

Ancient Maya Embedded Economies and Changing Ground Stone Densities in Households at Actuncan, Belize

Lisa J. LeCount , John H. Blitz, and Jonathan W. Tidwell

In embedded economies where multiple modes of production and exchange exist, artifact distributions in households alone do not reflect the strength of specific modes. We use a diachronic perspective tied to changes in political economies and artifact class densities standardized by excavation volume at the Maya site of Actuncan, Belize, to elucidate changes in the strength of individual production and exchange modes in the Preclassic and Classic periods. We focus on ground stone densities as a measure of grinding intensity across elite and common households. Data indicate that common households always ground more maize than elites, but intensity peaked in the Late Classic when tax and tribute demands and market exchanges were greatest. In the Terminal Classic, common household grinding intensity decreased by half as tribute burdens diminished, illustrating the impact of political hierarchies on household economies.

Keywords: embedded economy, ancient Maya, ground stone, households

En economías integradas donde existen múltiples modos de producción e intercambio, las distribuciones de artefactos arqueológicos en los hogares solas por sí no reflejan la fuerza de modos específicos. Utilizamos una perspectiva diacrónica vinculada a los cambios en las economías políticas y las densidades de clases de artefactos estandarizadas por el volumen de excavación en el sitio maya de Actuncan, Belice. Esto lo elucidar los cambios en la fuerza de los modos de producción e intercambio individuales en los períodos Preclásico y Clásico. Nuestro enfoque está en las densidades de la piedra de molienda como una medida de la intensidad de actividad de molienda en hogares de élite y comunes. Los datos indican que los hogares comunes siempre muelen más maíz que las élites, pero la intensidad alcanzó su punto máximo en el Clásico Tardío, cuando las demandas de impuestos y tributos, así como el intercambio de mercado, eran mayores. En el Clásico Terminal, la intensidad de la actividad de molienda doméstica común disminuyó a la mitad a medida que disminuían las cargas tributarias, lo que demuestra el impacto de las jerarquías políticas en las economías de los hogares.

Palabras claves: economías integradas, antigua Maya, piedra de molienda, hogares

To investigate the organization of ancient Maya economies, archaeologists routinely identify domestic practices and crafting activities within a political economy framework to reconstruct the ways people met their daily needs at any given point in time. Current models of Classic Maya economies acknowledge the simultaneous existence of multiple modes of production and exchange, scales of value, and varying degrees of elite regulation (Masson and Freidel 2012). But although

archaeologists can parse these resources, services, and modes into measurable variables, we often fail to address their articulations because they overlap in complex ways. A diachronic approach to Maya economies embedded in political history may be able to shed light on the shifting significance of specific production and exchange modes for both elites and commoners. This approach requires contextualizing and standardizing artifact distributions through time within elite and commoner households because

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much of the production of goods occurred within them. In this article, we document the intensity of grinding, as measured by the density of ground stone manos and metates within household contexts, to provide insights into economic embeddedness and how the intensity of domestic production changed as markets, taxes, and tributes waxed and waned through time.

Actuncan's Embedded Economies

At the Maya site of Actuncan (Figure 1), in the Mopan River Valley of western Belize, 10 field seasons of household archaeology have compiled an extensive inventory of artifact assemblages from commoner patio-groups (Groups 1–3, 5–7), elite houses (Structures 29, 41, and 73), and a palace (Structure 19 and Group 8). The socioeconomic status of Actuncan's households was determined based on the size and configuration of structures within each mound cluster (LeCount and Yaeger 2010). Actuncan was occupied from about 1000 BC until abandonment around AD 1000. A refined chronology provides the temporal controls necessary to assign household assemblages to time periods, allowing us to track changes in economic variables over time.

