



Soil and Human Interactions in Maya Wetlands

Timothy Beach and Sheryl Luzzadder-Beach
United States (beacht@georgetown.edu)

Since the early 1990s, we have studied Maya interaction with soils in Mexico, Belize, Guatemala, and elsewhere. We studied upland and lowland soils, but here we focus on seasonal or 'Bajo' wetlands and perennial wetlands for different reasons. Around the *bajos*, the ancient Maya focused on intensive agriculture and habitation despite the difficulties their *Vertisol* soils posed. For the perennial wetlands, small populations spread diffusely through *Mollisol* and *Histisol* landscapes with large scale, intensive agro-ecosystems. These wetlands also represent important repositories for both environmental change and how humans responded *in situ* to environmental changes. Work analyzing *bajo* soils has recorded significant diversity but the soil and sediment record shows two main eras of soil instability: the Pleistocene-Holocene transition as rainfall fluctuated and increased and tropical forest pulsed through the region, and the Maya Preclassic to Classic 3000 to 1000 BP as deforestation, land use intensity, and drying waxed and waned. The ancient Maya adapted their *bajo* soil ecosystems successfully through agro-engineering but they also withdrew in many important places in the Late Preclassic about 2000 BP and Terminal Classic about 1200 BP.

We continue to study and debate the importance of perennial wetland agro-ecosystems, but it is now clear that Maya interaction with these soil landscapes was significant and multifaceted. Based on soil excavation and coring with a broad toolkit of soil stratigraphy, chemistry, and paleoecology from 2001 to 2013, our results show the ancient Maya interacted with their wetland soils to maintain cropland for maize, tree crops, arrow root, and cassava against relative sea level rise, increased flooding, and aggradation by gypsum precipitation and sedimentation. We have studied these interactions across an area of 2000 km² in Northern Belize to understand how Maya response varied and how these soil environments varied over time and distance. Most areas dealt with water table rise and gypsum aggradation from extremely sulfur- and calcium-rich water sources. Thus far we have evidence for Archaic to Classic aggradation (5000 BP to the present) and Classic period fields and canals as mostly piecemeal attempts by the Maya to adapt to these and other environmental changes. Wetland fields were mainly Classic period systems (1500 to 1000 BP) but varied from long- to short-lived. We found one example of a very Late/Terminal Classic (c. 1200 BP), preplanned reclamation project on a floodplain. One system had some reoccupation in the Postclassic about 800 BP. These findings and a recent discovery in Campeche, MX display the burgeoning evidence for intricate Maya connections with tropical wetland soils.