Innovationscenter
for Økologisk Landbrug

Regenerativt landbrug

Definitioner, interesser, virkemidler og muligheder

STØTTET AF
Promilleafgiftsfonden for landbrug

RAL-Netværk 21-08-2025

Jon Aagaard Enni, konsulent, Team Planter og Jord, jone@icoel.dk

Agenda

- **Baggrund**
  - Hvad betyder "regenerativt"?
  - Historien bag
  - Nutidens hovedstrømninger
  - Definitioner og principper
- **Interesser**
  - Hovedaktører
  - Top down vs. bottom up
  - Følg pengene
  - Et spektrum
- **Fakta og faldgruber**
  - Sund jord = sunde planter – eller omvendt?
  - Plov eller pesticider?
  - Kulstofopbygning i landbrugsjord
- **Muligheder og udfordringer for økologien**
  - Økologiens ømme tæer
  - Regenerativt landbrug som "gateway drug"

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Fotograf: Jon Aagaard Enni

Baggrund

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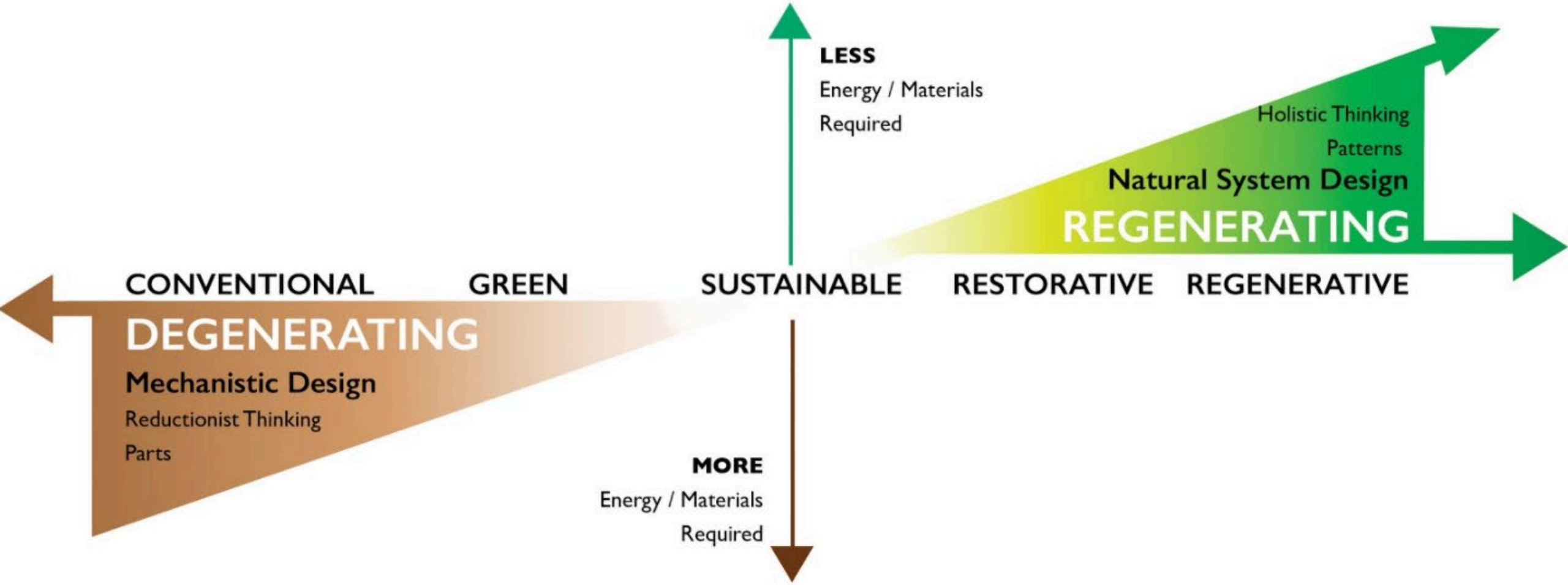
Hvad betyder ”regenerativt”?



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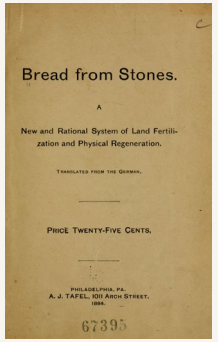
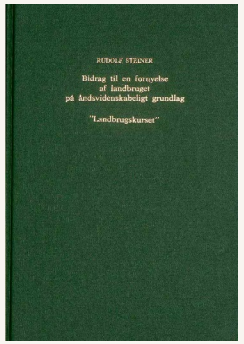
Kilde: https://www.slowood.hk/blogs/eco-stories/the-regenerative-power-of-soil
Formentlig adapteret fra Bill Reed, Regenesis: https://good-design.org/designing-the-possible-this-decade/figure-1-trajectory-of-ecological-design-bill-reed-regenesis/

Historien bag

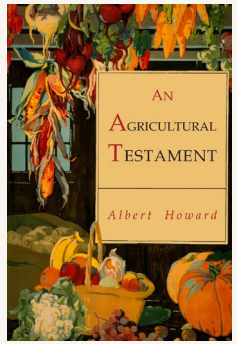
Hovedværker i den regenerative bevægelse



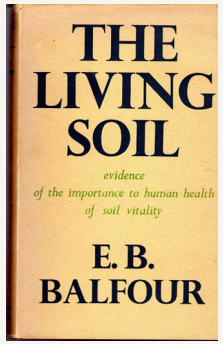
1894



1911



1924



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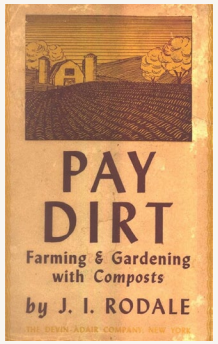
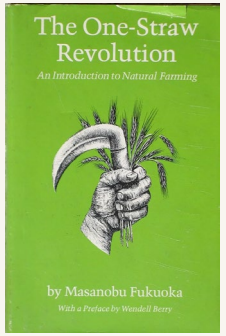
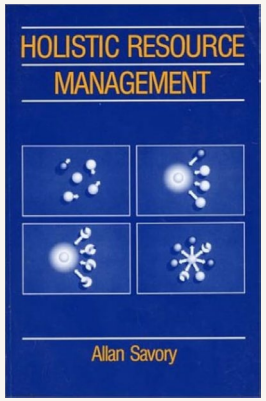
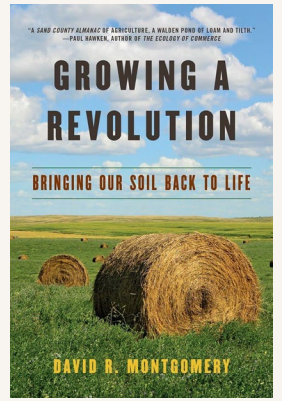


1943

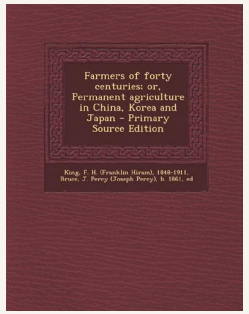


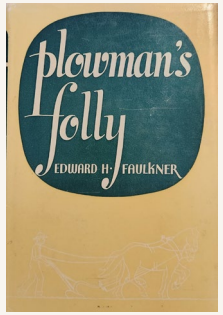
1945 1962 1975

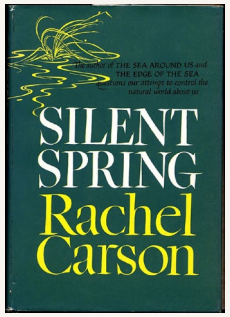


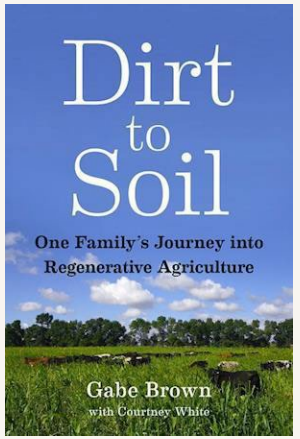


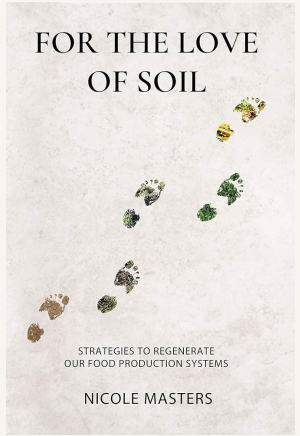
1988 - 2019











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Fotokilde: https://www.amazon.com/

Nutidens hovedstrømninger

- Biodynamisk jordbrug
  - Økologi + fokus på drøvtyggere, kompostering, bladgødskning
- Økologisk landbrug
  - Forbud mod syntetiske input, fokus på dyrevelfærd, bæredygtighed
- Real Organic
  - Øko+, husdyr skal være udendørs, ingen gylle/pesticider
- Regenerative Organic (Rodale)
  - Økologisk, lavinput, reduceret jordbearbejdning
- Holistisk management
  - Systemtilgang, fokus på rotationsafgræsning
- Conservation Agriculture (CA)
  - No-till, sædskifte, permanent jorddække
- Soil profits / NRCS / Gabe Brown
  - CA + rotationsafgræsning
- ”Nutrition farming” / Quality Agriculture
  - Frugt- og planteavl med fokus på jord- og planteanalyser, bladgødskning, biostimulanter
- Bio-intensive market gardening / CSA
  - Ofte øko, småskala grøntsagsproduktion, direkte afsætning, urban farming
- Permakultur
  - Systemtilgang, skovlandbrug, flerårige afgrøder, rotationsafgræsning
- Agroecology
  - Systemtilgang, sociopolitisk aktivisme, traditionelle metoder, ”food sovereignty”

Prin

THE FOUR PRINCIPLES OF ORGANIC AGRICULTURE

HEALTH

Healthy soils produce healthy crops that foster the health of animals and people.
Organic agriculture is intended to produce high quality, nutritious food that contributes to preventive health care and well-being.

