



EUROPEAN UNION

EUROPEAN MISSION SOIL WEEK

BOS 4 - Soil needs in PREPSOIL regions: engaging with multiple actors

22 November, 11:30-13:00

Main Hall – Building A



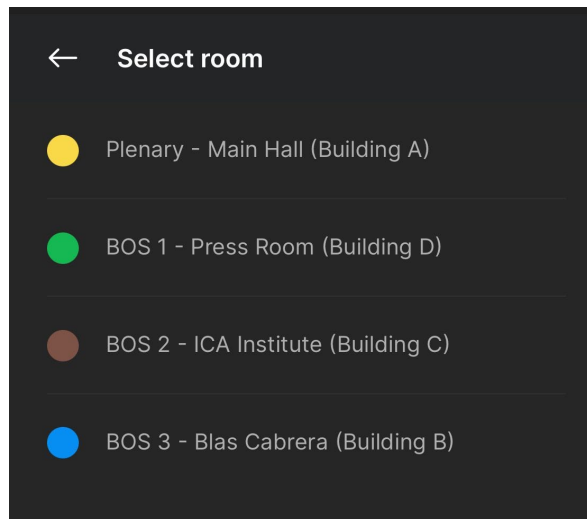
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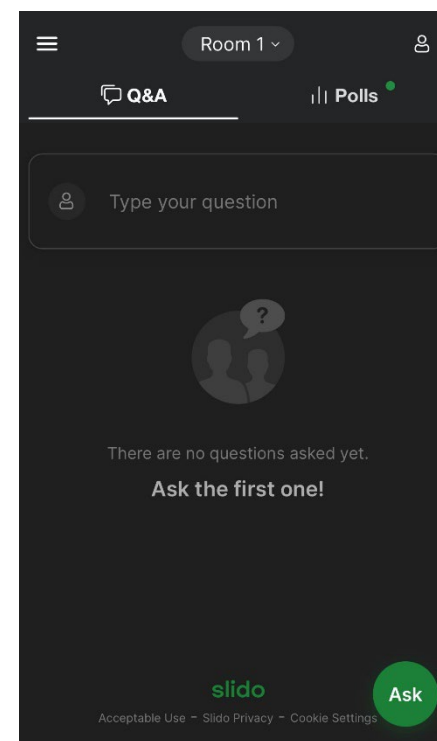


Housekeeping rules

- **WIFI**
 - Network : EMSW
 - Password : Mission.Soilw3ek2023
- **Questions**
 - Go to www.sli.do and enter event code **#ESMW2023** (or scan the QR code)
 - Select the 'room' of the session
 - Submit your questions



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Our speakers

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Saskia Keesstra

Senior Researcher

*Wageningen Environmental
Research (WUR)*



Thijs Vlaar

Soil policy advisor

City of Amsterdam



Anna-Helena Purre

Member of the Board

Elige LLC



Manuel Pulido

Associate Professor

University of Extremadura



Christina Lundström

Researcher

*Swedish University of Agriculture
(SLU)*

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*Soil needs assessments across Europe;
insights from the regions*

Linda Maring/Saskia Keesstra

Speakers:

- Manuel Pulido
- Thijs Vlaar
- Anna-Helena Purre
- Judit Berényi Üveges

22 November 2023



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CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

INIA
Instituto Nacional de Investigación
y Tecnología Agraria y Alimentaria



Program Soil Needs Assessment

Getting to know each other: SLIDO

Soil Needs Assessment

- Urban soil needs (Thijs Vlaar)
- Forest soil needs (Anna-Helena Purre)
- Agricultural soil needs (Judit Berényi Üveges)
- Mix-land use case: agro-forestry soil needs (Manuel Pulido)
- After each presentation short SLIDO questions

- After: hand-over to soil literacy in PREPSOIL

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Soil needs in PREPSOIL regions

Urban soil case | Amsterdam

Thijs Vlaar

Soil Policy Advisor for the City of Amsterdam

22 November 2023



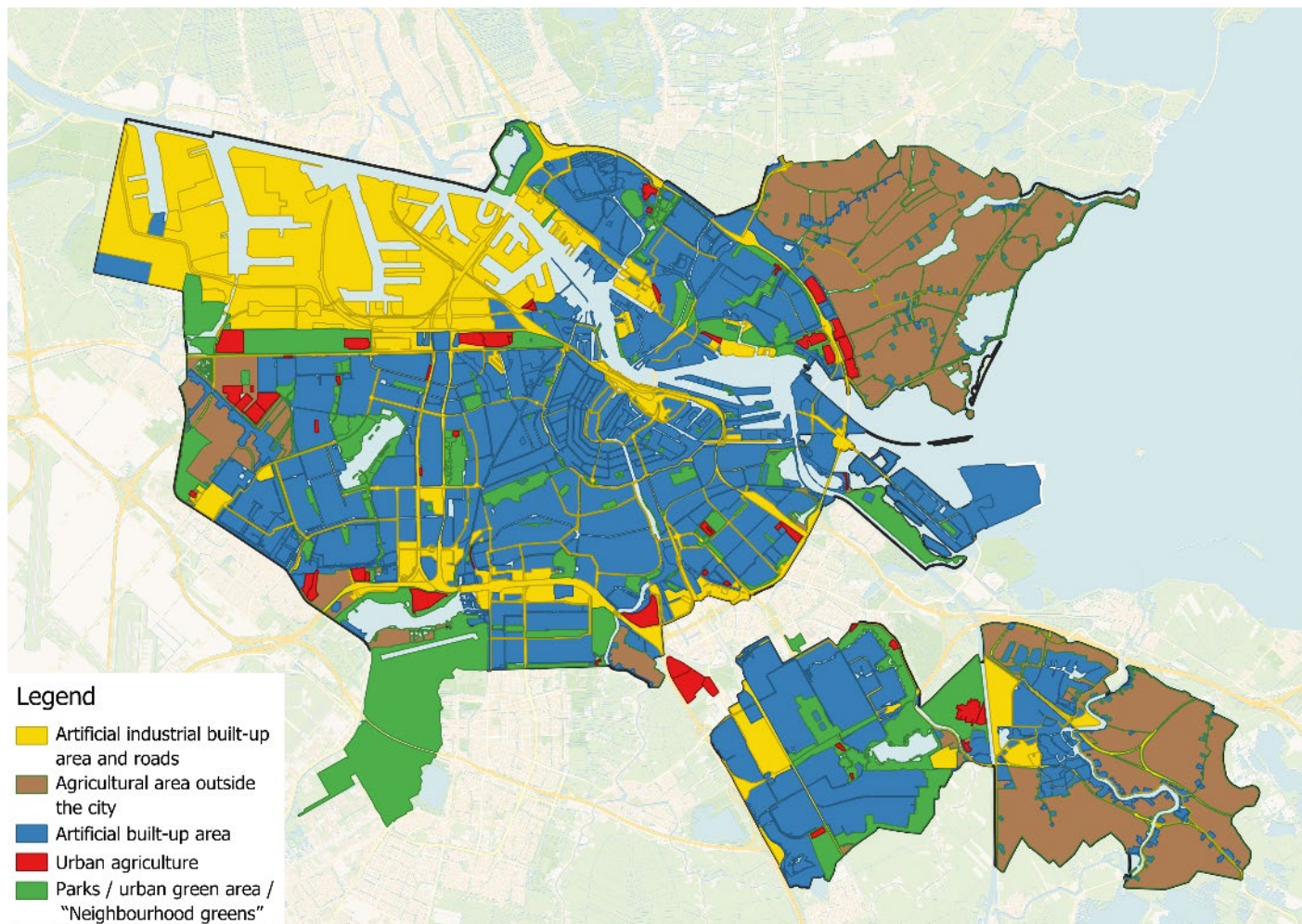
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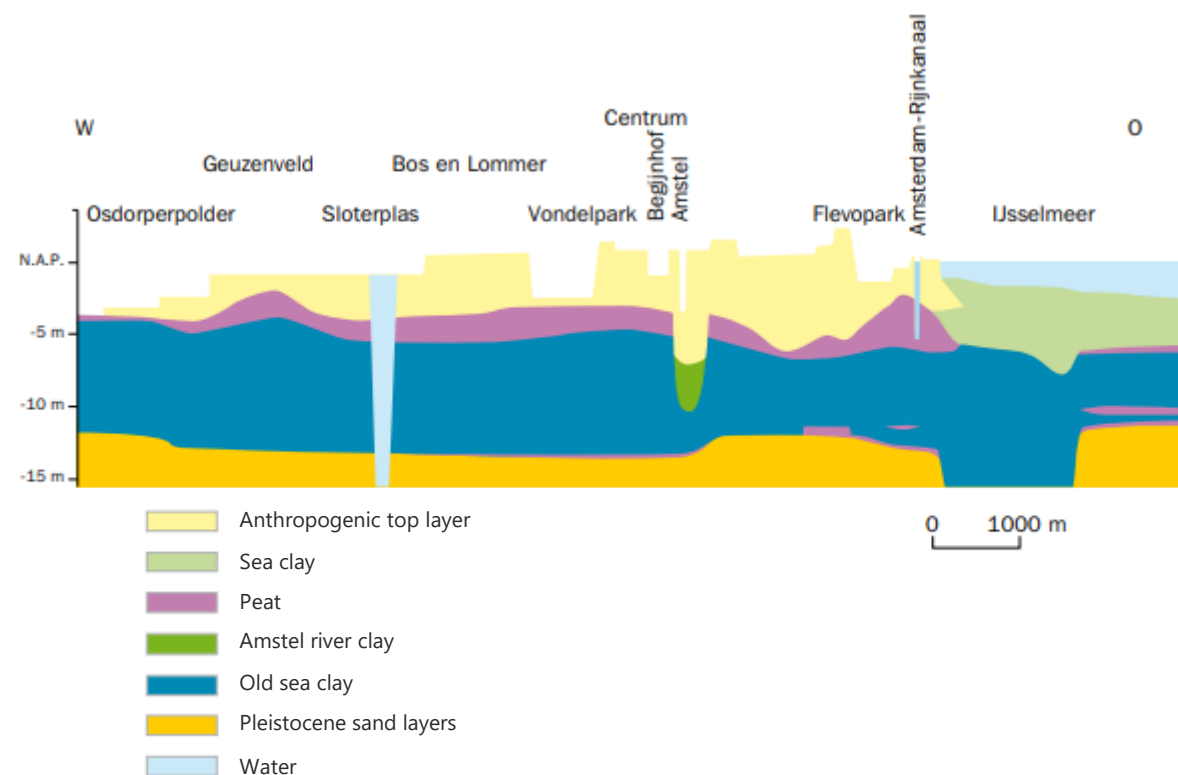
Characteristics of Amsterdam



