

5 years notillage. Case-study from a danish farm



Stud. M.Sc. Agriculture Frederik Vilhelm Larsen
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Disposition

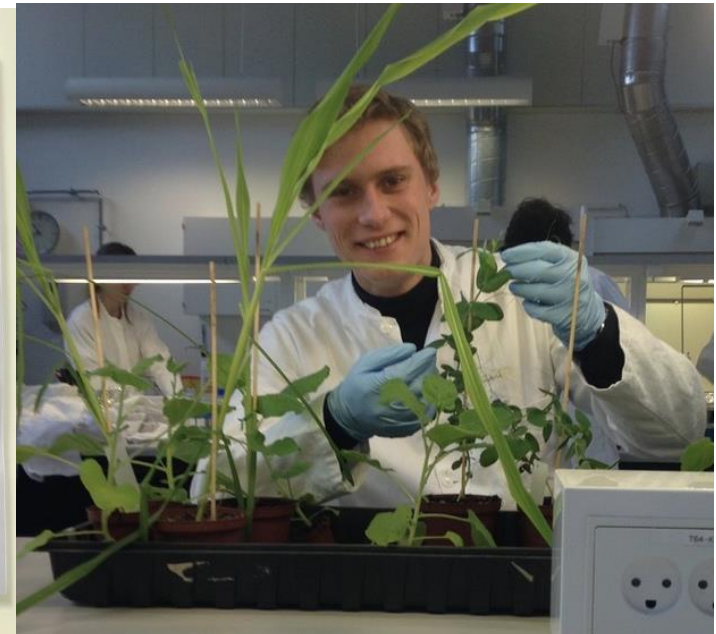
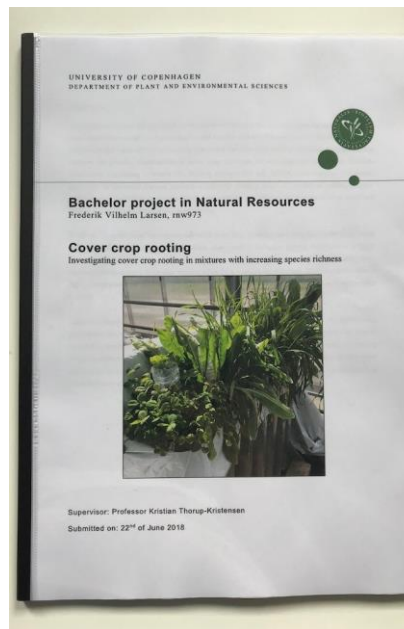
- About me
- Some stats
- Barløsegaard
- Approach to CA
- Crop-rotation
 - Case study: notill cocksfoot
 - Other crops
- Cover cropping
- Some small on farm trials
 - Cover crop species/cultivar trials
 - Over winter cover crops
 - Alfalfa living mulch
- Evt.



No-tillage: it's more than what meets the eye

Bagground

- M.Sc. Agriculture student at University of Copenhagen
- B.Sc. Natural Resources (plant science)
- Worked with farming in New Zealand
- Born and raised on an arable farm and still does farming whenever possible.
- Board member of FRDK, Danish min-till organization.



Some stats, from FRDK

- Different opinions on climate mitigation possibilities on Conservation Ag. “the jury is still out”
- However promising potential so far
- It is a fact: less time, less erosion, less fuel
- Around 300.000 ha “reduced” tillage in Denmark
- Less than 10.000 ha proper low disturbance no-tillage.