ECOLOGY

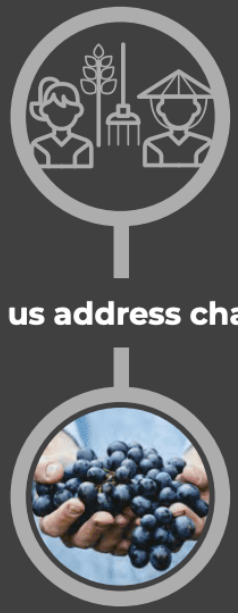
All land is home to wildlife and important for ecosystem services. Organic agriculture aims for ecological balance through the design of farming systems, establishment and good maintenance of habitats and conservation of agricultural biodiversity and genetic resources.

FAIRNESS

Equity, respect, justice and stewardship of the shared world. Organic agriculture aims to provide good food for all and a decent living for farmers and food workers.

CARE

Taking care of each other and our surroundings.
Organic agriculture focuses on how we can enhance efficiency and increase productivity without jeopardizing the health and well-being of people and the planet.



How can organic agriculture help us address challenges?

SOIL

Organic agriculture is centered on boosting soil health. What are the benefits of healthy soil?

What are some of the benefits of healthy soil?

We can grow nourishing, nutrient-dense foods in it without using inputs like artificial fertilizers
It provides us with higher crop yields in the long term

BIODIVERSITY

Organic agriculture seeks to maintain and boost biodiversity. Why does that matter?

What are some of the reasons biodiversity matters?

-Seed and crop diversity makes farms and landscapes more resilient to challenges (such as pest incursions) and change (such as global warming)
-Monoculture impacts negatively on soil health and biodiversity

LIVELIHOODS

How can organic agriculture help create more sustainable, secure and resilient livelihoods?

What are some of the key questions when considering sustainable livelihoods?

-What is the difference between food security and food sovereignty?
-How can organic agriculture contribute to more secure and resilient food production?

CLIMATE CHANGE

How can organic agriculture contribute to addressing the climate crisis?

Some contributions include:

-Soil that's cultivated organically stores more carbon than that which is cultivated for conventional agriculture
-It reduces greenhouse gas emissions by omitting the use of pesticides

Global Landscapes Forum

globallandscapesforum.org

Funding partners:

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Federal Ministry for Economic Cooperation and Development

In collaboration with:

IFOAM ORGANICS INTERNATIONAL

INTEGRATE LIVESTOCK

LIVING R-ROUND

Planned grazing

Minimize

Kilde: F

Innovo for Øk

Principper for regenerativt, økologisk landbrug i DK

Innovationscenterets bud

Minimal forstyrrelse af jorden

- Reduceret jordbearbejdning
- Forebyggelse og afhjælpning af skadelig jordpakning
- Fokus på kvalitet af input

Levende plantedække året rundt

- Persistente kløvergræsmarker
- Etablering som udlæg, hvor det er muligt
- Flerårige afgrøder
- Relay cropping
- Living mulch

Maksimal artsdiversitet

- Artsdiverse græsmarks- og efterafgrødeblandinger
- Samdyrkning af hovedafgrøder
- Stribedyrkning
- Skovlandbrug
- Småbiotoper

Integration af husdyr

- Rotationsafgræsning
- Mobile stalde (enmavede dyr)
- Udførsel af markopgaver med husdyr
- Forskellige husdyrarter i successiv rotation

Recirkulering af ressourcer

- Kompost
- Biogas
- Optimering af næringsstoftilførsel og –udnyttelse
- ”Produce no waste”
- ”Feed no food”

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Definitioner

REGENERATION INTERNATIONAL

About | Partners | Blog | Farm Map | Billion Agave Project | Events | Peoples Food Summit | Resources

Regenerative systems improve the environment, soil, plants, animal welfare, health, and communities.

The opposite of Regenerative is Degenerative

This is an essential distinction in determining practices that are not regenerative.

Agricultural systems that use Degenerative Practices and inputs that damage the environment, soil, health, genes, and communities and involve animal cruelty are not regenerative.

Regenerating Together Programme
BY SAI PLATFORM

Box 1: The definition of regenerative agriculture according to SAI Platform's Regenerating Together global framework for regenerative agriculture.

Regenerative agriculture is an outcome-based farming approach that protects and improves soil health, biodiversity, climate, and water resources while supporting farmer livelihoods.

Regenerative agriculture is a way of farming that regenerates

soil health

plant health

animal health

and human health.

It works by harnessing life's systems to:

– Bring soil back to life

– Reduce harmful toxins

– Improve crop quality

– Grow more nutritious food

– Use fewer synthetic inputs

– Improve farmers' quality of life.

It regenerates relationships between all life forms in an ecosystem:

between soil microbes and plants,

between livestock and landscapes,

between the people who grow food and the people who eat food.

Advancing Eco Agriculture's vision

for regenerative agriculture is to grow vibrant and abundant food without the need for chemical fertilizers and pesticides.

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SEGES INNOVATION

FORSKNING OG UDVIKLING > PRODUKTER OG YDELSER >

Hvad er regenerativt landbrug?

Regenerativt landbrug er en måde at dyrke jorden på, som kombinerer udbytte med jordens blivende sundhed og produktionskritiske ressourcer. Det er en tilgang til en mere robust og fremtidssikret landbrugsproduktion, som kan tilpasse sig klimaforandringer, fungere i bedre samspil med vores fælles ressourcer og i nogle tilfælde bidrage til at reducere CO_2-udledning.

Selve udmøntningen af det regenerative landbrug varierer fra landbrug til landbrug og fra region til region, men de holistiske principper bag det dynamiske dyrkningssystem er de samme. Og målet er klart og fælles; at genoprette jord- og økosystemernes sundhed, efterlade jord, vand og klima i bedre form til fremtidige generationer samt adressere økonomisk rimelighed.

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Planteavl Husdyr Klima Natur Bedrift Regler

Regenerativt landbrug er en bevægelse med rødder i forskellige alternative produktionsformer, herunder den økologiske. Der findes derfor ikke en stram definition. Derimod er begrebet afsæt for en fortløbende diskussion og udveksling af landbrugspraksisser på tværs af driftsformer, som formodentligt eller beviseligt kan regenerere landbrugsjorden. Begrebet vandt udbredelse i 1980'ernes USA anført af den økologiske pioner, Robert Rodale.

Seven Tendencies Towards Regeneration

IN AGRICULTURE, COMMUNITIES, AND **PERSONAL SPIRIT**

1. **PLURALISM**

Increase in diversity of plant species.
Increase in diversity of businesses, people and culture.
Increase in diversity of personal experiences, capacities, opportunities and openness to new experiences.

2. **PROTECTION**

More surface cover of plants, ending erosion and increasing beneficial microbial populations near the surface.
More resistance to economic and cultural fluctuations because of quantity and variety of businesses and people, which increases overall employment and community stability.
Improvement of personal hardiness and an ability to withstand crisis, accompanied by a boost in the body's immune system.

3. **PURITY**

Without chemical fertilizer and pesticide use a greater mass of plants and other life exists in the soil.
Without pollution of the environment, more people can exist in better health.
By ending detrimental habits such as smoking or thinking negatively, the potential for growth, happiness and success increases.

4. **PERMANENCE**

More perennials and other plants with vigorous root systems begin to grow.
As businesses and individuals become successful and stable, they can contribute more to the community.
New, more positive, personal spiritual behaviors take root and provide a deeper meaning to life.

5. **PEACE**

Past patterns of weed and pest interference with growing systems are disrupted.
Former patterns of violence and crime are reduced, improving overall security and well-being.
Negative emotions such as anger, fear and hate lessen in intensity and are replaced by tolerance, compassion and understanding.

6. **POTENTIAL**

Nutrients tend to either move upward in the soil profile, or to accumulate near the surface, thereby becoming more available for use by plants.
"Trickle up" economics -- more resources and money accumulate and are more available to more people.
The positive qualities and resources in yourself and your environment become easier to access and effect more people around you.

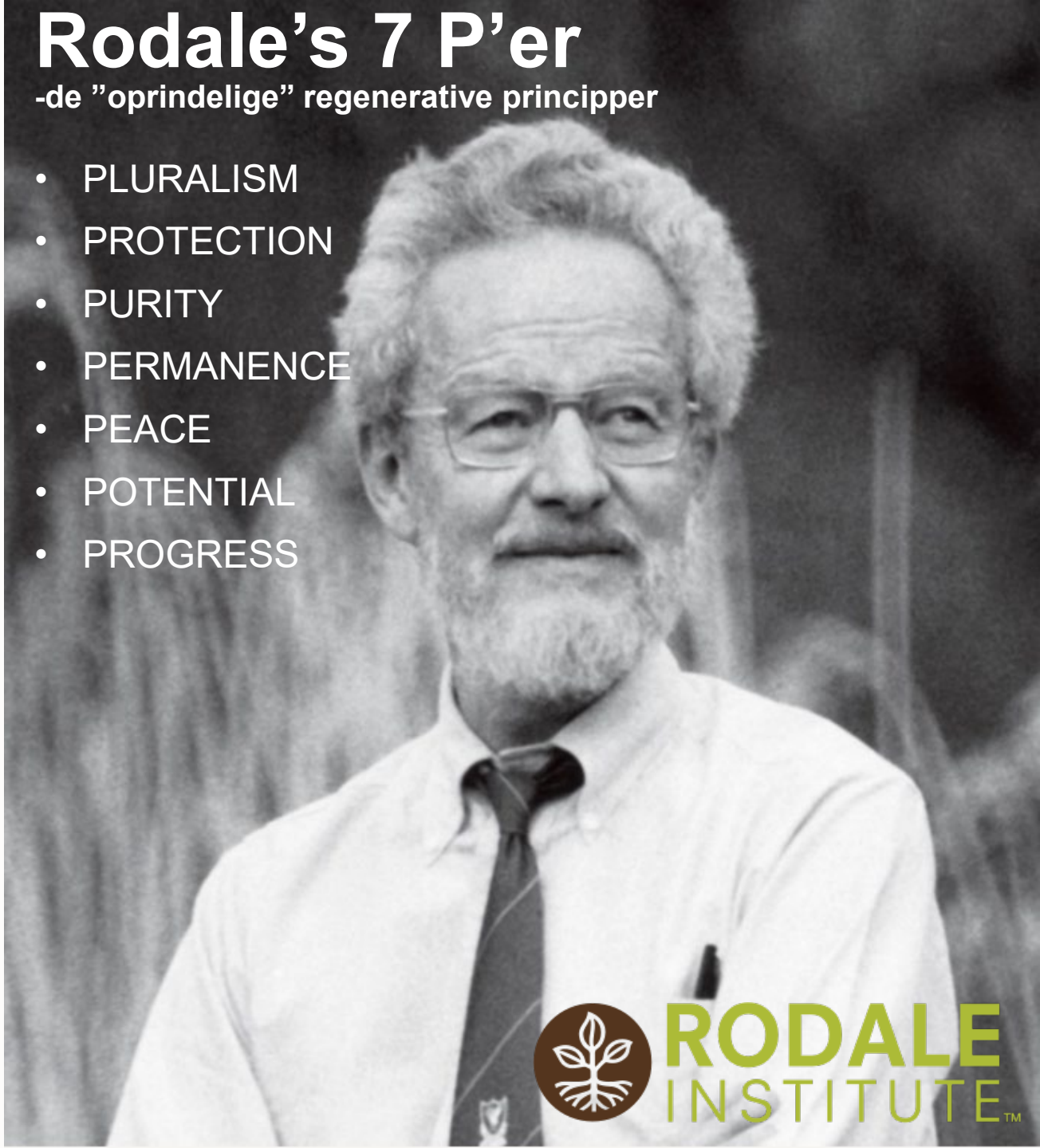
7. **PROGRESS**

Overall soil structure improves, increasing water retention capacity.
Overall community life improves, increasing the health and wealth of its inhabitants.
Capacity for well-being and enjoyment increases.

