Early crop cultivation in the lagoonal-deltaic landscapes of the Netherlands

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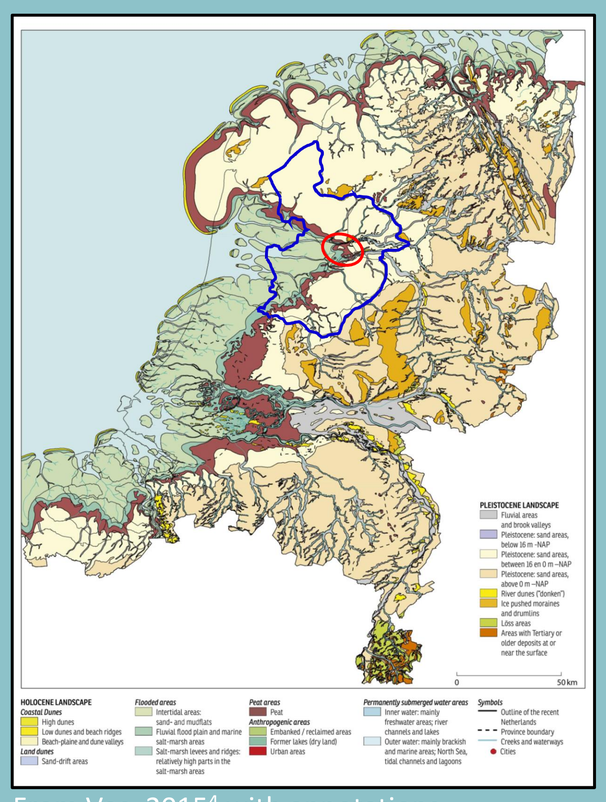
BACKGROUND

During the Mesolithic-Neolithic transition, the adoption of crop cultivation in the Dutch lowlands faced a dynamic wetland environment affected by rising sea levels, meandering fluvial channels, and repeated flooding. Despite this, the early farmers of the Swifterbant culture (4000-6000BCE) managed cultivation in specific environmental niches. Excavations revealed settlements with tilled fields on fluvial levees: elevated zones in the landscape[1,2].

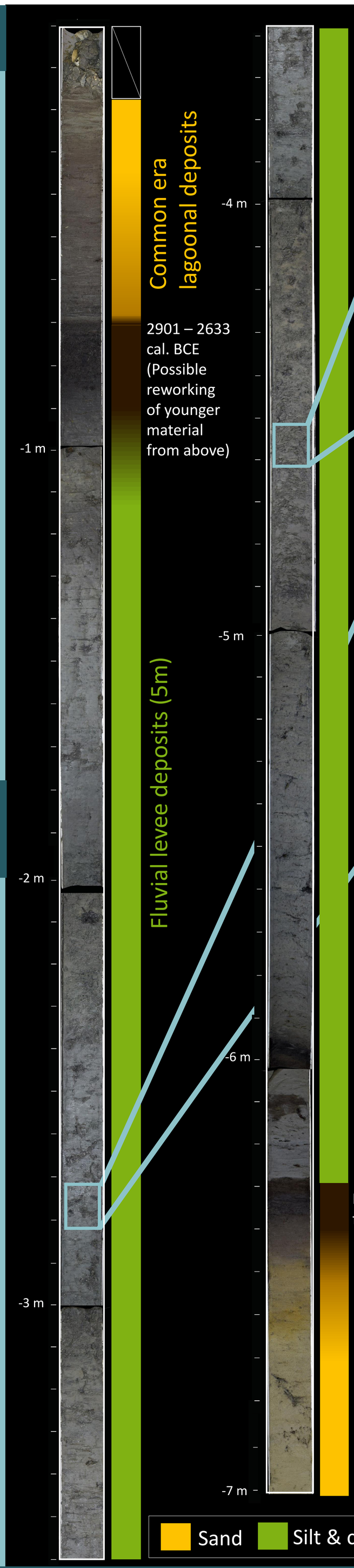
Much of the Neolithic lowlands are now buried and submerged under younger muds and coastal water bodies (Lake Ijssel), begging the question, to what extent westward towards former North Sea shores and into increasingly wet landscapes cultivation could have been possible?