- Densely populated (nearly 5000 p/km²) and built-up capital city of the Netherlands.
- Prevailing artificial built-up land, but there are also many other land uses within the city.
- ~15% is green area.

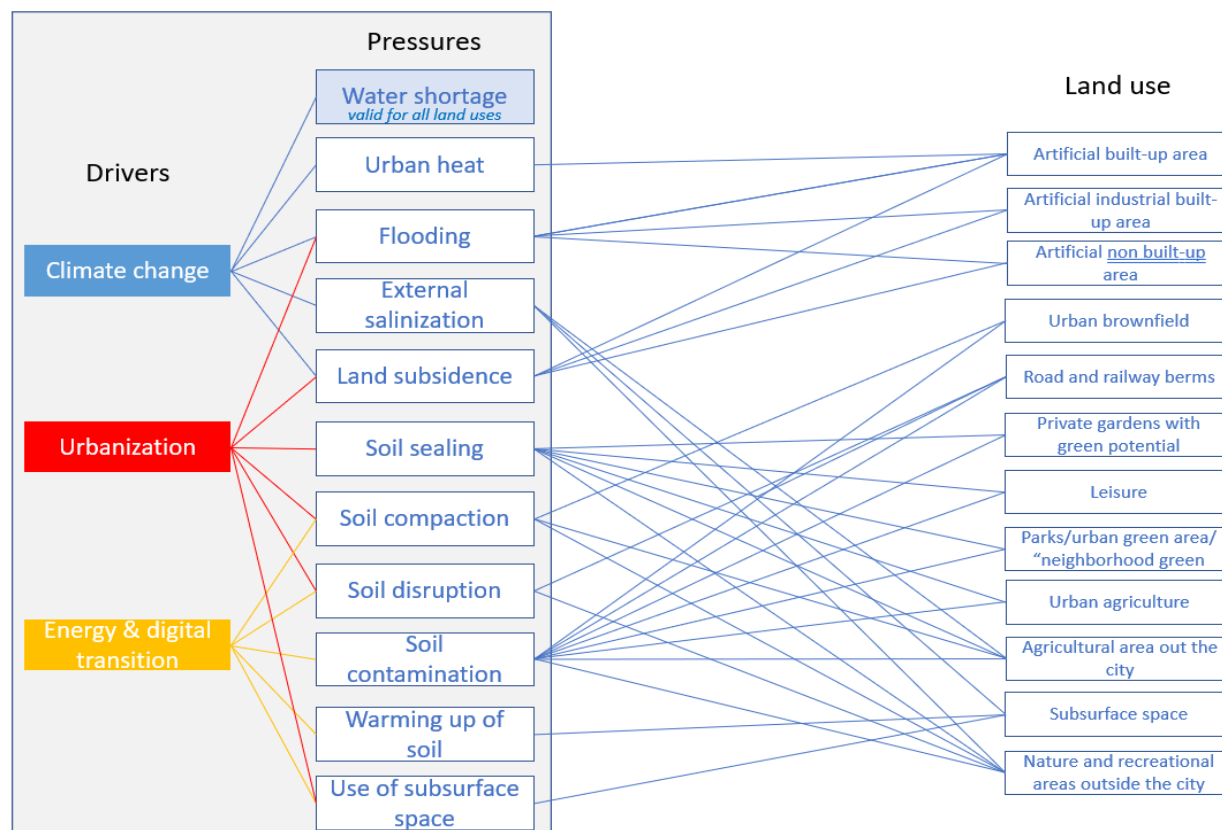
Characteristics of Amsterdam

- The city is built on soft clay and peat soils. The first stable layer of sand is located deeper than 10 meters.
- Almost the entire city is covered with an anthropogenic top layer.
- Polluted soils as a result of historical activities (urban brownfields).



Source: *De bodem onder Amsterdam*, TNO (Wim de Gans), 2011

Soil needs assessment of Amsterdam | Main pressures



“A unique feature of urban areas is that, next to their evident main residence function, there are **many** other, sometimes **spatially competing, land uses**. It is important to note that the **pressures** on urban soils **are not uniform** across the whole urban region but vary according to the different land uses.”