Rodale's 7 P'er

-de "oprindelige" regenerative principper

- PLURALISM
- PROTECTION
- PURITY
- PERMANENCE
- PEACE
- POTENTIAL
- PROGRESS



RODALE INSTITUTE™

Hovedaktører

-hvem ejer dagsordenen?

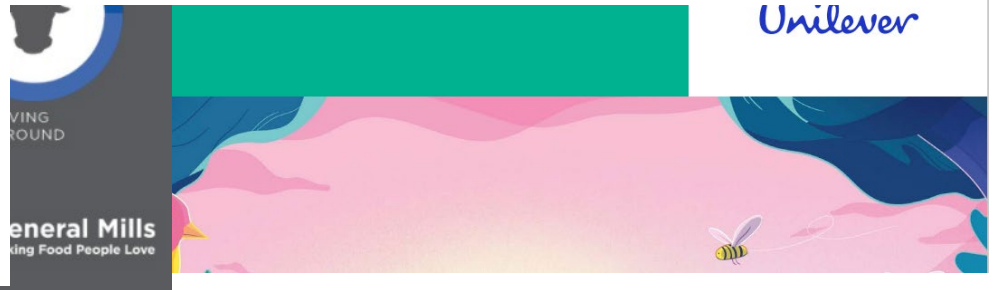
Degenerative Agriculture: Bayer/Monsanto's and Syngenta's Toxic Greenwashing Deception

06/29/2023 / by Dr. André Leu, D.Sc., BA Com., Grad Dip Ed. International Director, Regeneration International

"Regenerative agriculture and animal husbandry is the next and higher stage of organic food and farming, not only free from toxic pesticides, GMOs, chemical fertilizers, and factory farm production, and therefore good for human health; but also regenerative in terms of the health of the soil." Ronnie Cummins

Bayer/ Monsanto, Syngenta, and other members of the poison cartel are trying to greenwash their toxic industrial farming systems by hijacking Regenerative Agriculture.

Agriculture is entering a transformative era. Although the green revolution has been successful in feeding a rapidly growing human population, it has also depleted the Earth's soil and its biodiversity and contributed to climate change. These extractive practices are not sustainable. We must move quickly to transform agriculture by employing a suite of practices known as regenerative agriculture.

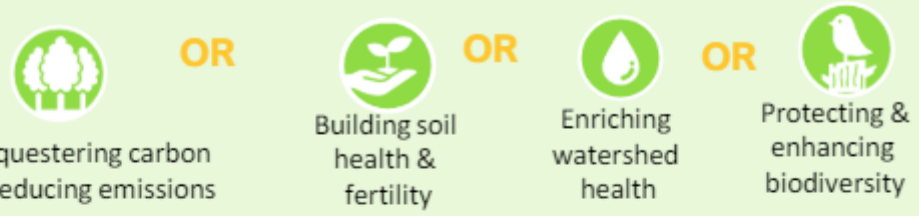


Case: PepsiCo

Instructions: Use this tab to determine which RegenAg practices to implement with your farmers depending on your impact area(s) of focus. See "Example of Combinations" for an illustration of how to determine RegenAg practices for a variety of goals.

Our Goal: land approximately equal to PepsiCo's entire agricultural footprint

- We will count acres as **regenerative** acres when they demonstrate **measured improvement in two or more of the following regenerative agriculture impact areas:**



Encouraged, but not required:

Help us measure improved farmer livelihoods. This will not count toward the 2+ impact areas required above.

							GREENHOUSE GAS	LIVELIHOODS	
Practice	Practice Implementation						Reducing emissions	Improving farmer livelihoods	Score
Soil Cover	Cover crops (incl. nutrient-fixing crops)						Indirect	Indirect	5
Soil Cover	Maintain roots left below soil						Indirect	No Impact	4,5
Crop Diversity	Crop rotation						Indirect	Indirect	3,5
Crop Diversity	Intercropping						Indirect	No Impact	3,5
Crop Diversity	Hedgerow plantings						Indirect	No Impact	3
Crop Diversity	Agroforestry						Indirect	Indirect	5
Land management	Silvopasture						Indirect	Indirect	5
Land management	Conservation tillage (reduced, strip, no-till)						Direct	Indirect	5
Land management	Crop residue management						No Impact	No Impact	2
Land management	Retiring marginal acres						Indirect	No Impact	3,5
Land management	Perennialization						No Impact	No Impact	3,5
Land management	4R Nutrient management						Direct	Indirect	3
Land management	Grassland restoration						No Impact	No Impact	2,5
Land management	Use Bio Fertilizers						Direct	Indirect	4,5
Integrated Livestock	Application of livestock manure directly and/ or post con						Indirect	No Impact	2
Integrated Livestock	Integrate Grazing Animals						Indirect	No Impact	3
Water	Irrigation efficiency						Indirect	Indirect	2
Water	Grassed waterways / riparian corridors / buffer zones						No Impact	No Impact	2,5
Water	Constructed wetlands / wetland restoration						Indirect	No Impact	3,5
Water	Drainage water management						No Impact	No Impact	1
Biodiversity	Integrated pest management						Indirect	Indirect	2,5
Biodiversity	Pollinator habitat development						No Impact	Indirect	1,5
Biodiversity	Natural habitat retention/restoration	Edge/outside of field	No Impact	No Impact	Direct	No Impact	No Impact	Indirect	1,5


The Potential of
Forenet Kredit
YARA
Nestlé
Agrovi
Den bedste løsning på jorden
frej
Velkommen til lanceringen af vores nye
Partnerskab for Regenerativt Landbrug
BCG
FOOD NATION
novo nordisk fonden
frej

Top down vs. bottom up

TABLE 1 A comparison between agroecology and three different types of regenerative agriculture (RA), using the 10 elements that define agroecology (FAO, 2019).

Agroecology	Philosophy RA	Development RA	Corporate RA
Science, practice, movement: social and ecological principles, landscape approaches, bottom-up, different sources of knowledge	RA as adopted by individuals or networks, based on philosophical principles, close to permaculture or biodynamic approaches	RA as promoted by development organizations, social and ecological principles, landscape approaches, often top-down, close to organic and low input farming	RA as proclaimed by enterprises, based on practical agronomic principles and corporate sustainability approaches, close to conservation agriculture
Diversity			
Efficiency*			
Recycling			
Resilience			
Synergy			
Human and social values			
Co-creation and sharing of knowledge			
Food culture and traditions			
Circular and solidarity economy			
Responsible governance			

*Efficient use of solar radiation, water, nutrients, energy and labor, based on primary productivity.
Green = close match; Yellow = partial match; Red = no match (for the color blind, respectively: 75% light dotted; 100% even; 25% light dotted).

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Kilde: Tittonell P, El Mujtar V, Felix G, Kebede Y, Laborda L, Luján Soto R and de Vente J (2022) Regenerative agriculture—agroecology without politics? Front. Sustain. Food Syst. 6:844261. doi: 10.3389/fsufs.2022.844261

Følg pengene

ABFSUGAR · Ahold Delhaize · Arla · Barry Callebaut · Bayer

MIGHTY EARTH — WHAT WE DO · WHERE WE WORK · NEWS · ABOUT · TAKE ACTION · DONATE →

REG
INTE

Degen
Toxic G

06/29/2023 / by D

"Regenerativ
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Bayer/ Mons
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sources | News

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man health;

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Forsøg i regenerativt landbrug med varierende tilførsel af kvælstof og næring

Lysegrønne områder har fået mindste input af næringsstof.

Mørkegrønne felter har fået større input af næring.

Forsøget afsluttes til høst. Udfaldet taler for at mindre input skaber mindre udbytte og risiko for at degenerere jorden istedet.

YARA

37

06/OCT/2023

for Økologisk Landbrug

Unilever · YARA

Sund jord = sunde planter – eller omvendt?

- Minimumsloven
- The “moron approach”
- Sund jord er velaggregeret
- Aggregering kan kun ske så dybt som rødderne kan nå
- Stressede planter eksuderer en større andel af deres C
- Sunde planter fikserer mere C

Hvad er værst for jorden?

