Velkommen til seminar om

EJP SOIL

Europæisk forskningssamarbejde om bæredygtig anvendelse af landbrugsjorden

- Stil gerne opklarende spørgsmål i chatten
- Skriv gerne forslag og kommentarer i chatten
- Ræk hånden op for at få ordet
- Husk at slukke din mikrofon, når du ikke taler

EJP SOIL
European Joint Programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

Program

1. Velkomst og baggrund for seminaret. v/Lars Munkholm
2. EJP SOILs rolle i det europæiske forskningslandskab. v/Niels Halberg
3. Introduktion til EJP SOIL ift. kortlægning af vidensbehov. v/Lars Munkholm
4. Resultater fra indledende interessentinddragelse v/Martin H. Thorsøe
5. Præsentation af Roadmap for EJP SOIL v/Lars Munkholm
6. Præsentation af EJP SOIL forskningsprojekter v/ Lars Elsgaard, Poul Erik Lærke, Mogens Greve og Anders B. Møller
7. Udbud af forskningsfinansiering i 2021 v/Lars Munkholm
8. Spørgsmål og diskussion
9. EJP SOIL kommunikation og formidling. v/Line Carlenius Berggreen
10. Afrunding og tak for i dag (kl. 16.00)

EJP SOIL
European Joint Programme

Introduktion til forskningsprojekter

I regi af EJP SOIL er der i 2020 igangsat en række forskningsprojekter. Der gives en introduktion til projekter, som er særligt relevante i en dansk kontekst

- Carboseq: Omhandler C-lagringspotentiale. Det store 4 mill. Euro projekt som inkluderer alle lande. v/ Lars Elsgaard
- INSURE: Lavbundsprojekt med fokus på ”tradeoffs” mellem C lagring og øvrige emissioner af drivhusgasser samt N og P tab. v/ Poul Erik Lærke
- SensRES: Handler om metoder til nedskallering af jordbundsdata – håndtering digitale jordbundsdata. v/ Mogens Greve / Anders B. Møller

Velkomst og baggrund for seminaret

Lars J. Munkholm

National Hub møde 1/3 i EJP SOIL

EJP SOIL
European Joint Programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

EJP soil – den korte version

- 5-årigt rammeprogram med fokus på bæredygtig anvendelse af landbrugsjorden under Horizon2020 EU programmet (2020-2025)
- Koordineret af Claire Chenu, INRAe, Frankrig
- 80 mill €, 50% fra EU og 50% fra partnerlandene
- 70% af midlerne anvendes på projekter i internt udbud indenfor programmet (kun åbent for de deltagende institutioner)
- Hjemmeside: https://projects.au.dk/ejpsoil/

EJP SOIL
European Joint Programme

EJP "SOIL" konsortiet

24 lande, 26 partnere

Participant organisation name	Country
Institut National de la recherche Agronomique (INRA)	FR
Wageningen Research (WR)	NL
BIOS Science Austria (BIOS)	AT
Flanders Research Institute for Agriculture, Fisheries and Food (EV-ILVO)	BE
Centre Wallon de Recherches Agronomiques (CRAW)	BE
Czech University of Life Sciences (CULS)	CZ
Aarhus University, Danish Centre for Food and Agriculture (AU)	DK
Estonian University of Life Sciences (EMU)	EE
Natural Resources Institute Finland (LUKE)	FI
Johann Heinrich von Thünen-Institut (vTI)	DE
Forschungszentrum Jülich (Jülich)	DE
Centre for Agricultural Research of the Hungarian Academy of Sciences (MTA ATK)	HU
Teagasc (Teagasc)	IE
Council for Agricultural Research and Economics (CREA)	IT
University of Latvia (UL)	LV
Lithuanian Research Centre for Agriculture and Forestry (LAMMC)	LT
Norwegian Institute of Bioeconomy Research (NIBIO)	NO
Institute of Soil Science and Plant Cultivation – State Research Institute (IUNG)	PL
National Institute for Agrarian and Veterinarian Research I. P. (INIAV)	PT
National Agricultural and Food Centre (NPPC)	SK
University of Ljubljana, Biotechnical Faculty, Centre for Soil and Environmental Science (ULBF)	SI
National Institute for Agriculture and Food Research and Technology (INIA)	SP
Swedish University of Agricultural Sciences (SLU)	SE
Agroscope (AGS)	CH
Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Research and Policies (TAGEM)	TR
Agri-Food and Biosciences Institute (AFBI)	UK

EJP SOIL
European Joint Programme

EJP SOIL : towards "climate-smart sustainable soil management"

Sustainable soil management Soil management is sustainable if the supporting, provisioning, regulating, and cultural services provided by soil are maintained or enhanced without significantly impairing either the soil functions that enable those services or biodiversity. *FAO, VGSSM 2015*

+ emphasis on:

Climate change adaptation : contribution of soils to adaptation of agroecosystems to climate change :

- Improved ability to infiltrate and store water
- Improved ability to resist to water and wind erosion

soil structure
soil organic matter
soil biodiversity

Climate change mitigation

- Carbon sequestration in soils
- Reduction of N2O and CH4 emissions

EJP SOIL
European Joint Programme

National Hubs?

Interessenter fra videns- og interesseorganisationer, offentlig forvaltning og private firmaer – alle med interesse i bæredygtig anvendelse af landbrugsjorden.

Samarbejdet skal bl.a. medvirke til at:

- Identificere videnbehov og understøtte en harmoniseret og lettilgængelig information om jord og jordbeskyttelse
- Udvikle en strategisk forskningsdagsorden (road map) for klimasmart bæredygtig anvendelse af landbrugsjorden
- Udvikle ”best practices” arbejdsmetoder for udveksling af viden mellem landmænd, forskere og beslutningstagere
- Bidrage med viden som basis for evidensbaseret rådgivning til landmænd og myndigheder om klimasmart anvendelse af landbrugsjorden.

EJP SOIL
European Joint Programme

EUROPEAN PARNTERSHIPS AND MISSION IN SOIL AND AGROECOLOGY PART OF HORIZON EUROPE

NIELS HALBERG, DCA, AARHUS UNIVERSITY

CHAIR OF BOARD OF PROGRAM MANAGERS, EJP SOIL

MEMBER OF MISSION ASSEMBLY FOR EC MISSION FOR SOIL HEALTH AND FOOD

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

Towards climate-smart sustainable agricultural soil management

EJP SOIL - a European Joint Programme Co-fund, contributing to key societal challenges including climate change and future food supply.

- **Purpose:** targeting climate change mitigation and adaptation, sustainable agricultural production, ecosystem services delivery and mitigation of soil degradation.
- **Five year** programme with 26 partner organisations from 24 European countries.
- **Co-funded** by the EC with a total budget of 80 million €.

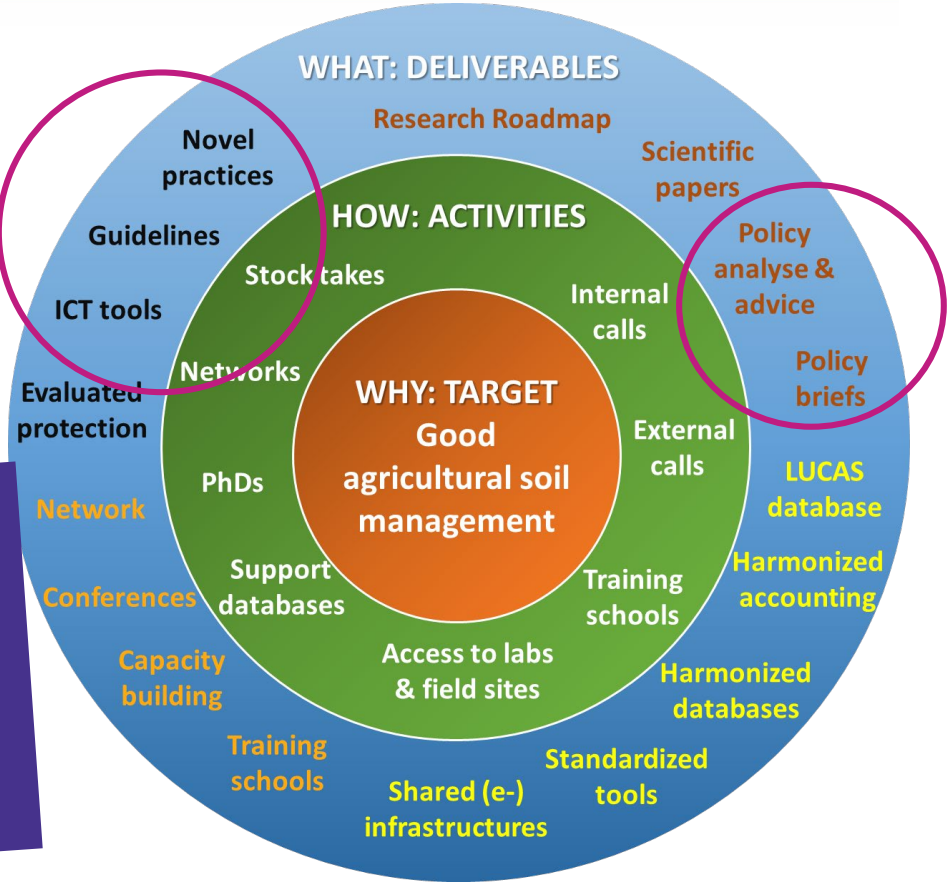
An overview of the EJP SOIL programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

EJP SOIL aims at

- Pooling Europe's research and development resources to build a sustainable integrated research system
- Develop a reference framework on climate-smart sustainable agricultural soil management.

1. Climate change mitigation
2. Climate change adaptation
3. Sustainable agricultural production
4. Ecosystem services
5. Soil degradation /restoration



4) Aim : create an enabling research environment to enhance the contribution of agricultural soils in addressing key societal challenges

EJP SOIL's BETYDNING

1. En øget forståelse af jordforvaltning har betydning for:
   - Klimatilpasning og afbødende tiltag
   - Bæredygtig landbrugsproduktion
   - Jordforringelse
2. Forståelse af hvordan kulstof bindfng bidrager til regional afbødning af klimapåvirkning
3. Opbygge netværk og kompetencer
4. Harmonisere information om jord og støtte international afrapportering
5. Fremme brug af bæredygtig udnyttelse af dyrkningsjorden
6. Udvikle regional og kontekstspecifik gødningspraksis

HELPS TO IMPLEMENT & REALIZE

- CAP
- CLIMATE TARGETS
- SDGs (2, 13, 15)

Support farmers in their role as stewards of land and soil resources

EJP SOIL
European Joint Programme

EJP SOIL Governance structure

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

National Hub vs National Stakeholders

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

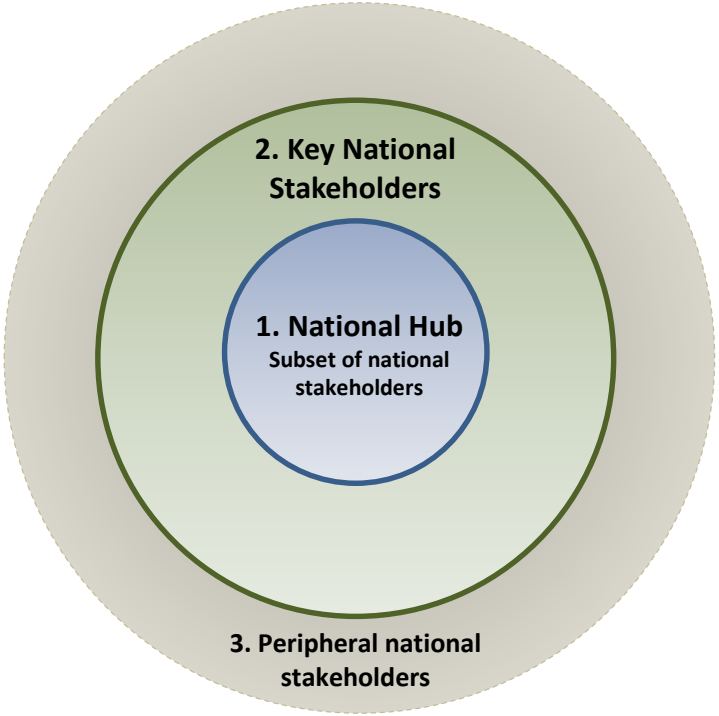
National Hubs members and National Stakeholders include:

- Farmers/farmer representative organisations
- Private sector
- Relevant NGOs or community based organizations involved in
- agricultural soil and land management
- Local governance and policy implementing representatives
- National European Soil Partnership representatives
- Representatives from scientific institutes

3. Peripheral National Stakeholders

Identified and mapped along with key national stakeholders:

- Peripheral national stakeholders are identified national stakeholders with potential future beneficial influence and interest further along in the programme (but not necessarily).
- Nice stakeholders to reach, yet not essential to achieve EJP SOIL knowledge sharing objectives.



1. National Hubs members' role

Selected by Programme Owners to:

- Provide feedback and input to EJP SOIL.
- Define and express a common national position towards agricultural soil management.
- Feed national needs to the Board of Programme Managers into the European process.
- Contribute to the objectives and learn from the work done in the EJP SOIL.
- Expected to participate in workshops
- Contribute to the dissemination of EJP SOIL activities.

2. Key National Stakeholders' role

Identified and invited to connect with EJP SOIL to:

- Represent the breath of national agricultural systems and soil management practices.
- Attend national open EJP SOIL activities with the purpose of taking notice of EJP SOIL's activities. Be consulted by EJP SOIL, if needed, through online questionnaires.
- Exchange, facilitate & implement knowledge sharing.
- Provide insight into perspectives and opinions, journalistic interview perspective.

Søjle II – Global Challenges and European Industrial Competitiveness – Missioner

The Soil Mission explained

Our vision – what do we want to achieve?

By 2030, at least 75% of soils in each EU Member State are healthy, or show a significant improvement towards meeting accepted thresholds of indicators, to support ecosystem services.

Objectives

1. **Reduce land degradation** – including desertification and salinazation
2. Conserve (e.g. in forests, permanent pastures, wetlands) and increase **soil organic carbon stocks**
   Target 2.1 – current **carbon concentration** losses on cultivated land (0.5 % per year) are reversed to an increase by 0.1-0.4 % per year)
   Target 2.2 – the area of managed **peatlands** losing carbon is reduced by 30-50 %

3. **No net soil sealing** and increase the **re-use of urban soils** for urban development
4. **Reduce soil pollution and enhance restoration**
5. **Prevent erosion**
6. Improve **soil structure** to enhance habitat quality for soil biota and crops
7. Reduce the **EU global footprint on soils**
8. Increase **soil literacy in society across Member States**

Hvordan vil Soil Mission nå målene?

Soil Mission vil støtte og ønsker at se mindst 1000 ”Living labs” på tværs af EU landene baseret på lokale initiativer.

Samskabelse (Co-design)

Forskning og innovation

Tværdisciplinær og

praksisorienteret tilgang t Forskning

Stærk formidling og involvering

Living Labs: Sam-skabelse af viden og innovation i “levende laboratorier” og fyrtårne

Mission for sund dyrkningsjord og fødevarer

- Denne Mission har til formål at ændre den traditionelle, lineære idé om forskning og udvikling ved at oprette et tæt netværk af Living Labs (“levende laboratorier”) og Lighthouses (“fyrtårne”) for forskellige typer af arealanvendelse.
- **Living labs er steder/projekter til fælles innovation** via deltagende, tværdisciplinær og systematisk forskning.
- Samarbejde mellem engagerede landmænd, interessenter fra forskellige sektorer, offentlige myndigheder og borgere, herunder forbrugere, at arbejde sammen med forskere om at udvikle nye løsninger og identificere huller i den eksisterende viden.
- Dette omfatter en øget brug af agroøkologiske principper samt økologisk jordbrugspraksis, jf Farm2Fork strategien
- **De levende laboratorier vil inkludere aspekter** i relation til jordbrugernes motivation, incitamenter, forretningsmodeller, som understøtter vedligehold af dyrkningsjorden og forbedrede økosystemydelser.

- **Nogle af disse Living Labs vil være “fyrtårne”**, dvs. områder til demonstration af løsninger, uddannelse og kommunikation.
- Fyrtårnene vil vise gode eksempler på bæredygtigt producerede og sunde fødevarer, foder eller fibre samt økosystemydelser, der forbinder land og by.

