

Using clay to make farmland climate proof



LIFE Platform Meeting on Soils
Pamplona, 10-11 April 2024

Soil - water pressures in sandy soils

Pamplona, 10 April 2024
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Background

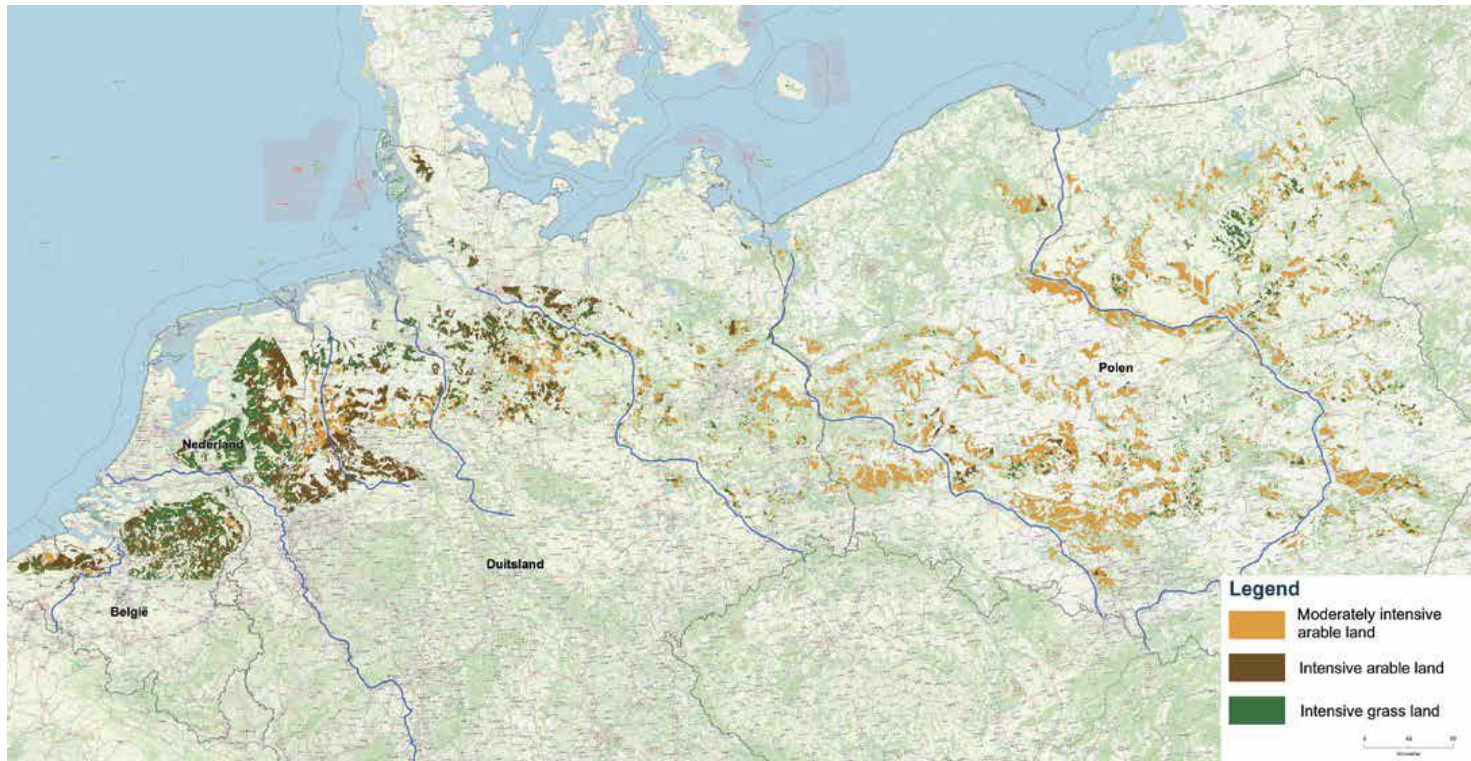
Climate vulnerability of sandy soils

- Agriculture has begun to suffer from the effects of climate change
- Crop yields decline during prolonged droughts
- Sandy soils are particularly vulnerable
- The agricultural sector faces the challenge of making these sandy soils, in interaction with farming systems, resilient to the effects of climate change



