

Study: 800-year-old farmers could teach us how to protect the Amazon

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Raised fields in the Amazon savanna.

In the face of mass deforestation of the Amazon, we could learn from its earliest inhabitants who managed their farmland sustainably. Research from an international team of archaeologists and paleoecologists, published today in the journal *Proceedings of the National Academy of Sciences*, shows for the first time that indigenous people, living in the savannas around the Amazonian forest, farmed without using fire.

Led by the University of Exeter, the research could provide insights into the sustainable use and conservation of these globally-important

ecosystems, which are being rapidly destroyed. Pressure on the Amazonian [savannas](#) today is intense, with the land being rapidly transformed for industrial agriculture and cattle ranching.

By analysing records of pollen, charcoal and other plant remains like phytoliths spanning more than 2,000 years, the team has created the first detailed picture of land use in the Amazonian savannas in [French Guiana](#). This gives a unique perspective on the land before and after the first Europeans arrived in 1492.

The research shows that the early inhabitants of these Amazonian savannas practiced 'raised-field' farming, which involved constructing small agricultural mounds with wooden tools. These raised fields provided better drainage, soil aeration and moisture retention: ideal for an environment that experiences both drought and flooding. The fields also benefited from increased fertility from the muck continually scraped from the flooded basin and deposited on the mounds. The raised-field farmers limited fires, and this helped them conserve [soil nutrients](#) and organic matter and preserve [soil structure](#).

It has long been assumed that [indigenous people](#) used fire as a way of clearing the savannas and managing their land. However, this new research shows that this was not the case here. Instead, it reveals a sharp increase in fires with the arrival of the first Europeans, an event known as the 'Columbian Encounter'. The study shows that this labour-intensive approach to farming in the Amazonian savannas was lost when as much as 95 per cent of the indigenous population was wiped out as a result of Old World diseases, brought by European settlers.

The results of this study are in sharp contrast with what is known about the Columbian Encounter's impact on tropical forest, where the collapse of indigenous populations after 1492 led to decreased forest clearance for agriculture, which in turn, caused a decline in burning. This study

shows that high fire incidence in these Amazonian savannas is a post-1492, rather than pre-1492, phenomenon.

Dr José Iriarte of the University of Exeter, lead author on the paper, said: "This ancient, time-tested, fire-free land use could pave the way for the modern implementation of raised-field agriculture in rural areas of Amazonia. Intensive raised-field agriculture can become an alternative to burning down tropical forest for slash and burn agriculture by reclaiming otherwise abandoned and new savannah ecosystems created by [deforestation](#). It has the capability of helping curb carbon emissions and at the same time provide food security for the more vulnerable and poorest rural populations."

Dr Mitchell Power of the University of Utah said: "Our results force reconsideration of the long-held view that fires were a pervasive feature of Amazonian savannas."

Professor Doyle McKey of the University of Montpellier said: "Amazonian savannas are among the most important ecosystems on Earth, supporting a rich variety of plants and animals. They are also essential to managing climate. Whereas savannas today are often associated with frequent fire and high carbon emissions, our results show that this was not always so. With global warming, it is more important than ever before that we find a sustainable way to manage savannas. The clues to how to achieve this could be in the 2,000 years of history that we have unlocked."

Dr Francis Mayle of the University of Edinburgh said: "We've got an unprecedented record of these Amazonian savannas that completely overturns previous assumptions about the way in which ancient cultures utilized these globally-important ecosystems."

Dr Stephen Rostain of CNRS said "These raised-field systems can be as

productive as the man-made black soils of the [Amazon](#), but with the added benefit of low [carbon emissions](#)."

Provided by University of Exeter

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