Soil needs assessment of Amsterdam | Main impacts

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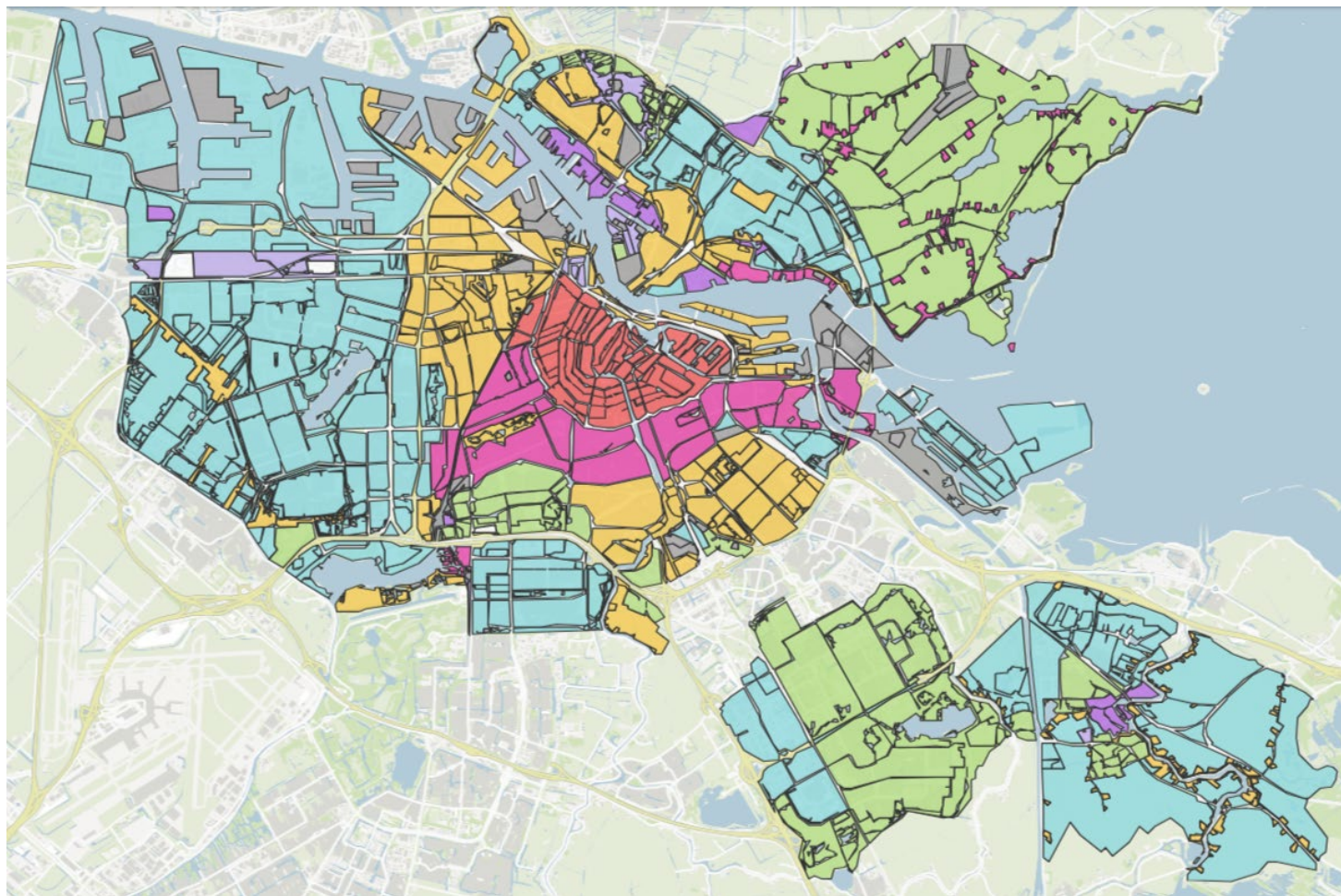
- Soil degradation due to high soil sealing rates as well as soil compaction and disruption processes.
Main driver: urbanization



Source: Fotobank Amsterdam

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Soil needs assessment of Amsterdam | Main impacts



Source: Maps Amsterdam

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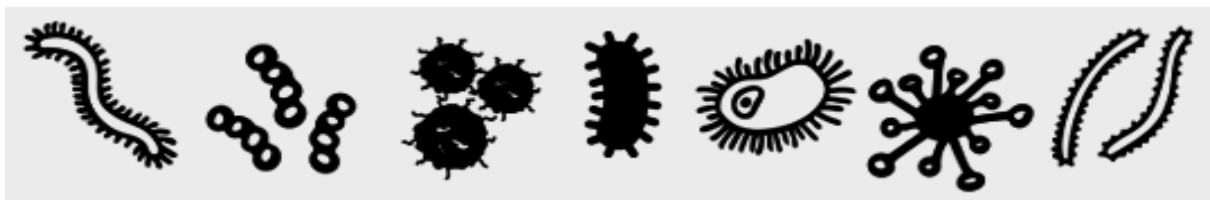
- Contaminated soils due to diffuse lead and PFAS contamination along with contamination from past activities.
Main drivers: urbanization and industrialization



Source: Denk Dieper, gemeente Amsterdam, 2019

Soil needs assessment of Amsterdam | Main impacts

- Loss of biodiversity as a result of soil degradation and soil contamination processes.



- Increase in flooding risks due to the growing area of covered surfaces in combination with the more limited water storing capacities of the subsurface.

Main drivers: urbanization and climate change



Soil needs assessment of Amsterdam | Main impacts

- Damage to buildings and (underground) infrastructure caused by land subsidence.
Main drivers: climate change and urbanization
- Growing competition for available (sub)surface space.
Main drivers: urbanization and energy & digital transition



Source: Fotobank Amsterdam



Source: Denk Dieper, gemeente Amsterdam, 2019

How to address the soil needs?



Define soil health in urban areas

- Important to distinguish between the different land uses but to also take an integrated approach when looking at the use of space.
- Prioritize soil functions per land use in defined frameworks and policies.
- The city of Amsterdam is currently working on defining a Soil Health Index for Amsterdam.

“It is important to recognize the unique characteristics and requirements of urban soils which differ from the more homogenous agriculture, nature and forest soil ecosystems.”

How to address these soil needs?

Take concrete actions

- Important to concretize abstract ambitions, especially now that there is a great deal of attention for soils and soil health in the Netherlands and Europe.

Raise awareness and create a shared visions

- Bring citizens, urban landowners and governments together to create a shared vision in which soil is seen as a communal asset.

Invest in Urban Living Labs

- LL's can help broaden knowledge on the currently little-known urban soil health.
- LL's play a crucial role in raising awareness and bringing different stakeholders together.



Source: Fotobank Amsterdam

There is no uniform definition of soil health in urban areas





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Thank you!

Email: Thijs.Vlaar@amsterdam.nl

Laura.Nougues@deltares.nl

Linda.Maring@deltares.nl

Website: prepsoil.eu



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Forestry – case study from Estonian
forested peat soils

Anna-Helena Purre
Elige OÜ

Sabine Jordan
SLU

22 November 2023



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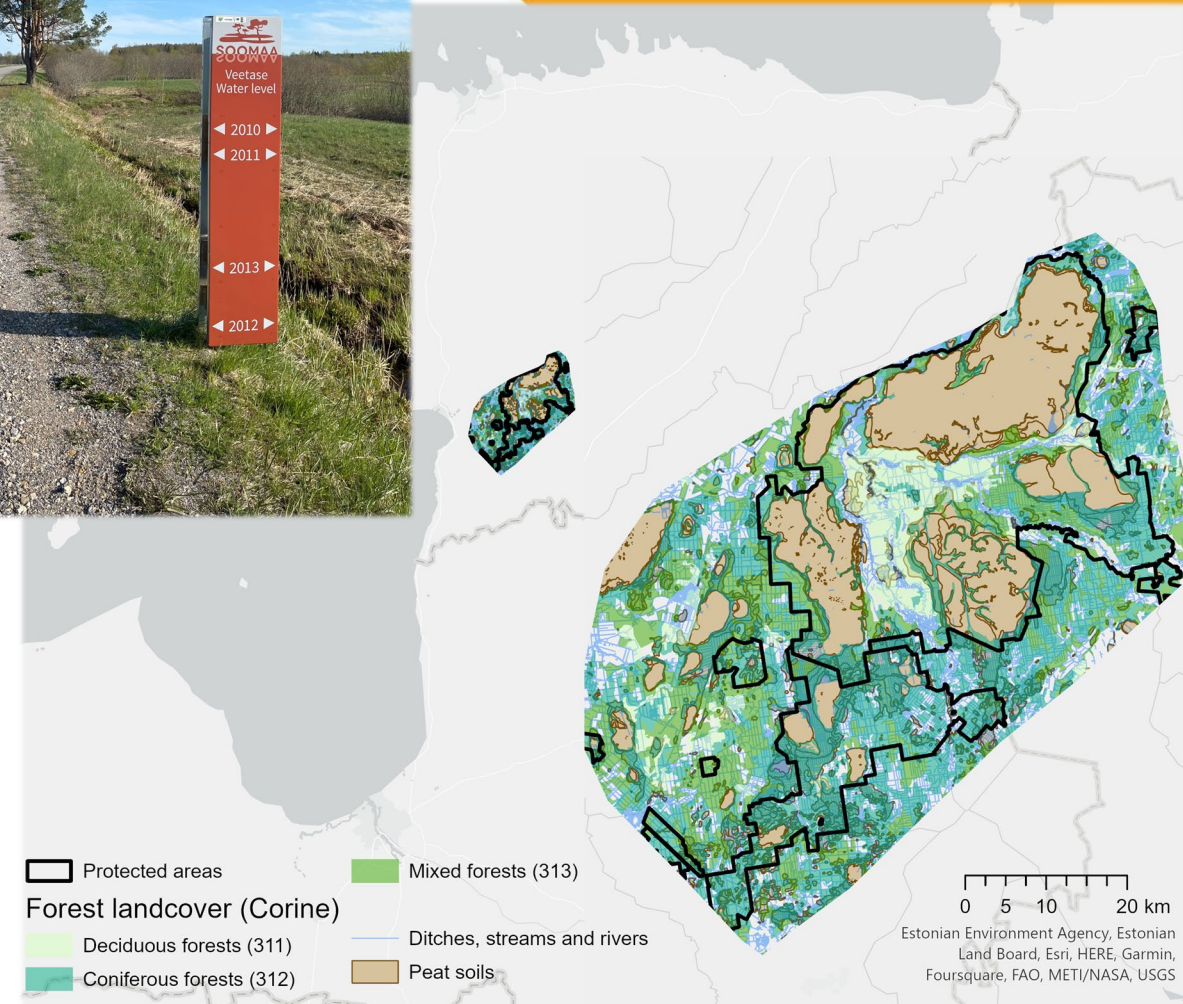