European Sand Belt

Intensive agriculture



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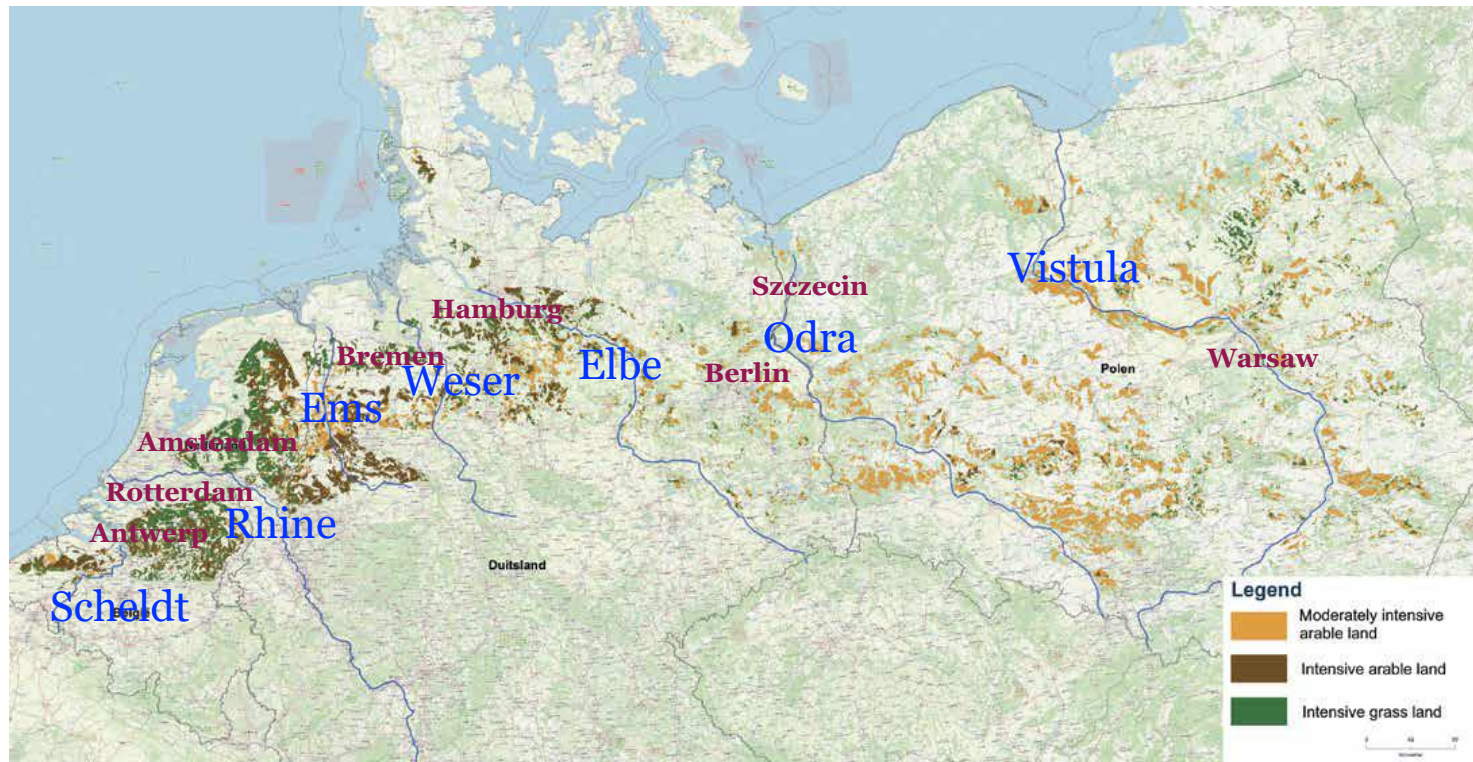
Existing measures include:

- Additional green manure
- Adapted crops and crop rotation
- Leave crop residues on land
- Composting
- Include 'perennial' grassland in crop rotation



European Sand Belt

River valleys and major cities



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<https://youtu.be/OozlMQ7k5hI>

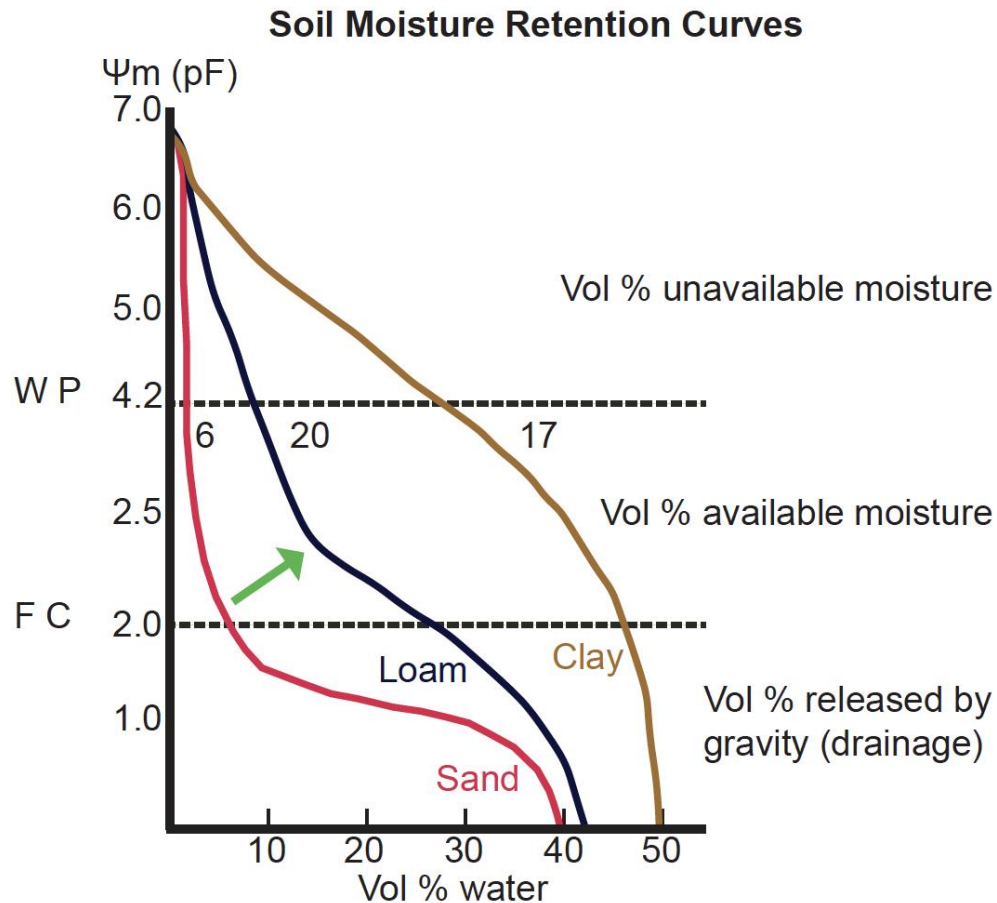