Barløsegaard an arable farm

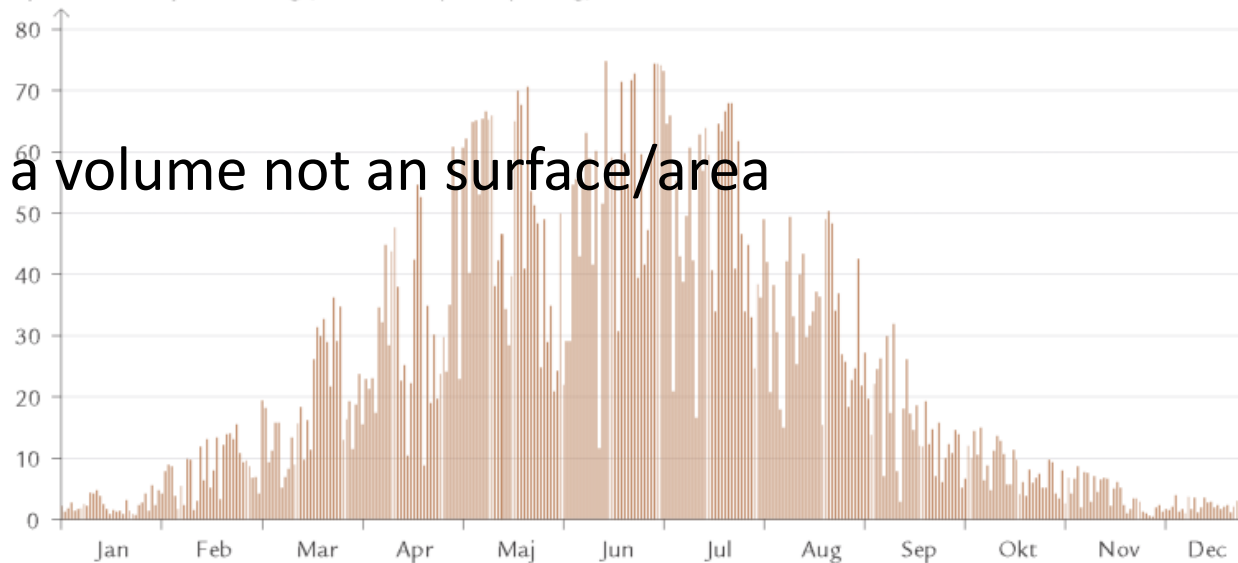
- No plowing since year 2000
- Direct drilling with Horsch CO4 in ~3 år
- Cross Slot notillage since summer 2016 = now just started on 4th season
- 230 ha in total. 210 ha arable + 12 ha christmas trees.
- Owner: My dad Hans Frederik Larsen



Our approach: sunlight

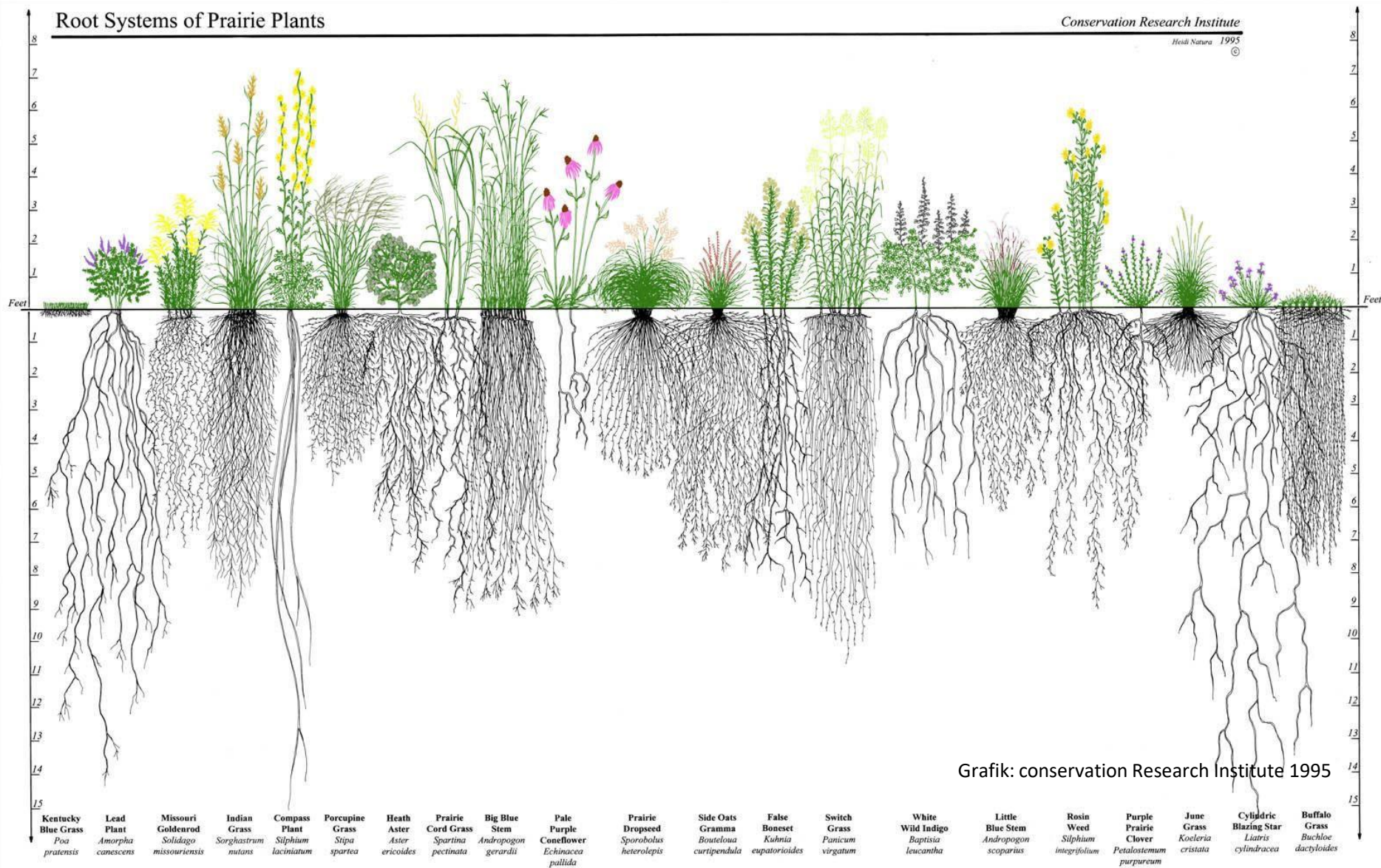
- Farmers are living by harvesting sunlight
- Our crops are supposed to capture as much sunlight as possible
- Weeds = Are in general indicator of poor resource use efficiency
- We are growing a volume not an surface/area