Farm to Fork strategy (part of EC Green Deal Policy)

2030 targets

The use of pesticides in agriculture contributes to pollution of soil, water and air.
The Commission will take action to **reduce the use of chemical and more hazardous pesticides by 50%**

The **excess of nutrients** in the environment is a major source of air, soil and water pollution, negatively impacting biodiversity and climate. The Commission will act to

- **reduce nutrient losses by at least 50%**, while ensuring no deterioration on soil fertility
- **reduce fertilizer use by at least 20%**

Antimicrobial resistance linked to the use of antimicrobials in animal and human health leads to an estimated 33,000 human deaths in the EU each year. The Commission will **reduce the sale of antimicrobials for farmed animals and in aquaculture by 50%.**

Organic farming is an environmentally-friendly practice that needs to be further developed.
The Commission will help the EU's organic farming sector to grow, with the goal of **25 % of total farmland being used for organic farming by 2030.**

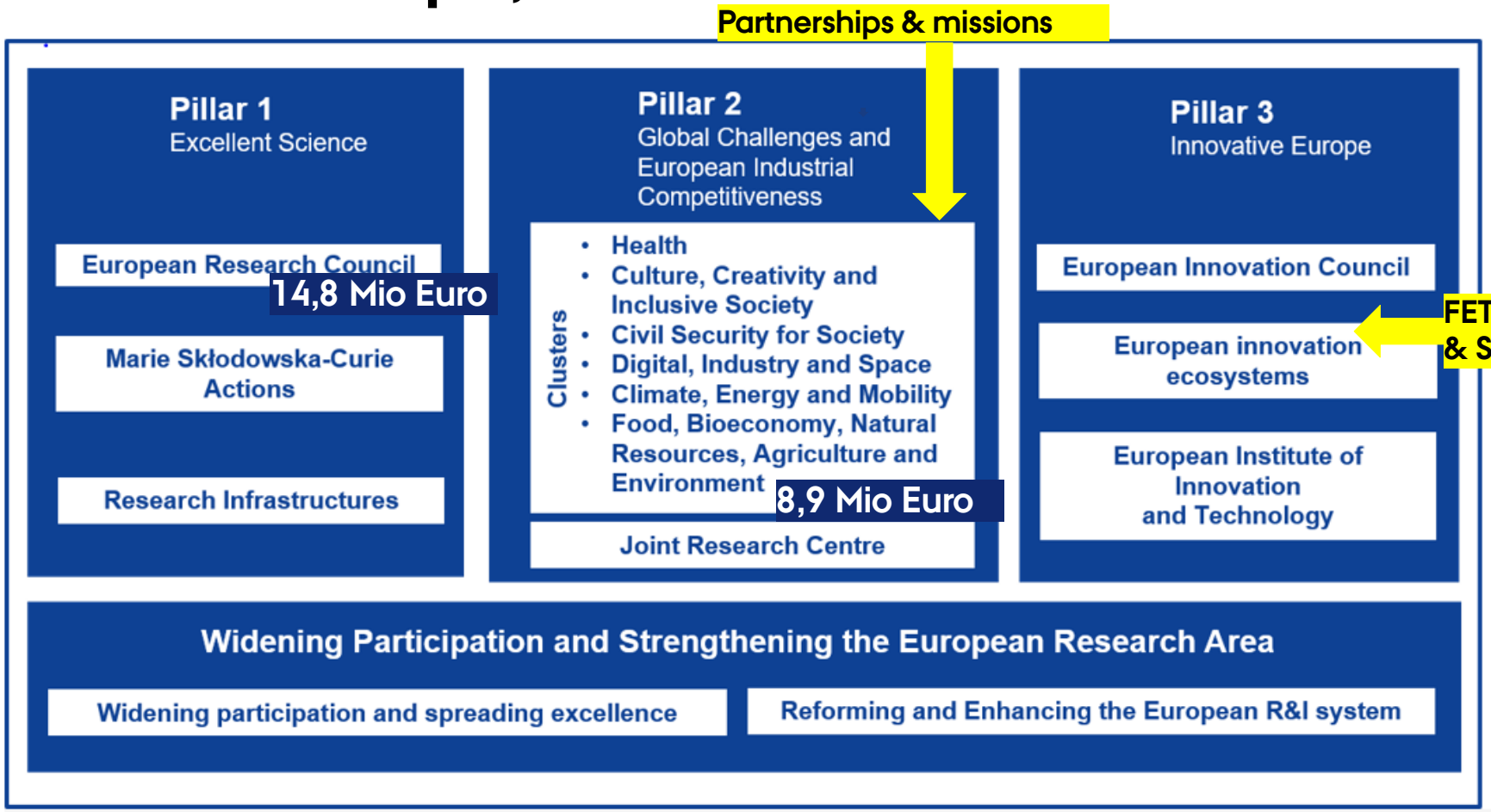
Co-funded European Partnerships in Horizon Europe

EU countries, with research funders and other public authorities at the core of the consortium.
(up to 50% of Pillar II budget, -but not likely…)

Topics in second wave from 2023:

- **Agroecology, living labs and research infrastructures** (CSA)
- **Safe and Sustainable Food Systems for People, Planet and Climate**
- **Agriculture of Data (full title: Environmental Observations for a Sustainable EU Agriculture)**
- **Animal Health and Welfare (CSA ? – to be postponed)**

Horizon Europe, overall structure



Kortlægning af vidensbehov

Lars J. Munkholm

National Hub møde 1/3 i EJP SOIL

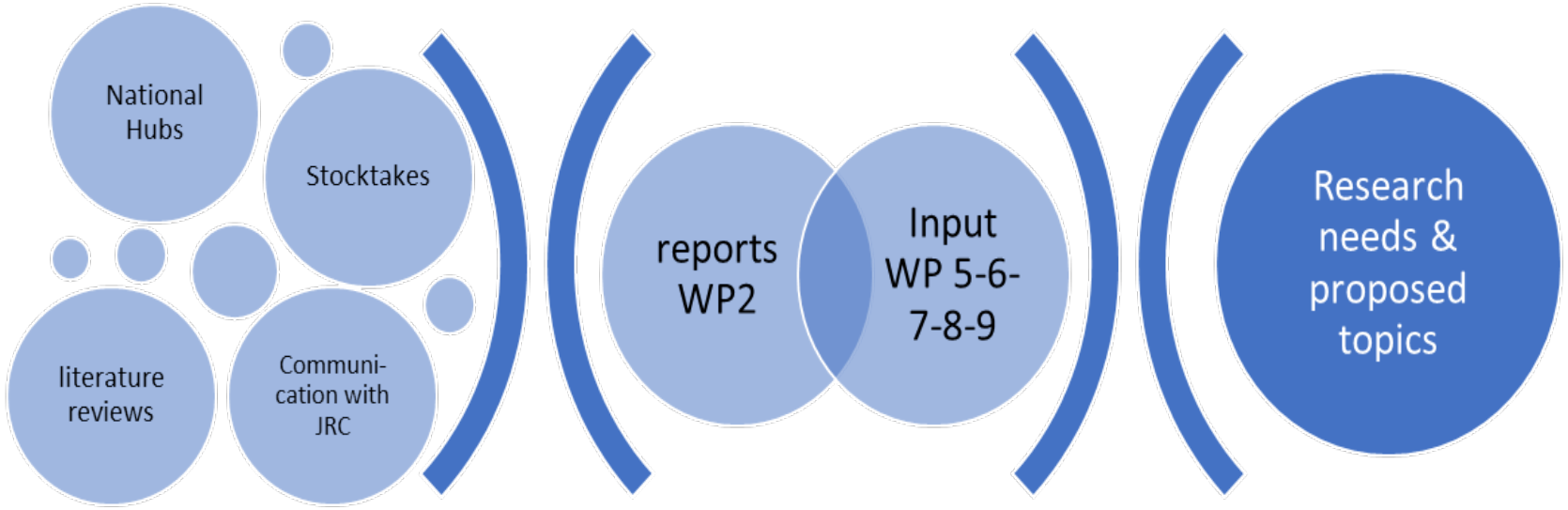
EJP SOIL
European Joint Programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

EJP SOIL Roadmap

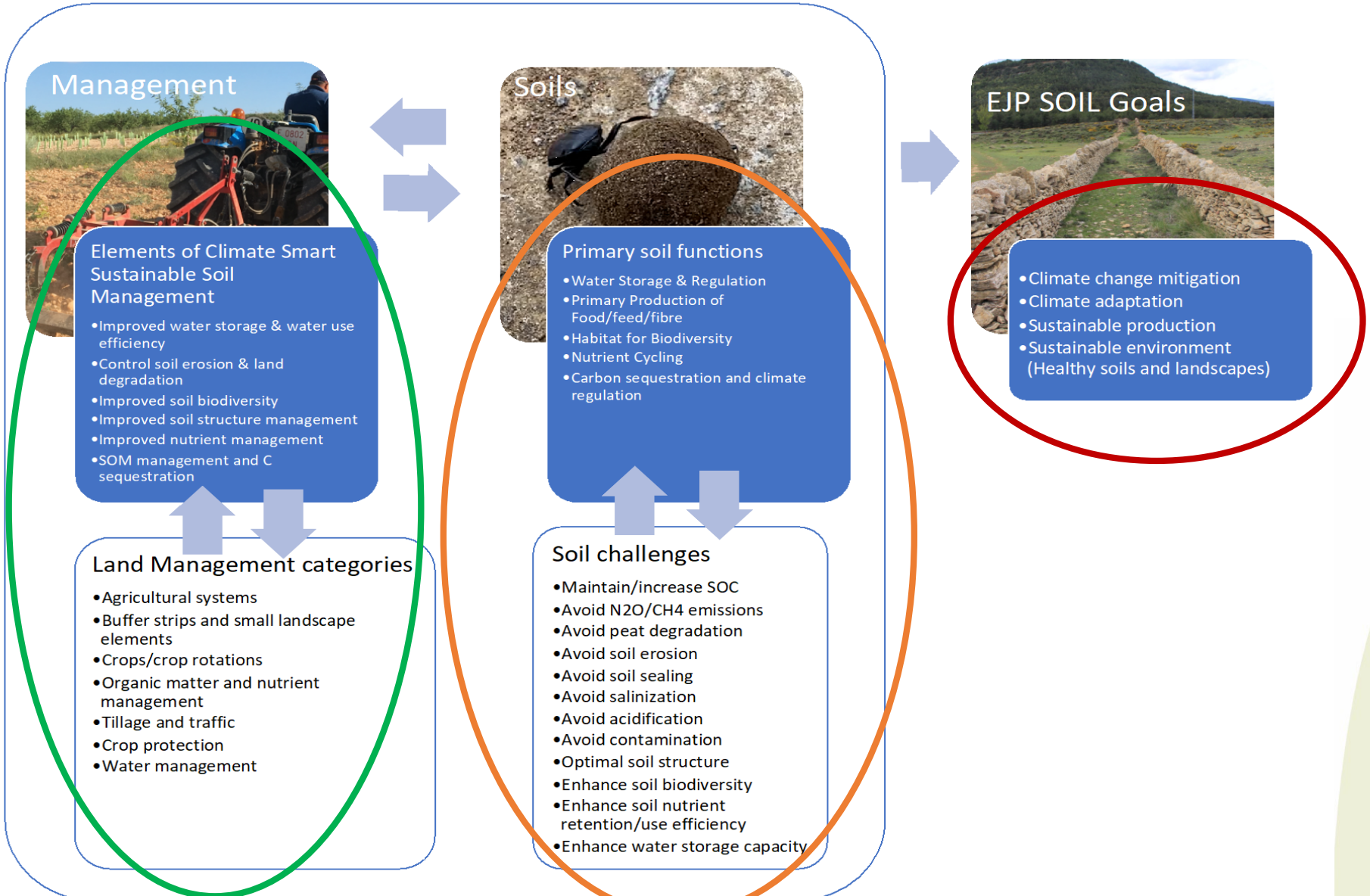
- Strategisk forskningsvision/agenda på EU skala indenfor **Climate-smart sustainable agricultural soil management**
  - Klimapåvirkning
  - Klimatilpasning
  - Bæredygtig produktion
  - Bæredygighed i fht. miljø
- Roadmap laves i starten af EJP SOIL – spiller ind i forhold til interne/eskterne udbud
- 10-års Roadmap laves i slutningen af EJP SOIL

Fra kortlægning af vidensbehov til Roadmap til interne/eksterne Udbud



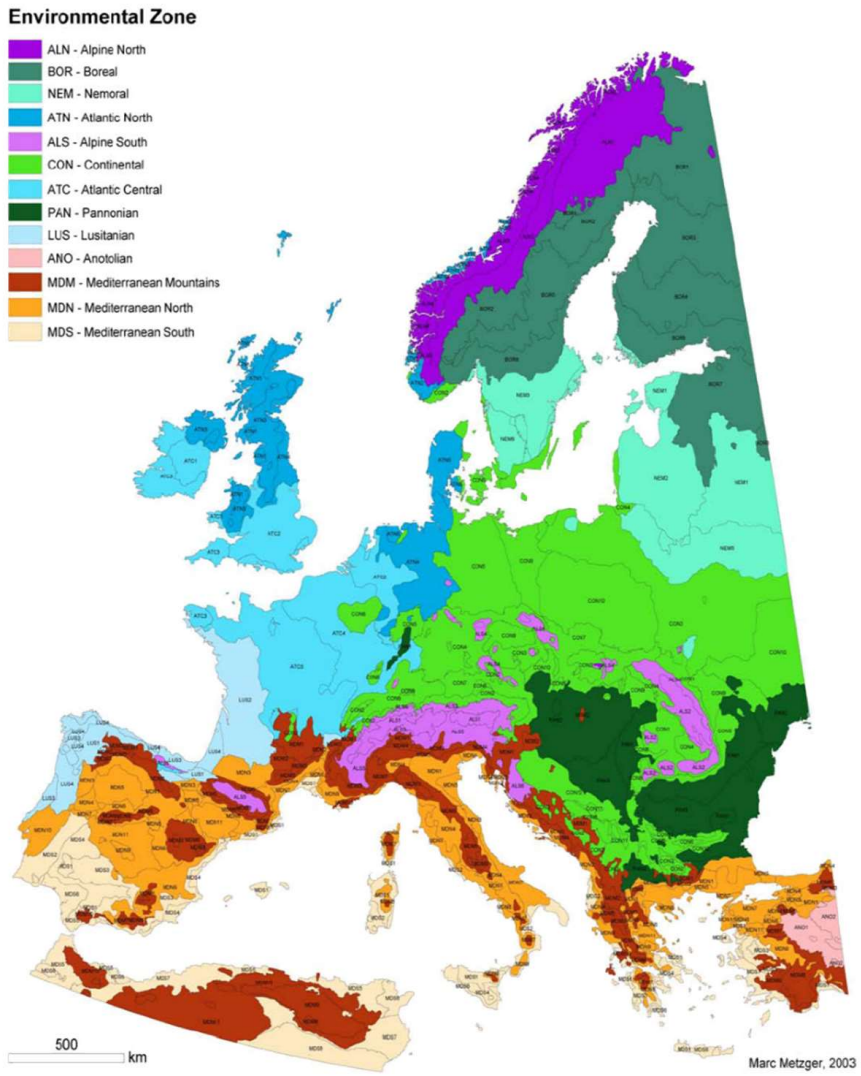
EJP SOIL
European Joint Programme

Sammenhæng mellem "goals", "soils" og "management"



