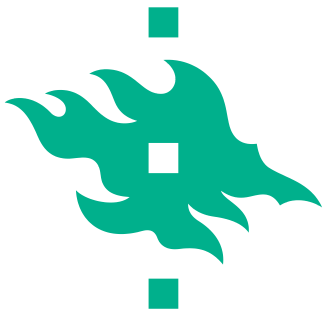
Oceanic: winter pea, winter faba; pea, faba, maybe lupins

Sub-boreal: pea, faba bean, narrow-leafed lupin

Mediterranean: winter pea, faba, lentil & chickpea; irrigated soy and other beans in summer

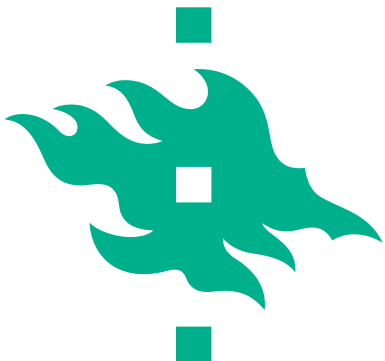
Continental: soy, common bean, pea, faba bean, sweet lupins



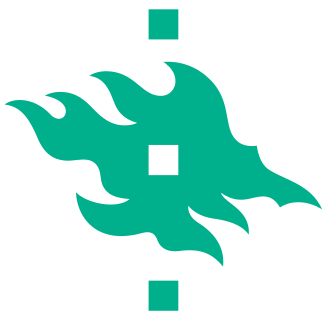


Palkokasvit ovat...

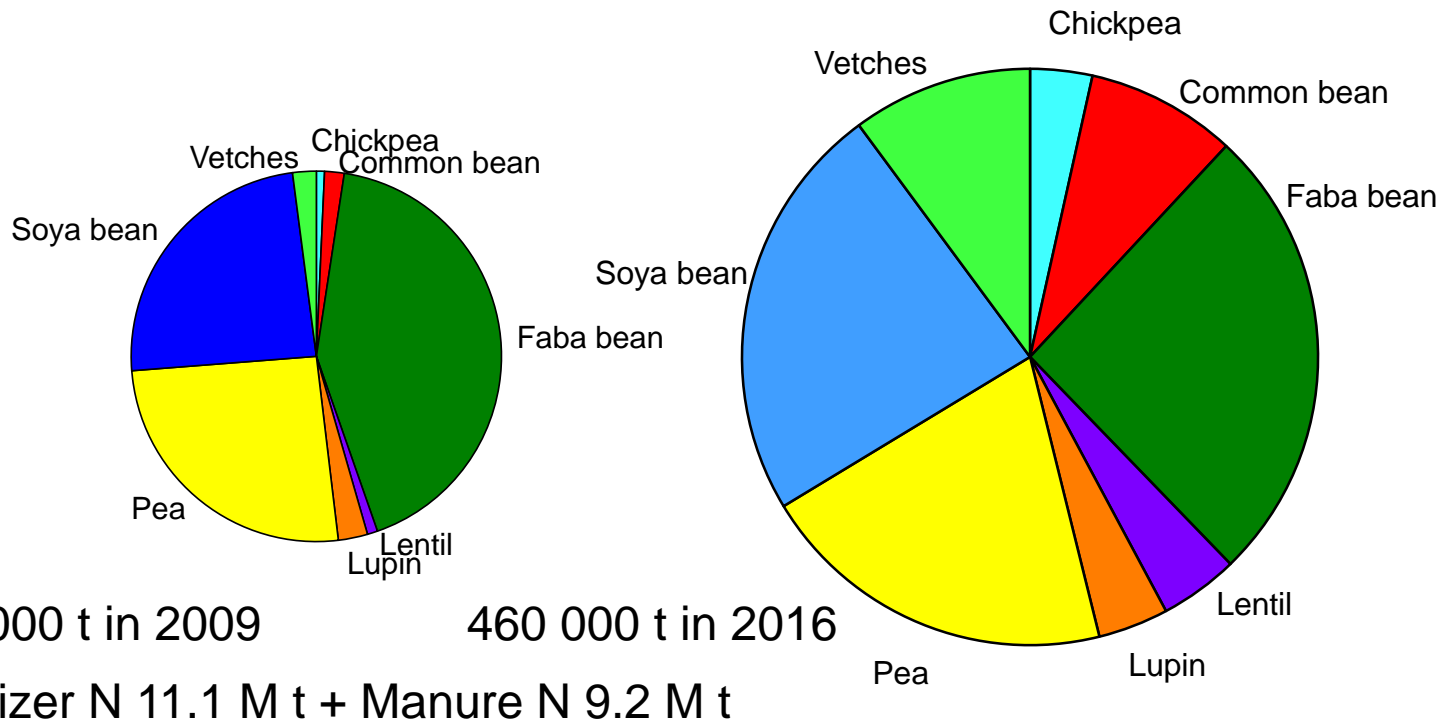
- Hyviä maaperälle
- Hyviä pölyttäjille
- Hyviä viljelykierroille
- Hyviä rehuvalintoja
- Hyviä ruokavalintoja
- Mutta haastavia jos viljelijällä ei ole kokemusta
- Ja hinta on vielä liian matala