Soomaa study area

- 1060 km² -> almost 50 % protected
- Mainly peat soils
- Bogs, forests, semi-natural meadows
- Tourism, forest management, hay making and grazing on meadows
- „fifth season“, large spring flooding



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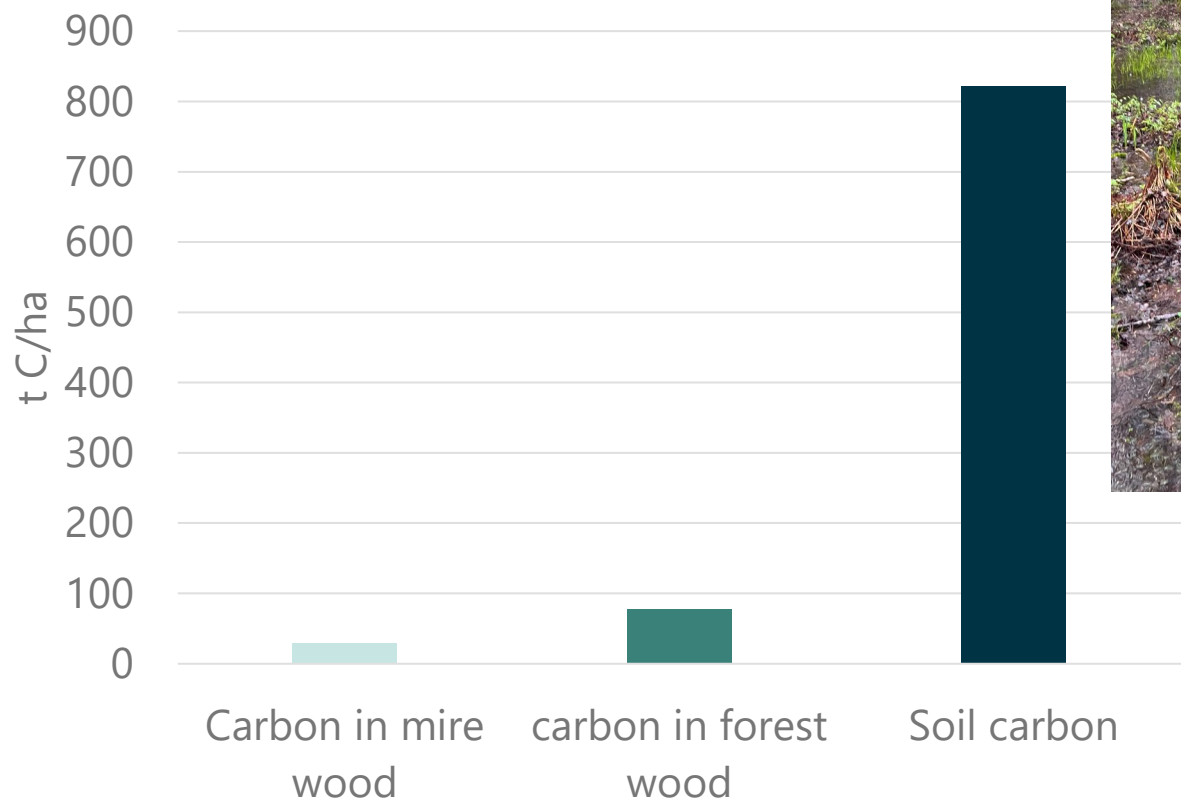
Old picture of spring flood, harvested forest and local “haabja” canoes in farmstead in Riisa village, Soomaa (time unknown, photo authorship rights Salus, K)

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Main challenges

Driver	Pressure	State	Impacts
Spring flooding („fifth season“)	Wet peatland soils and management with heavy machinery	Very good to bad (good inside Soomaa National Park)	Provision services, berries, mushrooms, timber
Climate change and „sixth season“ (winter flooding)	Time limitations (lack of frozen period, nesting period)	Drainage of peat soils for forestry purposes, fertilization during Soviet time	Buffering and regulatory services
Summer drought, water availability during summer		Unsuitable wet and soft conditions for machinery	Biodiversity and habitat
Soviet occupation after the II World War, and creation of the sovkhoses (state farms)	Spruce and pine monocultures from Soviet era	Decreasing population, increasing nature protection	Cultural and recreational services
End of the Soviet period and creation of Soomaa National Park in the 1990s	Restoration of peatlands and seminatural grasslands	Use of EU support for reconstruction of drainage network bordering the protected area	

Main challenges



Average amount of carbon in Soomaa in mire and forest woody biomass and soil (data based on ELME project results; Keskkonnaagentuur, 2020).



Pristine peatland forest



Drained peatland forest

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People mainly understand now what happens with the forest biodiversity and why it is important to protect forests, but the soil biodiversity and health is not topic at all and people do not think and know about that

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Possible solutions

- Overall wilderness area, forestry for farmers own use and some areas restricted from tourists, need to increase the National Park area
- Development should be:
 - Homogenous between municipalities, specialists working in authority
 - Balanced considering the activities and stakeholders
 - Some areas should be designated for human well-being and managed as such (forests for berry and mushroom picking and walking)
 - More natural succession
 - Improvement of tourist infrastructure to avoid trampling and erosion
 - Based on long-term site-specific planning instead of short-term planning
- Less drastic differences between the National Park area and bordering area
- Need consensus within local community and authorities

Wider possibilities

- Need for research about the impact of tourism, restoration activities (incl. negative impacts), machinery working on very wet soils with possible mitigation, flooding regime on soils and ecosystem, forest fertilization outside of protected areas
- Balancing of nature protection, forestry management, tourism and people living in the area



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Need for balancing of nature protection and forestry management, including reducing the forestry environmental impact on deeply drained peat soils and optimizing timber production and climate benefits

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**Soil needs Assessment Dong creek
watershed, Sand Ridge, Hungary**

Judit Berényi Üveges

Lead researcher,

Hungarian Research Institute of Organic Agriculture

Madrid, 22th November 2023.