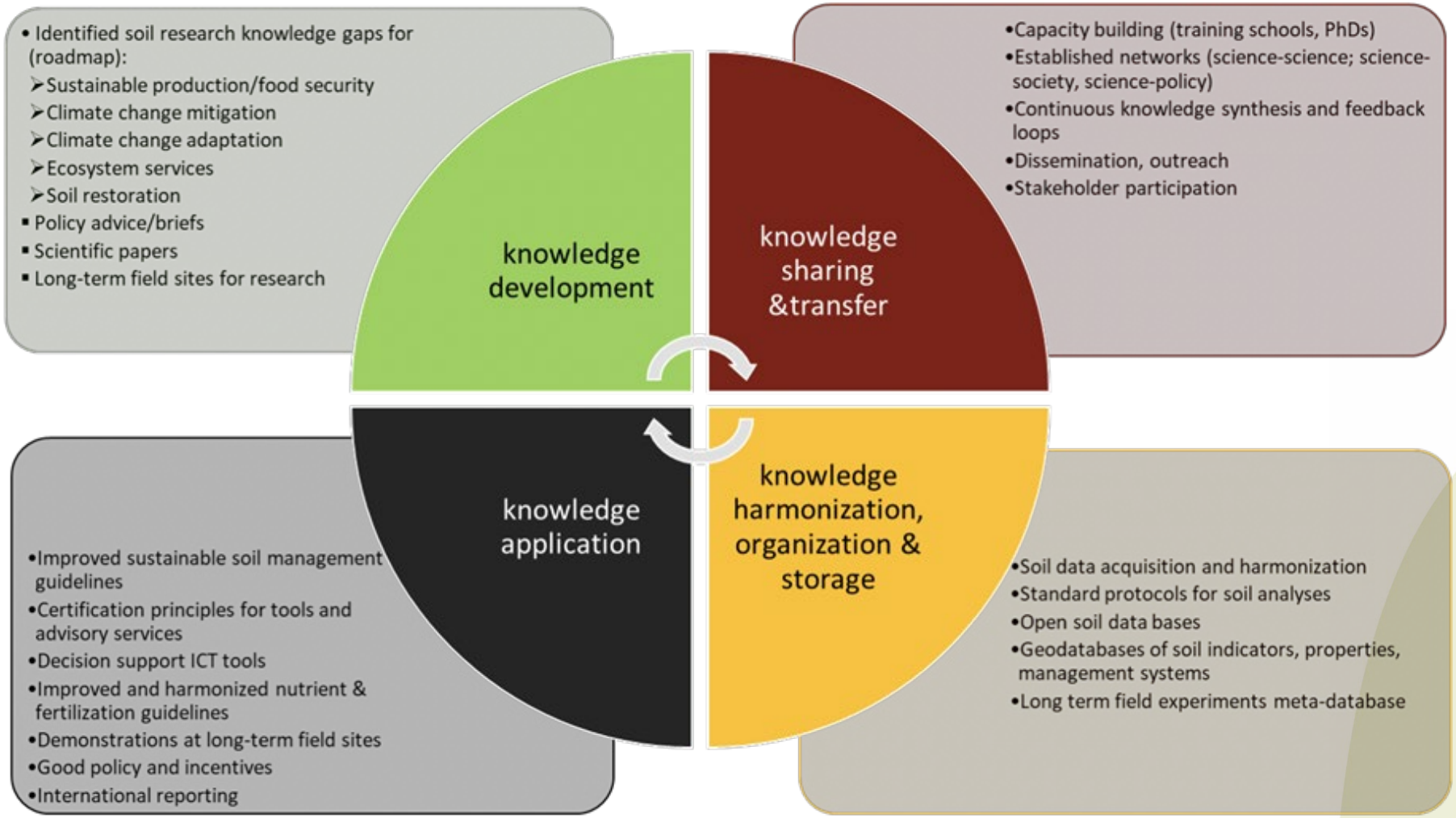
EJP European Joi

Hensyntagen til klima/regioner



EJP
European Joi

Knowledge framework



EJP SOIL
European Joint Programme

Fælles sprog – ordliste på EJP SOIL hjemmesiden

EJP SOIL
European Joint Programme

Projects › EJP SOIL › About EJP SOIL › EJP SOIL Library & Glossary

EJP SOIL
- About EJP SOIL
  - SOIL matters
  - Organisation
  - Stakeholders & Outreach
  - EJP SOIL Library & Glossary
  - News & Events
  - Contact
- European roadmap
- Research calls & Projects
- Capacity building
- SOIL data
- Synthesis & Integration
- Science to policy

EJP SOIL Library & Glossary

SOIL related literature

1. Keesstra et al., (2016). The significance of soils and soil science towards realization of the United Nations Sustainable Development Goals. *SOIL, 2, 111-128.*
2. Keesstra and Visser et al., (2018). Soil-Related Sustainable Development Goals: Four Concepts to Make Land Degradation Neutrality and Restoration Work. *LAND 2018, 133; doi: 10.3390/land7040133*
3. Keesstra and Visser et al., (2019). Soil as a Basis to Create Enabling Conditions for Transitions Towards Sustainable Land Management as a Key to Achieve the SDGs by 2030. *Sustainability 2019, 11, 6792; doi:10.3390/su11236792*

SOIL related projects/videos/literature

Video: The role of soils as a basis for circular agriculture - by Wageningen, NL. (English subtitles)

Webinar: Comment stocker le carbone dans le sol? (in french) with Claire CHENU - directrice de recherche INRAE, professeure à AgroParisTech et coordinateur d'EJP SOIL

SOIL related events

Other related initiatives

Glossary

Agricultural Soil Ecosystem Services (ASES): Ecosystem services derived from soil functions that can be provided by agricultural soils, and can be divided into four categories, as based on Weil & Bradley (2017)[2]:

Provisioning Services - providing goods such as food, feed, medicines, fuel and fibre.

Regulating Services – processes such as the regulation of water flow, floods and other climate events, decompose wastes, control pests, and carbon sequestration and storage.

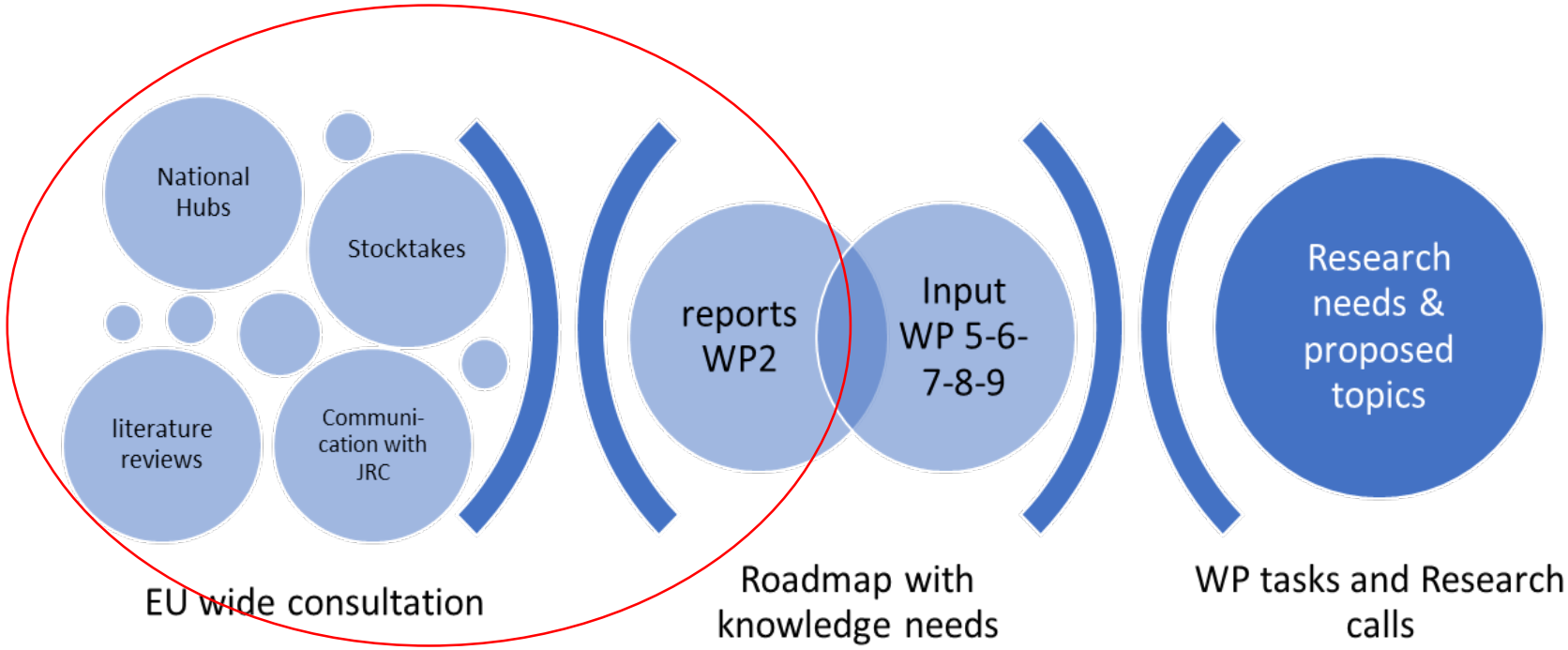
Supporting Services, services necessary for the production of other ecosystem services such as nutrient retention and cycling, primary biomass production, soil formation, habitat provision and pollination.

Cultural Services, non-material benefits such as spiritual uplift, scenic views, recreational opportunities, geological and archaeological archive.

Aspirational goal: A hope or ambition of achieving something. In this document, aspirational goals are the long-term goals (2050) to work towards, expressed by national and EU stakeholders

EJP SOIL
European Joint Programme

Kortlægning af Vidensbehov



EJP SOIL
European Joint Programme

Kortlægning i 3 trin

- Step 1: Aspirational targets: soil service aspirations at regional, national and European level for the future.
- Step 2: the knowledge availability and use
- Step 3: the barriers and opportunities to reach the aspirational targets.
- Plus three stocktakes on:
  - Impact of sustainable soil management practices
  - Soil quality indicators
  - Achievable soil carbon sequestration

Kortlægning i 3 trin

- Step 1: Aspirational targets: soil service aspirations at regional, national and European level for the future.
- **Step 2: the knowledge availability and use**
- Step 3: the barriers and opportunities to reach the aspirational targets.
- Plus three stocktakes on:
  - Impact of sustainable soil management practices
  - Soil quality indicators
  - Achievable soil carbon sequestration

EJP SOIL
European Joint Programme

RESULTATER FRA INDLEDENDE INTERESSENTINDDRAGELSE

AARHUS
UNIVERSITET
INSTITUT FOR AGROØKOLOGI

MARTIN HVARREGAARD THORSØE
FORSKER

FORMÅL MED MIT INDLÆG

Hvordan har vi arbejdet med jeres input i løbet af det første år?

- Hvad er de største udfordringer for en bæredygtig anvendelse af landbrugsjorden?
- Hvor ligger de største vidensbehov for at sikre en bæredygtig anvendelse af landbrugsjorden?
- Jeres anbefalinger til det fremadrettede arbejde.

Dels et dansk og Europæisk perspektiv

METODE

Det gik ikke helt som vi planlagde…

Interviewrunde kvalitativ/kvantitativ i foråret 2020 blandt en række forskellige interessenter.

- Danmark (29)
- Europa samlet (772).

Samlet i tre (ikke offentliggjorte) rapporter:

1. Politik og politiske ambitioner
2. Viden og videnshuller
3. Muligheder og barrierer for fremadrettet bæredygtig anvendelse af jorden

Bemærk: Rapporterne udtrykker ikke min, eller AU's holdning, men er et forsøg på at forstå beskrive jeres perspektiv og virkelighed.

	Off administration	Forskere	Forsknings fonde	Uddannelsesinstitutioner	Landmænd	Rådgivere	Landbrugs	Agro-industri	Laboratorier	Test og verifikation	NGOere	Total
Austria	1	4	0	3	0	2	1	0	0	0	0	11
Belgium Flanders	4	1	0	0	0	4	3	0	0	0	1	13
Belgium Wallonia	2	11	0	0	3	4	0	0	0	2	1	23
Czechia	1	3	1	1	1	0	1	0	1	1	1	11
Denmark	4	10	0	0	4	2	6	1	0	0	2	29
Finland	0	4	1	0	0	2	1	3	0	0	1	12
France	1	1	1	1	0	0	0	1	0	0	0	5
Germany	2	80	0	6	204	28	0	6	0	0	9	395
Hungary	2	3	0	2	1	2	2	2	2	1	1	18
Ireland	2	2	1	0	1	1	0	0	0	0	0	7
Italy	2	1	0	5	0	2	2	0	4	0	1	17
Latvia	5	2	0	1	41	0	4	1	0	0	2	56
Lithuania	1	3	0	1	2	2	0	0	0	0	1	10
Norway	0	0	0	1	1	2	1	0	0	0	0	5
Poland	2	1	0	0	5	2	0	1	1	0	0	12
Portugal	1	3	0	6	0	0	6	1	0	1	1	19
Slovakia	2	3	0	2	0	0	1	0	1	0	0	9
Slovenia	1	13	0	2	0	9	1	0	0	0	0	26
Sweden	0	0	0	0	1	3	3	0	0	0	0	7
Switzerland	9	7	0	4	0	3	3	4	0	1	0	31
The Netherlands	0	0	0	0	0	0	0	0	0	0	0	19+14[1]
Turkey	0	4	0	0	0	0	0	0	0	0	0	4
United Kingdom	1	5	1	2	2	0	2	4	1	0	1	19
Total	43	161	5	37	266	68	37	40	10	6	66	772

	I hvor høj grad er det nuværende vidensnetværk tilstrækkeligt effektivt til at kommunikere viden omkring bæredygtig jordforvaltning til landmænd?	I hvor høj grad er der tilstrækkeligt med ressourcer til formidling af viden om bæredygtig jordforvaltning til danske landmænd?	I hvor høj grad er der tilstrækkeligt med ressourcer til produktionen af viden om bæredygtig jordforvaltning?
Austria			
Belgium Flanders			
Belgium Wallonia			
Czechia			
Denmark			
Finland			
France			
Germany			
Hungary			
Ireland			
Italy			
Latvia			
Lithuania			
Norway			
Poland			
Portugal			
Slovakia			
Slovenia			
Sweden			
Switzerland			
The Netherlands			
Turkey			
United Kingdom			

I meget lav grad	I nogen grad	Neutral	I nogen grad	I høj grad

Vigtigste udfordringer i forhold til bæredygtig jordforvaltning

		Kulstof I jorden	N_2O/CH_4 emissioner	Degradering at organiske jorde	Forhindre erosion	Forsegling	Salinisation	Forurening	Jordstruktur	Jordbiodiversitet	Nærringsstof tab	Tilbageholdelse af vand
Central	AT (Alpine South)											
	CZ (Alpine South)											
	DE (Atlantic North)											
	HU (Pannonian-Pontic)											
	PL (Continental)											
	SK (Continental)											
	SI (Alpine South)											
	CH (Continental)											
Nord	DK (Atlantic North)											
	FI (Boreal)											
	LV (Nemoral)											
	LT (Nemoral)											
	NO (Boreal)											
	SE (Nemoral)											
Syd	IT (Mediterrenean North)											
	PT (Mediterrenean South)											
	TU (Anatolian)											
Vest	BE (W) (Atlantic Central)											
	FR (Atlantic Central)											
	IE (Atlantic Central)											
	NL (Atlantic North)											
	UK (Atlantic North)											

Legend: Meget vigtig | Vigtig | Neutral | Mindre vigtig | Ikke vigtig

AARHUS UNIVERSITET
INSTITUT FOR AGROØKOLOGI

Vigtigste vidensbehov for at sikre en bæredygtig jordforvaltning

		Kulstof I jorden	N_2O/CH_4 emissioner	Degradering at organiske jorde	Forhindre erosion	Forsegling	Salinisation	Forurening	Jordstruktur	Jordbiodiversitet	Nærringsstof tab	Tilbageholdelse af vand
Central	AT (Alpine South)											
	CZ (Alpine South)											
	DE (Atlantic North)											
	HU (Pannonian-Pontic)											
	PL (Continental)											
	SK (Continental)											
	SI (Alpine South)											
	CH (Continental)											
Nord	DK (Atlantic North)											
	FI (Boreal)											
	LV (Nemoral)											
	LT (Nemoral)											
	NO (Boreal)											
	SE (Nemoral)											
Syd	IT (Mediterrenean North)											
	PT (Mediterrenean South)											
	TU (Anatolian)											
Vest	BE (W) (Atlantic Central)											
	FR (Atlantic Central)											
	IE (Atlantic Central)											
	NL (Atlantic North)											
	UK (Atlantic North)											

Meget vigtig	Vigtig	Neutral	Mindre vigtig	Ikke vigtig

Mest kritiske vidensbehov (stor udfordring/stort vidensbehov)

		Kulstof I jorden	N_2O/CH_4 emissioner	Degradering at organiske jorde	Forhindre erosion	Forsegling	Salinisation	Forurening	Jordstruktur	Jordbiodiversitet	Nærringsstof tab	Tilbageholdelse af vand
Central	AT (Alpine South)											
	CZ (Alpine South)											
	DE (Atlantic North)											
	HU (Pannonian-Pontic)											
	PL (Continental)											
	SK (Continental)											
	SI (Alpine South)											
	CH (Continental)											
Nord	DK (Atlantic North)											
	FI (Boreal)											
	LV (Nemoral)											
	LT (Nemoral)											
	NO (Boreal)											
	SE (Nemoral)											
Syd	IT (Mediterrenean North)											
	PT (Mediterrenean South)											
	TU (Anatolian)											
Vest	BE (W) (Atlantic Central)											
	FR (Atlantic Central)											
	IE (Atlantic Central)											
	NL (Atlantic North)											
	UK (Atlantic North)											

Meget vigtig udfordring og meget vigtigt videnshul

Meget vigtig udfordring og vigtig videnshul

Vigtig udfordring og meget vigtigt videnshul

Vigtig udfordring og vigtig videnshul

STYRKER (DANSK PERSPEKTIV)

- Veluddannede landmænd og et effektivt og veludviklet rådgivningsvæsen
- Blandt alle aktører stor interesse i en bæredygtig anvendelse af landbrugsjorden.
- Enighed omkring udfordringer (særligt tab af kulstof og jordpakning)
- Uafhængig forskningsindsats er godt for legitimiteten

SVAGHEDER (DANSK PERSPEKTIV)