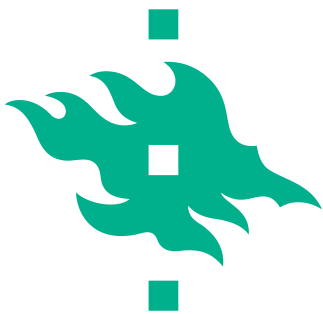


Kiitos mielenkiinnosta!



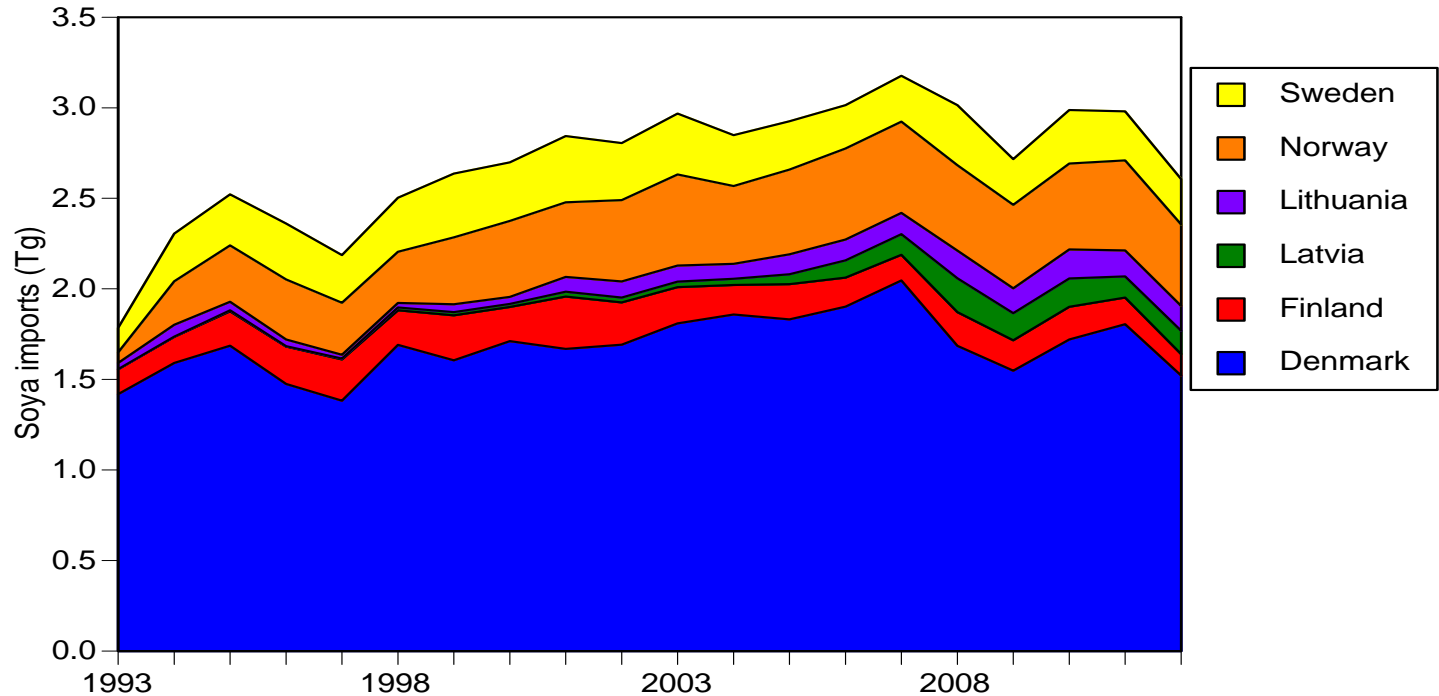
How much nitrogen is fixed?

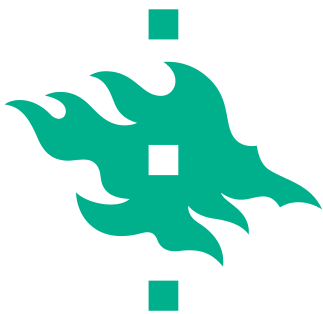




~3 M t soijaa tuodaan Pohjoismaihin ja Baltiaan

Tuotanto on
< 10% tästä





Palkoviljojen viljelyala Pohjoismaissa ja Baltiassa

