The Managed Mosaic

Ancient Maya Agriculture and Resource Use

Edited by
SCOTT L. FEDICK

UNIVERSITY OF UTAH PRESS

SALT LAKE CITY

∞ Printed on acid-free paper

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

The managed mosaic : ancient Maya agriculture and resource use / edited by Scott L. Fedick.

p. cm.

Papers presented at the Conference on Ancient Maya Agriculture and Biological Resource Management, held Aug. 22–24, 1991, University of California, Riverside.

Includes bibliographical references (p.) and index.

ISBN 0-87480-519-8

1. Mayas—Agriculture—Congresses. 2. Mayas—Hunting—Congresses. 3. Mayas—Economic conditions—Congresses. 4. Irrigation farming—Mexico—History—Congresses. 5. Irrigation farming—Guatemala—History—Congresses. 6. Subsistence economy—Mexico—History—Congresses. 7. Subsistence economy—Central America—History—Congresses. 8. Mexico—Antiquities—Congresses. 9. Central America—Antiquities—Congresses. I. Fedick, Scott L., 1956– . II. Conference on Ancient Maya Agriculture and Biological Resource Management (1991 : University of California, Riverside)

F1435.3.A37M35 1996

338.1'097281—dc20

96-21015

Critical Resource Control and the Rise of the Classic Period Maya

ANABEL FORD

The Classic period Maya have been viewed as an anomalous civilization because they emerged in a tropical setting. But are the Maya unique? Complex civilizations are built on an agricultural base, centered on the control of resources, dependent on scheduling between agriculture and public works, and involved in a cycle of integrating growing populations. Such is the case with the ancient Maya. True, the resource base is unique when compared with other civilizations that developed in more arid contexts, but the foundation remains the same. What we need to do is examine that foundation, the resource base of the Maya.

I suggest that there are four major variables that contribute to the development of complexity: (1) overall resource productivity, (2) local resource control (3) resource diversity, and (4) critical resource control. While these factors, together, are key to the evolution of complex societies, the source of power largely depends on the effective hierarchical control and management over critical resources. Critical resources are those related directly to subsistence.

The governing hierarchy, monopolized by the elite, has a vested interest in resources and labor, from which its power is derived. The effectiveness of resource control in complex societies is associated with the nature and distribution of resources. Concentration of resources facilitates the control of production and provides for the direct control of labor. In contrast, dispersed resources scatter the population and labor base. Scattered populations are more difficult to control in terms of production and labor, the mainstay of the elite.

The central Lowland Maya economic landscape is a mosaic of dispersed subsistence resources (Fedick and Ford 1990). Primary well-drained uplands, the single most important resource in the Maya region, occur in small and large patches composing 15–50 percent of the overall area of the region (Figure 18.1a)

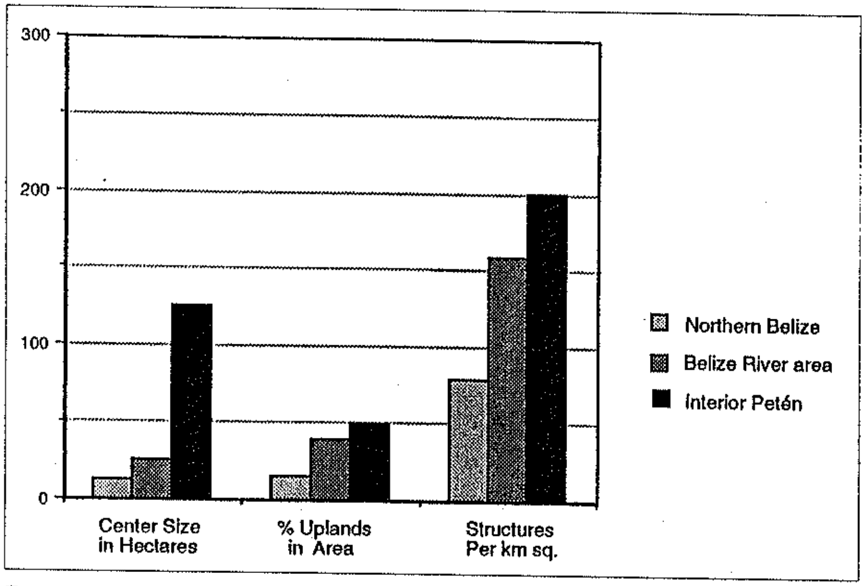

FIGURE 18.1 (a) Center size, uplands, and structure density in three areas of the Maya Lowlands.

