The Forest as a Cropscape: The Cultivated Legacy of the Ancient Maya

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Abstract Everything utilized by the ancient Maya of lowland Mesoamerica was derived from the resources of the Maya forest: agricultural fields, useful perennials, and habitats of the closed canopy forest. For pre-conquest Americans, including the Maya, cultivation was largely rainfall dependent, and land management was undertaken with human power, manipulated with tools of stone and fire. The Maya cultivated the entire landscape and relied on the dynamic relationship between fields and forest for all needs. Some two hundred years ago Malthus wrote that the choice appears to be between cultivated fields or forest; he was equating cultivable with *arable*, but arable correctly defined is *plowable*. Clearly, demand for cropped fields inherently reduces land covered with forests, and at the same time, it is assumed that more cleared land increases erosion and reduces fertility. This does not describe the Maya system. The agrarian Maya civilization was based on an intimate engagement with nature and the environment using labor, knowledge, and skill to direct vibrant growth toward human priorities. The expansion of the ancient Maya civilization in the tropical Mesoamerican lowlands across the millennia, exemplary long-term land management system: the milpa-forest garden. Using historic and prehistoric data, this paper demonstrates that the imposed narrative of the Western ecological imperialist limits the appreciation of the nature of land use in the tropics in general and the Maya forest in specific. Achievements of the ancient Maya chart a path for attaining the core of the United Nations Sustainable Development Goals. Health and well-being (SDG 3) as well as life on land (SDG 6, 13, 15) are dependent on useful forests and productive fields ensuring access to recourses and food sovereignty (SDG 2). Calling for a reassessment of the disparaged technology and culture based on what the Western vision sees as shifting agriculture uncovers the co-creative landscape promoting sustainable principles of land use.

Keywords Swidden · Milpa · Landscape · Maya Forest

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1 Introduction: What is a Cropscape?

The ancient Maya were an agricultural society whose growth and development provides ample proof of their sustainability. Yet the "mystery" of Maya civilization is promulgated as fact in Western narratives: emerging in an inhospitable environment and bound to fail, collapsing under the weight of environmental misuse. The Western ecological imperialist attitude persists in pejorative views of the tropics and shows reticence to discuss a successful example of human adaptations, such as the Maya, in the context of planning for a viable future. Exploring solutions past provides an adaptable model to address access to resources, water conservation, biodiversity, and food sovereignty. This requires the recognition of the Indigenous land-use practices and the intentions to coexist in the landscape; so we look to the Maya example.

Controversy surrounds the environmental legacy of the ancient Maya (Fig. 1). The notion that the tropics are fragile and cannot support agriculture contrasts with the enduring impacts of Maya lifeways, illegitimately described as environmentally destructive. Alternative lines of evidence, including a robust archaeological record spanning millennia of growth and long-surviving Indigenous understandings of forest ecology and food production, promote a revision. The evidence speaks to the great potential of the tropical woodlands for supporting populations without a loss to the long-term viability of tropical landscapes where the temperature has been moderated with land cover, biodiversity maintained in forests and fields, water conserved with the cycle, soil fertility managed with habitat diversity, and erosion checked with dynamic land cover.

The consequence is that the Maya forest today is the result of accumulated human selective priorities. Farmer decisions based on practical experimentation by generations, centuries, and millennia, were executed with labor and skill and founded on the experience of nature, especially its cycles, tolerances, and resilience. Cultivation of the Maya landscape is founded on the milpa forest garden cycle, including the use of domesticated plants and the selection of favored trees. This traditional environmental knowledge prioritizes the building of resilience and predictability in order to fulfill basic human needs. Forest gardens are intentionally and deliberately structured within the landscape, and the recognition of purposeful cultivation makes the Maya forest a cropscape. The endurance of this cropscape is the product of the cultivation of biological "capital."

Temperate zone preconceptions have colored, and continue to color, views of the tropics as unwelcoming, with unstable environments, mediocre soils, and lacking important resources. In fact, Indigenous food production strategies are typically framed in reference to what they lack when compared to temperate zone practices: metal, draft animals, and plows (Mt Pleasant, 2015). To transform what Gourou (1980) judges as useless tropical land into something beneficial for European-style cultivation requires that "only with correct techniques can [tropical soil] be permanently improved to yield good harvests." While such positions are being espoused, other observers see complex cultivation systems. An appreciation and value placed