Fotosyntetisk aktiv lysindstråling (mol fotoner per m² per dag)



Grafik: Den Store danske 2019

Both above and below ground



Tallgrass prairie in Madison, Wisconsin



Soil; Our greatest asset

- Longterm goal to improve soil quality -> production potential
- Healthy resilient soil is something we grow with root exudates
- Nature mimicking; look at nature for inspiration on our agroecosystems



management practices (Figure 4) [75,140–142]. Many of these same practices have been shown to increase PGPR/B and reduce DRB [100,101].

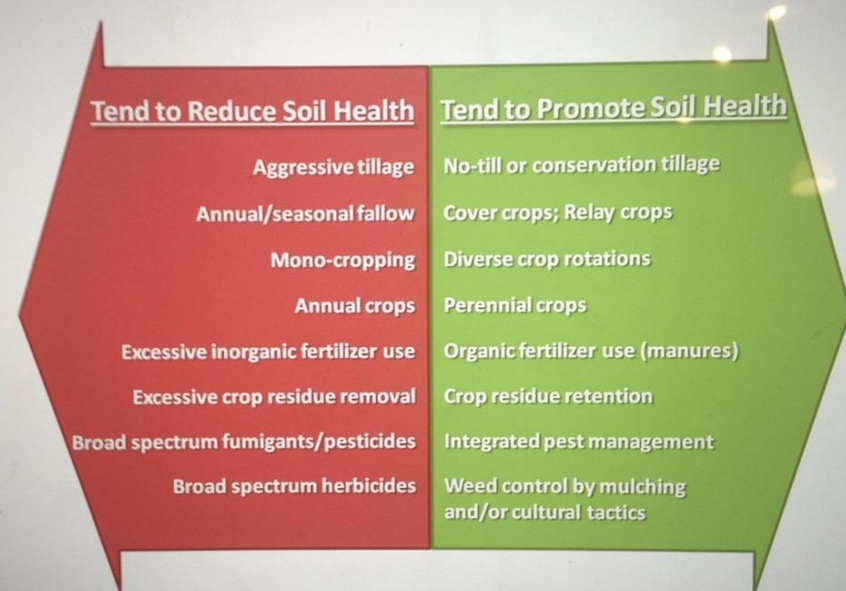


Figure 4. Generalized Effects of Agricultural Management Practices on Soil Health (information compiled from: [75,140–142]).