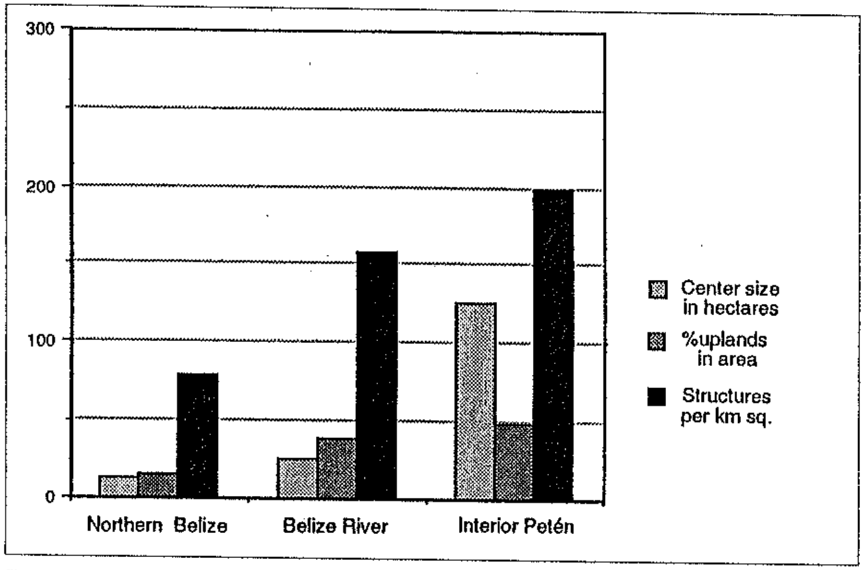

FIGURE 18.1 (b) Comparison of three areas of the Maya Lowlands. Center sizes are derived from R. F. Carr and Hazard (1961), Ford (1991, and current research), and Hammond (1985). Land resource and settlement density figures are from Fedick and Ford (1990).

Settlement and population are distributed in proportion to available uplands (Figure 18.1b). Given the dispersed nature of settlement, the major problem that faced the ancient Maya was that of labor control. Dispersed settlements are inherently difficult to manage, and dispersed production, difficult to centralize. How were labor and production mobilized by the elite hierarchy? An important way for the elite to effectively mobilize a dispersed population is through the control of critical resources—those resources directly related to subsistence.

The association between the available uplands and settlement density is roughly linear, but the association between these and labor investment in public architecture at major centers is not. Comparing public centers in northern Belize and the Belize River area, we find that there is a size differential that relates to the relative proportion of uplands and settlement density (Figure 18.1b). Nohmul, one of the larger centers in northern Belize, covers about 13 ha (Hammond 1985), while El Pilar, in the Belize River area, covers more than 25 ha (Ford 1991, and current research at El Pilar; Ford and Fedick 1992). The size and area of El Pilar is at least double that of Nohmul. Correspondingly, settlement density around El Pilar is double, and the amount of available uplands is more than double that of Nohmul. Obviously, in these cases there is a general relationship between center size, settlement size, and primary agricultural resources.

When we turn to a comparison of the Belize River area to that of the interior Petén, however, we find a contrast that does not follow linear trajectory. The center of Tikal, in the heart of the Petén region, covers over 125 ha (R. F. Carr and Hazard 1961), five times the size of El Pilar and ten times the size of Nohmul. This dramatic difference in size is not consistent with either settlement density, which is only 33 percent greater than the Belize River area, or available uplands, which are only 25 percent greater. The disproportionate investment in the public realm, represented by the monumental size of Tikal, demonstrates a significant difference in labor control by the local hierarchy when compared with surrounding areas of the lowland Maya region. This control was the result of their power.

How did Tikal and other interior Petén centers consolidate their power so effectively? The major clue to this question is found in the distribution of water in the region. The water regime in the Maya Lowlands is divided into the wet season and the dry season. A large portion of the 2,000 mm average rainfall per year occurs between June and January. The dry period between January and June gets little rain. The driest period runs from March through May, with evaporation peaks in April and May (Instituto Geográfico Nacional 1972:3.6). Farming activities traditionally have been structured around the weather regime, with cutting and burning in the dry season and planting and reaping in the wet season.

In addition to the long annual period of desiccation, surface water is variably distributed in the region. Perennial rivers drain the eastern and western perimeters of the lowlands, and a string of permanent lakes stretch across the fault zone of the central Petén. The interior Petén around Tikal, however, is devoid of surface water, having no natural rivers and no permanent streams. Drainage catchments are found in the closed-depression swamps that hold standing water in the wet season due to their deep, impermeable clays, but desiccate completely in the dry period to a useless cementlike hardpan.