- I det store og hele går det fint, men behov for yderligere indsats i forhold til kommunikation med landmænd, herunder flere midler til inddragelse i forskningsprojekter
- Forskningen er meget specialiseret, teoretisk og indsatser er for fragmenterede
- Efterspørgselsdrevet rådgivning: Rådgivere bruger for meget af deres tid på at sikre overholdelse af regler og regulativer og ikke tilstrækkelig tid på at udbrede god landmandsmæssig praksis i forhold til landbrugsjorden
- "Politisk/administrativ" indflydelse på prioriteringen af forskningsindsatsen og for lang responstid

ANBEFALINGER

- Behov for en mere helhedsorienteret tilgang til reguleringen af landbruget
- En bred pallet af virkemidler er nødvendig for at sikre en nødvendig lokal tilpasning og en målrettet og helhedsorienteret regulering.
- Behov for overvågning, stedsspecifikke databaser, teknologiudvikling og virkemidler, der støtter op om mulighederne for en mere målerettet regulering og præcisionsjordbrug.
- Fokuser på konkrete videnshuller (viden omkring kulstof i jorden, trade-offs i forhold til beskyttelse af organiske jorde, langsigtet: recirkulation af P).
- Behov for at sikre hurtig omsætning af viden til virkemidler og praksis
- Forbedrer integrationen af målinger med modeller

AARHUS
UNIVERSITET

EJP SOIL Roadmap

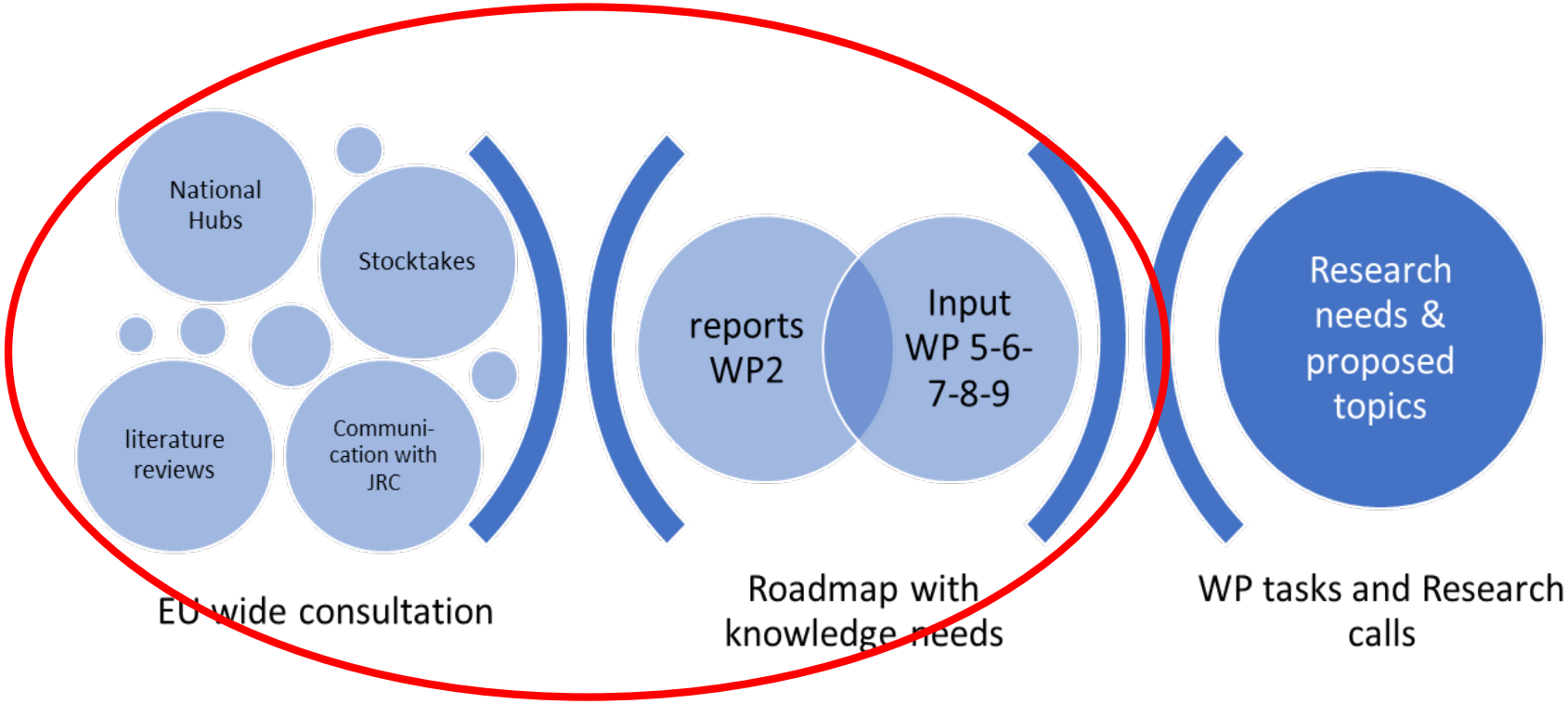
Lars J. Munkholm

National Hub møde 1/3 i EJP SOIL

EJP SOIL
European Joint Programme

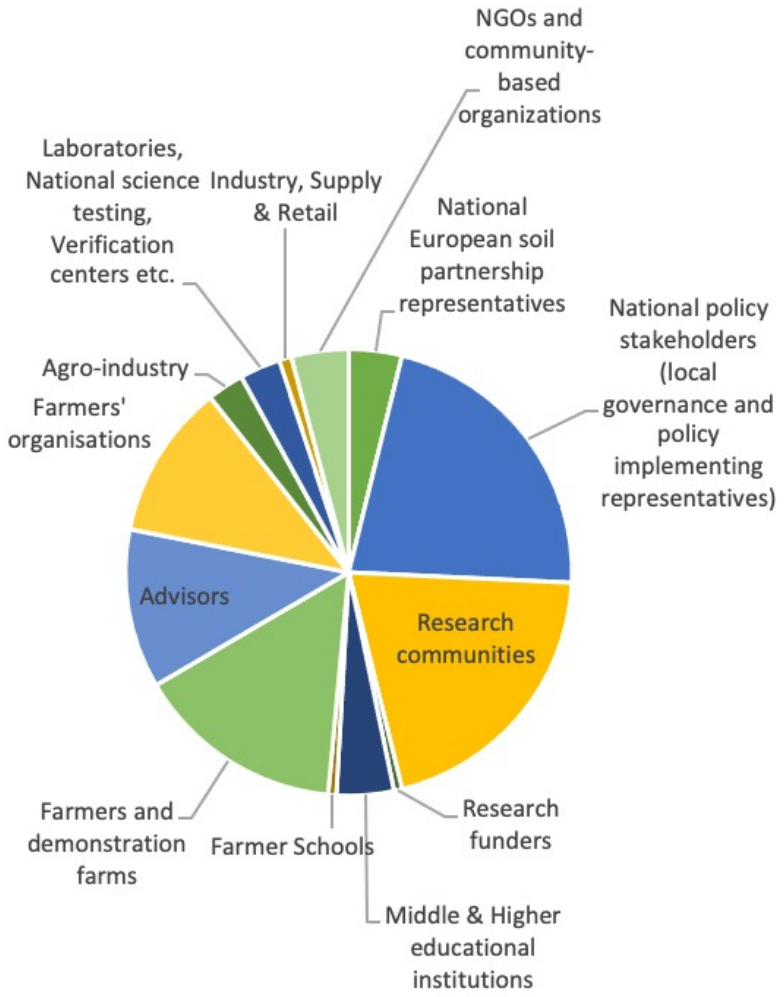
EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

Fra videnskortlægning til Roadmap

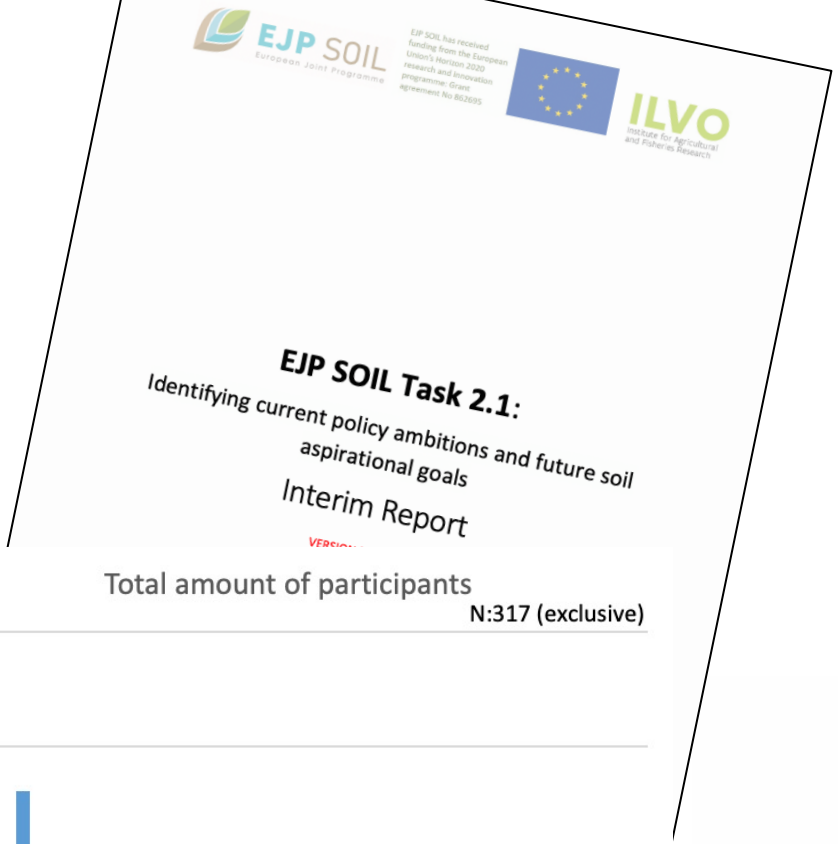


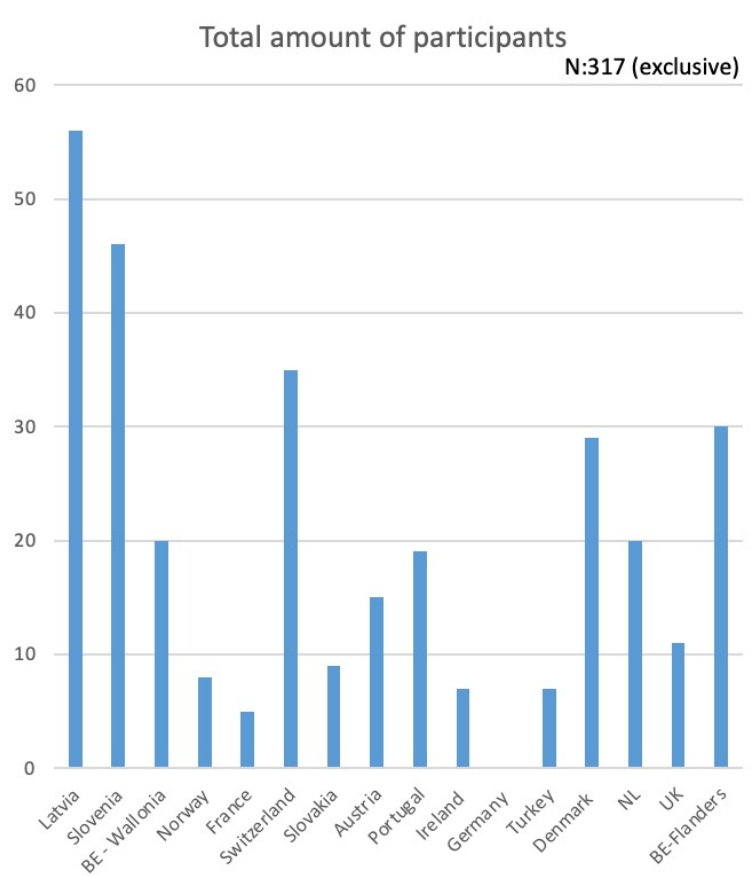
EJP SOIL
European Joint Programme

Aspirational targets [T2.1]



N:338 (not-exclusive)



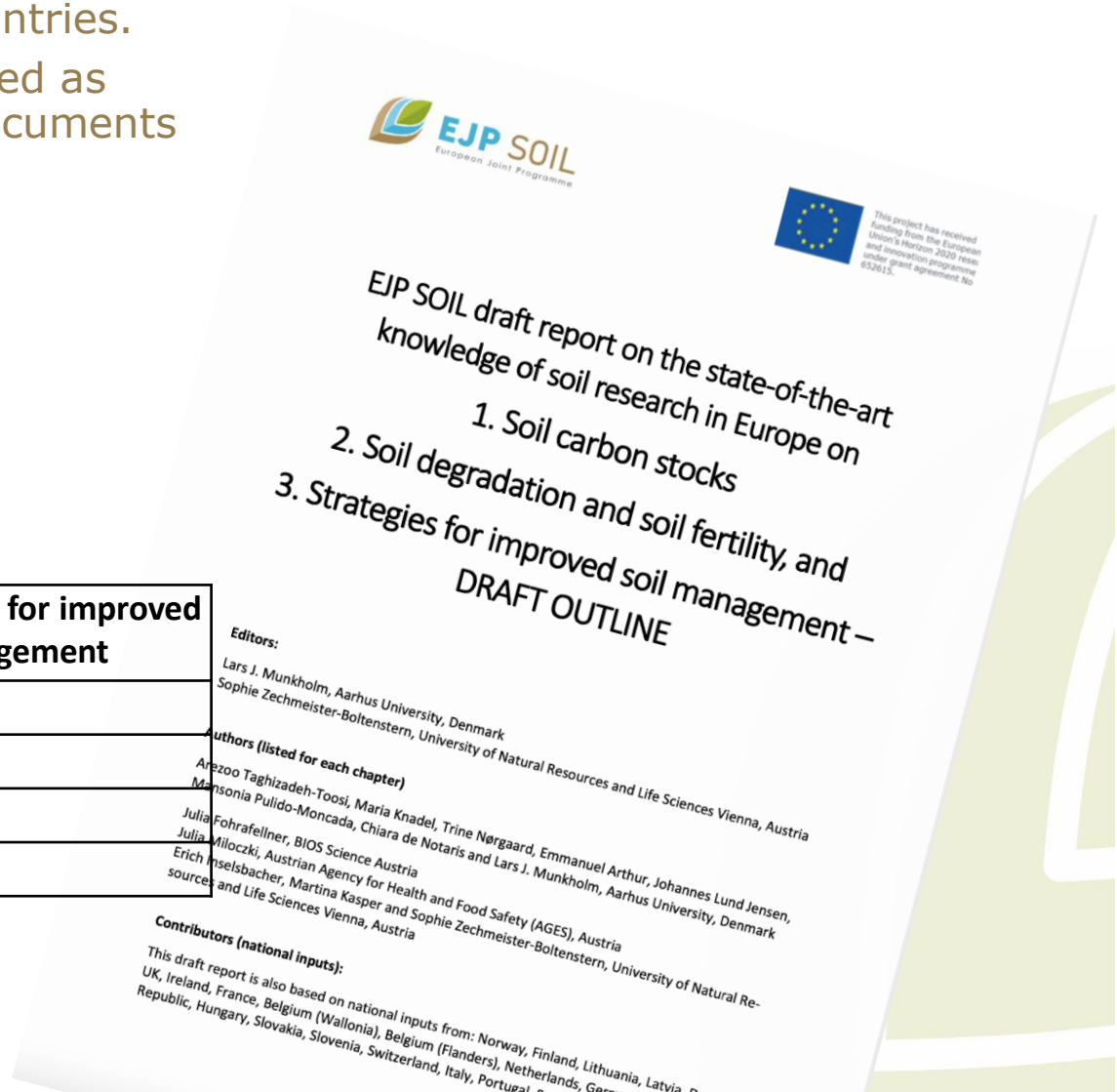


EJP
European Joint Programme

Knowledge availability [T2.2.1]

- The number of researchers interviewed were 254 in total and ranged between 3 and 26 for individual countries.
- The number of documents retrieved and reviewed as part of the national literature reviews >1800 documents
- The documents were mainly reviewed journal publications (72%) and reports (19%).