Actuncan's political history broadly predicts the linkages between consolidation of power at greater regional levels and accumulation of economic demands on households. In the Terminal Preclassic, it was the largest political center in the Mopan Valley, and as an autonomous polity, tax/tribute demands should have been relatively low. By the Late Classic, Actuncan was incorporated into Naranjo's realm (itself part of a larger Calakmul hegemony) via Xunantunich, the provincial capital. Accordingly, tax/tribute demands likely increased dramatically. When regional hierarchies began to wane in the ninth century, Actuncan embarked on a new round of civic building that attests to its Terminal Classic autonomy (Mixer 2017) and anticipated declines in tax/tribute demands.

Actuncan's urban population was always small. Two or three elite and three commoner families rejuvenated a small village and directed the building of an architecturally impressive Terminal Preclassic to Early Classic center. The site grew modestly over time to contain six Late

Classic commoner groups and a noble palace, but fewer elite houses. Late Classic elite houses may have been more attracted to Xunantunich or other centers that grew larger and more politically dominant at this time (LeCount and Yaeger 2010). Although the number of elite families dwindled, their absence was filled by nobles living in the palace and a growth in commoner patio-groups. In the Terminal Classic, populations declined overall as political balkanization fragmented the landscape. After the termination of the noble palace, two of the three elite houses were reoccupied. These household trajectories form the social backdrop of economic shifts (Figure 2).

Taxation and tribute, as well as market exchange, affect household productions in discernible ways (Hirth 1996). Maya leaders financed their political ambitions, to a large extent, through tax or tribute systems (Foiás 2013); that is, through the extraction of resources from their members (taxes) or from subordinate polities (tribute). For households, the implementation of these two systems results in the same outcome: to pay taxes or tributes, households must ramp up the production of goods. Once we account for these burdens, the residuals provide a clearer picture of domestic production tied to subsistence needs, reciprocity, and market exchange. Although there is little evidence for large markets at Actuncan, they existed at nearby centers during the Late and Terminal Classic (Cap 2015).

The combination of taxes, tributes, and market exchanges, however, presents a major impediment to studying embedded economies because surplus production in households was likely slated for all of them. We can begin to untangle their variable impacts by linking household productivity to historical developments in economic modes through time. Taxes were a fact of life from the Terminal Preclassic onward, but tribute and market activities arose in concert during the Late Classic. Actuncan's political independence during the Terminal Classic allows us to view the strength of market activities in households at a time when the tribute burden was greatly reduced.

Ground Stone Manos and Metates at Actuncan

Ground stone manos and metates are ubiquitous artifact pairings in Mesoamerica, closely