The weather pattern of the Maya Lowlands makes for a seasonal deficit of water at the height of the dry season, creating a serious drinking-water problem at that time. Clearly, the seasonal water shortage presented a major obstacle in the past, especially in the interior Petén. Correspondingly, the interior Petén was the last area of the lowlands to be settled in the pioneering developmental period and the first to be abandoned with the local collapse of the Maya civilization.

The water problem has continued to loom large in more recent times. After several unsuccessful attempts to locate the water table, the University of Pennsylvania archaeological project of the 1950s and 1960s finally reactivated the ancient Maya drainage and water collection system that directed water off the centers, plazas, and temples into reservoirs (Dimick 1968:101–10). These Maya reservoirs, or *aguadas*, continue today as the most reliable water sources for the area.

Drinking-water sources impacted archaeological survey projects as well. In William Bullard's 1958 field notes, there is constant reference to ancient Maya reservoirs used in his dry-season survey. Dennis Puleston's mid-1960s survey also employed outlying minor centers' reservoirs for drinking water. Further, all the dependable water sources I used on my 1978 Tikal-Yaxha intersite survey (1986) were reservoirs located at ancient Maya centers. Therefore, it is not surprising that interviews with Tikal National Park service rangers indicate that all overnight campsites used on patrol are those with permanent water sources found at ancient Maya centers (Filipe Lanza, Park Ranger at Tikal, personal communication 1989). Lanza's map of camp locales correlates with Puleston's plots (1983:51) of minor centers around Tikal. Thus, the prehistoric Maya still control modern activities in the interior Petén with water.

Primary agricultural resources act as a centrifugal and decentralizing force on settlement and a disintegrating force on social organization. Settlements in the Maya Lowlands were dispersed into the large and small patches of good agricultural lands and appeared to be hierarchically structured by the available uplands (Figure 18.1b). Settlement form, type, and size were related to general landform (Ford 1986:82–91). Large patches of uplands had centers, and one of the largest patches of uplands in the Petén was around the center of Tikal. Settlement densities in the large patches were very high, averaging about 200 structures per km², and the residential units included the most complex elite groupings in the region (Arnold and Ford 1980; Ford and Arnold 1982). Smaller patches of uplands had correspondingly moderate settlement densities (100–150 structures per km²), lacking centers, but exhibiting the presence of elite residents. Secondary resource zones had simple settlements, absence of elite residents, and low settlement densities (under 50 structures per km²).

Thus, despite the scattering effect of the land resource base, there were strategic links between local areas through successive levels of elite management. This pattern demonstrates decentralized controls of agricultural resources that were monitored by the resident elite. The effectiveness of the elite hierarchy must have been delicately hinged on the mobilization of resources and activation of controls that provided the political ties among the local areas and communities to the major centers.

The dispersed nature of the elite hierarchy was inherently weak and could have had a destabilizing effect on population integration. Therefore, there must have been other mechanisms to effectively enforce controls on competing members of the elite. Consolidation of control in the interior Petén relates directly to the nature of critical resources, those resources that are vital to subsistence and discrete enough to be directly controlled by the elite. Control of such resources must have been exclusive and have involved both risks and capital investments, something only elites could muster. But the risks must have guaranteed elite control on the one hand and general social benefits on the other.

While agriculture was a focus of elite control for the Maya, as it was for complex societies in other areas of the world, the distribution of land in the Maya area is not sufficiently concentrated to manage directly. The critical absence of drinking water during the dry season, however, provided an important mechanism for control. Water is a daily subsistence need of humans. It is vital to dry-season subsistence and could be readily used as a control mechanism. Reservoirs are a very important part of the landscape of centers of the interior Petén region, such as Tikal, where a minimum of thirteen major reservoirs have been mapped (R. F. Carr and Hazard 1961). Reservoirs are discrete and controllable. This is especially the case when they are located and incorporated into the architecture of the major and minor centers of the ancient Maya. As part of the composition of centers, then, access to reservoirs could have been monitored and restricted. The centralized drinking-water resources could thus have solidified ties among members of the elite and served to integrate their constituent populations.

Risk and investment are part of the development of drinking-water reservoirs and include labor investment in the facilities, time lag for production, and potential structural failure. Reservoirs could be developed and maintained at centers by the elite management of peasant labor. Elite capital investment in the development of reservoirs would minimize risks of dry-season subsistence to all the populace and at the same time enhance the elite management's power base.