Institution/sub categories	Carbon stock	Soil degradation and fertility	Strategies for improved soil management
University level	57	81	76
National institution	71	85	83
Non-governmental	18	21	23
Total	**146**	**187**	**182**



EJP SOIL
European Joint Programme

Knowledge use [T2.2.2]

Table 2: Interview types

	Face-to-face	Phone or video-link	Focus group	Online focus group or webinar	Email or survey	Other	Total
Austria	5	3	0	0	3	0	11
Belgium Flanders	0	0	0	0	13	0	13
Belgium Wallonia	0	0	0	0	26	0	26
Czechia	0	0	0	0	11	0	11
Denmark	0	15	0	0	11	0	26
Finland	0	13	0	0	0	0	13
France	0	0	0	0	5	0	5
Hungary	6	4	0	0	4	2	16
Ireland	0	0	0	0	7	0	7
Italy	0	3	0	0	14	0	17
Latvia	42	4	0	0	10	0	56
Lithuania	6	4	0	0	0	0	10
Norway	0	1	0	0	4	0	5
Poland	0	11	0	0	1	0	12
Portugal	0	0	0	0	20	0	20
Slovakia	0	0	0	0	9	0	9
Slovenia	0	0	0	0	26	0	26
Switzerland	0	0	0	0	0	31	31
The Netherlands	0	0	0	19	0	14	33
Turkey	0	4	0	0	4	0	8
United Kingdom	0	0	0	0	19	0	19
Total	**59**	**62**	**0**	**19**	**187**	**47**	**374**

Table 1: Stakeholder representation

	Policymakers	Research communities	Research funders	Educational institutions and	Farmers & demonstration farms	Advisors	Farmers' organisations	Agro-industry, supply & retail	Laboratories	National science testing and	NGOs	Total
Austria	1	4	0	3	0	2	1	0	0	0	0	11
Belgium Flanders	4	1	0	0	0	4	3	0	0	0	1	13
Belgium Wallonia	2	11	0	0	3	4	0	0	0	2	1	23
Czechia	1	3	1	1	1	0	1	0	1	1	1	11
Denmark	4	10	0	0	4	2	6	1	0	0	2	29
Finland	0	4	1	0	0	2	1	3	0	0	1	12
France	1	1	1	1	0	0	0	1	0	0	0	5
Hungary	2	3	0	2	1	2	2	2	2	1	1	18
Ireland	2	2	1	0	1	1	0	0	0	0	0	7
Italy	2	1	0	5	0	2	2	0	4	0	1	17
Latvia	5	2	0	1	41	0	4	1	0	0	2	56
Lithuania	1	3	0	1	2	2	0	0	0	0	1	10
	0	0	0	1	1	2	1	0	0	0	0	5
	2	1	0	0	5	2	0	1	1	0	0	12
				6	0	0	6	1	0	1	1	19
					0	0	1	0	1	0	0	9
							1	0	0	0	0	26
								4	0	1	0	31
										0	0	19+14[1]
												4

EJP SOIL
European Joint Programme

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 652615.

EJP Soil draft report on knowledge on and use of knowledge on sustainable soil managemenet

Report for EJP SOIL task 2.2.2

Author: Martin Hvarregaard Thorsøe, AU

Contributors: Chiara Piccini (CREA); Dario Fornara (AFBI); Ele
Vanwindekens (CRAW); Frederik Bøe (NIBIO); Grze
Julia Miloczki (AGES); Martina Kasper (R
Maria Gonçalves (INIAV); Mir
Olivier Heller (AGS
Made

EJP SOIL
European Joint Programme

Barriers and opportunities [T2.2.3]

Table 1 - Number of stakeholders for each Country and European Environmental Zone

Country	Geographical Zone	European Environmental Zone	N. of stakeholders
Austria	Central Europe	Continental (CON)	9
Belgium Wallonia	Western Europe	Atlantic Central (ATC)	13
Belgium-Flanders	Western Europe	Atlantic Central (ATC)	13
Denmark	Northern Europe	Alpine South (ALS)	11
France	Western Europe	Atlantic Central (ATC)	5
		Lusitanian (LUS)	5
		Mediterranean North (MDN)	5
		Mediterranean Mountains (MDM)	5
Hungary	Central Europe	Pannonian (PAN)	15
Ireland	Western Europe	Atlantic Central (ATC)	5
Italy	Southern Europe	Mediterranean South (MDS)	2
		Mediterranean North (MDN)	14
		Mediterranean Mountains (MDM)	4
Latvia	Northern Europe	Nemoral (NEM)	60
Lithuania	Northern Europe	Nemoral (NEM)	10
Norway	Northern Europe	Boreal (BOR)	7
Portugal	Southern Europe	Mediterranean South (MDS)	10
		Lusitanian (LUS)	7
		Mediterranean North (MDN)	8
Slovakia	Central Europe	Continental (CON)	9
Slovenia	Central Europe	Alpine South (ALS)	26
Switzerland	Central Europe	Continental (CON)	16
The Netherland	Western Europe	Atlantic North (ATN) and Atlantic Central (ATC)	12
Turkey	Southern Europe	Anatolian (ANA), Mediterranean South (MDS), Mediterranean North (MDN), Mediterranean Mountains (MDM)	4
United Kingdom	Western Europe	Atlantic North (ATN)	17
		Atlantic Central (ATC)	8
Total			**296**

EJP SOIL
European Joint Programme

3 Stocktakes [T2.4.1-2.4.2-2.4.3]

Agricultural Soil Management in

l related issues in the EJP SOIL

and design region relevant

n estimates achievable s

agricultural land in Eu

d issues in the EJ

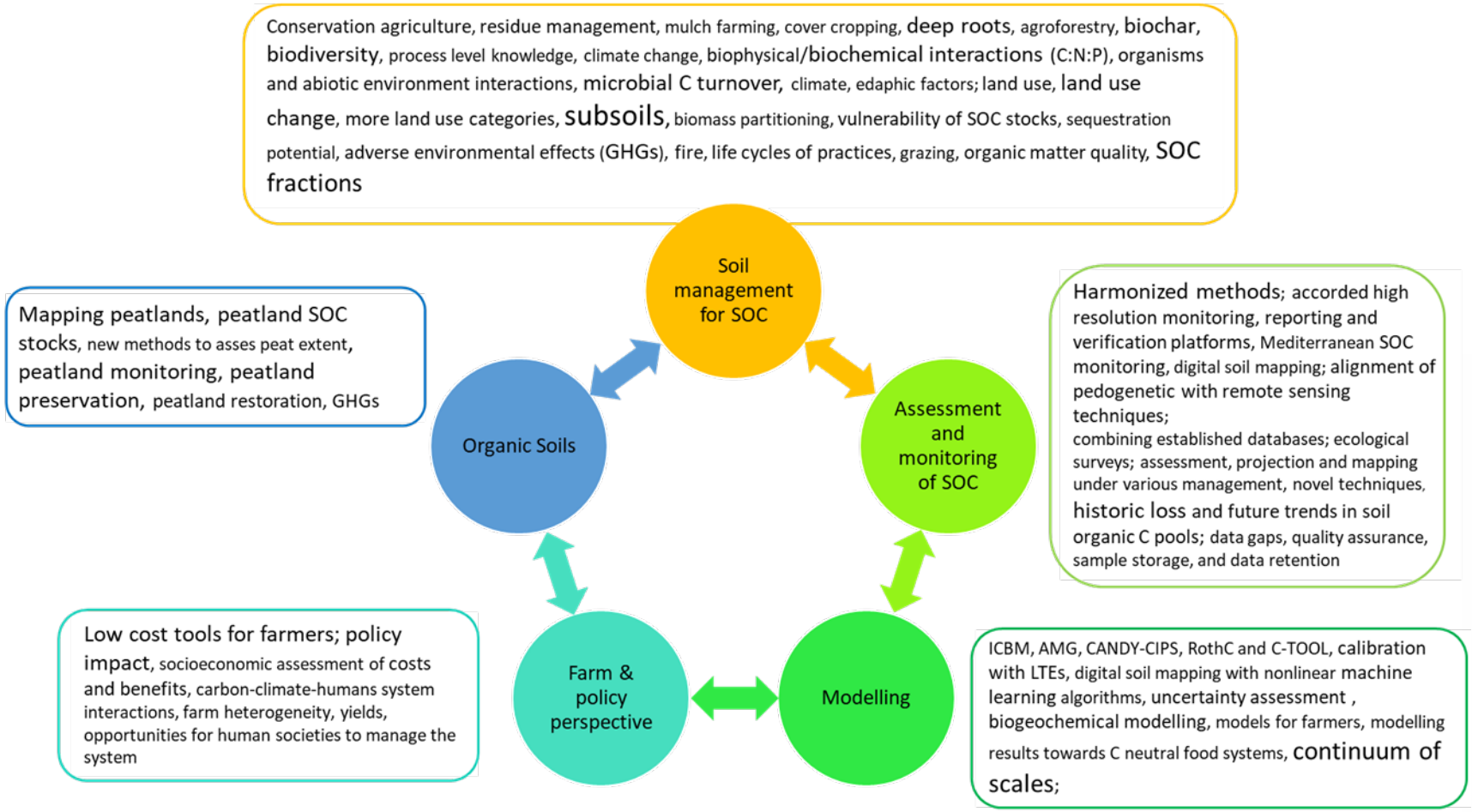
design region relevant re

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Wallonie recherche CRA-W

EJP SOIL
European Joint Programme

Eksempel på vidensbehov for kulstof i jord fra T2.2.1 rapporten



EJP SOIL
European Joint Programme

Towards climate-smart sustainable management of agricultural soils

DRAFT 2

Deliverable 2.4

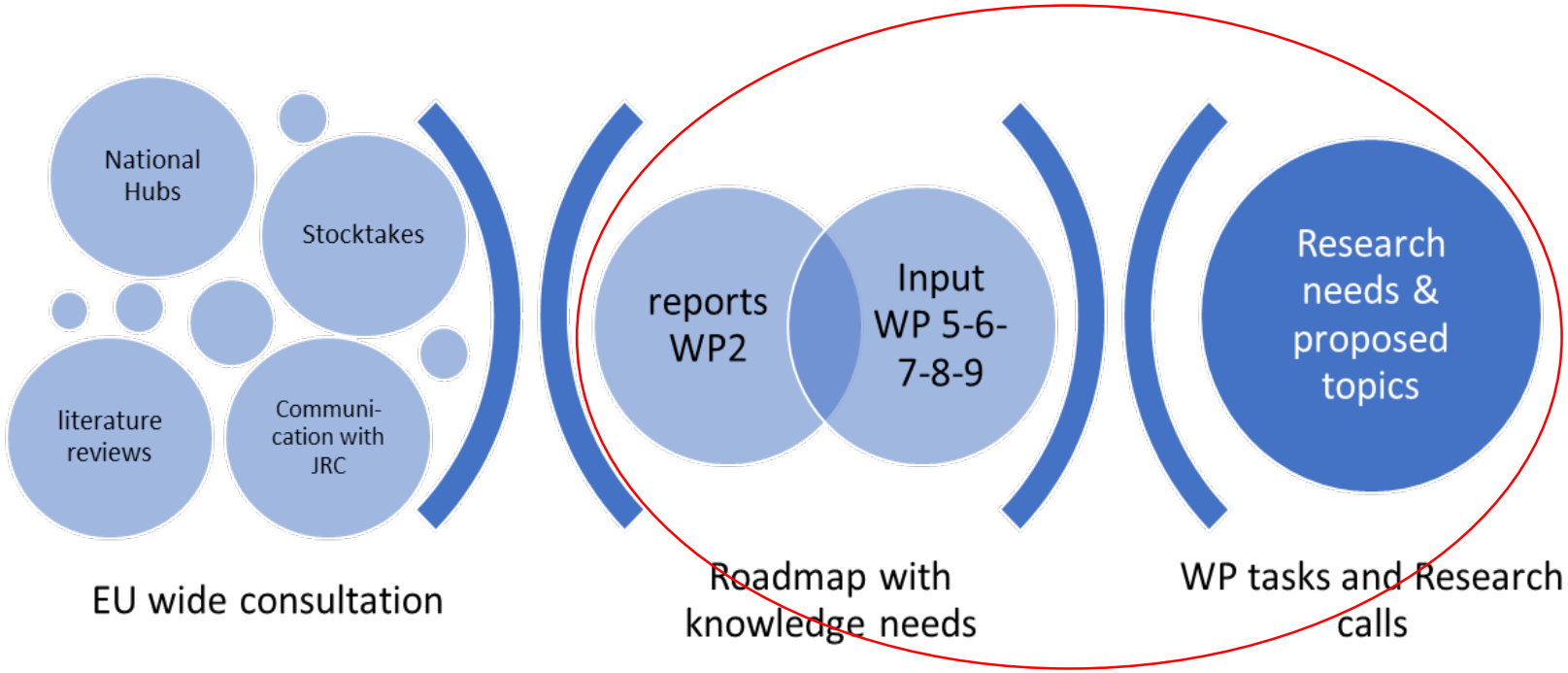
Due date of deliverable: M14
Actual submission date: XX.XX.202X

Roadmap rapport - kulstof i jord eksempel

Increasing SOC stocks in agricultural soils, in addition to effective reduction of N2O and CH4 emissions from agriculture, **requires progress in five areas**:

- Evaluating the effect of (individual and combined) soil management options on C sequestration and GHG emissions
- Providing (realistic) estimates for C storage potential across EU agricultural soils
- Understanding the mechanisms and drivers behind C sequestration in and GHG emissions from agricultural soils
- Measuring, Reporting and Verifying (MRV) SOC stocks and GHG emissions
- Creating enabling conditions for reducing GHG emissions and increasing SOC stocks: developing C farming schemes

Fra Roadmap til aktiviteter



EJP SOIL
European Joint Programme

Emner til udbud indenfor "climate change mitigation"

Table 2: Topics for Expected Impact 1a and 2; Climate change Mitigation*	
CM1	**Plant below-ground inputs to enhance carbon sequestration**
CM2	**Knowledge of potential SOC sequestration under different soils types/ pedoclimatic regions. (1st call)**
CM3	**Preserving and managing SOC in peatland and organic soils**
CM4	**Understanding SOC sequestration**
CM5	**Effects of the soil biome on the persistence SOC storage and its drivers**
CM6	**Stoichiometry of C-N-P as drivers for SOC storage and persistence and GHG emissions**
CM7	**Components of an European SOC MRV platform**
CM8	**Evaluating soil management options for specific objectives: Trade-offs between soil organic carbon sequestration, greenhouse gas emissions and/or N and P losses (1st call)**
SP2	**The use, processing and application of external sources of organic matter to mitigate climate change and improve soil health**
SE6	**Soil futures: scenario modelling for assessing the potential of climate-smart sustainable soil management to provide multiple ecosystem services**
POL2	**Enabling conditions for enhancing climate smart and sustainable soil policy: schemes for payment for ecosystem services, including soil carbon sequestration**

Respons på Roadmap udkast

COUNTRY/EJP SOIL PARTNER	########	
Dear reviewer please provide your overall opinion on the description of the impact areas by answering to the given question and using the general remarks column. In case you have very specific		
Impact area	**Does the description of the impact area logically result into the knowledge needs?**	**General remarks**
1a + 2 Climate mitigation : Fostering understanding of soil management and its influence on climate mitigation. Combined with expected impact 2: Understanding how soil carbon sequestration can contribute to climate change mitigation at regional level including accounting for carbon.		
1b Climate Adaptation : Fosteri climate adaptation		
1c + 6: Sustainable production : influence on sustainable agricult Developing region-specific fertiliz climatic conditions.		
1d Sustainable environment: Foste on a sustainable environment		
3. Networking & Knowledge sharing : Strengthening scientific cooperation at European level including training of young scientists		
4. Harmonising : Supporting harmonised European soil information, including for international reporting.		
5a. Adoption of sustainable management : Fostering the uptake of soil management practices which are conductive to climate change adaptation and mitigation for endusers.		
5b. Science to policy interface: Fostering the uptake of soil management practices which are conductive to climate change adaptation and mitigation for the science-policy interface.		