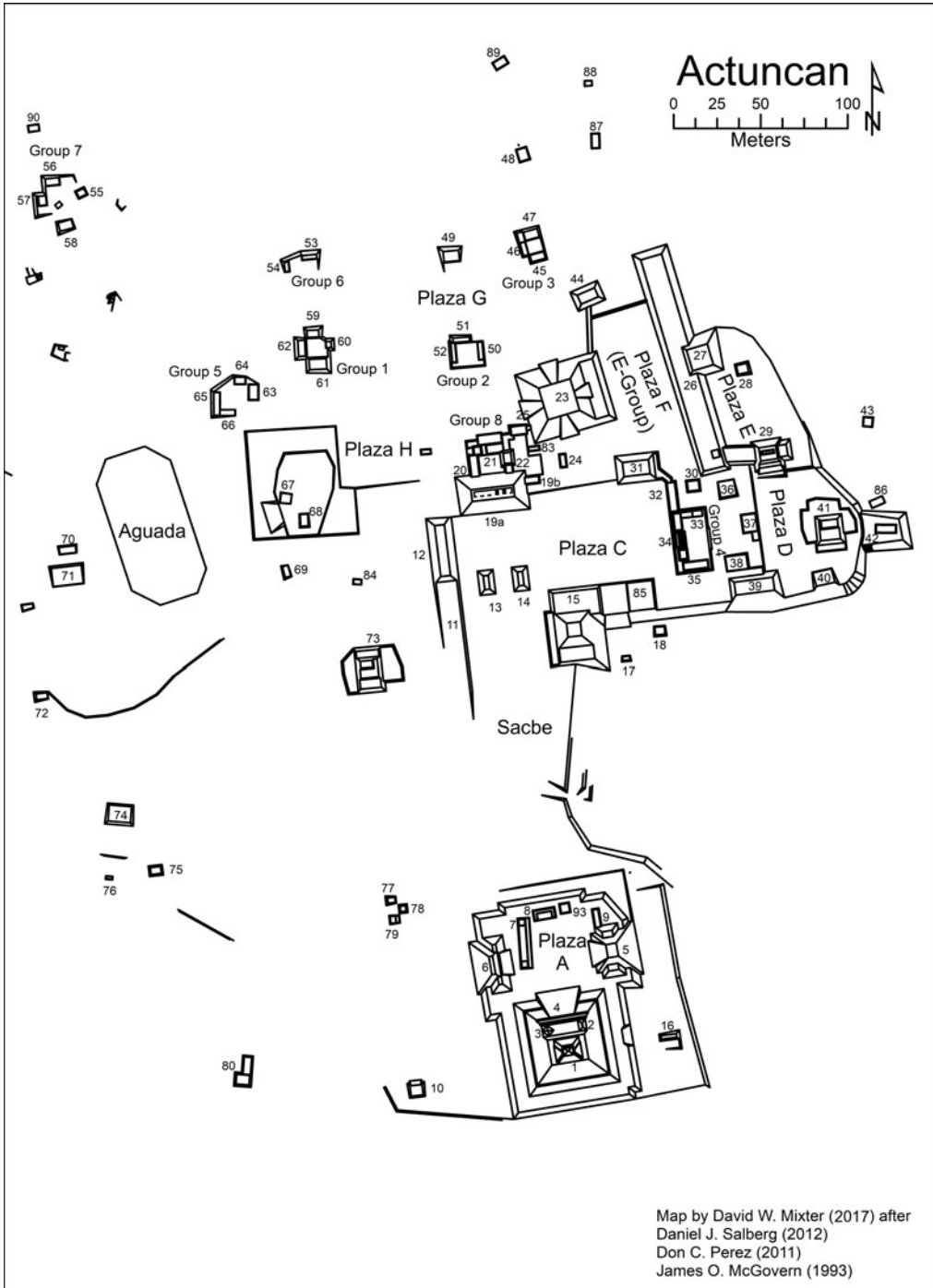


Figure 1. Plan of Actuncan, Belize (map by David Mixter).

identified with the domestic sphere. The frequencies of grinding implements reveal the location and intensity of food processing in the community. But because frequencies of artifact classes

are a product of the extent of excavation across households, artifact counts must be adjusted by a standard measure of excavation volume. Our project recorded a standard measure of

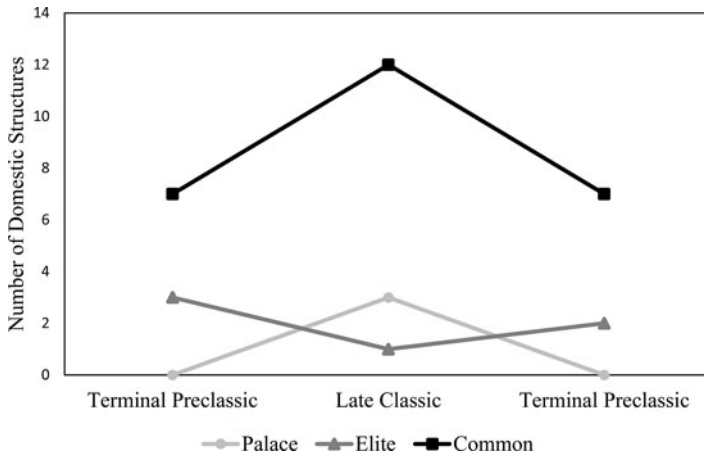


Figure 2. Number of structures occupied by time periods.

excavation matrix by tallying the number of five-gallon buckets of soil recovered from cultural contexts, which were converted to cubic meters. We did not include large rock (>25 cm in size) in this procedure. For this study, we quantified the relationship between counts of ground stone mano-metates and total cubic meters of excavation matrix for all households with a ratio measure.

