

Ancient agricultural strategies revealed: How pre-industrial communities adapted to climate changes

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Bread wheat field. Credit: Giedre Motuzaite Matuzeviciute

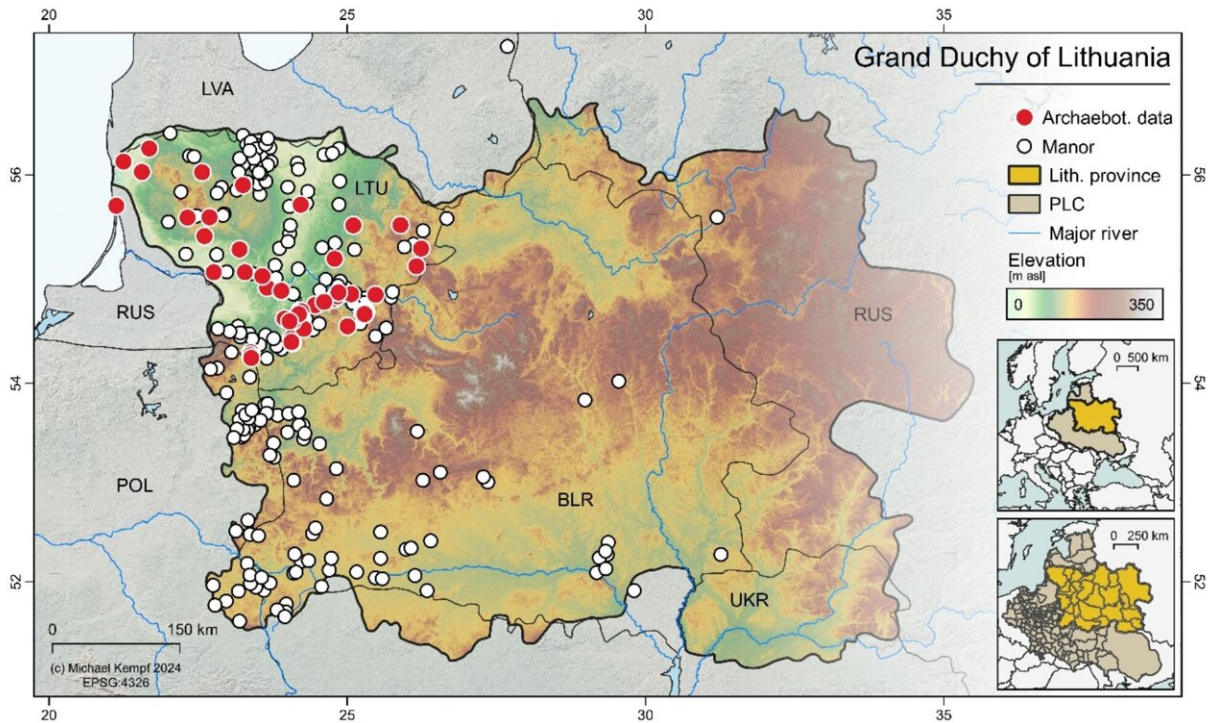
A recent study [published](#) in *Scientific Reports* delves into the adaptive agricultural practices of pre-industrial communities in north-eastern Europe over the past two millennia. The research highlights how significant climatic shifts, coupled with socioeconomic factors,

influenced the selection and cultivation of buffer crops to mitigate the risks associated with primary staple crop failures.

"This study shows quite vividly that due to climate change the thermophilic millet crop, which was the staple food during the first millennium AD, was replaced by other, more cold-resistant crops such as buckwheat," states the paper's senior author and PI of the ERC-CoG project MILWAYS, Prof. Giedre Motuzaite Matuzeviciute.

The study provides insights into the resilience and ingenuity of ancient agricultural systems, emphasizing the dynamic interplay between [environmental challenges](#) and human innovation. By analyzing [archaeological evidence](#) and [historical records](#), the researchers reconstructed past crop repertoires, shedding light on how communities diversified their [agriculture](#) to ensure [food security](#) amidst changing conditions.

This research enhances our understanding of historical agricultural practices and offers valuable lessons for modern agriculture. As contemporary societies face greater climate variability and socioeconomic uncertainties, the adaptive strategies of the past may inform sustainable agricultural practices and policies today.



Geographical location of the historical Grand Duchy of Lithuania within the European context (PLC, Polish-Lithuanian Commonwealth). The map shows the study area (Lithuanian Province of the PLC), including the locations of manors where historical data (1500–1800 AD) was analyzed and the archaeobotanical sample sites. Digital elevation model derived from SRTM90 v4.122. This map is produced using QGIS 3.10.12 (QGIS Geographic Information System. QGIS Association. <http://www.qgis.org> (2024). Credit: *Scientific Reports* (2025). DOI: 10.1038/s41598-025-87792-0

"Recent drying-up processes and increased risk of prolonged [heat waves](#) and subsequent droughts are challenging our socio-political resilience, and demand a rethinking of global food production strategies. Reconsidering drought tolerant species, therefore, can help mitigate the long-term effects of current global warming," says environmental scientist Dr. Michael Kempf.

"It is due to the Little Ice Age that the staple foods such as rye bread and buckwheat porridge came to dominate the cuisine of northeastern Europeans. Warming climates might lead us back to forgotten millet crops," says Prof. Motuzaite Matuzeviciute.

Situated at the intersection of different climatic zones, northeastern Europe represents a marginal agricultural region where buffer crops play a crucial role in ensuring food security amidst shifting environmental conditions.

"Natural conditions, agriculture, and gastronomic culture have always been closely interconnected. Gastronomic culture is more inert, meaning that environmental changes first affected agriculture and only later became apparent in the kitchen. Therefore, studying these processes is essential for understanding both past and contemporary societies," noted Prof. Rimvydas Laužikas.

The historical records indicate a southward shift of millet agriculture during the onset of the Little Ice Age. The Vilnius University Ph.D. candidate Meirzhan Abdrakhmanov concludes that "this study emphasizes the dynamic nature of agricultural adaptation and underscores the resilience of past communities in responding to climatic changes."

More information: Meirzhan Abdrakhmanov et al, The shifting of buffer crop repertoires in pre-industrial north-eastern Europe, *Scientific Reports* (2025). [DOI: 10.1038/s41598-025-87792-0](https://doi.org/10.1038/s41598-025-87792-0)

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