- Rundsendes ca. 15. marts
- Frist for tilbagemelding 15. april

Seminar 1. marts 2021 - EJP Soil

Europæisk forskningssamarbejde om

bæredygtig anvendelse af landbrugsjorden

Projekt: CarboSeq

Lars Elsgaard, Arezoo Taghizadeh-Toosi, Zhi Liang, Johannes L. Jensen

Aarhus Universitet, Institut for Agroøkologi

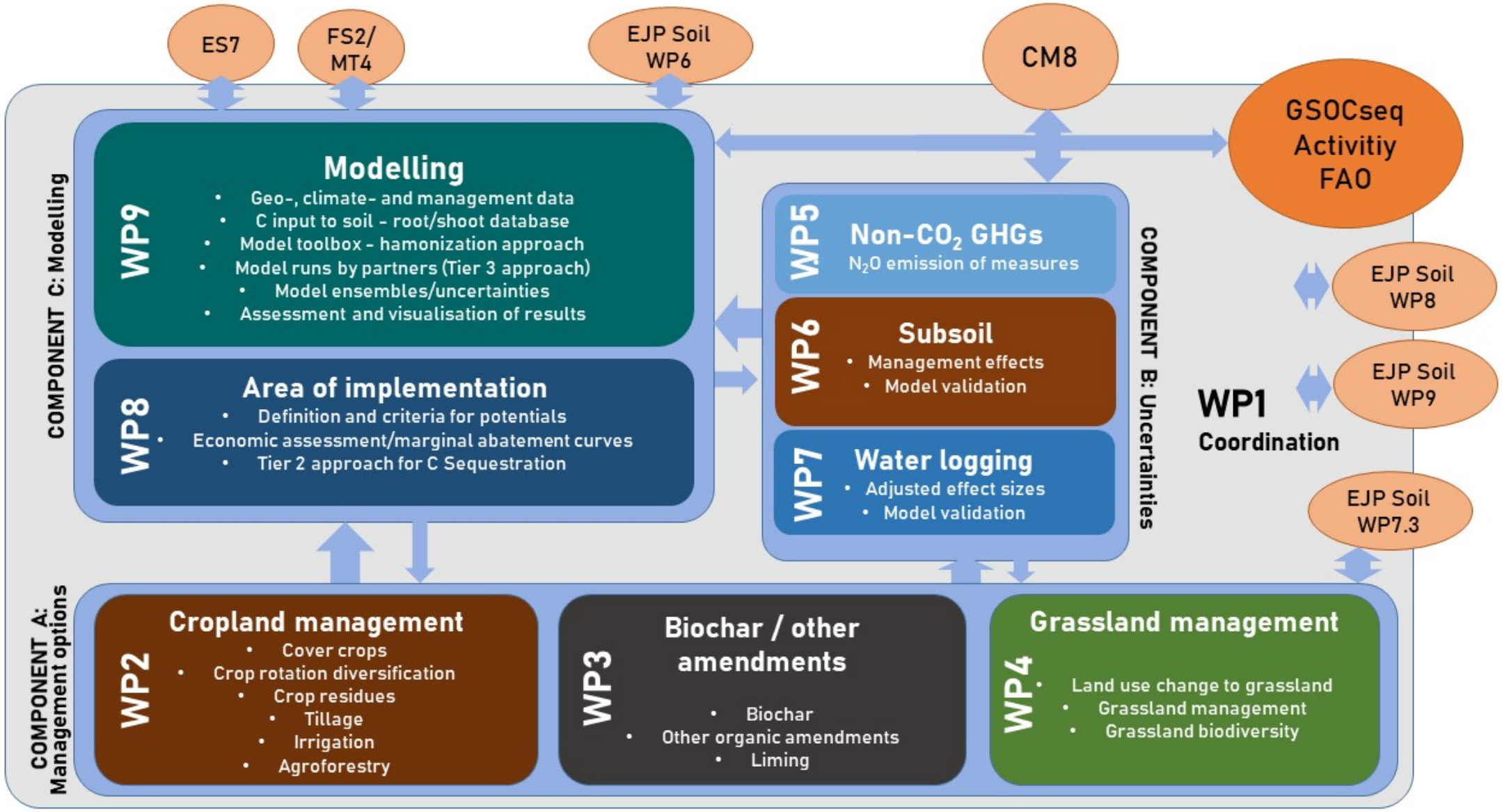
The aim of *CarboSeq* is to estimate the feasible SOC-sequestration potential taking into account technical and socio-economic constraints

The global potential of SOC sequestration through agricultural practices is 0.9±0.3 Pg C/year, which may offset 20 to 33% of the annual increase in atmospheric CO_2

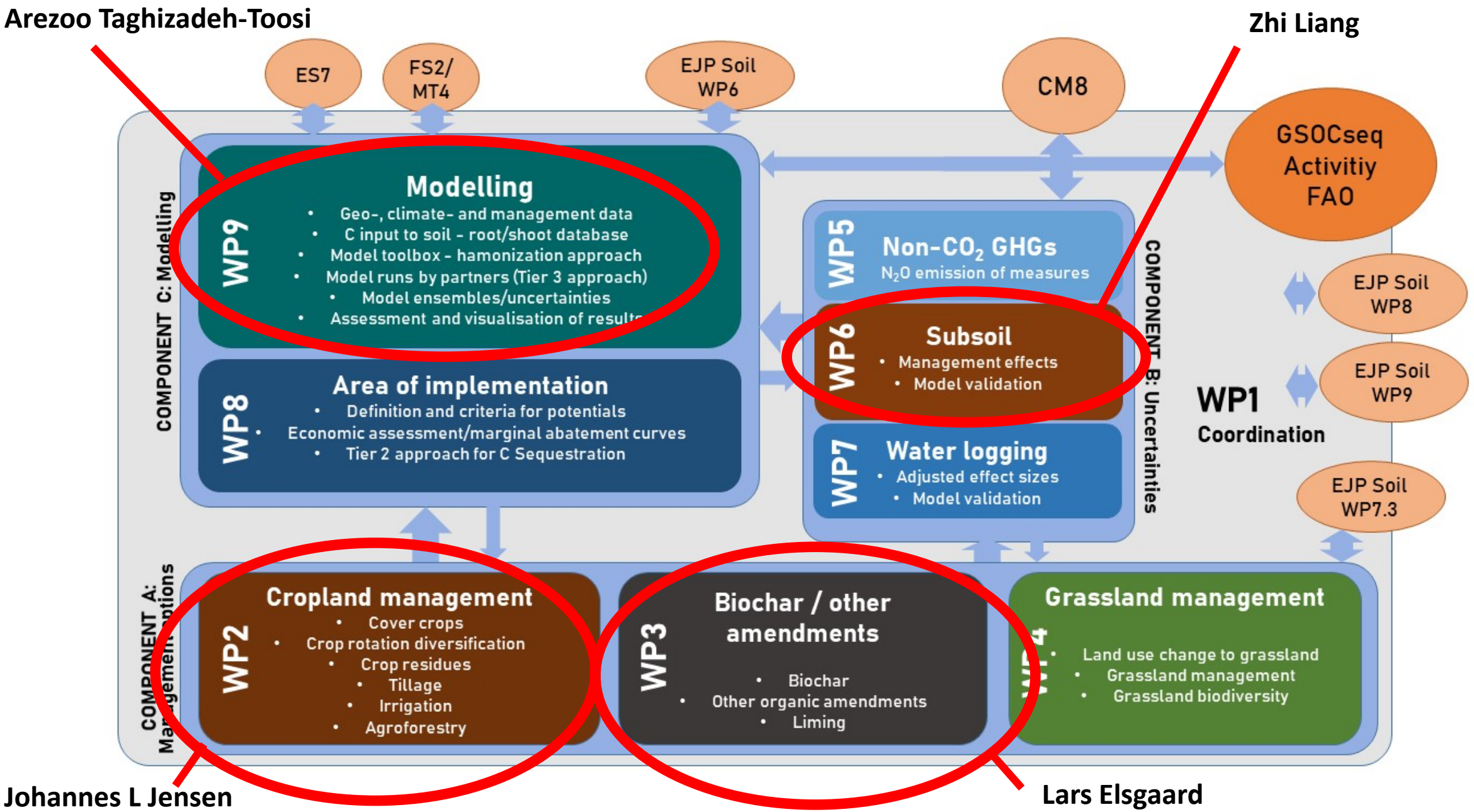
Lal 2004, Geoderma

- ✓ Europe (EU+UK+CH+NO+TU+x)
- ✓ Only mineral soils (<12% SOC)
- ✓ Only agriculture (but including agroforestry, hedges)
- ✓ Only measures that have already been demonstrated to sequester SOC or established in practice
- ✓ Only measures that lead to increased SOC stocks

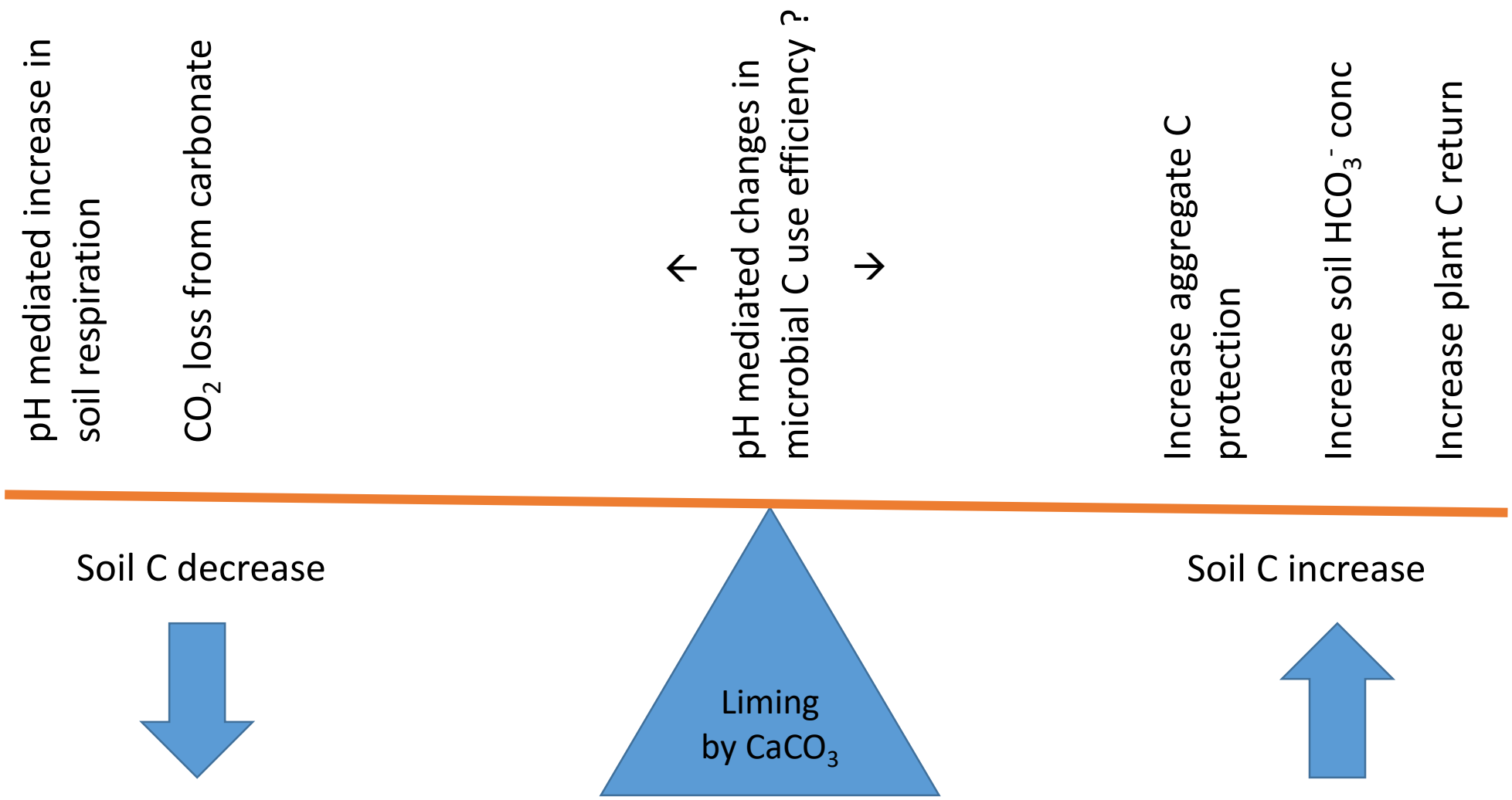
Overview of components and workpackages in CarboSeq



Participation of AU in CarboSeq (25 PM)



Goals and approach of WP III T IV – Effects of liming on soil organic carbon



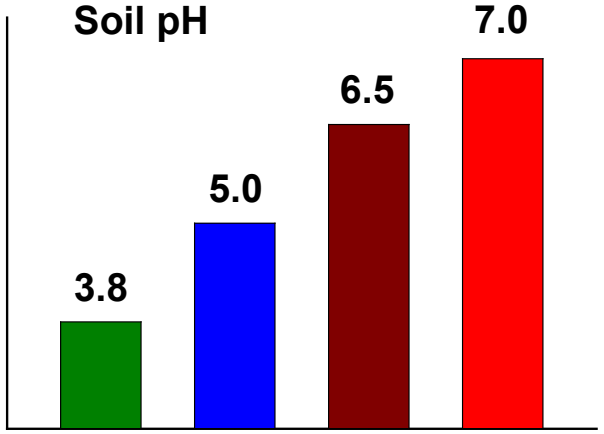
The Jyndevad LTE on liming × P with four soil pH levels targeted at pH 4 to 7

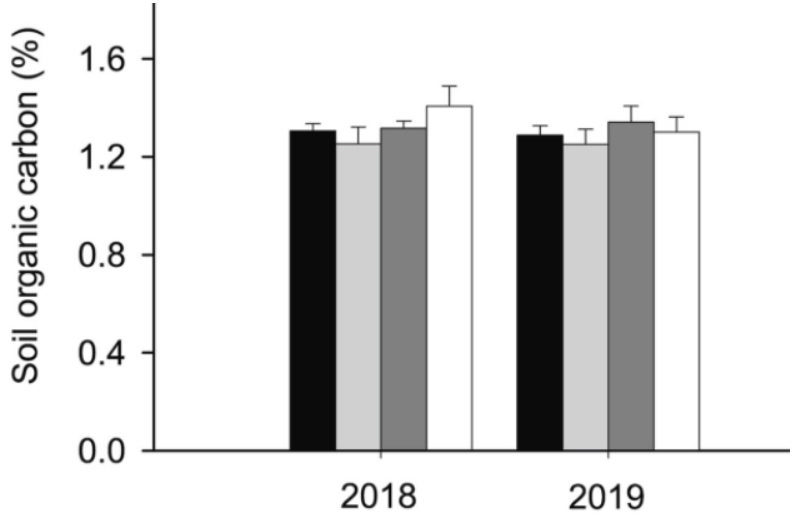
LTE on liming and P started in 1942-44

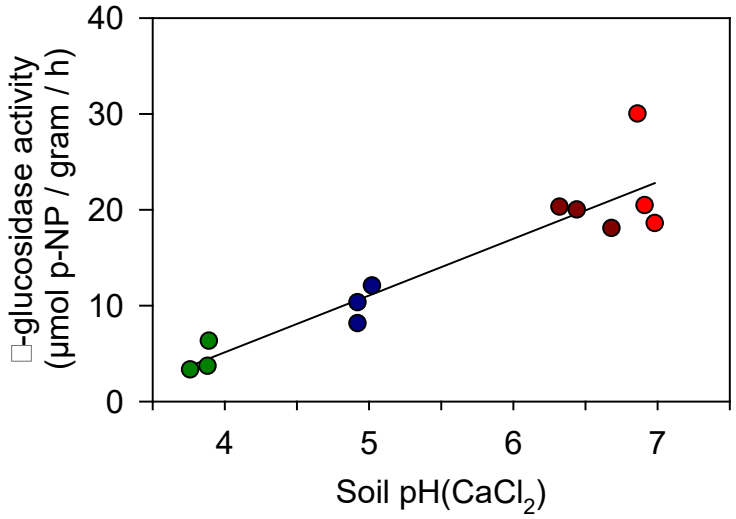
Coarse sand (1.3% C) with spring barley

Four liming levels in triplicate plots (90 m^2)