A total of 281 ground stone manos and metates comprise the sample at the site, although analyses incorporated different subsets. At Actuncan, manos and metates were produced in a limited number of morphological forms (Figure 3) classified by transverse cross-sectional shape (Delu 2007). As confirmed by ethnoarchaeological,

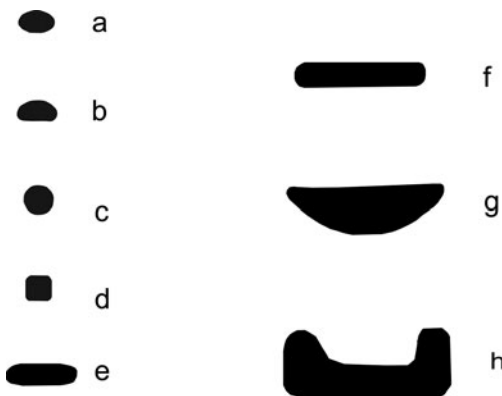


Figure 3. Mano (a–e) and metate (f–h) morphological types: (a) oval A; (b) oval B; (c) circular; (d) square; (e) lenticular; (f) flat; (g) concave; (h) trough. Drawing by Lisa J. LeCount.

use-wear, and experimental studies (e.g., Biskowski 2000), metate and mano forms have different functional, technological, and temporal implications. Although we often assume that ground stone implements were primarily used to grind maize, they also were used to process other food stuffs and inorganic materials and had a myriad of secondary uses. This fact is why we focus on the intensity of grinding, not what was ground or how much was ground. Occurrence seriation of 88 metates and 91 manos sufficiently intact to determine morphological type and from all well-dated contexts (including nonhousehold contexts) at Actuncan revealed a trajectory of design changes. Concave metates ($n=67$) are earliest and were used throughout the sequence. Trough ($n=4$) and flat ($n=13$) metates first appear in the Late and Terminal Classic periods. Four examples appear intermediate between concave and flat. Oval A ($n=24$), oval B ($n=29$), circular ($n=27$), and square ($n=6$) manos have long, overlapping periods of use. Two-hand lenticular manos, although represented by only five examples, first appear in the Terminal Classic, coincident with trough and flat metates. The ceramic *comal* first appears at Actuncan and Xunantunich in the Terminal Classic, and although very rare, this initial appearance coincides with the adoption of flat and trough metates. This coupled technology is a tortilla-production assemblage, probably introduced from highland Mesoamerica (Biskowski 2000). Another key observation is that all mano

Table 1. Ground Stone Mano-Metate Counts, Cubic Meters Excavated, and Ratio Density for Three Time Periods.

Context	Terminal Preclassic ^a			Late Classic			Terminal Classic			Total		
	<i>N</i>	m ³	Ratio	<i>N</i>	m ³	Ratio	<i>N</i>	m ³	Ratio	<i>N</i>	m ³	Ratio
Palace	1	2.97	0.34	7	36.08	0.19	6	26.05	0.23	14	65.10	0.22
Elite	9	62.59	0.14	12	31.31	0.38	12	55.21	0.22	33	149.10	0.22
Common	12	34.91	0.34	43	37.04	1.16	22	36.34	0.61	77	108.28	0.71
Total	22	100.47	0.22	62	104.42	0.59	40	117.59	0.34	124	322.48	

^a Includes Early Classic.

and metate morphological forms are found in both commoner and elite household contexts at Actuncan, indicating no restriction in access or knowledge about grinding technologies.