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Dong-ér Kelő-ér watershed in Sand Ridge region, Hungary

- Dominant land use: agriculture field crop production,
- Secondary land use: pasture, orchards, nature conservaton area
- Soil type: Arenosol, Cambisol
- Texture: sand, loamy sand
- Genetically low organic matter content



Photo: Csaba Toldi



Main challenges of the region

- Climate change
- Drought, desertification
- Wind erosion
- Loosing land productivity
- Yield instability
- Water management concentrating on drainage (drainig wetlands and flood protection was historical priority)
- People leaving the region: labour shortage



Photo: Csaba Toldi

Possible solutions

- Change the concept of water management: keeping water in the landscape
- Cooperation with water authority
- Water retention in channels, ponds
- Wetland rehabilitation
- Change in soil use: applying regenerative practices adopted to the region
- Tillage reduction
- Cover crops
- On-farm research to test and adopt regenerative farming practices in living lab environment



Kujáni Family

Farmers, advisors

„Climate change emphasize the vulnerability of the sandy soils in the region that has originally low fertility.

We farmers have to learn to how to adapt to this changing environment, how to manage that small amount of water we got from rainfall and the limited amount of nutrients.

We have to try new things test innovative solutions to **stop desertification** processes in the region.”



Message to other similar regions

- Soil conservation techniques are well known in theory. Their adaptation to the climatic and farming conditions of a certain region is better to do in cooperation with local farmers, advisors and research community in the region.
- Saving water and developing water retention methods also a key issue in dry sandy regions. To find the best ways need cooperation with water management people to find the best solutions for the regions.
- Water management and application of soil conservation techniques have to be applied together.



Open mindset and experiments are needed to find the ways how to adapt to the rapidly changing environment of the farmlands.





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Soil needs in PREPSOIL regions

DEHESA, Extremadura, Spain

Manuel Pulido Fernández

FUNDECYT-PCTEX, UEX

22 November 2023



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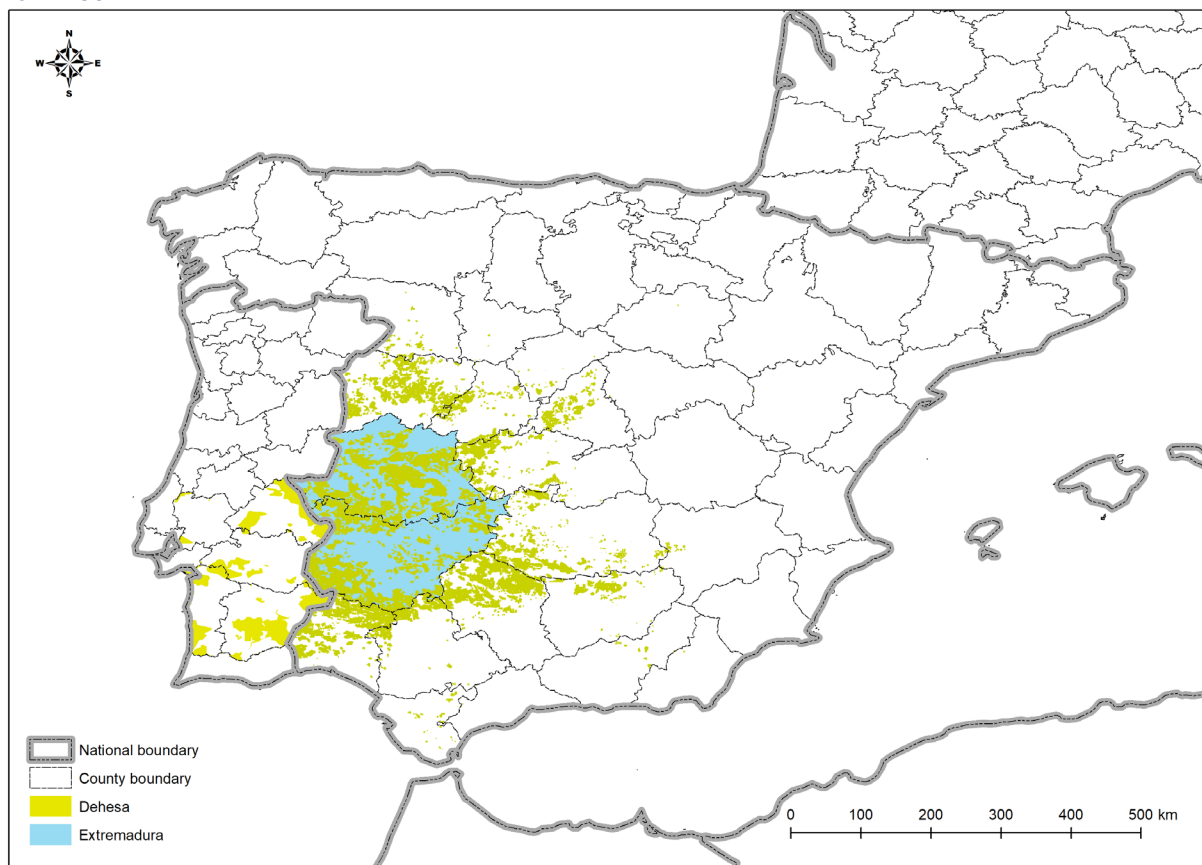
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DEHESA, Extremadura, Spain

- General information
- Stakeholders
- Drivers
- Pressures
- Responses
- Other regions
- Statement

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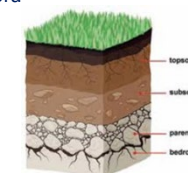


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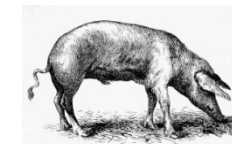
10 – 60 trees ha⁻¹
Acorn (montanera)

©Quora



Shallow soils
Poor in nutrients

©Shutterstock



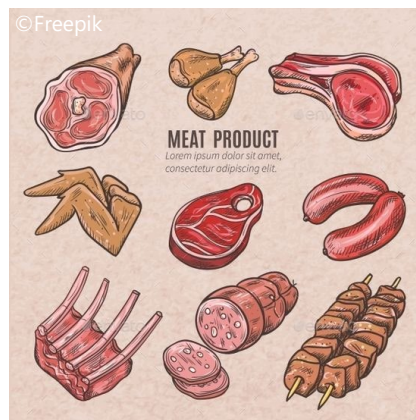
6 M livestock heads
Free-fattening
Meat of high quality

DEHESA, Extremadura, Spain

- General information
- Stakeholders
- Drivers
- Pressures
- Responses
- Other regions
- Statement

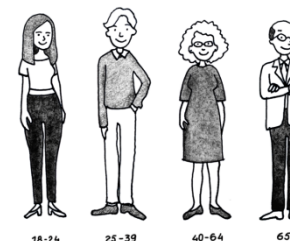


Policy

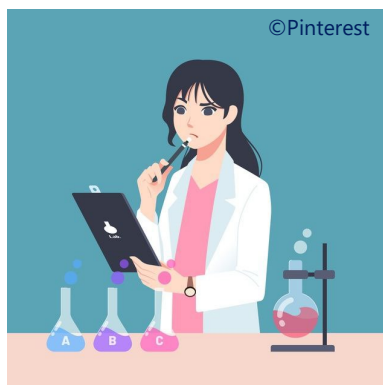


Industry

© Behance



Citizens



Academia



Farmers



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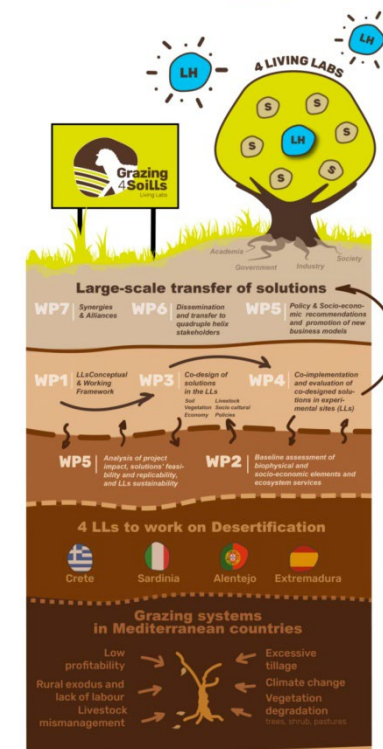