Fakta:

- Ploven er ikke en klimasynder i DK
- Pløjefri dyrkning betyder ofte lavere udbytter og/eller større pesticidforbrug
- Mange gavnlige effekter af CA tilskrives fejlagtigt fraværet af jordbearbejdning
- Pløjning skader jordens mikroliv, men det gør pesticider også

Faglig holdning:

- I DK er skadelig jordpakning fra gyllevogne en større trussel end pløjning
- Kunstgødning og monokultur undergraver jordens sundhed
- Pesticider behandler symptomer på dårligt fungerende jord (fungi- og insekticider)

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Kilder: Wan, NF., Fu, L., Dainese, M. *et al.* Pesticides have negative effects on non-target organisms. *Nat Commun* **16**, 1360 (2025). https://doi.org/10.1038/s41467-025-56732-x ; Munkholm, L. J., Hansen, E. M., Melander, B., Kudsk, P., Jørgensen, L. N., Heckrath, G. J., Ravnskov, S. og Axelsen, J. 2020 Vidensyntese om Conservation Agriculture.Aarhus Universitet, DCA - Nationalt Center for Fødevarer og Jordbrug. 134 s. - DCA rapport nr. 177 https://dcapub.au.dk/djfpdf/DCArapport177.pdf ; Pittelkow, C., Liang, X., Linquist, B. *et al.* Productivity limits and potentials of the principles of conservation agriculture. *Nature* **517**, 365–368 (2015). https://doi.org/10.1038/nature13809

Myter om pesticider

- De skader ikke jordens mikroliv
- De nedbrydes hurtigt i jorden
- Ukrudtsmidler er ikke farlige for mennesker
- Glyphosat virker kun på planter

ENVIRONMENTAL

Review

Toxic Effects of Glyphosate on the Nervous System: A Systematic Review

Carmen Costas-Ferreira, Rafael Durán and Lilian R. F. Faro *

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Abstract: Glyphosate, a non-selective systemic biocide with broad-spectrum activity, is the most widely used herbicide in the world. It can persist in the environment for days or months, and its intensive and large-scale use can constitute a major environmental and health problem. In this systematic review, we investigate the current state of our knowledge related to the effects of this pesticide on the nervous system of various animal species and humans. The information provided indicates that exposure to glyphosate or its commercial formulations induces several neurotoxic effects. It has been shown that exposure to this pesticide during the early stages of life can seriously affect normal cell development by deregulating some of the signaling pathways involved in this process, leading to alterations in differentiation, neuronal growth, and myelination. Glyphosate also seems to exert a significant toxic effect on neurotransmission and to induce oxidative stress, neuroinflammation and mitochondrial dysfunction, processes that lead to neuronal death due to autophagy, necrosis, or apoptosis, as well as the appearance of behavioral and motor disorders. The doses of glyphosate that produce these neurotoxic effects vary widely but are lower than the limits set by regulatory agencies. Although there are important discrepancies between the analyzed findings, it is unequivocal that exposure to glyphosate produces important alterations in the structure and function of the nervous system of humans, rodents, fish, and invertebrates.

Keywords: glyphosate; glyphosate-based herbicides (GBH); neurotoxic effects; human; rodent; fish

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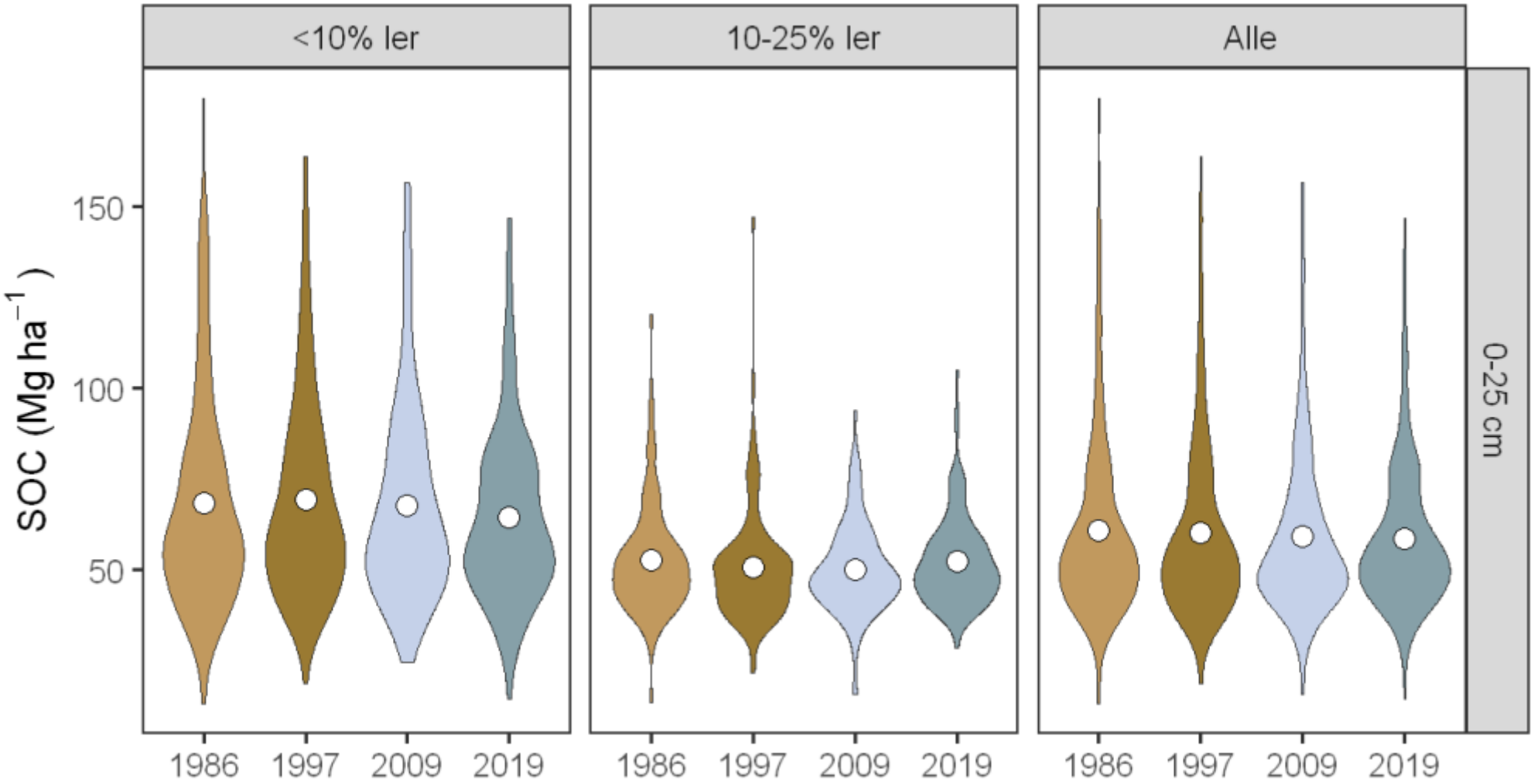
KEYWORDS: *Multiresidue analysis, herbicides, fungicides, insecticides, organic farming, no tillage, environmental impact, soil ecology*

Kulstofopbygning i landbrugsjord

Udviklingen i danske landbrugsjordes indhold af organisk kulstof (0-25cm) 1986-2019



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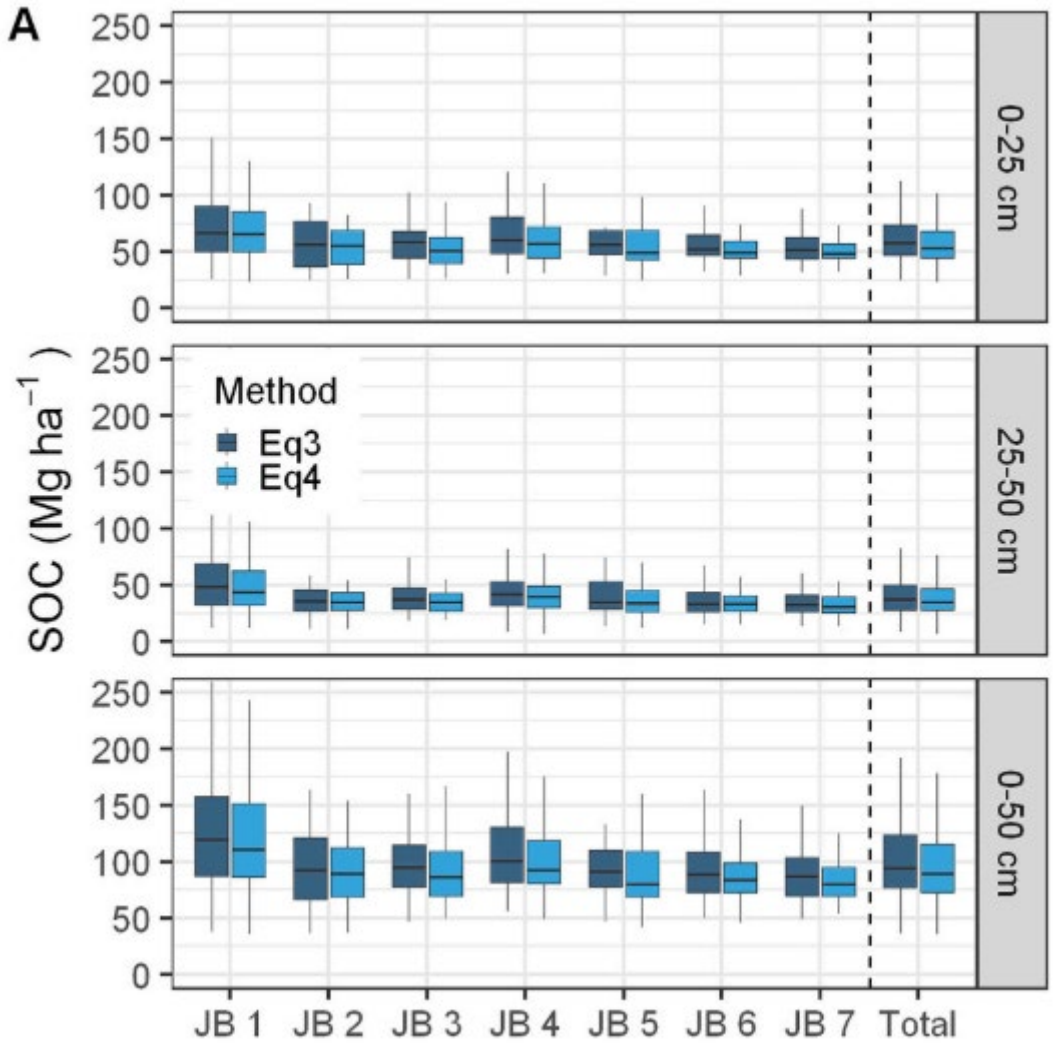
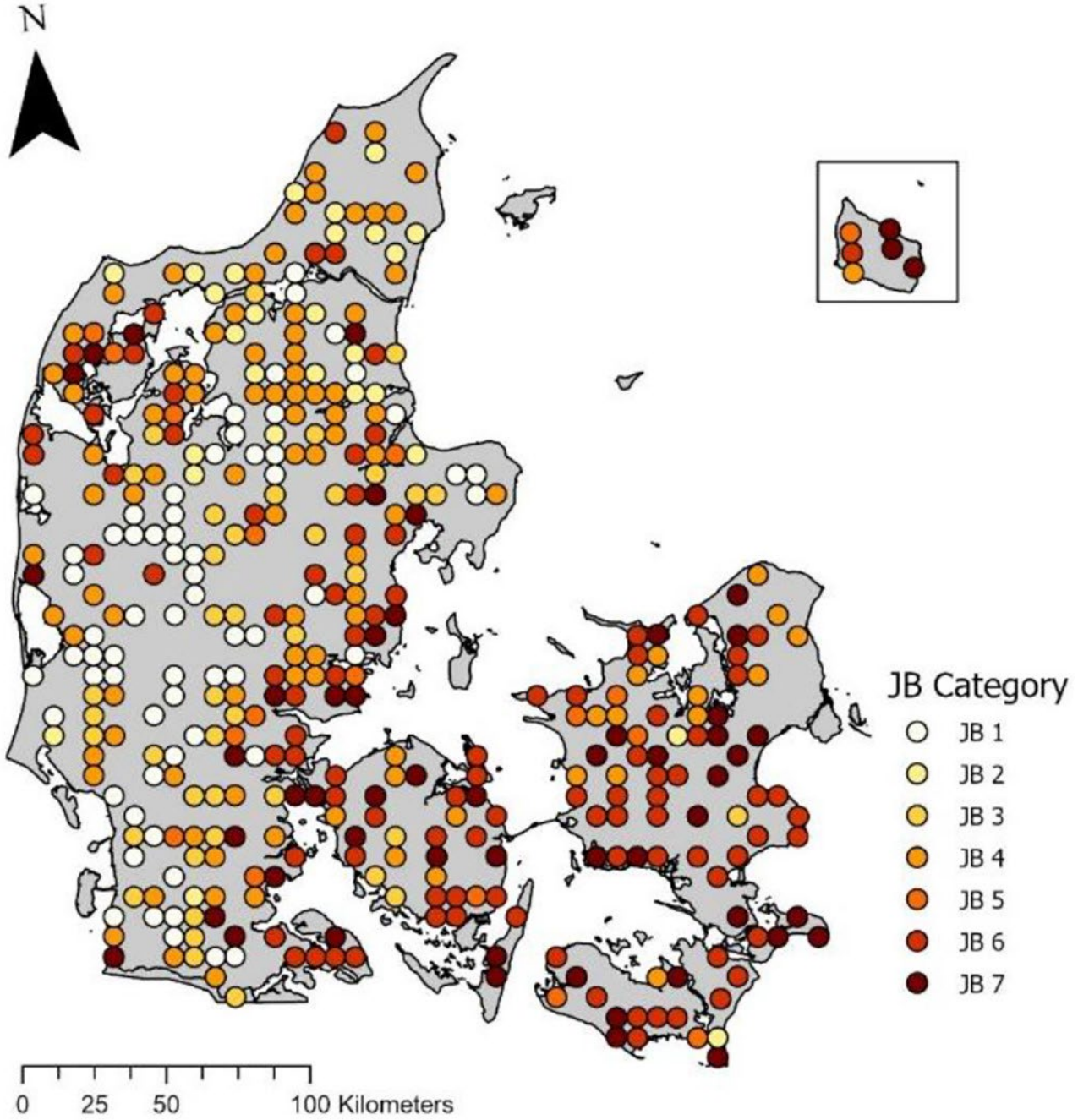
Kilde: Elsgaard L, Harbo LS, Munkholm LJ, Gyldenkærne S. 2022. Status og udvikling i kulstofindholdet i mineraljorde. 8 sider. Rådgivningsnotat fra DCA – Nationalt Center for Fødevarer og Jordbrug, Aarhus Universitet, leveret: 05.12.2022.