Household Surplus Production as Measured by Grinding Intensity

We chart the intensity of grinding in commoner, elite, and palace household contexts across three major time periods by quantifying the relationship between mano-metate counts ($n = 124$) and total cubic meters of excavation matrix with our density measure (Table 1). The palace complex was residential only in the Late Classic; therefore, the density of ground stone for the palace in the Terminal Preclassic and Terminal Classic periods does not reflect household production. In comparing grinding intensity by time periods, commoners ground twice as much as elites in the Terminal Preclassic, and by the Late Classic period, commoner grinding intensity more than tripled while elite grinding intensity doubled. Grinding is also recorded at the palace complex in the Late Classic, where noble feasting and the processing of inorganic substances at the palace complex have been documented by geochemical analyses of plaster floors (LeCount et al. 2016). A functionally distinctive ceramic assemblage at the palace also indicates an attention to cooking and storage of food stuffs, possibly related to tribute owed to Xunantunich in the form of cooked food and dried staples (LeCount and Lawhon 2020). In the Terminal Classic, commoner grinding intensity declined dramatically, becoming somewhat more equitable with elite grinding. Ground stone at the abandoned palace is found in termination deposits, a ritual destruction perhaps

concurrent with public ceremonials involving food preparation.

When the totals of all household contexts are combined, grinding at Actuncan reaches peak intensity in the Late Classic and then declines in the Terminal Classic. Although Actuncan's population also peaked in Late Classic times, there is little reason to think that individual households consumed substantially more food per person. More likely, households increased grinding intensity to produce a surplus for consumption elsewhere. Although Actuncan's elite households were the likely recipients of some commoners' surplus, we suggest that a large portion of this increased grinding was necessary to meet tax demands. The scale of Actuncan's taxes would have increased dramatically at this time because Xunantunich itself owed tribute to overlords; this increase is similar to that seen at Motul de San Jose (Emery and Foias 2012). Market exchange also would have stimulated surplus production.

One way to untangle the degree to which households produced surplus for market exchanges versus taxes/tribute is by removing one exchange mode from the equation. This calculation can be approximated by viewing the decrease in production from the Late to Terminal Classic periods, when Actuncan's tax/tribute burden would have diminished substantially due to the decline of regional political hierarchies. The significant decrease in commoner grinding from 1.16 pieces per cubic meter in the Late Classic to 0.61 in the Terminal Classic signals the reduction of surplus production by almost half. We suggest that this decrease is representative of the decline in taxation and tribute demands, given that market exchanges continued in the Terminal Classic. We do not know whether

the local market vendors offered household products as ground meals, cooked food, or both. The selling of cooked foods did occur elsewhere; for instance, the Calakmul mural shows the selling of tamales in a market (Carrasco Vargas et al. 2009). Tribute demands would have required transporting goods for long distances; therefore, staple food items, particularly maize, or inorganic items such as pigments, were most likely transported as ground materials.

Conclusions

In sum, all households at Actuncan were engaged in grinding activities, the vast majority of which was probably maize-based food. Regardless of what was ground, commoners always ground more than elites, but intensity peaked in all households in the Late Classic, after which it declined. Population change is not a factor in the decline, given that production metrics are calculated as a function of household construction and occupation volumes by time period. Actuncan's demographics do change, but agricultural fields show improvements (LeCount et al. 2019) and public construction continued into the Terminal Classic (Mixer 2017). Therefore, we suggest changes in grinding intensity were due to shrinking tax/tribute demands from declining regional political hierarchies. Although markets played an important role in ramping up food production in the Classic period, the intensity of market production is difficult to calculate because it is more strongly intertwined with domestic rather than political economies. Community patterns of ground stone manos and metates, an underinterpreted artifact set in Mesoamerican archaeology, reveal the location and intensity of household surplus production. With careful sampling, these ordinary tools are one means to identify changing aspects of ancient embedded economies.