Fig. 4. Grazing4Soils general concept

DEHESA, Extremadura, Spain



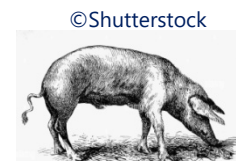
Climate change

- General information
- Stakeholders
- **Drivers**
- Pressures
- Responses
- Other regions
- Statement

Low farm profitability

Lack of generational replacement

Lost of traditional knowledge



©Pinterest



DEHESA, Extremadura, Spain

- General information
- Stakeholders
- Drivers
- **Pressures**
- Responses
- Other regions
- Statement

P1	Need of cultivation	P5	<u>Lack of tree regeneration</u>
P2	Farm fragmentation	P6	Land abandonment
P3	<u>Increasing animal stocking rates</u>	P7	Changes in land management
P4	Replacement of sheep by cattle		

DEHESA, Extremadura, Spain

- General information
- Stakeholders
- Drivers
- Pressures
- **Responses**
- Other regions
- Statement

R1	<u>Zero tillage</u>	R5	Ecosystem regeneration
R2	<u>Smart grazing</u>	R6	<u>Fair prices</u>
R3	<u>Soil protection</u>	R7	Policies' improvement
R4	Tree regeneration	R8	Multi-actor working methodologies

DEHESA, Extremadura, Spain (vs. agricultural monocrops)

... introducing livestock (mixed systems)

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DEHESA, Extremadura, Spain (vs. unmanaged forest areas)

... clearing forests (fires, hunting animal control)



DEHESA, Extremadura, Spain (vs. landless husbandry)

... labelling products (animal welfare, ecosystem services)

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DEHESA, Extremadura, Spain

1. *The European Commission recognized 'Extremadura Cattle' as a new geographical indication, which guarantees quality to the consumer and collective rights over the product to all producers in the geographical area*
2. *“Extremadura 2030” aims to undertake a project to highlight all the social, cultural, environmental and economic potential of Extremadura's pastures, creating networks of unique Extremaduran pastures, both public and private, developing training programs in the sustainable management of our pastures, designing tools of sustainable certification of our pastures, and promoting their use, approving an Extremaduran pasture law, and the first public catalog of regional pastures among many other actions.*



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Many thanks for your attention

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Q&A

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Discussion and wrap-up

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PREPSOIL: Engagement with multiple actors to increase soil literacy

Christina Lundström

Swedish University of Agricultural Sciences (SLU)



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Soil Mission objective 8: Increase soil literacy in society across Member States

PREPSOIL aims to inspire and support key persons and facilitators in their work to build awareness and activities for soil health in different sectors and areas

Our stakeholders come from three main target groups:

- Soil advocates and Communities of Practice
- Professionals working with soil in agriculture, forest and urban sectors
- Teachers and their pupils / students

Awareness raising through engagement with soil advocates and Communities of Practice (CoP)

- Exploring how to engage, co-learn and co-create with diverse organisations and “knowledge brokers” within agriculture and urban/gardening spheres
- Develop and present Communities of Practices in Europe, where people share methods and experiences to establish healthy soils
- Find and connect Soil Advocates using PREPSOIL web forum
- Present successful large scale soil health and land restoration initiatives



United Kingdom, Worldwide

Incredible Edible Network

The Incredible Edible Network is a network of people in different cities throughout the UK, and beyond, that connects people within communities by engaging them in the transformation of the own urban (from small villages to large towns) landscape where they live, and by turning disused urban plots into a source of healthy food.

Land uses: Agricultural, Natural, Urban



Brussels, Belgium

Super Terram (towards a multispecific urbanism)

Super Terram is a co-creation research project focused on Brussels' soils and the life animating them. By placing living soils at the heart of citizen mobilizations, the project aims to bring out new ways of developing our cities that are more sensitive to the multiple relationships that unfold under our feet.

Land uses: Urban



Région Pays de la Loire, France

Territorial consultation on (soil) organic matter by multiple stakeholders in the North of France (ConcerTO)

The ConcerTO methodology aims to develop a global vision of existing and potential value chains, current experiments, and projects' learning around the topic of organic matter, with the aim to make the latter a tool for territorial development supporting the deployment of the circular bioeconomy.

Land uses: Agricultural, Natural, Urban

Enhancing vocational, professional and life-long learning in soil management

Surveys to actors in agriculture, forest and urban sectors, to assess:

- understanding of soil health concepts
- how they put knowledge into practice in their professional roles (AKIS)

Investigation of extension programs and grass root initiatives concerning soil health, to explore strengths, weaknesses and possible improvements in co-learning systems.



Good examples on soil education for youth

Two open calls (2023 and 2024)

- Application in native language or English on PREPSOIL website

Selection of 10 cases and a committee nominates winners

- Two from primary school
- Two from secondary school or vocational training

The committee consists of

- soil researcher,
- science teacher from primary school
- science teacher from secondary school
- teacher from vocational training
- pedagogy actor

The winners:

- Receive diploma
- Are published on the PREPSOIL website
- If from Italy, The Netherlands, Norway, Polen, Spain or Sweden, each PREPSOIL representative will reward the winners nationally
- Poster on scientific meeting
- Presented at national webinars

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Raising Soil Awareness, Austria

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Winner 2023!



BoWidL: Raising Soil Awareness by field cultivation, Austria

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Earth, earth, earth, Italy

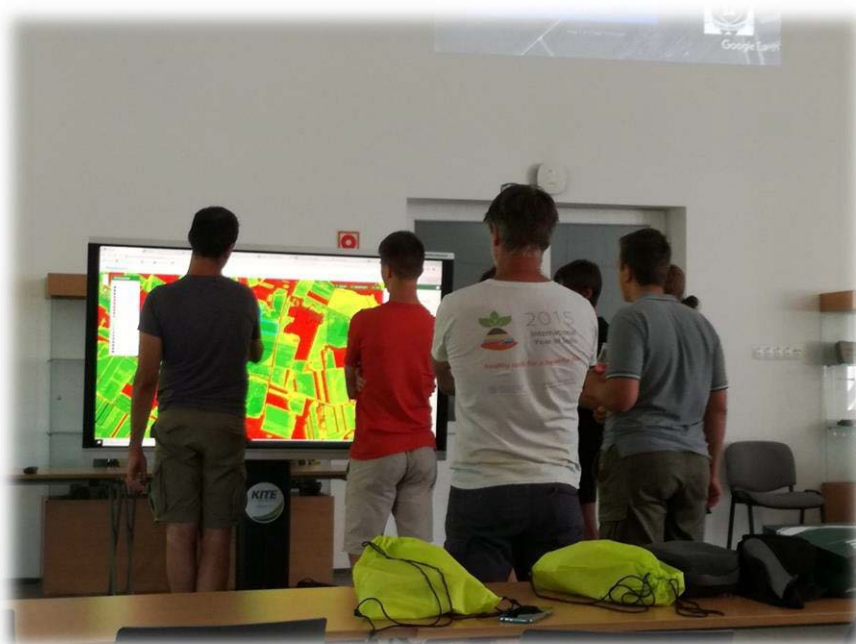
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Extreme precision farming and soil science camp, Hungary

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Soil physics: colour, texture, structure, the role of clay content, Hungary



Earth, earth, earth, Italy

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HuLK – Humus, Landwirtschaft und Klima, Austria



Learning in the open air, Spain



Extreme precision farming and soil science camp, Hungary

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Earth, earth, earth, Italy

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Urban vegetable gardens, Spain



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Extreme precision farming and soil science camp, Hungary

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Urban vegetable gardens, Spain