Geografisk distribution





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Kilde: Harbo et al., Estimating organic carbon stocks of mineral soils in Denmark: Impact of bulk density and content of rock fragments, Geoderma Regional, Volume 30, 2022, https://doi.org/10.1016/j.geodrs.2022.e00560

Virkemiddel-case: No-Till

Geografiske forskelle

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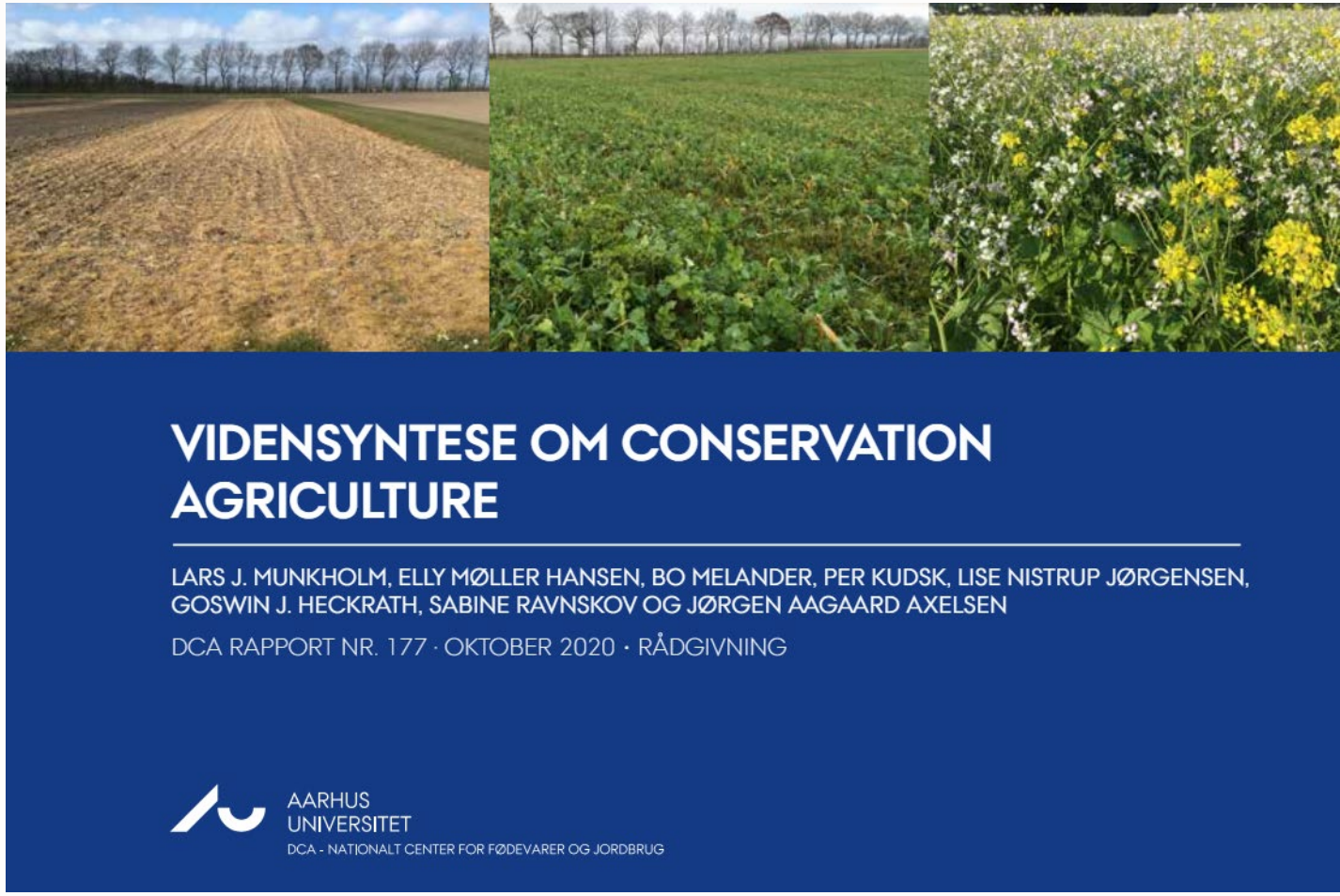
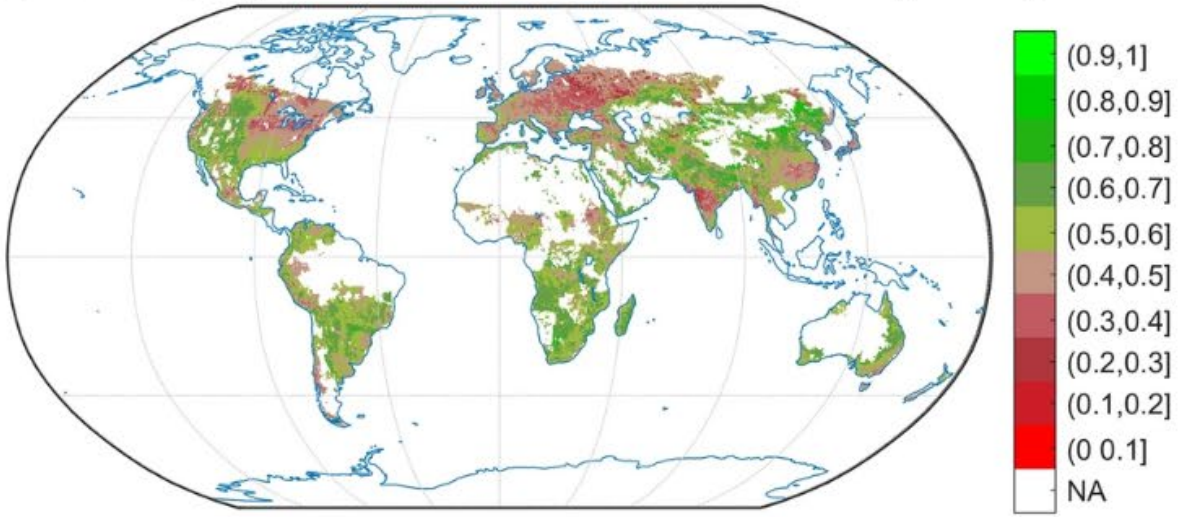
AU: Ubetydelig klimaeffekt af NT i DK

” *En ny metaanalyse viser, at* ***effekten af direkte såning aftager med øget nedbør/koldere klima*** *og er lille eller ubetydelig under kolde og nedbørsrige forhold som de danske (Sun et al. 2020). Analysen viste desuden* ***sammenhæng mellem effekt af direkte såning på udbytte og kulstoflagring*** *– jo større problemer med at opretholde udbytteniveauet i forhold til pløjning des mindre effekt på kulstoflagringen. Generelt har det vist sig, at direkte såning klarer sig bedst udbyttemæssigt under varme og tørre forhold og at udbyttetabet stiger med øget nedbør/koldere klima*”