Limestone levels of **0, 4, 8, 12** Mg lime/ha





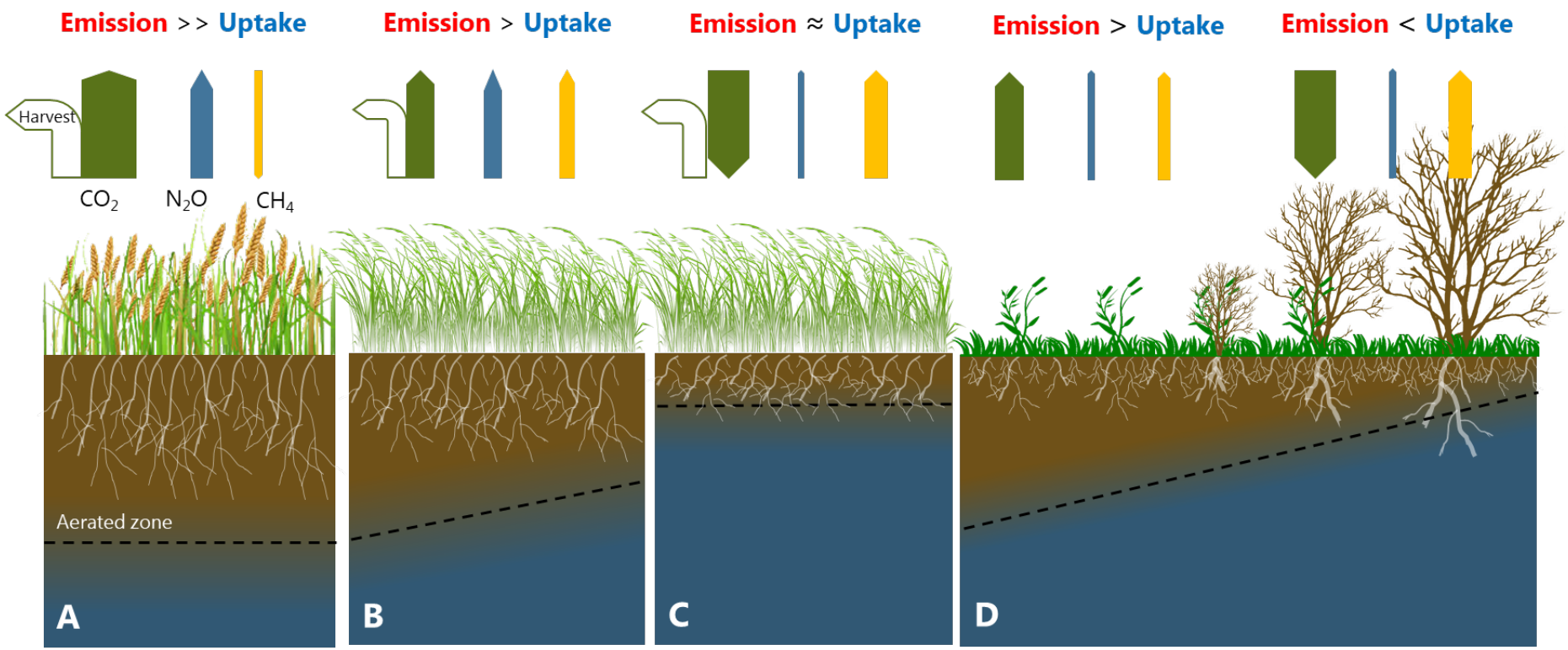


AARHUS
UNIVERSITY
DEPARTMENT OF AGROECOLOGY

Indicators for carbon sequestration and successful greenhouse gas mitigation by rewetting cultivated peat soils (INSURE)

Seniorforsker Poul Erik Lærke

Land Use Change (LUC) scenarios for peatlands and their GHG emissions



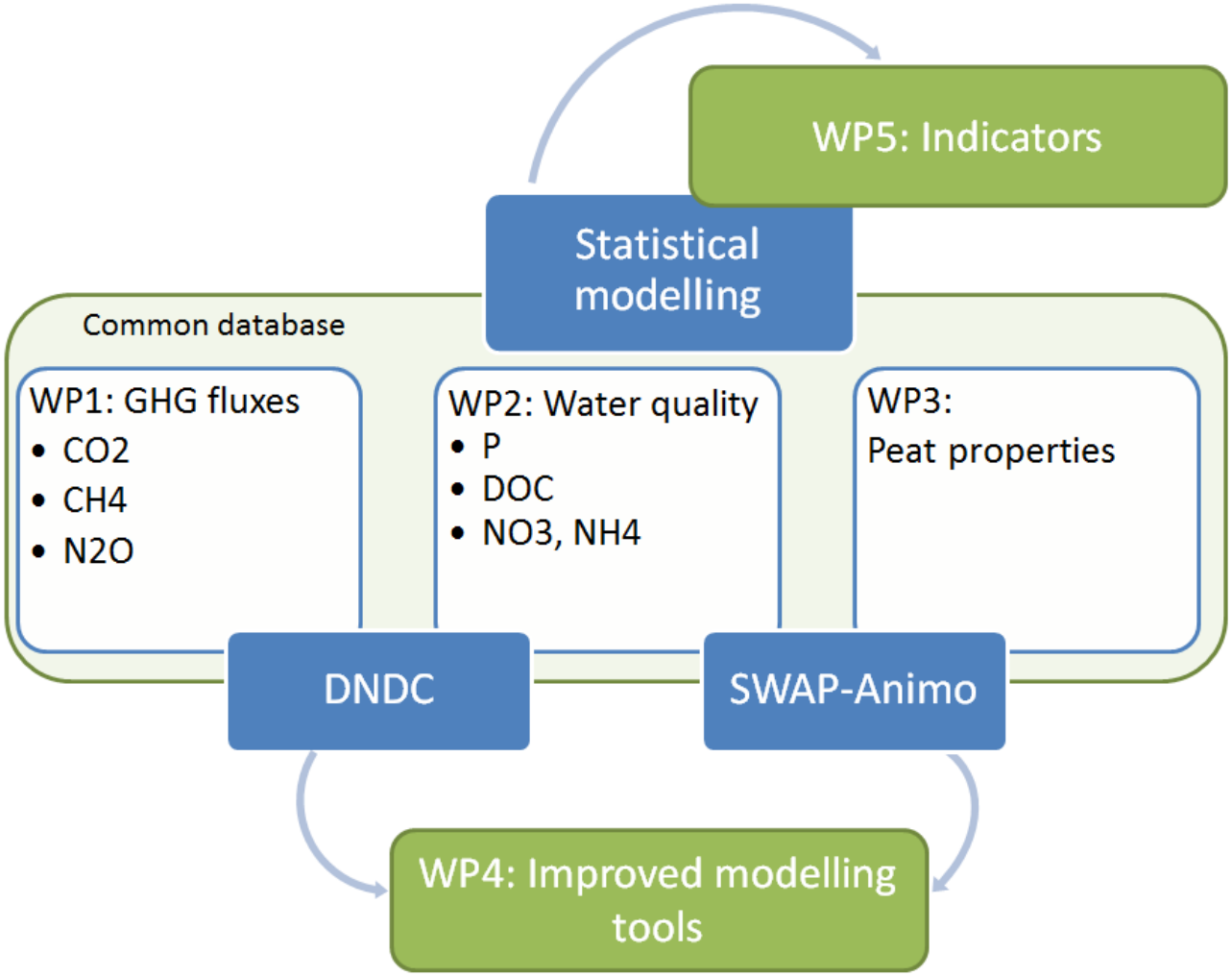
Traditional + Drained
Intensive management
+ *maintenance of drains*
+ *soil cultivation*
+ *fertilisation*
+ *biomass harvest*

LUC Passive
Extensive management
÷ *maintenance of drains*
÷ *soil cultivation*
+/÷ *fertilisation*
+ *biomass harvest*

LUC Active
Paludiculture
÷ *dræning (afbrydes)*
+/÷ *afgrøde-genetablering*
+/÷ *gødskning*
+ *høst af biomasse*

Natural succession of vegetation over time
No management/wetlands
÷ *maintenance of drains*
÷ *soil cultivation*
÷ *fertilisation*
÷ *biomass harvest*

INSURE Work Packages and Work Flow



INSURE
Institutes and responsible persons (2021-2023)

› Finland, LUKE - Kristiina Regina – project coordinator)

› Denmark, Aarhus University – Poul Erik Lærke (WP1 lead)

› Ireland, Teagasc – David Wall (WP2 lead)

› Switzerland, AgroScope - Jens Leifeld (WP3 lead)

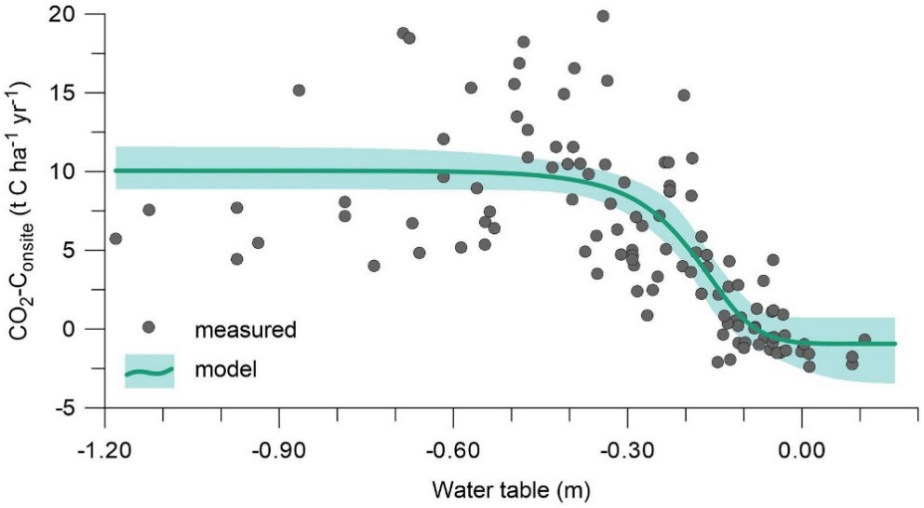
› Norway, NIBIO - Hanna Silvennoinen (WP4 lead)

› The Netherlands, Wageningen UR - Rudi Hessel

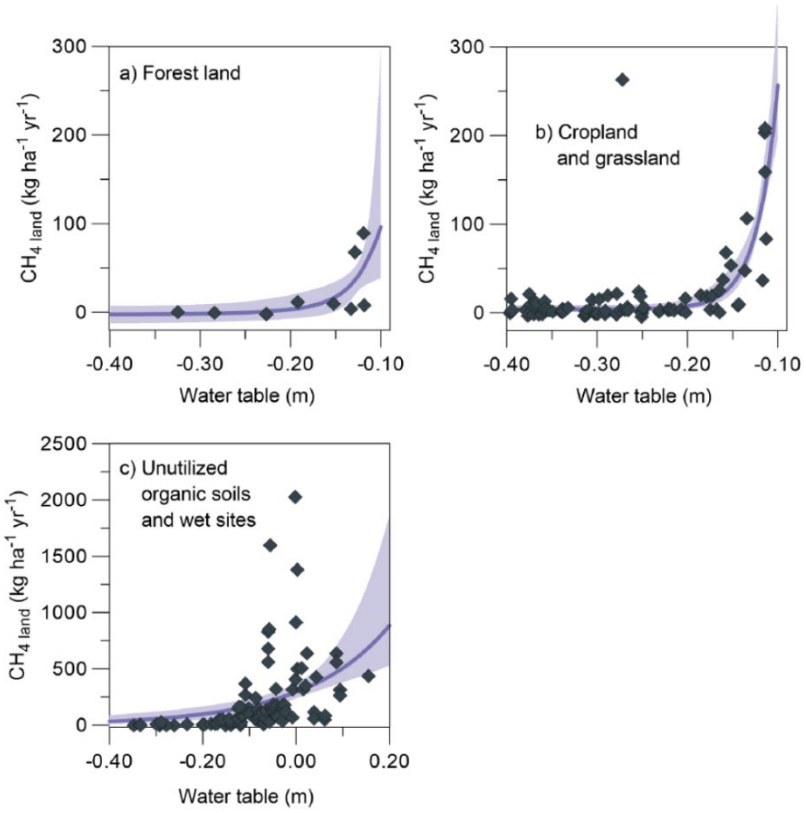
INSURE Hypotheses

- #1 **Water table** depth is the main controller of the net GHG balance on cultivated peat soils
- #2 **Risk of high CH4** after rewetting can be predicted from management and peat composition
- #3 Seasonal water table depth management affects peat biodegradability and **nutrient (N and P) and dissolved organic C leaching** losses from agricultural peat soils
- #4 **Peat quality** is a co-driver for GHG fluxes

Better prediction of GHG emission needed!

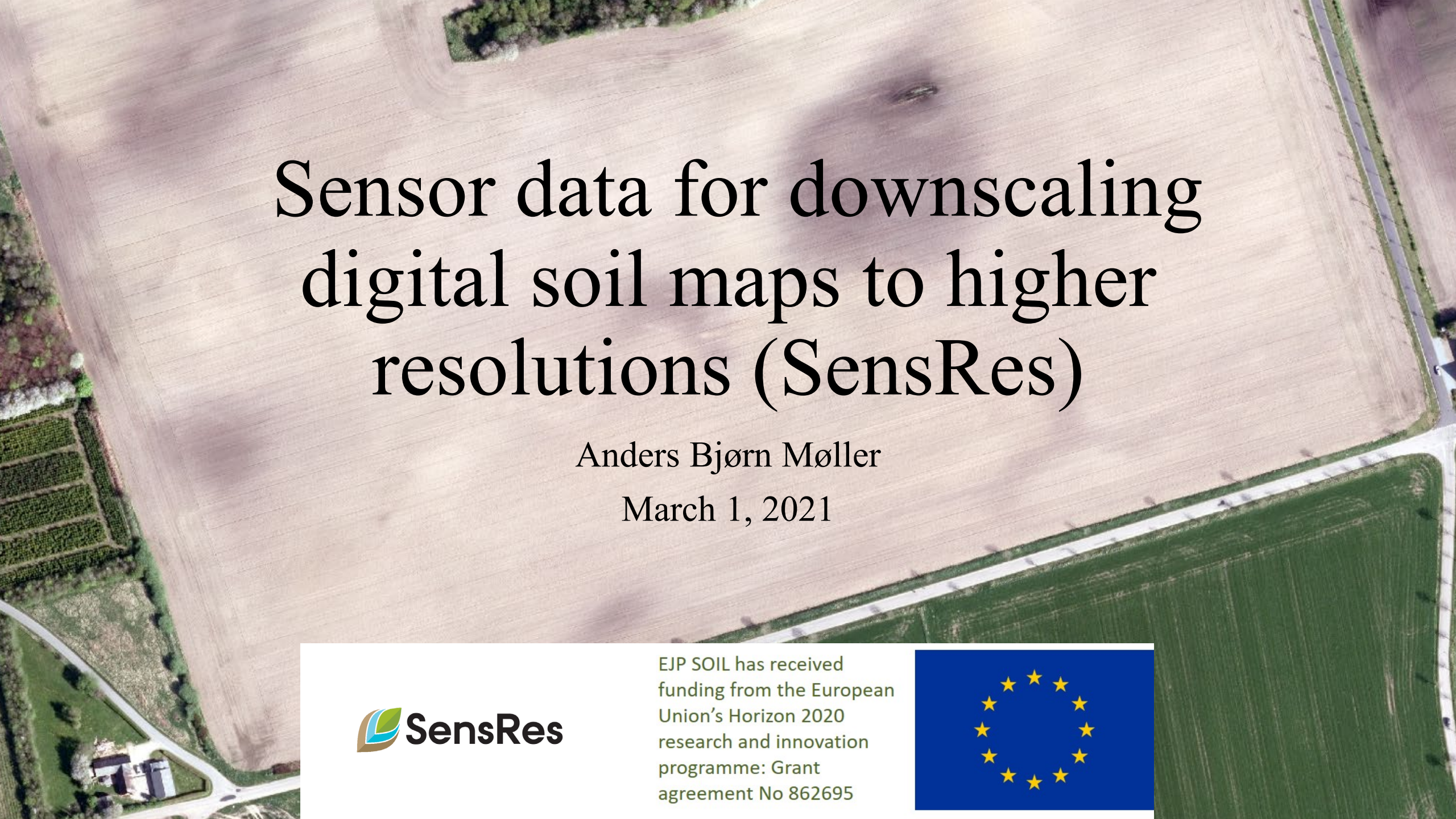


Årlig netto CO_2-C-flux fra tyske kulstofrige jorder i forhold til gennemsnitlig årlig vandstand (Tiemeyer et al., 2020).



Årlig udledning af CH4 fra (a) skovjorde, (b) landbrugsarealer, (c) naturarealer (Tiemeyer et al., 2020).