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Data Availability Statement. All artifacts are curated at the Clarissa Falls Eco-Resort, Belize. For requests to access collections, contact Lisa LeCount. Annual Reports of the AAP are available as downloadable documents at <https://lecount.people.ua.edu>.

Competing Interests. The authors declare none.

References Cited

- Biskowski, Martin
2000 Maize Preparation in the Aztec Subsistence Economy. *Ancient Mesoamerica* 11:293–306.
- Cap, Bernadette
2015 How to Know It When We See It: Marketplace Identification at the Classic Maya Site of Buenavista del Cayo, Belize. In *The Ancient Maya Marketplace: The Archaeology of Transient Space*, edited by Eleanor M. King, pp. 111–137. University of Arizona Press, Tucson.
- Carrasco Vargas, Ramón, Verónica A. Vázquez López, and Simon Martin
2009 Daily Life of the Ancient Maya Recorded on Murals at Calakmul, Mexico. *PNAS* 106:19245–19249.
- Delu, Antonina M.
2007 *The Ground Stone Tools of Caye Coco, Belize*. Institute for Mesoamerican Studies Occasional Publication No. 12. State University of New York, Albany.
- Emery, Kitty F., and Antonia E. Foias
2012 Landscapes, Economies, and the Politics of Power in the Motul de San Jose Polity. In *Motul de San Jose: Politics, History, and Economy in a Classic Maya Polity*, edited by Antonia E. Foias and Kitty F. Emery, pp. 401–418. University Press of Florida, Gainesville.
- Foias, Antonia E. (editor)
2013 *Ancient Maya Political Dynamics*. University Press of Florida, Gainesville.
- Hirth, Kenneth G.
1996 Political Economy and Archaeology: Perspectives on Exchange and Production. *Journal of Archaeological Research* 4:203–239.
- LeCount, Lisa J., and Taylor D. Lawhon
2020 To Have and to Hold: Formal and Stylistic Analyses of Ceramic Assemblages from the Noble Palace at Actuncan, Belize. *Research Reports in Belizean Archaeology* 17:319–327.
- LeCount, Lisa J., Chester P. Walker, John H. Blitz, and Ted C. Nelson
2019 Land Tenure Systems at the Ancient Maya Site of Actuncan, Belize. *Latin American Antiquity* 30:245–265.
- LeCount, Lisa J., E. Christian Wells, Thomas Jamison, and David W. Mixer
2016 Geochemical Characterization of Inorganic Residues on Plaster Floors from the Palace Complex at Actuncan, Belize. *Journal of Archaeological Science: Reports* 5:453–464.
- LeCount, Lisa J., and Jason Yaeger (editors)
2010 *Classic Maya Provincial Politics: Xunantunich and Its Hinterlands*. University of Arizona Press, Tucson.

- Masson, Marilyn A., and David A. Freidel
2012 An Argument for Classic Era Maya Market Exchange. *Journal of Anthropological Archaeology* 31:455–484.
- McGovern, James O.
1993 Survey and Excavation at Actuncan. In *Xunantunich Archaeological Project, 1993 Field Report*, edited by Richard M. Leventhal, pp. 102–127. Report on file at the Belize Institute of Archaeology, Belmopan.
- Mixter, David W.
2017 Collective Remembering in Archaeology: A Relational Approach to Ancient Maya Memory. *Journal of Archaeological Method and Theory* 24:261–302.
- Perez, Don C.
2011 Mapping Actuncan. In *Actuncan Archaeological Project: Report of the 2010 Season*, edited by Lisa J. Lecount and Angela H. Keller, pp. 10–14. Report on File at the Belize Institute of Archaeology, Belmopan.
- Salberg, Daniel J.
2012 Mapping Actuncan during the 2011 Field Season. In *Actuncan Archaeological Project: Report of the 2011 Season*, edited by Lisa J. Lecount and John H. Blitz, pp. 24–31. Report on File at the Belize Institute of Archaeology, Belmopan.

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