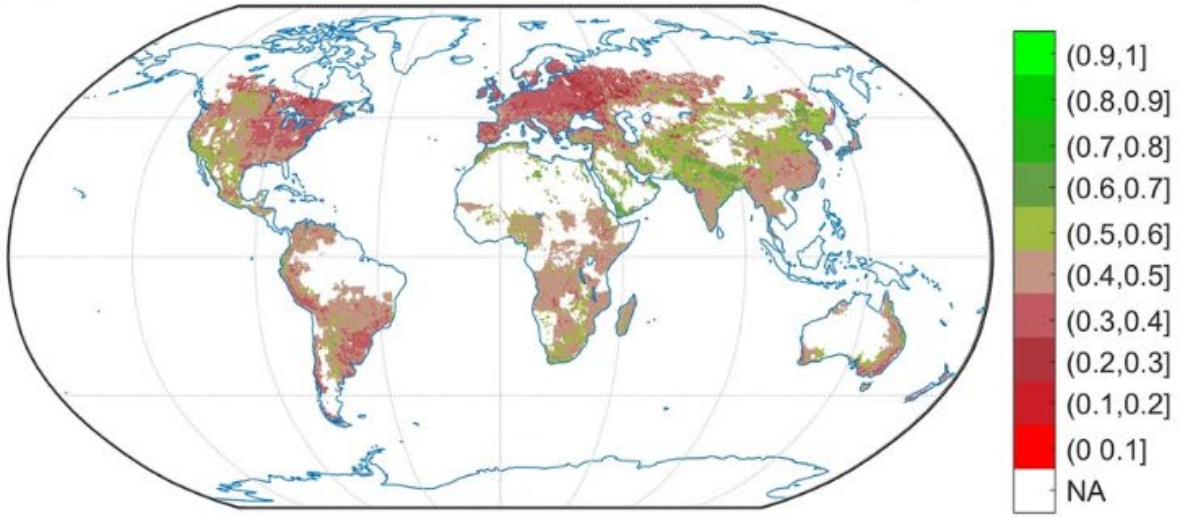


https://dcapub.au.dk/djfpdf/DCArapport177.pdf

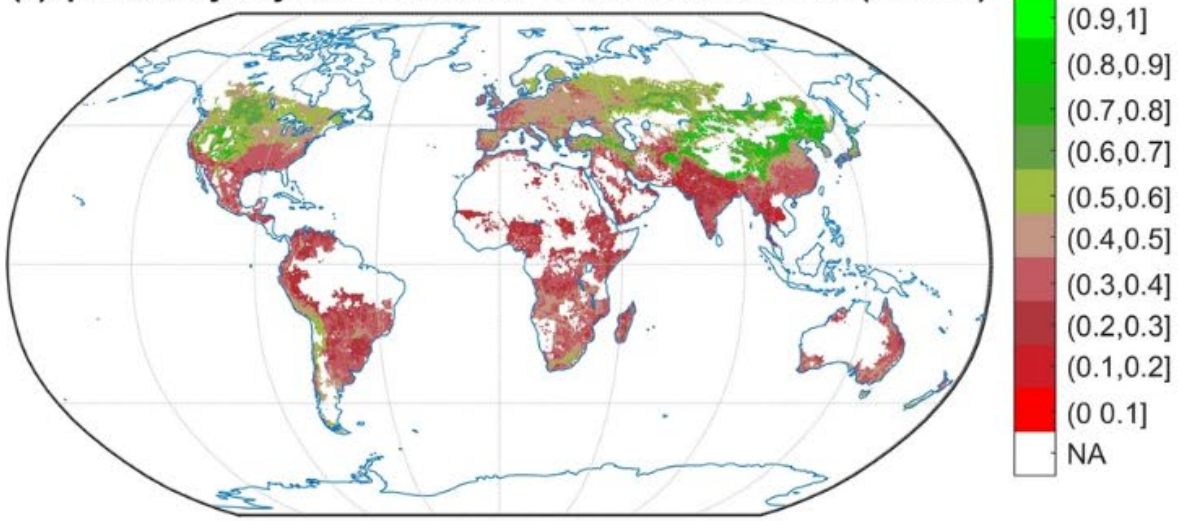
(a). probability of yield increase for winter wheat with CA (+F+WD)



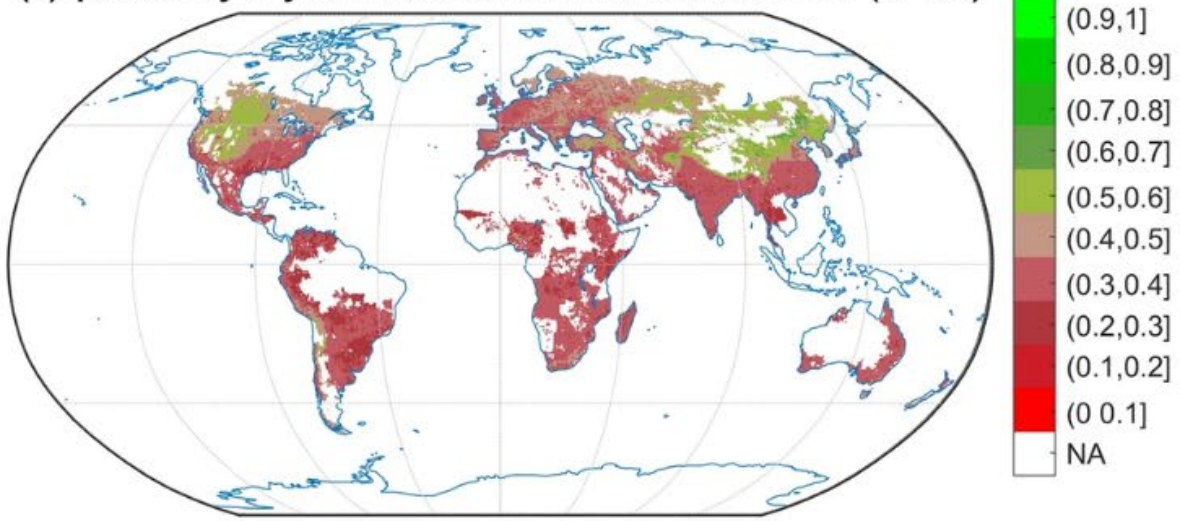
(b). probability of yield increase for winter wheat with CA (-F-WD)



(c). probability of yield increase for winter wheat with NT (+F+WD)



(d). probability of yield increase for winter wheat with NT (-F-WD)



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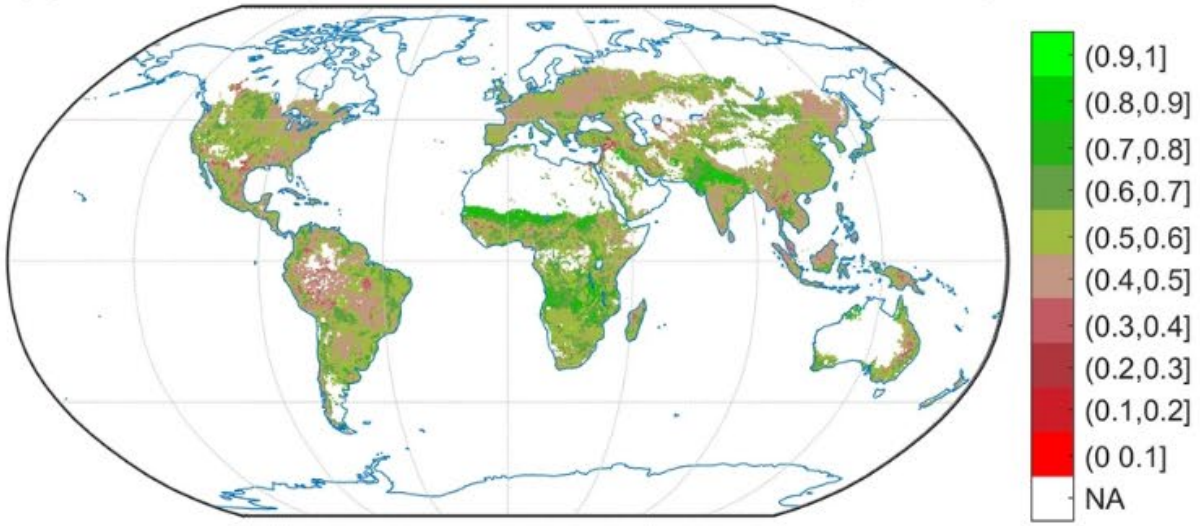
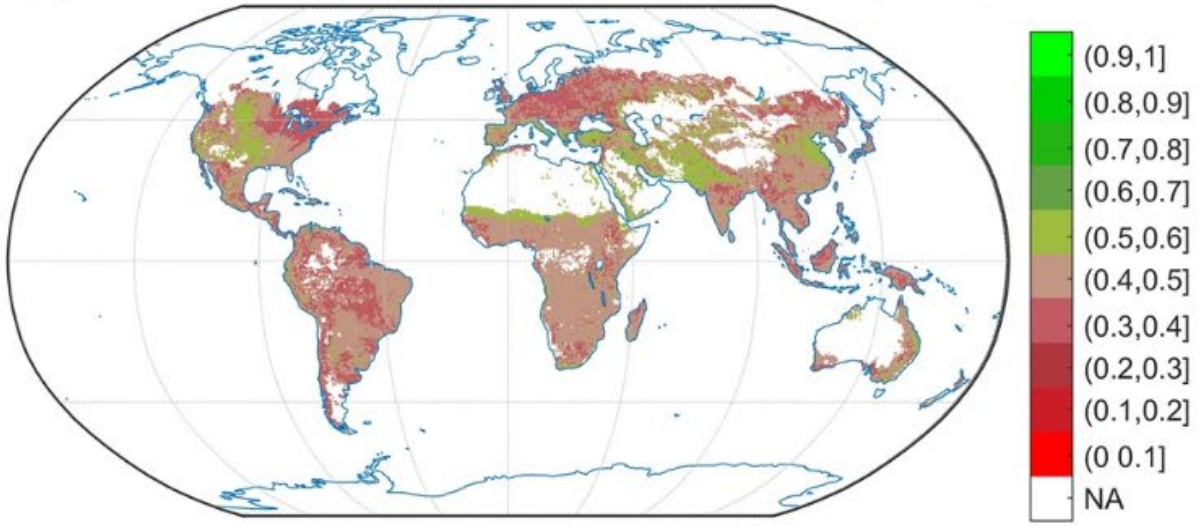
Kilde: Su, Y., Gabrielle, B., Beillouin, D. *et al.* High probability of yield gain through conservation agriculture in dry regions for major staple crops. *Sci Rep* **11**, 3344 (2021). https://doi.org/10.1038/s41598-021-82375-1

