UC SANTA BARBARA

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Climate and Conflict

An extended period of turmoil in the prehistoric Maya city of Mayapan, in the Yucatan region of Mexico, was marked by population declines, political rivalries and civil conflict. Between 1441 and 1461 CE the strife reached an unfortunate crescendo — the complete institutional collapse and abandonment of the city. This all occurred during a protracted drought.

Coincidence? Not likely, finds new research by anthropologist and professor Douglas Kennett of UC Santa Barbara.

Writing in the journal Nature Communications, lead author Kennett and collaborators in the fields of archaeology, history, geography and earth science suggest that drought may in fact have stoked the civil conflict that begat violence, which in turn led to the institutional instabilities that precipitated Mayapan's collapse. This transdisciplinary work, the researchers said, "highlights the importance of understanding the complex relationships between natural and social systems, especially when evaluating the role of climate change in exacerbating internal political tensions and factionalism in areas where drought leads to food insecurity."

"We found complex relationships between climate change and societal stability/instability on the regional level," Kennett said in an interview. "Drought-induced civil conflict had a devastating local impact on the integrity of Mayapan's state institutions that were designed to keep social order. However, the fragmentation of populations at Mayapan resulted in population and societal reorganization that was highly resilient for a hundred years until the Spanish arrived

on the shores of the Yucatan.”

The researchers examined archaeological and historical data from Mayapan, including isotope records, radiocarbon data and DNA sequences from human remains, to document in particular an interval of unrest between 1400 and 1450 CE. They then used regional sources of climatic data and combined it with a newer, local record of drought from cave deposits beneath the city, Kennett explained.

“Existing factional tensions that developed between rival groups were a key societal vulnerability in the context of extended droughts during this interval,” Kennett said. “Pain, suffering and death resulted from institutional instabilities at Mayapan and the population fragmented and moved back to their homelands elsewhere in the region.”

The vulnerabilities revealed in the data, the researchers found, were rooted in Maya reliance on rain-fed maize agriculture, a lack of centralized, long-term grain storage, minimal investments in irrigation and a sociopolitical system led by elite families with competing political interests.

Indeed the authors argue that “long-term, climate-caused hardships provoked restive tensions that were fanned by political actors whose actions ultimately culminated in political violence more than once at Mayapan.”

Yet significantly, a network of small Maya states also proved to be resilient after the collapse at Mayapan, in part by migrating across the region to towns that were still thriving. Despite decentralization, trade impacts, political upheaval and other challenges, the paper notes, they adapted and persisted into the early 16th century. It all points to the complexity of human responses drought on the Yucatan Peninsula at that time — an important consideration for the future as well as the past.

“Our study demonstrates that the convergence of information from multiple scientific disciplines helps us explore big and highly relevant questions,” Kennett said, “like the potential impact of climate change on society and other questions with enormous social implications.

“Climate change worries me, particularly here in the western U.S., but it is really the complexities of societal change in response to climatic perturbations that worry me the most,” he added. “The archaeological and historical records provide lessons from the past, and we also have so much more information about our Earth’s climate and the potential vulnerabilities in our own sociopolitical systems.”

About UC Santa Barbara

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