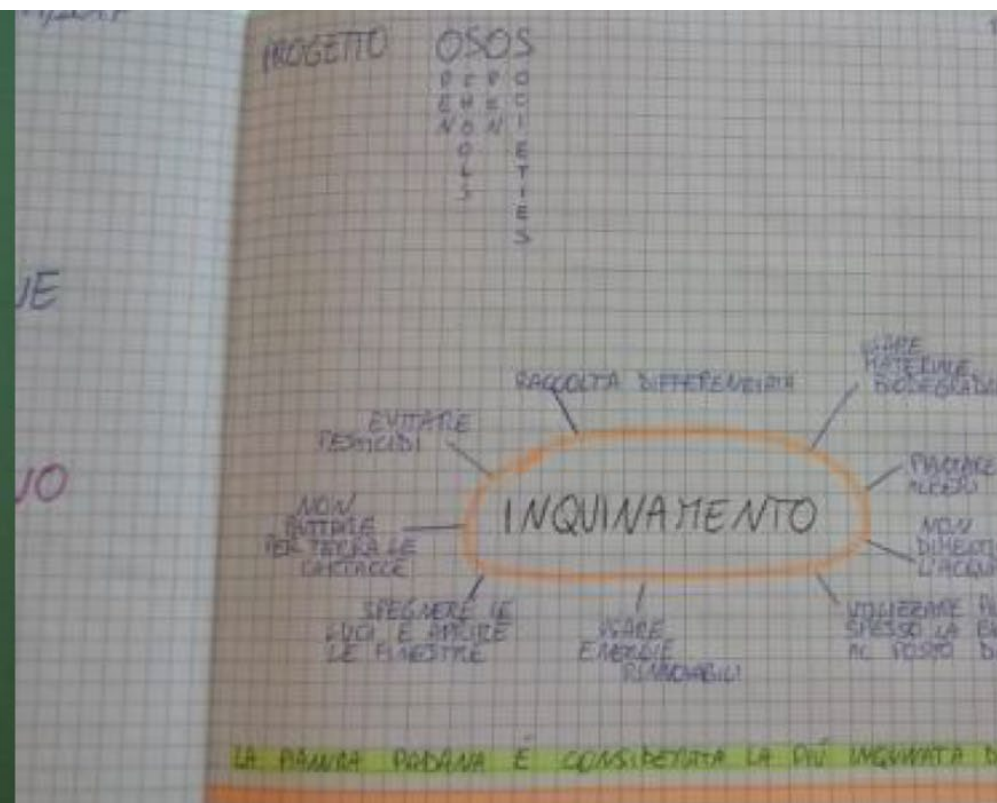


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Ground animal diversity, Hungary



Open school for open society, Italy



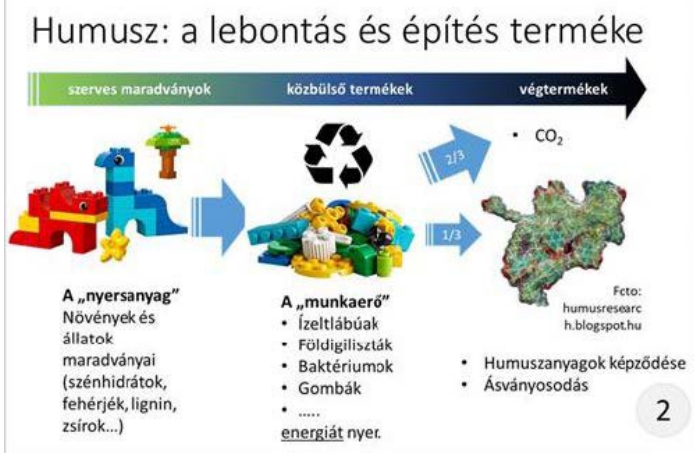
Soil organic matter decomposition/humus build-up, Hungary

1 Dimenziók a talajban



Foto: nickandmel2006
 Foto: collembola.org
 Foto: Yonsei University, Yongjae Lee
 Agyagszávyok kb. 50-800 m²/g
 Humuszkolloidok kb. 800-1000 m²/g
 felülete kb. 20 m²
 felülete kb. 10 mm²
 1 humusz molekula akár 10 000 vízmolekulát is képes „megtartani”
 Foto: humusresearch.blogspot.hu Photo taken of a single Humic Acid molecule with a Scanning Electron Microscope, the first time this has ever been done. The work was initiated by (you guessed it) Michael Melendrez of Soil Secrets LLC. The laboratories used were the National Labs at Los Alamos and Sandia, New Mexico

2 Humusz: a lebontás és építés terméke



szerves maradványok közbülső termékek végtermékek

• CO₂
 • Humuszanyagok képződése
 • Ásványosodás

A „nyersanyag”
 Növények és állatok maradványai (szénhidrátok, fehérjék, lignin, zsírok...)

A „munkaerő”

- Ízeltlábúak
- Földigiliszták
- Baktériumok
- Gombák
-

energiát nyer.

Foto: humusresearc h.blogspot.hu



Carbon Cycle, Soil and Biodiversity, Italy

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Winner
2023!

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The vital soil, Sweden



The school oasis, Italy



Learning in the open air, Spain



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Soil zoology: The size of ground-dwelling animals, Hungary



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Soil degradation: erosion by water, Hungary



ChemicArt: visualizing internal differences in soils, Hungary

mintajel			
pH tartomány			

*Légszárz talajból 2,5-szeres mennyiségű desztillált vízzel készített szuszpenz

talaj kémhatása	pH *	tartomány	jelentőség
erősen savanyú	< 4,5	"piros"	Savanyú talajokban nő a foszfát-megkötés, az alumínium- és mangán-mérgezés léphet fel.
savanyú	4,5-5,5	savanyú	
gyengén savanyú	5,5-6,8		
semleges	6,8-7,2	"zöld"	pH 7,5-8,5 között a CaCO ₃ szerepe döntő fontosságú a jó talajszerkezet kialakításában.
gyengén lúgos	7,2-8,5		
lúgos	8,5-9,0	lúgos	Lúgos és erősen lúgos talajokban káros folyamatok játszhatnak fel, a Na-sók hatására roncsolódhatnak.
erősen lúgos	> 9,0	"lila"	

2. Vizsgálat: kalcium karbonát-tartalom közelítő meghatározása

pH > 7,2			
mintajel			
pezség mértéke			

pezség fokozatai	jelzés	CaCO ₃ %	A CaCO ₃ a savanyító hatás közömlésén jelentősen csökkenti a talaj élethez szükséges tápanyagok mennyiségét.
nincs	0	0	
csak "halható"	Ny	<2	
gyengén pezség	Gy	2-4	Kalcium karbonátból (CaCO ₃) híg sósav jelenlétében szén-dioxid gáz fejlődik, ez "pezségként" jelenti a folyamat egyenlete:
közepesen pezség	K	4-7	
erősen pezség	E	7-10	
szinte "for"	IE	> 10	CaCO ₃ + 2 HCl = CaCl ₂ + H ₂ O + CO ₂

3. Vizsgálat: fenoltalein lúgosság meghatározása

mintajel			
színreakció			
jelzése			

Elsősorban szikes, vagy szikesedésre hajlamos talajok esetén végzett vizsgálat. 0,1% szódátartalom csaknem minden növényre mérgező hatású. Gipszesítés javíthat rajta. A szikes területek elsősorban természeti értékekkel bírnak ki (Apajpuszta, Hortobágy).

piros szín erőssége	pH	jelentőség CaCO ₃	jelentőség Na ₂ CO ₃ szódá	jelzés	közeli szódátartalom %
nincs	< 8,4	nincs	nincs	0	0
enyhe (rózsaszín)	8,4-8,7	lehet	lehet	Gy	0,0-0,1
közepes	8,7-9,2	lehet	kevés	K	0,1-0,2

minták származása:
 1 Velence
 2 Velence
 3 Velence



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Share your experiences and inspire others!