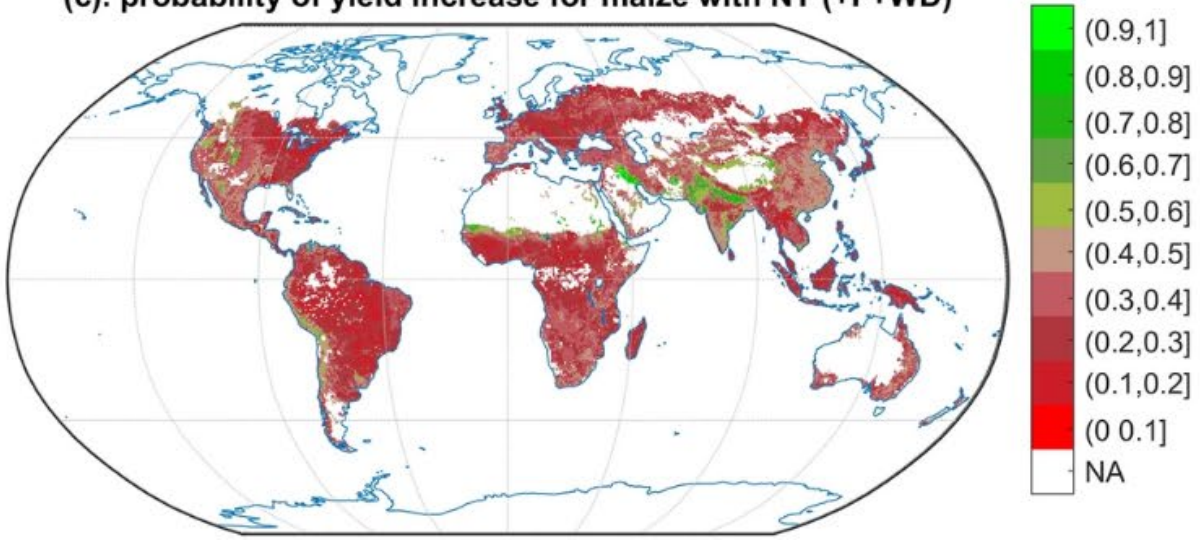
(a). probability of yield increase for maize with CA (+F+WD)



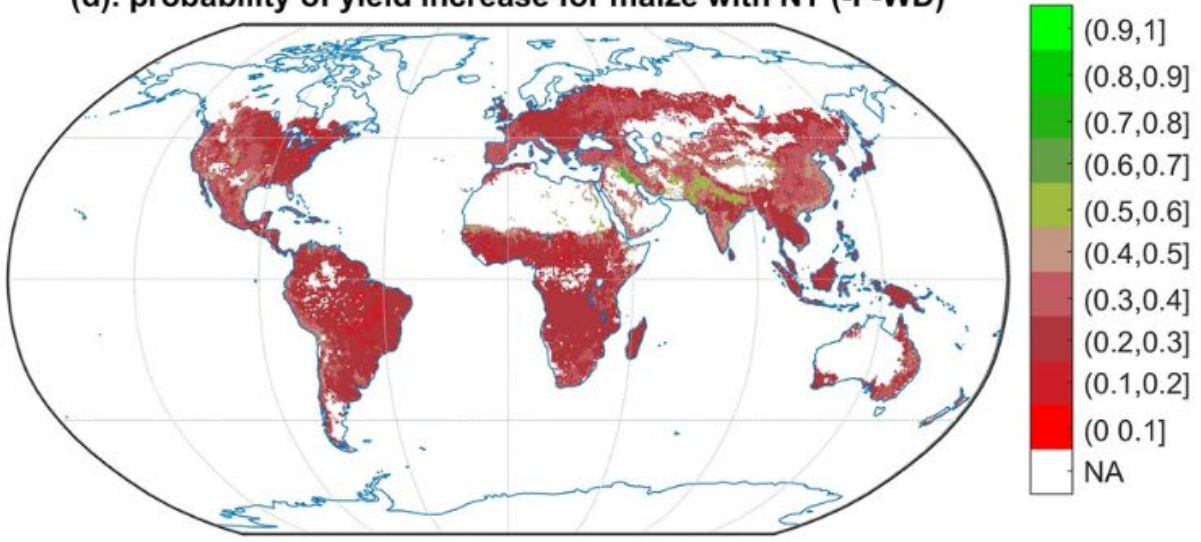
(b). probability of yield increase for maize with CA (-F-WD)



(c). probability of yield increase for maize with NT (+F+WD)



(d). probability of yield increase for maize with NT (-F-WD)



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Forskel i jordens indhold af organisk kulstof (SOC) efter 41 år med hhv.
reduceret jordbearbejdning (ST) og No-Till (NT), sammenlignet med pløjning (FIT).

Forsøget ligger i Frankrig, under temperatur- og nedbørsforhold, som minder om Danmarks (FR:10,9 C / 628 mm, DK 8,3 C / 746 mm**)**
Jordprøver udtaget i 0-60cm

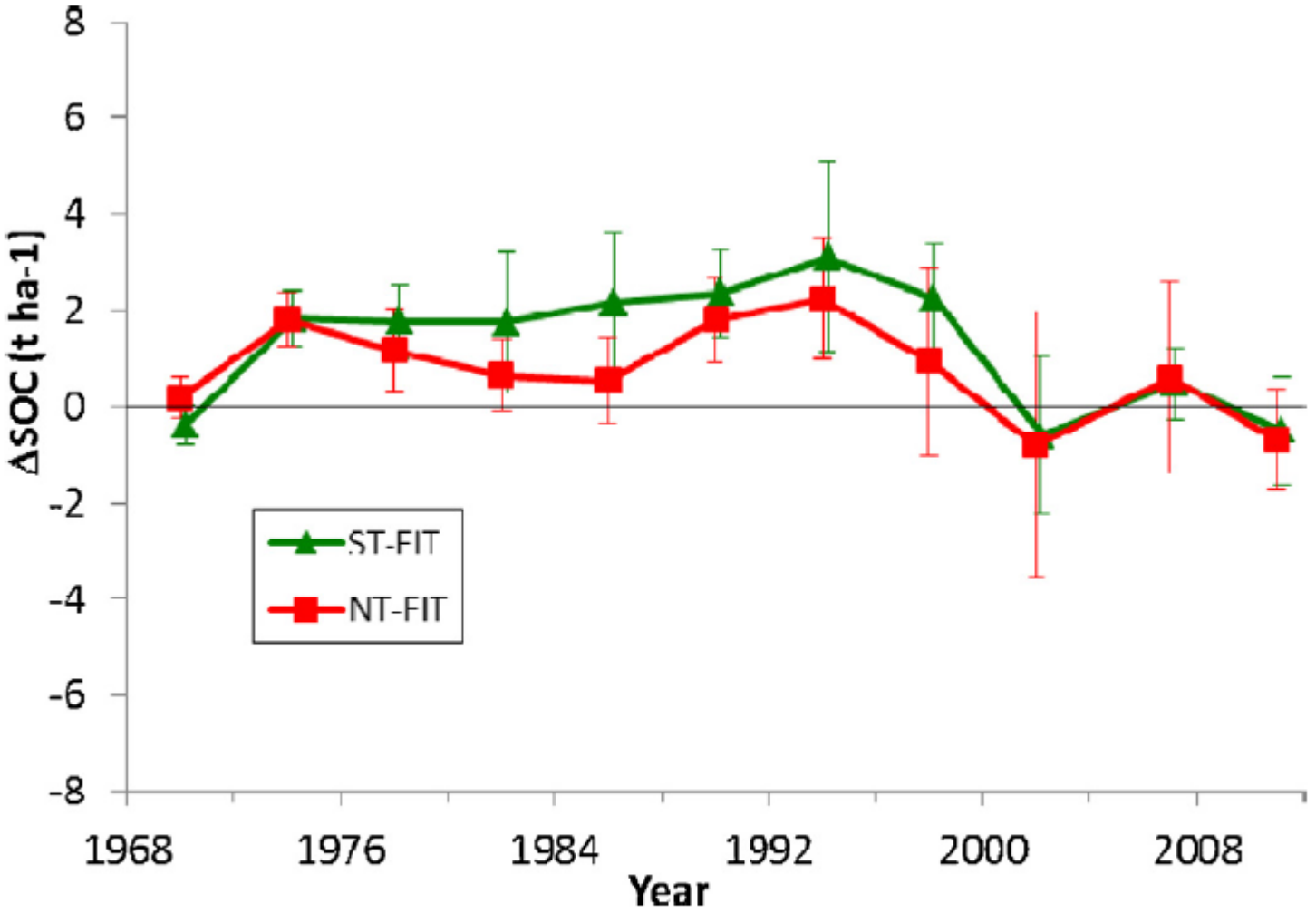

Fig. 4. Evolution of the differences in SOC stocks between reduced tillage (ST and NT) and full inversion tillage (FIT) versus time: mean of all treatments (CM1–CM6). Vertical bars represent the confidence intervals ($p < 0.05$).

Kilde: Dimassi et al., 2014, Long-term effect of contrasted tillage and crop management on soil carbon dynamics during 41 years, Agriculture, Ecosystems & Environment, Volume 188, https://doi.org/10.1016/j.agee.2014.02.014

Hvad virker så?

