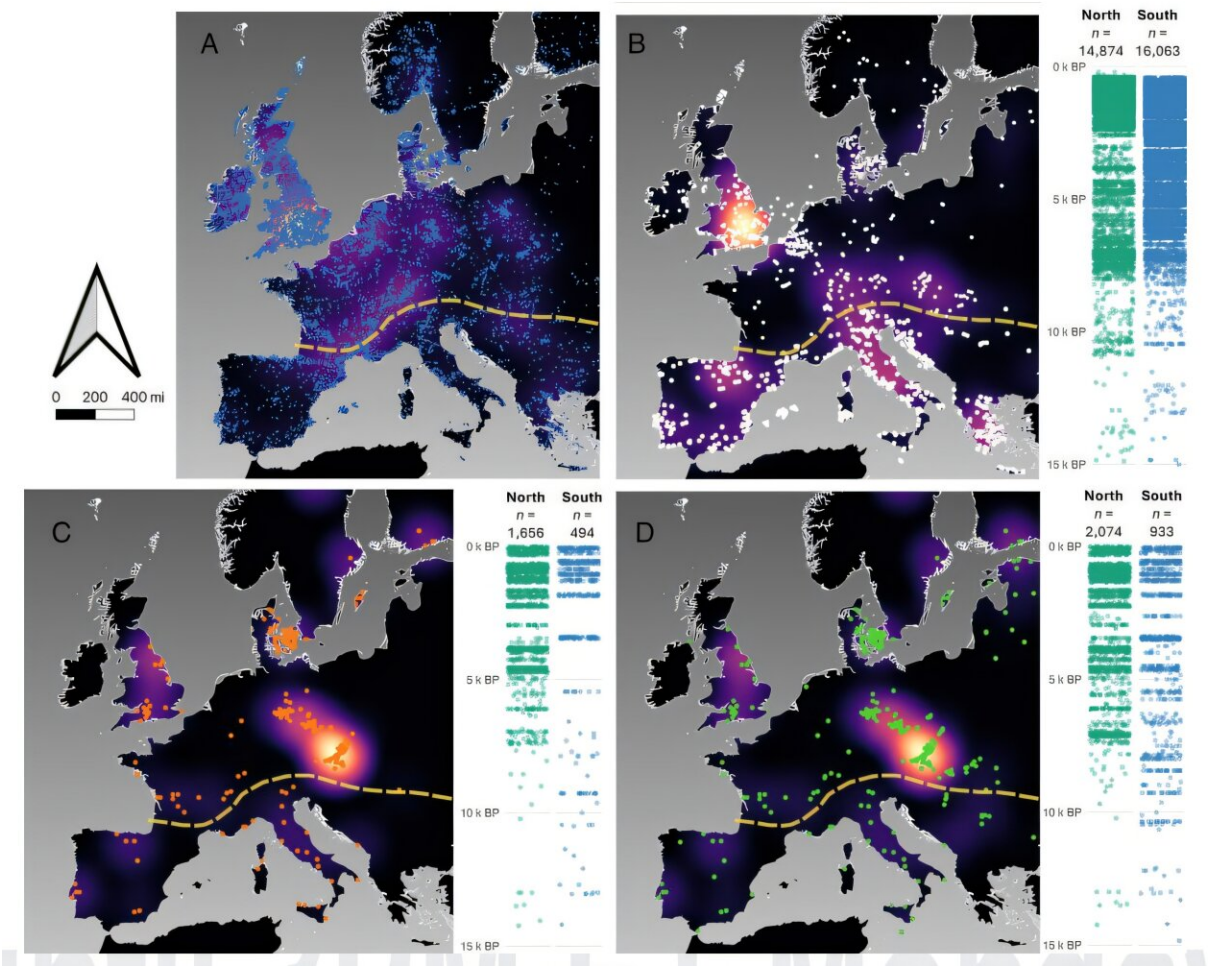
The paradox of plenty: How Europe's first farmers grew more people, not taller ones

May 1 2026, by Sayan Tribedi



Map of Europe showing the spatial and temporal distribution of sites from which the data analyzed in this study are derived. (A) radiocarbon dated sites, (B) carbon (δ13C) and nitrogen (δ15N) stable isotopes, (C) skeletal biomechanics and (D) body size. Credit: Eóin W. Parkinson, Fifteen thousand years of

bioarchaeological data reveal life history trade-offs among Europe's first farmers, *Proceedings of the National Academy of Sciences* (2026). DOI: 10.1073/pnas.2505519123