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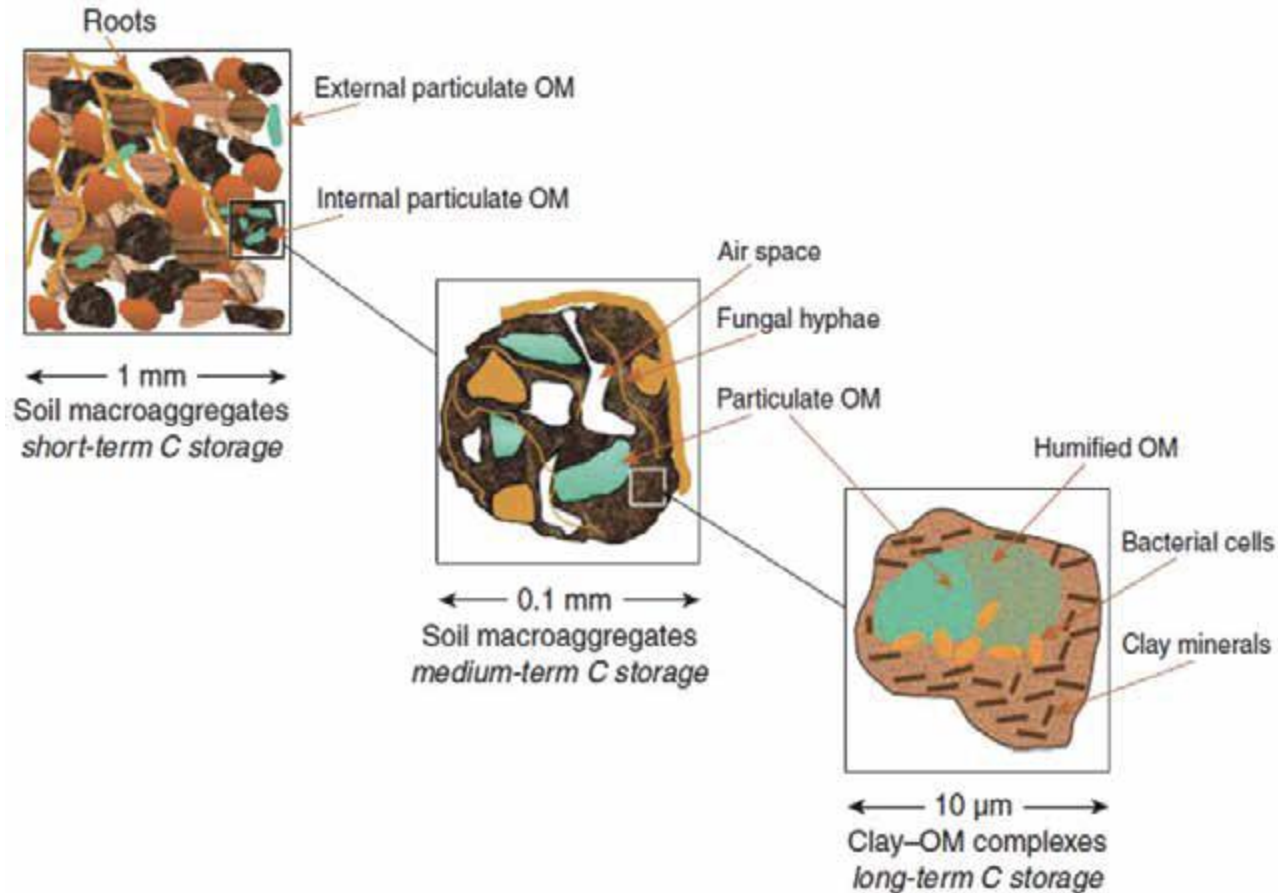


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More fines = more water retention



More Soil Organic Matter = more water retention



From Jones & Donnelly, 2004, <https://doi.org/10.1111/j.1469-8137.2004.01201.x>.