C-opbyggende tiltag i DK

- Husdyrgødning
- Flerårige græsmarker
- (Kraftige) Efterafgrøder
- Høj biomasseproduktion
- Udlæg i vårsåede afgrøder
- Kompost (/biokul)

Tiltag som mindsker jorderosion i DK

- Kontinuerligt plantedække
- Reduceret jordbearbejdning
- Forebyggelse af skadelig jordpakning

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Estimating the soil erosion cover-management factor at the European scale

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ABSTRACT

Land use and management influence the magnitude of soil loss. Among the different soil erosion risk factors, the cover-management factor (C-factor) is the one that policy makers and farmers can most readily influence in order to help reduce soil loss rates. The present study proposes a methodology for estimating the C-factor in the European Union (EU), using pan-European datasets (such as CORINE Land Cover), biophysical attributes derived from remote sensing, and statistical data on agricultural crops and practices. In arable lands, the C-factor was estimated using crop statistics (% of land per crop) and data on management practices such as conservation tillage, plant residues and winter crop cover. The C-factor in non-arable lands was estimated by weighting the range of literature values found according to fractional vegetation cover, which was estimated based on the remote sensing dataset F_{cover}. The mean C-factor in the EU is estimated to be 0.1043, with an extremely high variability; forests have the lowest mean C-factor (0.00116), and arable lands and sparsely vegetated areas the highest (0.233 and 0.2651, respectively). Conservation management practices (reduced/no tillage, use of cover crops and plant residues) reduce the C-factor by on average 19.1% in arable lands.

The methodology is designed to be a tool for policy makers to assess the effect of future land use and crop rotation scenarios on soil erosion by water. The impact of land use changes (deforestation, arable land expansion) and the effect of policies (such as the Common Agricultural Policy and the push to grow more renewable energy crops) can potentially be quantified with the proposed model. The C-factor data and the statistical input data used are available from the European Soil Data Centre.

Muligheder og udfordringer for økologien

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Fotograf: Jon Aagaard Enni

Økologiens største udfordringer ift. diskursen om regenerative tiltag

Fra vidensyntesen:

- (Konventionel) gylle
- Pløjning (og dybdeharvning)
- Recirkulering af slam

Tilføjelser:

- Enmavede husdyr er meget på stald
- "Feed no food"
- Økologiens image er under angreb – især i Nordamerika

4 Implementering af regenerative principper i dansk, økologisk landbrug og dyrkningsmæssige udfordringer

Forfattere: Jon Aagaard Enni (ICOEL), Johannes Ravn Jørgensen (AU-AGRO)

Mange af de tiltag, som i den internationale diskurs forbindes med regenerativt landbrug, hører i kontekst af dansk økologi, under kategorien *Best Practice*. Der er med andre ord sjældent tale om nye tiltag, som er ukendte eller uprøvede i dansk økologi. Det ses da også ved, at de økologiske arealer ofte udelades i fremskrivninger af potentielle klima- og miljøgevinster ved større udbredelse af regenerativt landbrug, med den begrundelse, at økologisk landbrug allerede anvender mange af de regenerative tiltag, som spås en effekt (e.g. Jameson et al., 2024).

Mange regenerative tiltag er allerede integreret i økologiske dyrkningsmetoder, hvilket bekræftes af European Academies Science Advisory Council i deres rapport om regenerativt landbrug i Europa (EASAC, 2022). Dette udelukker dog ikke, at der stadig er potentiale for forbedringer inden for dansk økologisk landbrug. De største udfordringer er, hvad angår miljøpåvirkning og ressourceforbrug:

- Brugen af konventionel husdyrgødning i planteproduktionen
- Frekvens og intensitet af jordbearbejdning
- Manglende recirkulering af næringsstoffer fra spildevand

REGENERATIVT LANDBRUG

I ØKOLOGISK LANDBRUG - EN VIDENSYNTESE

JOHANNES RAVN JØRGENSEN (EDITOR)

DCA RAPPORT NR. 230 • SEPTEMBER 2024 • RÅDGIVNING

AARHUS
UNIVERSITET
DCA - NATIONALT CENTER FOR FØDEVARER OG JORDBRUG

Primære faglige indsatsområder

- Lavere frekvens og intensitet af jordbearbejdning (uden udbyttetab)
- Mindre skadelig jordpakning
- Flere plantearter i græsmarker, efterafgrøder og hovedafgrøder
- Større fokus på roddybde og -type
- Mere og bedre afgræsning
- Selvforsyning med foder
- Bedre udnyttelse af plantenæringsstoffer

Videnssyntesen konkluderer, at der er betydelige potentialer forbundet med integrationen af regenerative principper i økologisk landbrug, herunder forbedret jordkvalitet, øget biodiversitet og reduceret klimapåvirkning. Samtidig peges der på behovet for yderligere forskning og udvikling af klare definitioner og reguleringer for at sikre en effektiv og konsistent implementering. Der er også et behov for at fremme vidensdeling og uddannelse blandt landmænd for at overkomme de identificerede barrierer.

Regenerativt landbrug

-som "gateway drug"?

Case 1: Gabe Brown

In addition to physical disturbance, Gabe encourages growers to give up chemical disturbance — synthetic fertilizers, pesticides and fungicides. "We need to minimize those or eliminate them," he says.

The last year Gabe used any synthetic inputs on his 6,000-acre ranch was in 2007. He points out that 97% of any plant is carbon, oxygen, nitrogen and hydrogen — four elements that are found in the atmosphere. He questions why farmers would want to write checks for chemical fertilizers when the same nutrients can be found for free.

"We just have to be smart enough as farmers and ranchers to understand how that energy cycle drives the nutrient cycle and how we need green growing plants collecting that solar energy feeding microbiology. And then it's the microbiology that bring the nutrients to the plants."

Case 2: Michael Meyer

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Drastisk omvæltning

Oprindelig var Michael Meyer selv konventionel landmand og opdrættede svin. Så han ved, hvor meget det kræver at blive økologisk regenerativ landmand.

I 2016 tog han en »kold tyrker«, som han kalder det, og skiftede fra konventionel landmand til økologisk regenerativ landmand. Som femte generation på slægtsgården Vilhelmshøj var det en drastisk omvæltning, men i dag er han glad for, at han tog skridtet og driver gården med de nye metoder sammen med sønnen.

Allerede i 1999 holdt han op med at pløje jorden, så jordens mikrobiologi ikke blev forstyrret – og fordi det også lettede arbejdspresset. Men det var altså først for ni år siden, at han tog det store skridt.

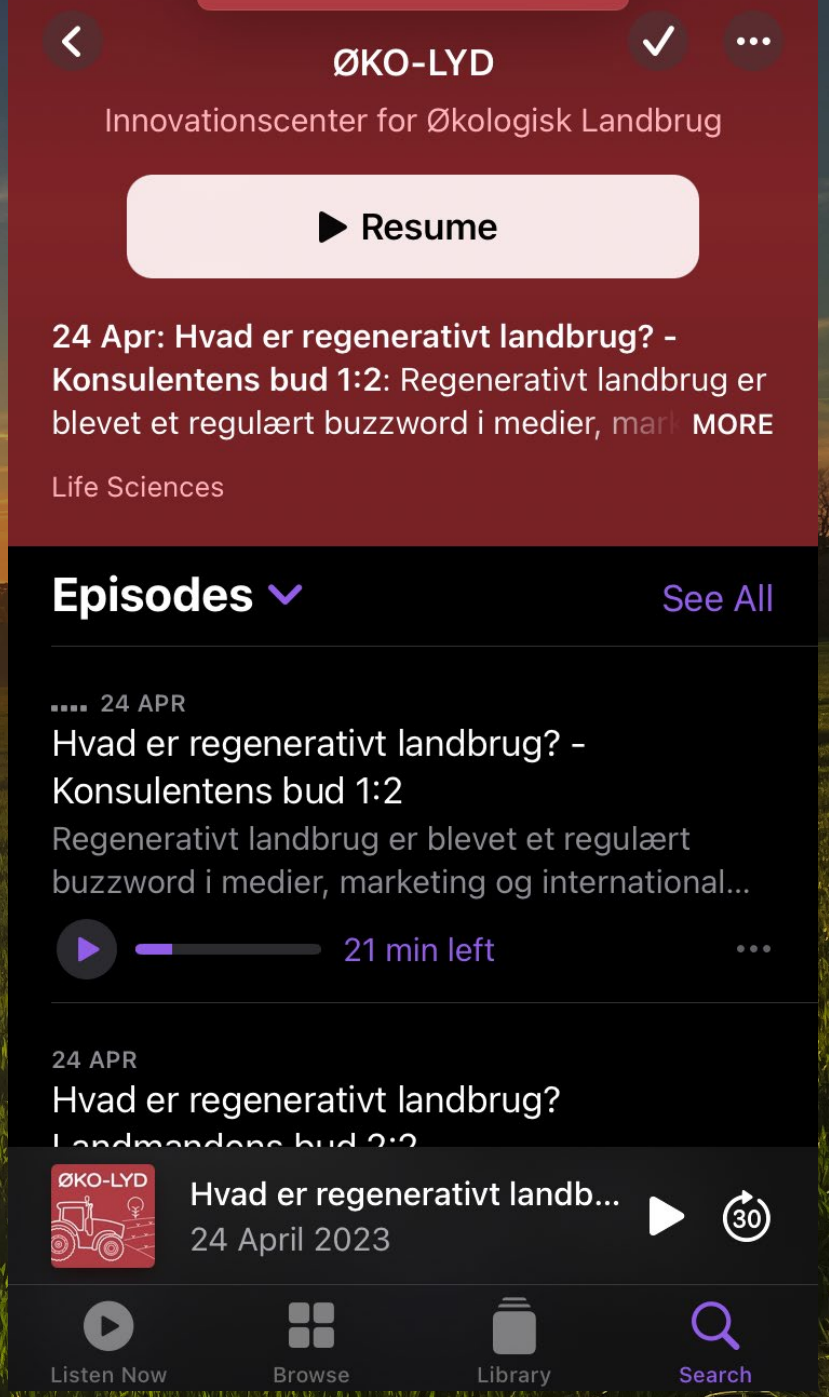
> **Tidligere brugte vi kunstgødning og p slet ikke mere**
>
> Michael Meyer, regenera

En rådgiver i økologisk og biodynamisk landbrug inspirerede ham til at tage på kursus. Godt nok havde han besluttet sig til at blive en økologisk regenerativ landmand, men han fik alligevel et chok.

»Jeg var den eneste konventionelle landmand på kurset. Resten var økologer og biodynamikere, som lyttede opmærksomt til oplæggene. Og jeg sad lidt og skævede rundt og tænkte: Hvad fanden er det, de taler om? Det var så langt fra det, som jeg normalt gjorde og havde lært«.

Tak for jeres tid!

Følg podcasten ØKO-LYD for mere information om regenerativt landbrug i en dansk, økologisk kontekst.



Fotograf: Jon Aagaard Enni