The critical absence of water for up to five months every year makes water storage an important social concern. In the interior core area, especially around Tikal, it was a matter of public works (Scarborough and Gallopin 1991). The presence of reservoirs ensured drinking-water availability in the dry season, and must have been a significant persuasion for reciprocal service on the part of the general farming peasantry in the form of produce and labor. Consequently, it is noteworthy that Maya nobles of the Classic period referred to themselves as Ah Nab, or "Waterlily People" (Schele and Freidel 1990:94), and water lilies form a critical part of the iconography of power.

Since the discovery and documentation of raised and drained fields in northern Belize and southern Quintana Roo (see Harrison 1982; Puleston 1978; B. L. Turner and Harrison, eds. 1983), where water lilies now grow, there has been the temptation to associate the water lily with this form of agriculture (see Puleston 1977), and it has been suggested that water lilies were evaporation-retardant plants (Schele and Freidel 1990:93). In fact, water lilies and other floating aquatic plants, like hyacinths and ferns, are major consumers of water; but while they need great amounts of water for survival, their life-cycle requirement acts to purify standing water by removing pollutants (Stewart et al. 1979; R. W. King 1979; Serfling and Mendola 1979; *Journal of the American Water Works Association* 1980:36; *Opflow* 1976).

Use of aquatic plants removes nitrogen, phosphorous, particles (sludge), organic chemicals, and heavy metals from sewage waters, precisely those aspects of water that are toxic to humans. Thus, aquatic plants significantly lower contaminants from the effluents, creating potable water. In addition to the essential purifying effects of aquatic plants in standing water, the necessary regular and periodic harvest of the plants for maintenance of the water supply can provide a very high-quality organic compost (Serfling and Mendola 1979:675). Such a system is important in resolving water-supply and sewage-treatment problems that face us today (R. W. King 1979:684) and certainly were faced by the Maya.

As a strategy to manage risks, investment in public works is a key to controlling a populace. Such public works can include construction of facilities to provide water for irrigation, drinking, or other important endeavors critical to subsistence. To initiate such projects requires a capital investment that cannot be readily borne by an ordinary subsistence farmer because of the labor time, the risk involved in experimentation, and the possibility of failure. Along with risk for the managing elite hierarchy, however, the investment must have the potential to yield a significant return in the form of the control of labor. We thus see the presence of centers, the highest settlement densities, and the highest ranking elite associated with a critical capital investment: reservoirs. Such reservoirs

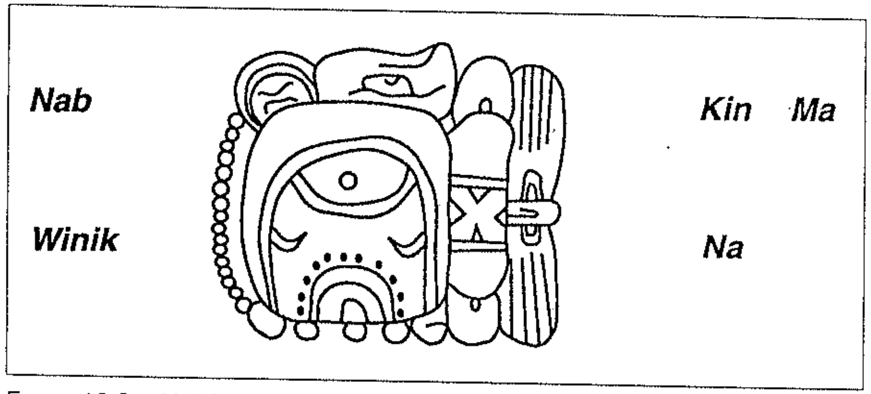

FIGURE 18.2 *Nab Winik Makina* (Water Lily Lord) in Mayan hieroglyphs, redrawn on the basis of Tikal Temple IV, Lintel 3 (C. Jones and Satterthwaite 1982:Figure 74).

would be magnets in the dry months for the surrounding populace in ancient Maya times, as they are for anyone living and working in the region today.

Ancient Maya occupation in the interior Petén always depended on access to and management of drinking water resources. Early on, the potential attraction of the fertile agricultural resources of the interior could not outweigh the dry-season water problems. Initial pioneering populations, forced away by increasing population from water-rich areas along rivers and around lakes in the Preclassic, dispersed widely into the interior. The initial occupants located and enhanced the natural water-collection areas. These pioneers overcame the obstacle of drinking water—a persistent seasonal problem in the interior region of the Péten to this day. By overcoming this serious problem, these pioneers set the stage for the *Nab Winik Makina* (Figure 18.2), or Water Lily Lords of the Classic period.