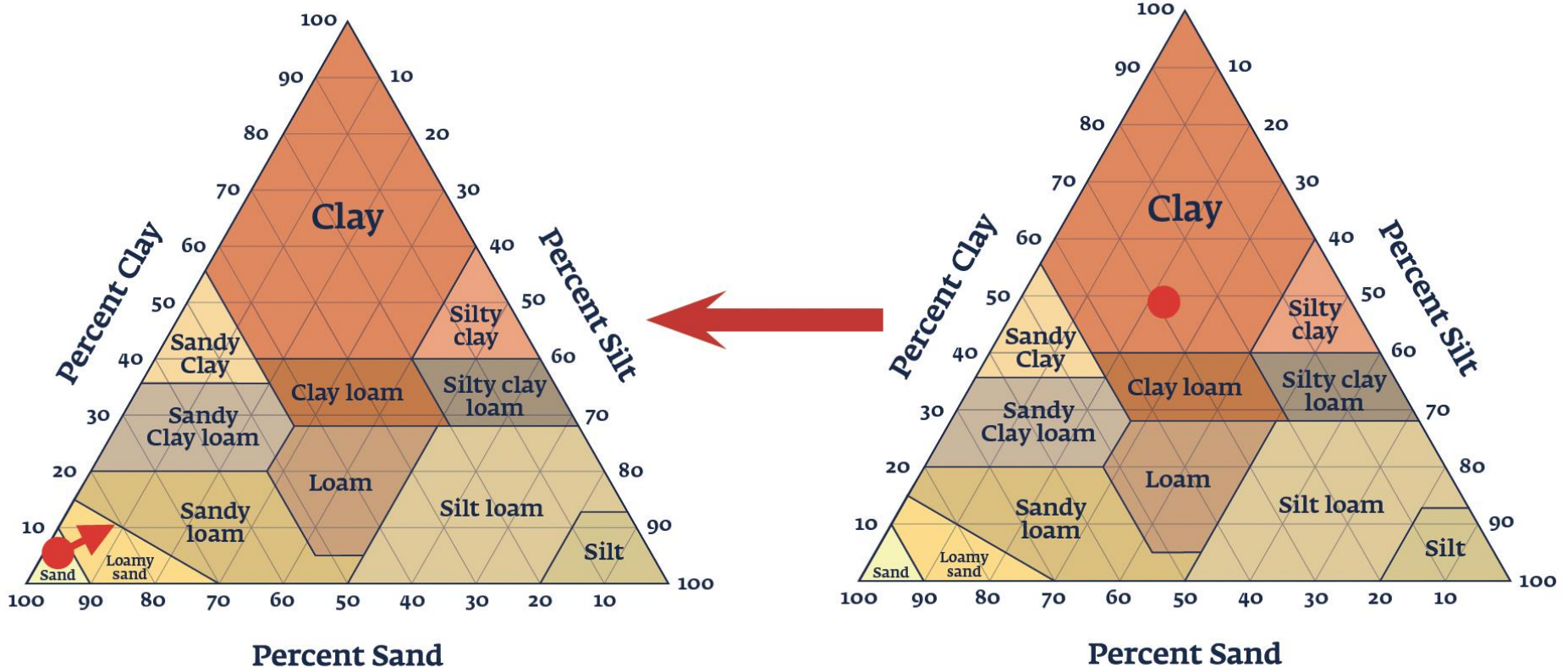
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Approach

- Increase soil water and carbon retention using available clay from land developments
- 1-3 cm / year for 2 to 4 years, target 8% lutum (particles $< 2 \mu\text{m}$)
- Reconcile civil engineering/public works and agriculture



Using clay: from sand to loamy sand



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Experiences and observations

- Roots penetrate clay clods
- Need for irrigation 3-4 days later
- Higher Cation Exchange Capacity
- Higher effective nitrogen uptake = less leaching
- More worms per hectare
- Higher dry matter yields, >10%



Dealing with challenges

- Turnaround in land development chain
- No bricks, stones, rubble
- Faster wear of manure (/clay) spreaders



Turnaround in land development chain

Transformation of thinking and behaviour

- Field days - direct contact with farmers
- Upgrade sustainability models with long-term chain impacts
- Adapt planning and procurement procedures - relocation of released soil as integral part of land development



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Thank you for your attention