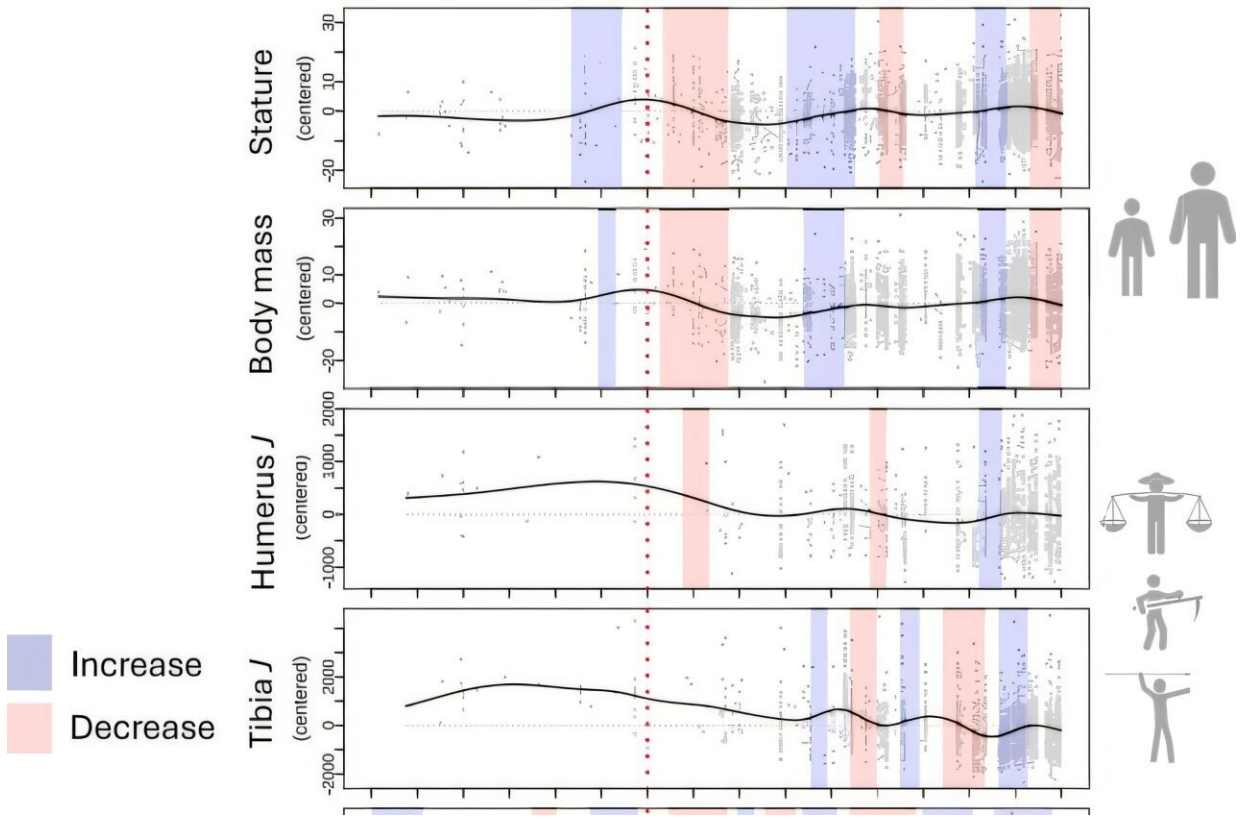
The first farmers of Europe experienced a significant rise in population, something which impacted their height at the same time. About 8,500 years ago, the adoption of farming led to the surprising result of more babies but smaller bodies. By investigating large bioarchaeological datasets, a hidden life-history trade-off at the onset of European farming was uncovered.

Picture a world where bigger food equals smaller bodies. Isn't it ironic? However, that was exactly the hidden cost faced by Europe's first farmers thousands of years ago. About 9,000 years ago, our ancestors started to give up their hunter-gatherer lives for settled agricultural lives. This switch brought about major changes, including our diets and entire societies.

As farming became more established, they found something puzzling about their skeletal remains: these early farmers were shorter and less robust than their foraging predecessors.

