Diet of the ancient people of Rapa Nui shows adaptation and resilience not 'ecocide'

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New isotopic analyses of bones, soils and plant remains from Rapa Nui, Chile (Easter Island) provide evidence contrary to the widely-held belief that the ancient civilization recklessly destroyed its environment. Credit: Terry Hunt

Research by an international team, led by the University of Bristol, has shed new light on the fate of the ancient people of Rapa Nui (Easter Island).

It had been proposed that vast forests of giant palm trees were cut down by the people of Rapa Nui leaving them among other things without canoes.

With no canoes, they could no longer fish so they ate chickens, rats and agricultural crops.

However, Rapa Nui is not a tropical paradise with fertile soils so crop productivity decreased.

This 'ecocide' hypothesis attributes societal collapse on Rapa Nui to human overexploitation of natural resources.

This new study published in the *American Journal of Physical Anthropology* challenges that interpretation and instead shows that the ancient population ate roughly equal amounts of seafood and terrestrial resources.

Catrine Jarman, lead author of the study and PhD student at the University of Bristol's Department of Anthropology and Archaeology, said: "We also discovered that agricultural crops consumed must have been planted in soils that were deliberately managed and manipulated to provide better yields.

"Previous work has shown that plants of Rapa Nui were grown in rock mulch gardens and planting enclosures known as manavai. These had been carefully constructed and deliberately managed, and our study showed that the islanders may have added fertilisers."

The research team analysed archaeological material dating from 1400AD to the historic period from the Kon Tiki Museum in Oslo, Norway.

These included some material from excavations lead by the famous Norwegian explorer and anthropologist Thor Heyerdahl in the 1950s and 1980s.

A rock mulch garden on Rapa Nui with taro (*Colocasia esculenta*) is growing. Taro has long been a staple food of the natives of Polynesian Islands. Credit: Terry Hunt

Other samples were provided by Terry Hunt at University of Oregon and

Carl Lipo professor of anthropology at Binghampton University that were collected as part of University of Hawai'i archaeological field schools.

In Professor Brian Popp's laboratory at the University of Hawai'I at Mānoa School of Ocean and Earth Science and Technology (SOEST) and in the Leibniz Laboratory for Radiometric Dating and Stable Isotope Research at the Christian-Albrechts University of Kiel, Germany, the team analysed the stable isotope ratios of carbon and nitrogen in archaeological soils, human and animal bone and plant remains from around 1400 AD, and modern soil and plant samples from the island.

Professor Popp said: "Human and animal bone retain isotopic ratios that reflect a consumer's diet in life.

"By studying these isotope ratios, particularly in individual amino acids, we estimated the relative proportions of different food sources in each individual's diet."

Christian-Albrechts from the University of Kiel Thomas Larsen, added: "We used three independent lines of isotopic evidence to determine what the ancient Rapa Nui people ate.

"Although we cannot say that no rats were eaten, all our results indicate that seafood was an important part of the Rapa Nui diet."

Finding that the Rapa Nui islanders consumed more fish than what was previously thought was not a real surprise for Catrine Jarman and her colleagues. What was surprising, however, was the evidence suggesting extensive manipulation of agricultural crops.

The ecocide hypothesis, though controversial, is commonly used as the archetypal parable of the dangers of environmental destruction.

Understanding how past populations managed their limited resources for subsistence purposes is crucial to this debate, but empirical evidence of their diets is sparse.

Contrary to notions of 'ecocide', the new results suggest that the ancient population adapted to the harsh environmental conditions by managing their gardens and manipulating soils for better crops. This means that they exhibited astute environmental awareness and stewardship to overcome nutrient poor soils.

Catrine Jarman concluded: "This research highlights the unique and varied environmental adaptations that Pacific Islanders have shown through time.

"Polynesians developed sustainable economies in ways that we are now better understanding through interdisciplinary research. Lessons from the past and from traditional island societies have value and relevance today."

More information: 'Diet of the prehistoric population of Rapa Nui (Easter Island, Chile) shows environmental adaptation and resilience' by C. Jarman, T. Larsen, T. Hunt, C. Lipo, R. Solsvik, N. Wallsgrove, C. Ka'apu-Lyons, H. Close and B. Popp in *American Journal of Physical Anthropology*

Provided by University of Bristol