Tak for opmærksomheden!
Overview of the Danish experimental site on a poorly drained fen peatland in the Nørreå stream valley



Sensor data for downscaling digital soil maps to higher resolutions (SensRes)

Anders Bjørn Møller

March 1, 2021

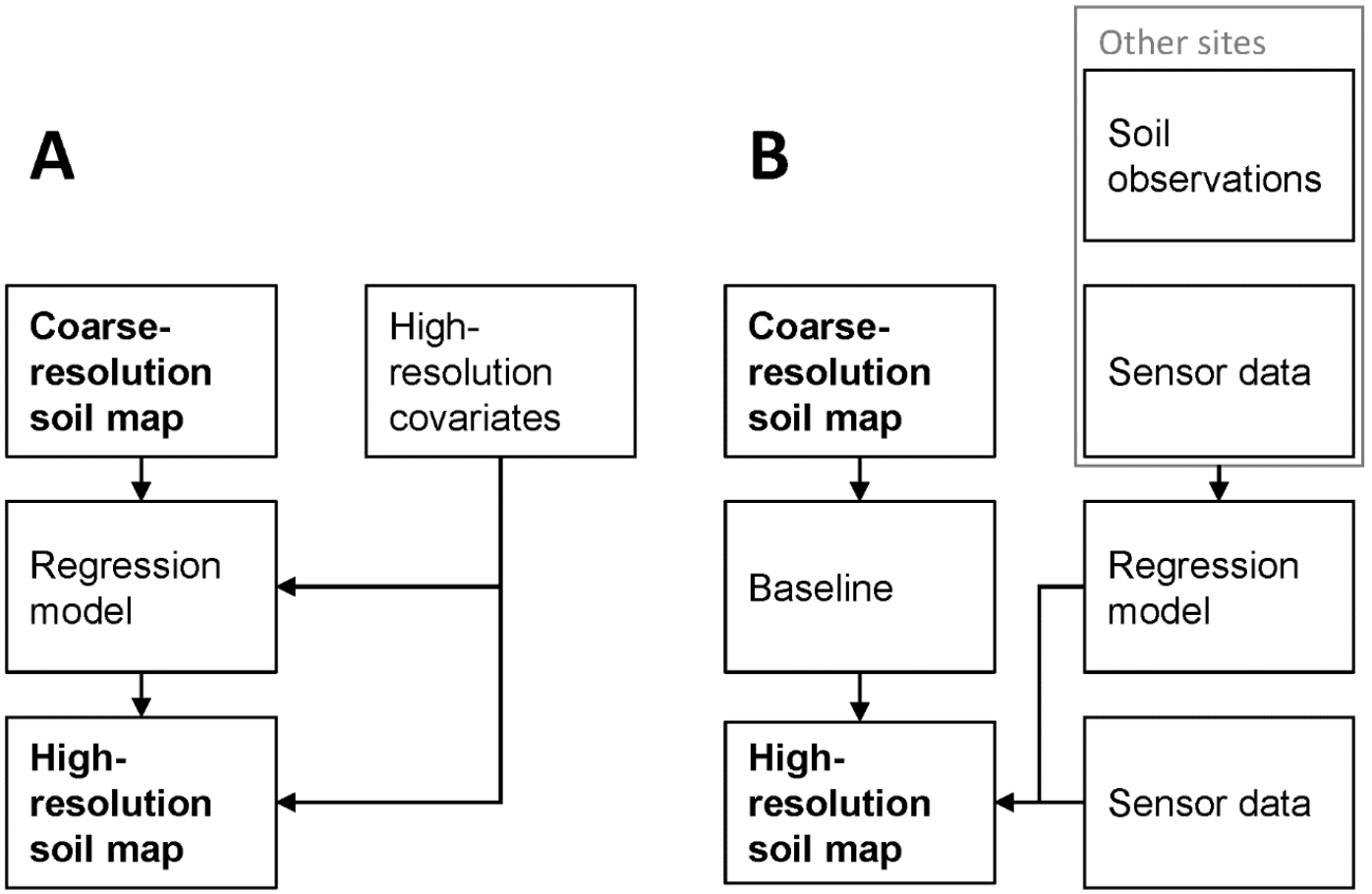
SensRes

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

Why?

1. Large-scale soil maps often fail to account for intra-field variability.
2. Soil sensors usually require local samples for calibration.
3. Existing downscaling methods require correlation between the coarse-resolution soil map and the sensor data.

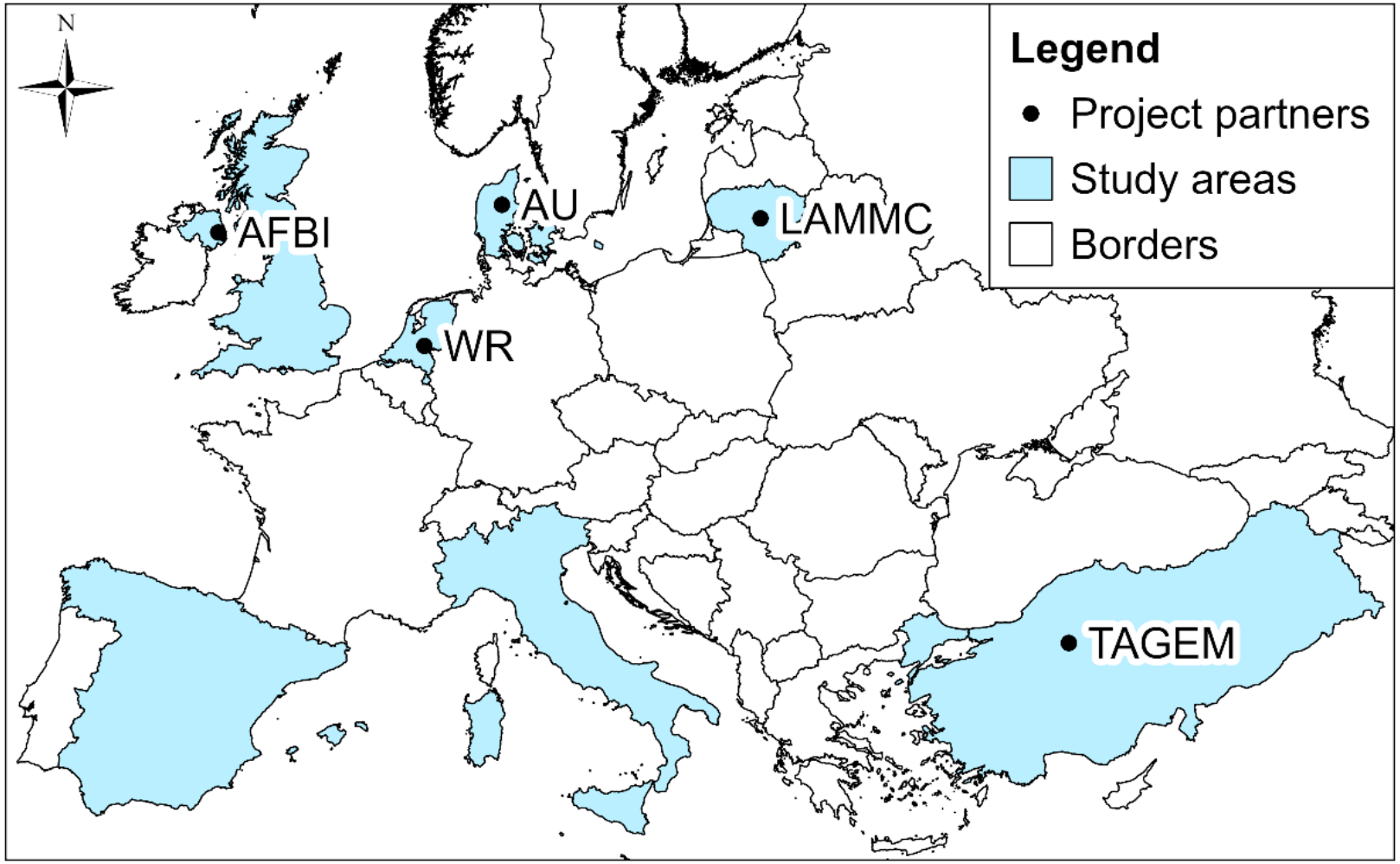
What?



Malone et al., 2012

Møller et al., 2020

Who? Where?


N
Legend
Project partners
Study areas
Borders
AFBI
AU
LAMMC
WR
TAGEM

How?

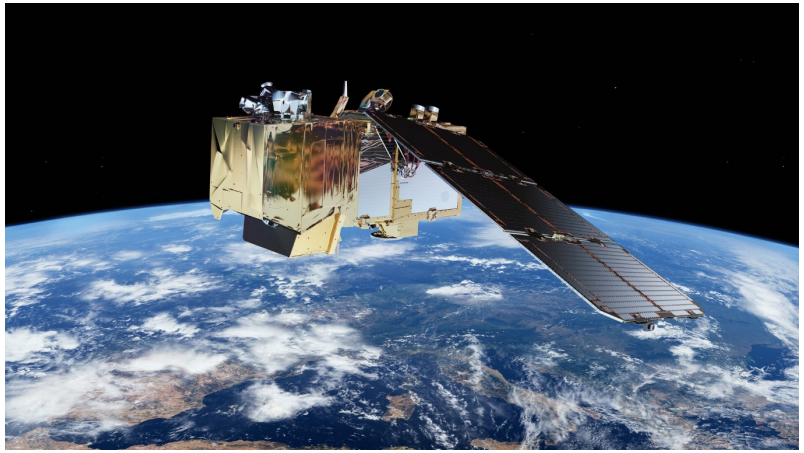
Drones

Flight-elvolved.com

Proximal sensors

Dualem.com

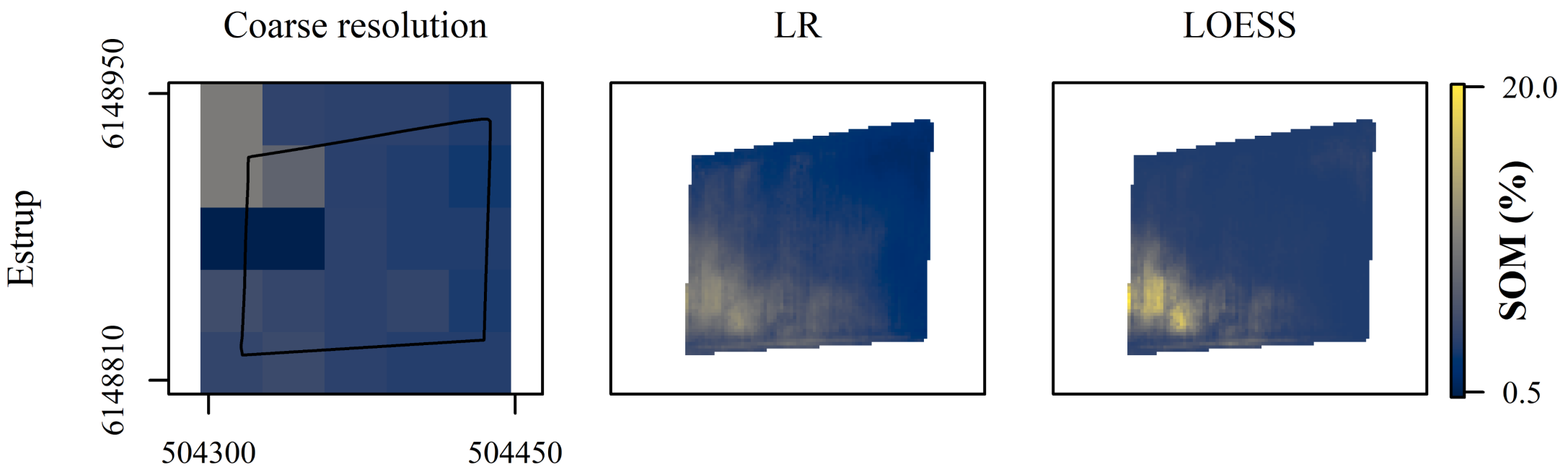
Satellite images



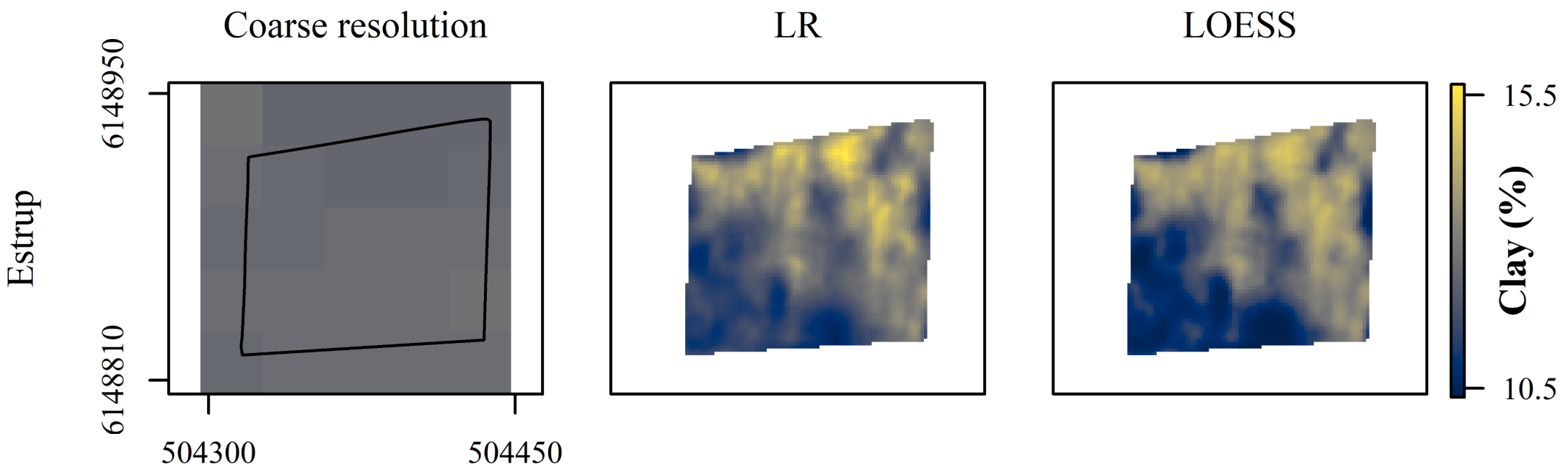
Esa.int

+ All of the above (sensor fusion)

Example: Soil organic matter



Example: Clay



EJP SOIL Roadmap

Lars J. Munkholm

National Hub møde 1/3 i EJP SOIL

EJP SOIL
European Joint Programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

Interne/eksterne udbu

- Interne udbud
  - Kun for partnerinstitutionerne
  - Ca. 30 millioner Euro i 2021 runde (56 kræves)
  - 9 emner inkluderet i 2021 udbuddet

- Eksterne udbud
  - EJP SOIL administrerer eksterne udbu diverse kilder (indenfor og udenfor EU German Research Foundation. Åbne fo berettigede til støtte fra de forskellige
  - 3 emner udvalgt til 2021 udbud

Participant organisation name	Country
Institut National de la recherche Agronomique (INRA)	FR
Wageningen Research (WR)	NL
BIOS Science Austria (BIOS)	AT
Flanders Research Institute for Agriculture, Fisheries and Food (EV-ILVO)	BE
Centre Wallon de Recherches Agronomiques (CRAW)	BE
Czech University of Life Sciences (CULS)	CZ
Aarhus University, Danish Centre for Food and Agriculture (AU)	DK
Estonian University of Life Sciences (EMU)	EE
Natural Resources Institute Finland (LUKE)	FI
Johann Heinrich von Thünen-Institut (vTI)	DE
Forschungszentrum Jülich (Jülich)	DE
Centre for Agricultural Research of the Hungarian Academy of Sciences (MTA ATK)	HU
Teagasc (Teagasc)	IE
Council for Agricultural Research and Economics (CREA)	IT
University of Latvia (UL)	LV
Lithuanian Research Centre for Agriculture and Forestry (LAMMC)	LT
Norwegian Institute of Bioeconomy Research (NIBIO)	NO
Institute of Soil Science and Plant Cultivation – State Research Institute (IUNG)	PL
National Institute for Agrarian and Veterinarian Research I. P. (INIAV)	PT
National Agricultural and Food Centre (NPPC)	SK
University of Ljubljana, Biotechnical Faculty, Centre for Soil and Environmental Science (ULBF)	SI
National Institute for Agriculture and Food Research and Technology (INIA)	SP
Swedish University of Agricultural Sciences (SLU)	SE
Agroscope (AGS)	CH
Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Research and Policies (TAGEM)	TR
Agri-Food and Biosciences Institute (AFBI)	UK

EJP SOIL
European Joint Programme

Interne udbud 2021

Topic number	Title	Budget per project, Euro
1	Plant **below-ground inputs to enhance soil carbon sequestration** in agricultural soils	2 M
2	Effects of the **soil biome on the persistence SOC storage** and its drivers	2 M
3	Contribution of soils to **climate mitigation and adaptation, sustainable agricultural production and environment in agroecological systems**	5 M
4	Alleviating **soil compaction** in a climate change context	2 M
5	The use, processing and application of **external sources of organic matter to mitigate climate change and improve soil health**	2 M
6	**Innovative techniques to monitor SOC stocks and soil degradation/restoration changes** in the EU, using spectral systems/NIRS/MIRS, and other proximal sensing tools.	2 M
7	**Modelling soil functions and soil threats** for mapping soil functions and ecosystem services.	5 M
8	**European soil biodiversity forecast** towards resilient agroecosystems in response to climate change.	2 M
9	**Enabling conditions for climate smart and sustainable soil policy**: fair and functional payment systems for ecosystem services related to climate mitigation and sustainable production	2 M

EJP SOIL

Kommunikation & Formidling

v/ Line Carlenius Berggreen
lcb@dca.au.dk

EJP SOIL
European Joint Programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

Målgrupper & Mission

Målrettet Kommunikation og inddragelse

Landmænd & rådgivere

Politikere & myndigheder

Agro-industrien

Forskningsmiljøer

Civil samfundet

Platform for interaktion mellem forskning og interessenter

EJP SOIL
European Joint Programme

Nyheder, information, annoncering

Interessent involvering – Workshops, besøg, mv.

EJP SOIL
European Joint Programme

Tak

lcb@dca.au.dk

EJP SOIL
European Joint Programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695