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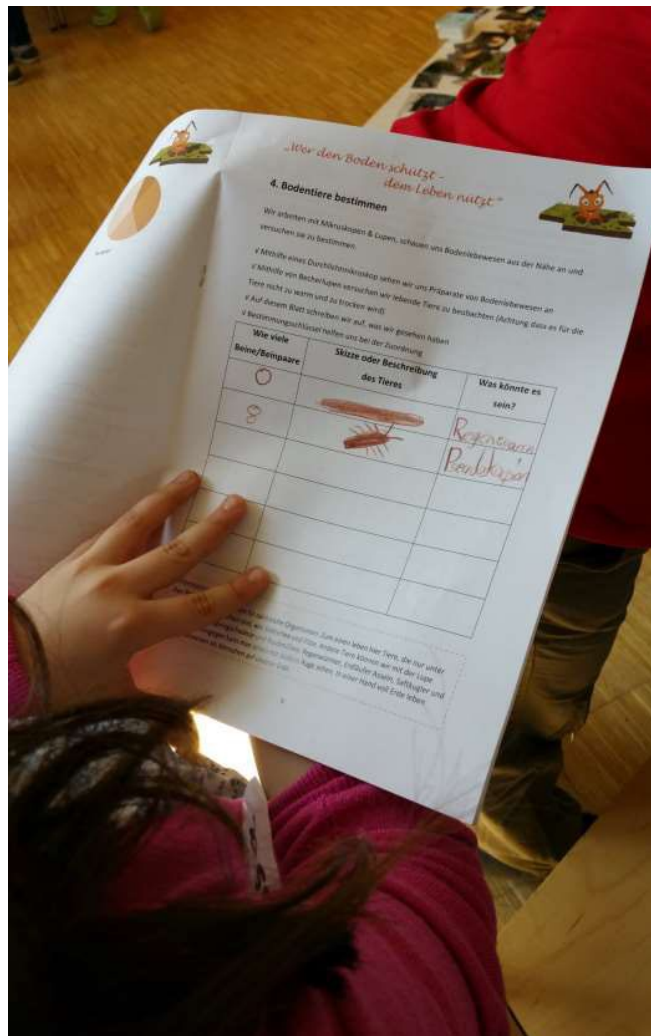
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BoWidL: Raising Soil Awareness by field cultivation, Austria

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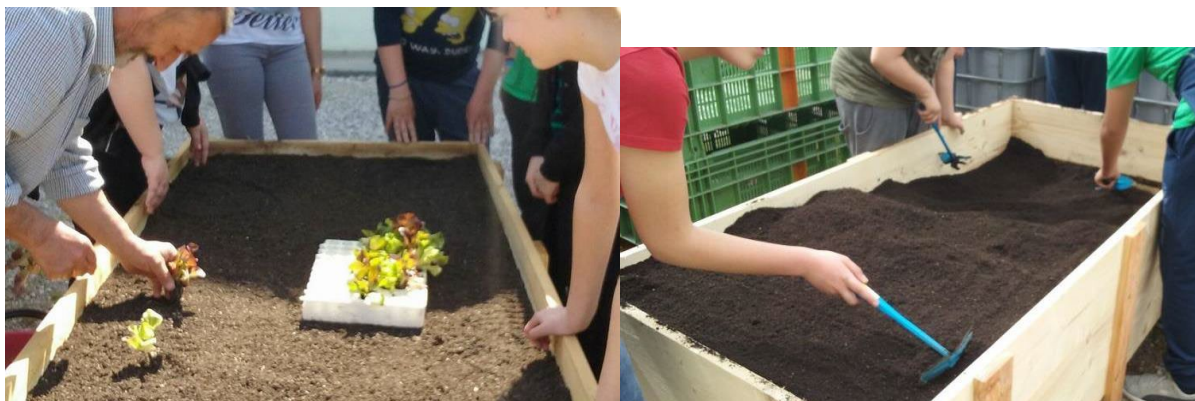


Meet our "Little Gardeners"

from
Kindergarten
Merlara, Italy

Open school for open society, Italy

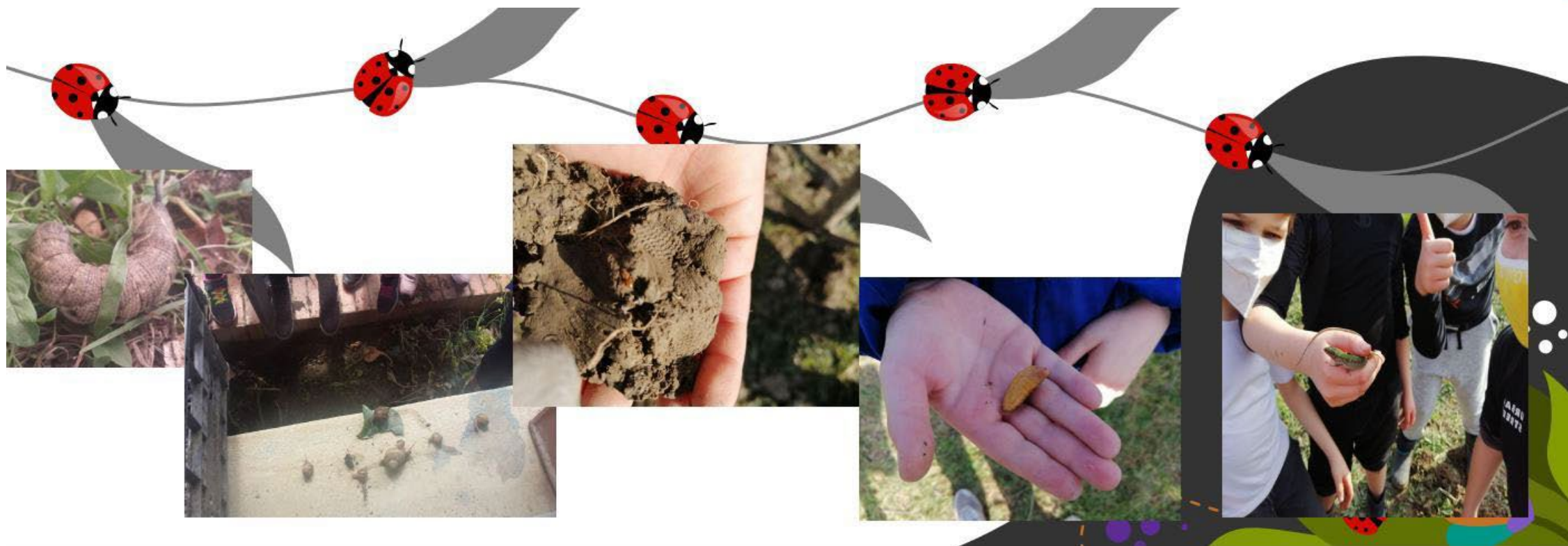
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The school oasis, Italy



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Welcome to engage with us!

Are you:

- a teacher?
- a soil advocate?
- interested in soil issues?

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We would like to thank all of you, who contributed to and funded this work!

Thank you!

Christina Lundström

Swedish University of Agricultural Sciences

Christina.lundstrom@slu.se

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EUROPEAN MISSION SOIL WEEK

Programme Day 2 - Wednesday, 22 November

Time	Session Name	Building name
9:30 – 10:00	Social, economic, and cultural transformations for soil health	<i>Main hall – Building A</i>
10:00 – 11:00	PREPSOIL project: supporting the Mission Soil	
11:00 – 11:30	Coffee Break	
11:30 – 13:00	Breakout session 4 - Soil needs in PREPSOIL regions: engaging with multiple actors	<i>ICA Institute - Building C</i>
	Breakout session 5 – Knowledge transfer to farm advisors	
13:00 – 14:00	Lunch Break	<i>Main hall – Building A</i>
14:00 – 16:00	Breakout session 6 - Living Labs and other experiences from placed-based innovation	<i>Blas Cabrera Institute - Building B</i>
	Breakout session 7 - Soil biodiversity	<i>ICA Institute - Building C</i>
	Breakout session 8 - Business models for soil health	<i>Press Room - Building D</i>
16:00 – 16:30	Coffee break	<i>Main hall - Building A</i>
16:30 – 16:45	Reporting from breakout sessions	
16:45 – 17:30	The Mission's regional and local dimension	
17:30 – 18:15	Mission Manifesto and Mission Ambassadors	
18:15 – 19:00	Cocktail & Networking	



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Lunch Break (Main Hall – Building A)



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