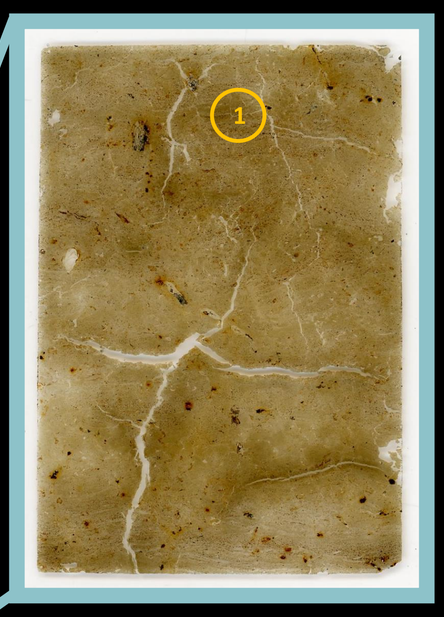
FINDING SUITABLE GROUNDS

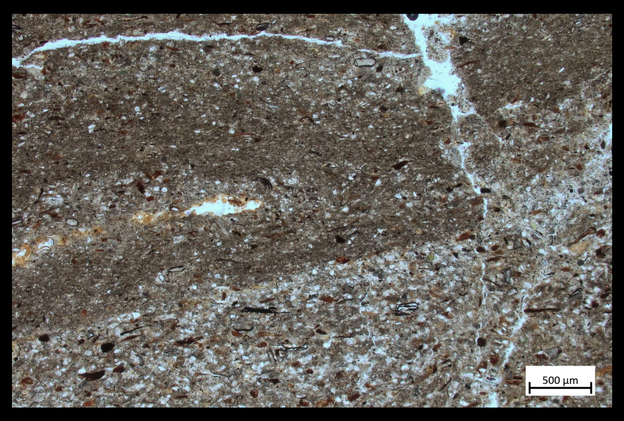
The Finding Suitable Grounds Project addresses the Neolithic cultivation potential fluvial ridges into coastal wetlands. Coring targeted previously surveyed buried levees[3] for micromorphological, palaeo-, and archaeo- botanical analysis.



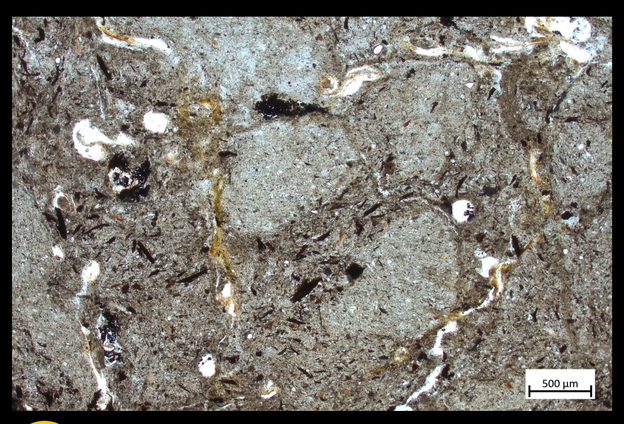
From Vos, 2015[4] with annotations



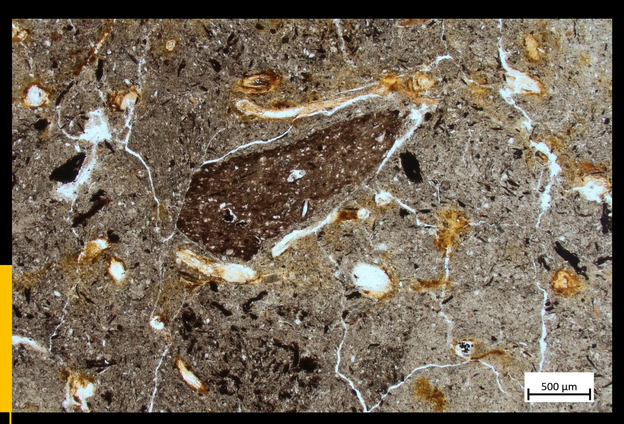




1 Undisturbed natural sedimentation. Laminations of coarse silt to very fine sand and fine clay deposits.



2 Disturbed sediment. Aggregates rolled in groundmass containing charred material



3 Angular pottery fragment

ANTHROPOGENIC TRACES

- Pottery fragments
- Charred plant material potentially due to slash-and-burn clearing
- Aggregates of varying shapes and sizes mixed in a homogenous groundmass

TILLING? TRAMPLING? BIOTURBATION?

Aggregates are a micromorphological characteristic associated with tilling, trampling, and bioturbation. Likely all three processes are visible within different areas of the cores.

Bioturbation: Typically results in rounded aggregates which may have void space or infilling due to root or worm activity.

Trampling or Tilling: Often produces angular, rolled, and pressed aggregates of varying shape and size. Deformation by trampling is also characterized by horizontal compaction and lamination which is present in some cores but not others. The aggregated areas lacking compaction closely resemble the microstructure of previously studied tilled fields further inland but lack clay coatings seen in tilled fields in other environments[1].

NEXT STEPS

Micromorphological results must be supplemented with botanical macro remains, phytoliths, pollen, diatoms, and additional ^{14}C dates.

Regional → Buried palaeolandscape[4]

Local → Geophysics & morphogenesis

Macroscopic → Core lithology & pedo-facies

Microscopic → Soil microstructure

1 Huisman, D. J., Jongmans, A. G., & Raemaekers, D. C. M. (2009). Investigating Neolithic land use in Swifterbant (NL) using micromorphological techniques. *Catena, 78*(3), 185-197.
2 Huisman, D. J., & Raemaekers, D. C. M. (2014). Systematic cultivation of the Swifterbant wetlands (The Netherlands). Evidence from Neolithic tillage marks (c. 4300–4000 cal. BC). *Journal of Archaeological Science*, *49,* 572-584.
3 Van den Brenk et al. (2023). Background magnetic susceptibility mapping of drowned prehistoric landscapes for Archaeological Heritage Management in the Netherlands. [Manuscript in preparation].
4 Vos & De Vries (2017), Cohen et al. 2017. In: Lauwerier et al. (Eds). *Netherlands Archeological Reports* 55. RCE.