How could a revolution that promises more reliable food make people smaller? When confronted with environmental shifts, organisms will usually reallocate energy, explains life history theory. Abundant food may have meant communities could have more children, even if this meant individual bodies became slightly smaller.

A new study appearing in *Proceedings of the National Academy of Sciences* gets to the bottom of this ancient puzzle of how this fundamental trade-off played out across the continent.



Stacked plots of Generalized Additive Model (GAM) derivatives showing centered diachronic trends and statistically significant periods of change in body size (Top two panels, n = 3,007), long bone robusticity (Middle two panels, n = 2,150), and diet (Bottom two panels, n = 30,937) in Europe (15,000 to 0 BP). Plots are underlain by a KDE model of radiocarbon dates over the same period. Raw data points (centered on the mean) are shown in gray. Shaded blue bands indicate periods of significant increase and red bands indicate periods of significant decrease based on first derivative estimates with 95% CI. Red dotted line at 9,000 BP marks the onset of the spread of farming across Europe. Credit: Eóin W. Parkinson, Fifteen thousand years of bioarchaeological data reveal life history trade-offs among Europe's first farmers, *Proceedings of the National Academy of Sciences* (2026). DOI: 10.1073/pnas.2505519123

Reading the bones of the past

To test this idea, Eóin Parkinson and colleagues assembled huge datasets: about 3,000 skeletal measurements, 30,937 dietary isotope values, and 60,197 radiocarbon dates from across Europe. Tracking these proxies over 15,000 years revealed a clear pattern. Around 8,500 years ago, radiocarbon frequencies (a proxy for population size) spiked as predicted body size and weight from the bones dipped.

Parkinson reports that "a population 'boom' among early farmers starting at ~8,500 BP coincided with declines in body size, consistent with a life history strategy that favored reproduction over skeletal growth." This suggests early farmers indeed funneled extra resources into fertility—making more children—while individual bodies grew smaller.

These findings confirm hints from previous studies. For example, one analysis found Neolithic Europeans were roughly 1.5 inches shorter on average than preceding hunter-gatherers. Parkinson's work links that stature drop to a demographic surge: agriculture didn't just reduce height, it increased birth rates. In short, early agriculture triggered a classic life-history trade-off between growth and reproduction across the continent.

The Mediterranean's cost, the North's resilience?

Farming expanded into Europe along two corridors: one inland through the Balkans and central Europe, and the other via the coast of the Mediterranean. Everyone came with different food and problems. Southern farmers, particularly those on the Mediterranean route, adopted agriculture such as cereals, fruits and seafood earlier (about 9000–8000 BP) when compared to northern farmers (those on the Danube–Baltic route), who took much longer to adopt cereal agriculture and relied more on dairy and hardier grains.

This regional variation had skeletal repercussions. Populations in the South showed a marked decrease in stature and weight following the adoption of agriculture, due to a quick increase in population numbers and the sacrifices made by individuals. In the North, a less severe decrease in stature was accompanied by a slower population increase.

One possible explanation for the difference may be related to diet: people from northern regions had a higher proportion of protein and dairy products in their diets, thereby alleviating some effects on stature, while people in the South consumed mostly cereals such as wheat and barley, which led to a more severe stature decrease.

It was found that northern and southern populations in Europe displayed different dietary and morphological trends, possibly adapting to the local environment. Moreover, it is believed that the adaptation was characterized by a stronger trade-off between development and fertility in the South. Yet in both areas, the common theme of a relationship between fertility and small body size could be seen.

From ancient fields to modern challenges

This ancient pattern carries a modern message. The Neolithic revolution 's effects were not a simple story of progress: Parkinson emphasizes that "the transition to agriculture did not have a singular biological impact, but rather manifested in a complex set of trade-offs." In other words, the rise of farming gave humanity population strength but demanded sacrifices in growth.

Today's rapid lifestyle and dietary changes pose similar puzzles—how does an abundance of food but a sedentary life affect growth and health? By uncovering the deeply ingrained compromises of agriculture, the study makes it evident that even significant changes in lifestyle can carry costs.

The realization of the legacy of our evolutionary history provides insight into why diet, exercise, and reproductive patterns continue to influence us.

More information: Eóin W. Parkinson, Fifteen thousand years of bioarchaeological data reveal life history trade-offs among Europe's first farmers, *Proceedings of the National Academy of Sciences* (2026). DOI: 10.1073/pnas.2505519123