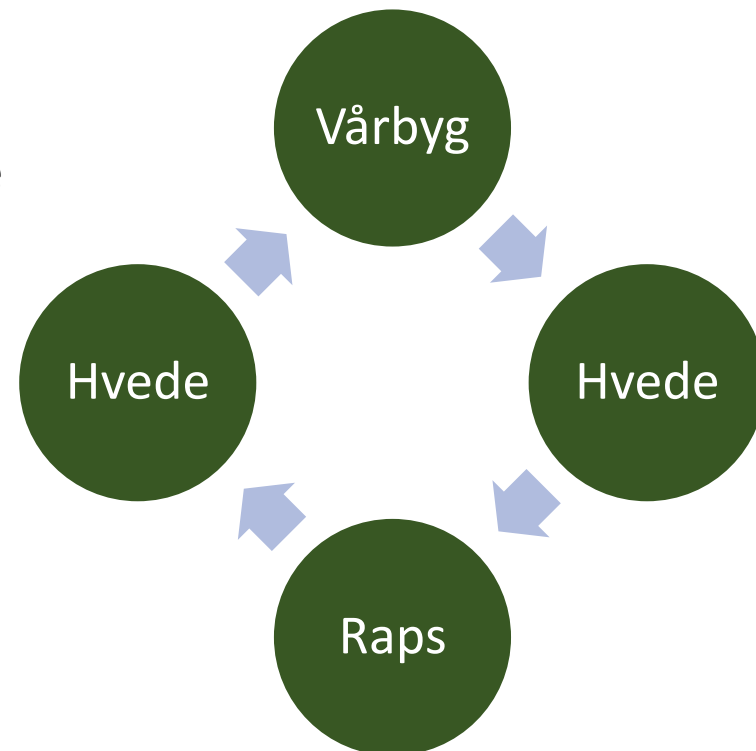
Sea gull indicator

- Successful notillage is a matter of no sea gulls and no visible disturbance



Markplan og sædskifte

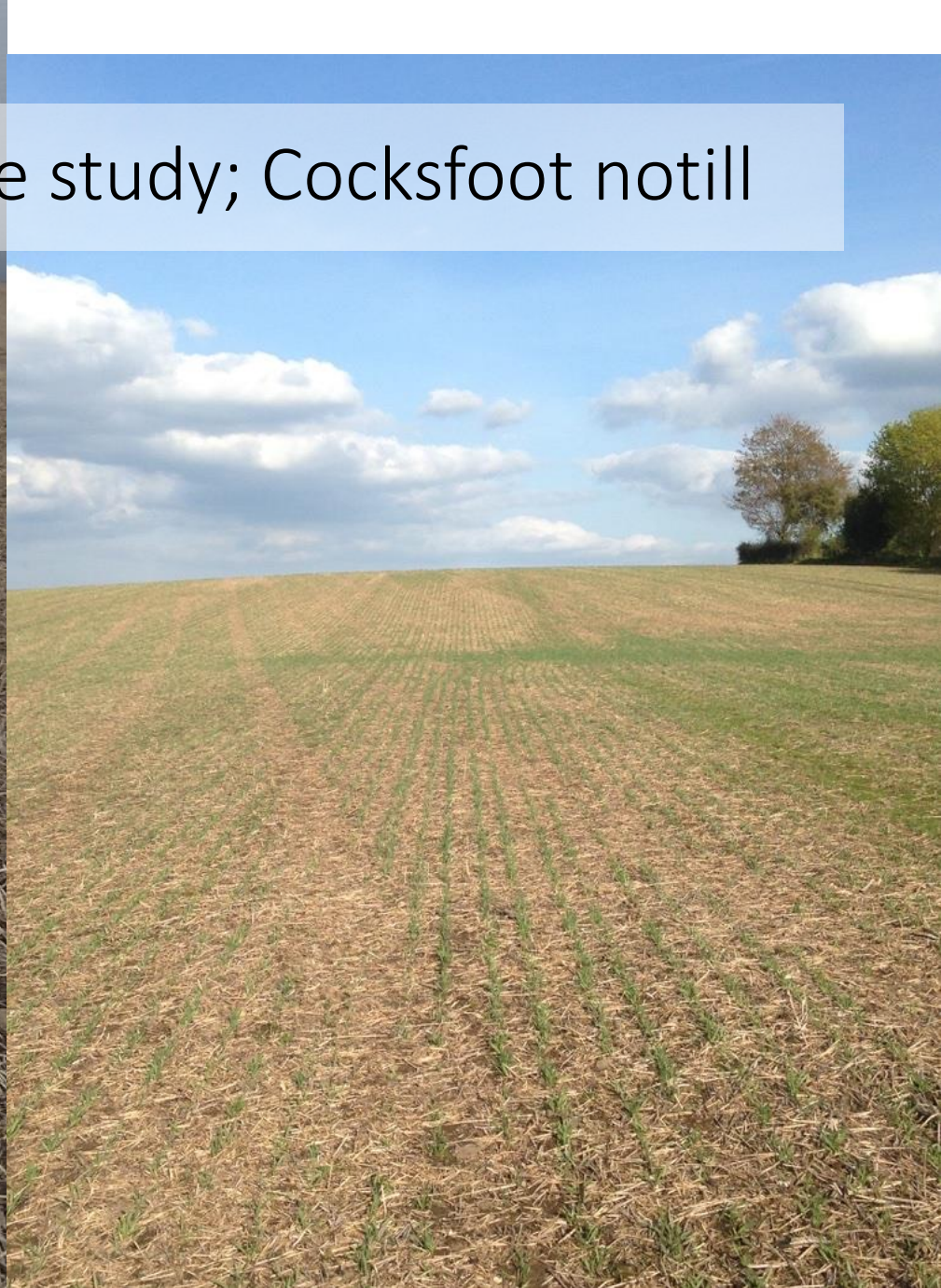
- Traditional arable rotation: wheat -> OSR -> wheat -> barley
- Now some cocksfoot seed crop
- Min-till sugar beats and Red Fescue until 2006
- Perennial grass seed crops are sound in no-till
- Emphasis on expanding crop rotation
- The more green our fields are when drilling the better



Case study; Cocksfoot notill



2x drilled; spring malting
barley + grass seed



Spring first year of grass harvest



Harvest of cocksfoot

Yield 2018:
1280 kg/ha clean
seed
12% cleanings



Wheat and OSR early spring 2019




Cover crops



- Earliest possible establishment. In standing crop
- Keep it simple. Believers of funktionel biodiversity
- Vetch, raddish, crimson clover works for us
- Small seeds works and are cheap pr plant

Establishing cover crop before
wheat harvest



A photograph of a lush green field filled with plants that have small white flowers. A wooden handle, possibly from a tool, is stuck upright in the center of the field. In the background, there are several trees and a clear sky.

October 2017

Foto: Erik Sandal



Happy cover crop and farmer



Maybe diversification into livestock integration is a future option

We believe in trial and error

- We only learn from our failures
- Any small corner of a field is good enough and cheap
- 0,5 ha is just as good as a 50 ha field for learning.

Cover crop cultivar trial:

- Cheap vs. Expensive seed
- (18.oct 2018)
- We dont want flowers



Cover crop cultivar trial

- Cheap vs expensive winter rye
- (18.okt 2018)
- Seed purity...



Freudenberger, grønrug

P.H.Petersen, protector

Cover crop species trial:

- Black oats and spring rye
- Flowering 18. oct 2018
- Weed suppressive mulch



Feb. 2018



18. Okt 2018

Two tier cover crop system



December 2018



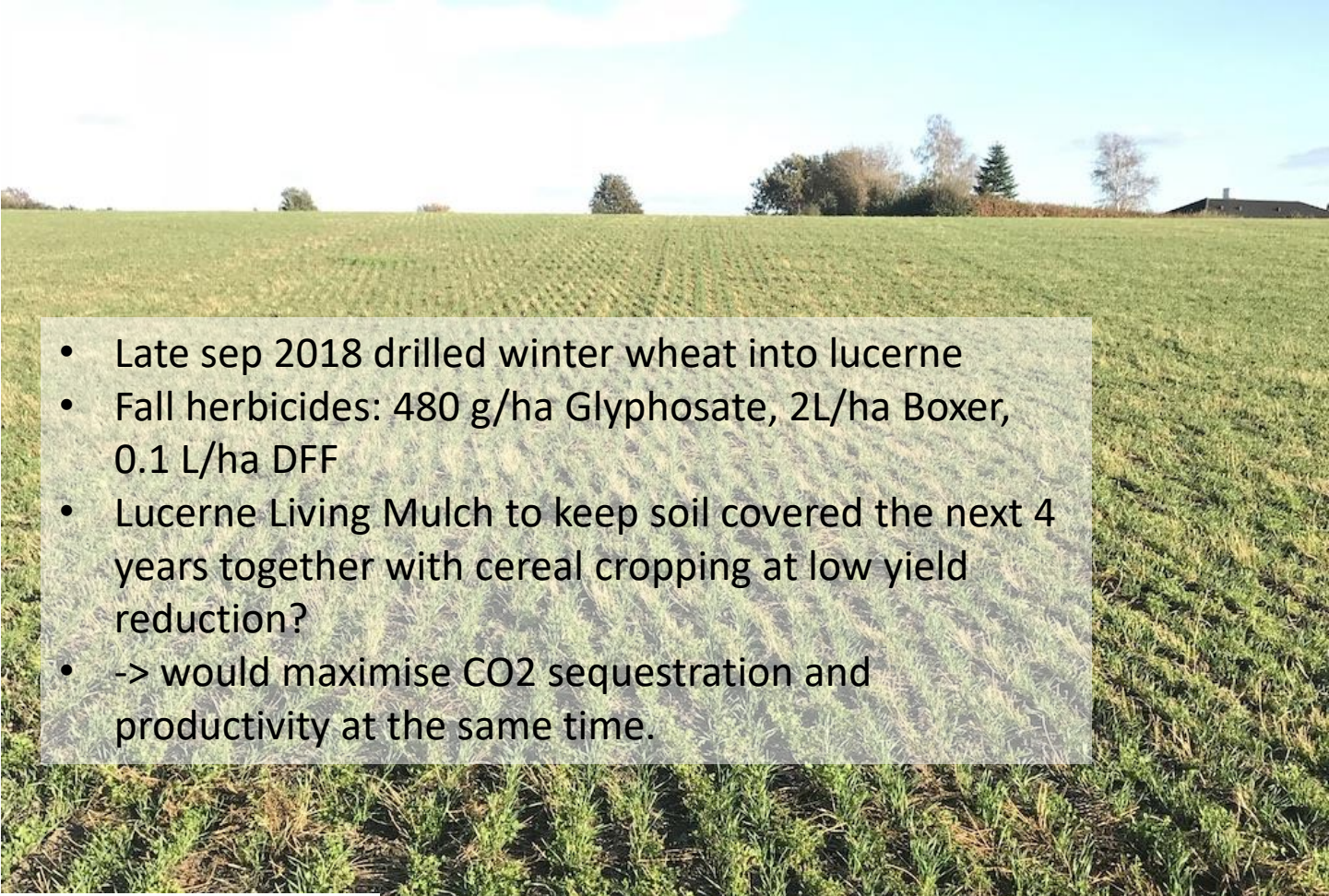
Februar 2019

- Faba beans undersown with lucerne in dry 2018 season





Only two weeks after bean harvest

- 
- Late sep 2018 drilled winter wheat into lucerne
 - Fall herbicides: 480 g/ha Glyphosate, 2L/ha Boxer, 0.1 L/ha DFF
 - Lucerne Living Mulch to keep soil covered the next 4 years together with cereal cropping at low yield reduction?
 - -> would maximise CO₂ sequestration and productivity at the same time.





Sidst i december.

An aerial photograph of a green tractor pulling a grey seed drill through a golden-brown field. The tractor is moving from the upper center towards the lower right, leaving a trail of dark soil behind it. The field is divided into long, straight rows of crops. In the top left corner, there is a small area of dark green trees.

Some
comments

Questions?

Thanks