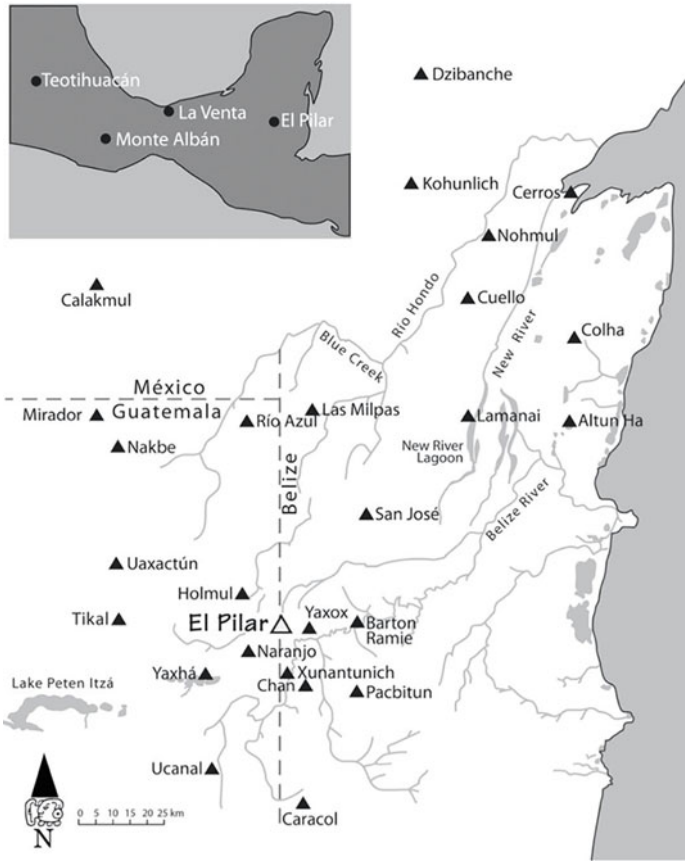

Fig. 1 Location of Mesoamerica and the Maya Area with relevant places indicated. *Credit* MesoAmerican Research Center

on traditional tropical agriculture (Altieri, 1987; Conklin, 1963; Dove, 1983) are the nexus of environment and culture, and cycles over time, sustaining life on land.

Contemporary development schemes envisioned and put into practice without local Indigenous input, and plantation monocultures and extensive pasturage are exacerbating environmental challenges. These unsustainable practices collectively raise temperatures, eliminate biodiversity, squander water, impoverish soil, and cause erosion. Reexamining and questioning the assumptions of land use in the tropics in general and the Maya forest in particular, this paper reassesses the disparaged technology and culture, belittled by Western colonials as shifting agriculture. The "invisible" co-creative cropscape of fields and forests becomes evidence of the sustainable benefits of Indigenous methodologies. Sustainable development goals parallel the natural outcomes of Indigenous production by addressing climate impacts,

conserving water, lowering the temperature, expanding the diversity and variety of crops, promoting food sovereignty, and securing sustainable life on land.

The path to attaining the core of the United Nations Sustainable Development Goals in the tropics needs to consider traditional Indigenous practices. Addressing the roots of climate change (SDG 13) is the foundation for health and well-being (SDG 3) as well as life on land (SDG 15). Useful forests and productive fields provide access to recourses, including water (SDG6) and ensure food sovereignty (SDG 2). The examination here calls for a reassessment of the disparaged shifting agriculture, using the co-creative landscape of the Maya to promote sustainable principles of land-use.

2 Background: Ancient Mesoamerica and the Maya

The contemporary Maya forest is a hotspot of biodiversity known for its remarkable abundance of useful plants (Chazdon, 2014; Gómez-Pompa & Kaus, 1992; Mittermeier et al., 2000). Modern forests' inventories represent the residual of past transformations, first by the selection process of the ancient Maya and then, with the Spanish conquest, from the continued imposition of foreign land-use strategies: pasturage and plows, where once only human labor and skill had existed. This misunderstanding is the basis for assuming the collapse of civilization and relating it to deforestation (Binford et al., 1987; Rice, 1976; Turner & Sabloff, 2012). I propose that the Maya forest is a cropscape. The scope of managed forest products, and the role of the Maya in forest maintenance, are apparent in role of the dominant plants (Table 1; see Balick et al., 2000; Campbell et al., 2006; Fedick, 2020; Ford, 2008; Roys, 1931).

The ever-changing fluctuations of the ancient Maya cropscape are contingent on the intentional management of the relationship of fields to forests. Based on the Western narrative, demand for fields inherently reduces forest cover, and generally the more cleared land increases erosion and reduces fertility (Webster, 2002). Principles that agricultural projects around the world promote are the basis for the dire predictions of E. O. Wilson in his *Future of Life*, and the underpinning of the Belize Valley soil study (Birchall & Jenkin, 1979). In the search for cultivable lands, development focus lies blindly on only *arable* land. Arable lands are cultivable but cultivable lands include much more than those which are plowable. Traditional land use is largely based on human labor (see Bray, 1994). These conflicting perspectives devalue the importance of traditional knowledge.

Reimagining the Maya forest as a landscape of resources developed by land-use decisions for the long-term is a new way of appreciating the ancient Maya methods. To accomplish this, we need to consider debates and misunderstandings about past forest use as the received wisdom of ecological imperialism (Crosby, 1986). Popular views state the Maya people outstripped their environment in the quest for resources (Diamond, 2005). This assumption originates from interpretations of accounts by early Spanish conquistadors, who saw the forest as impenetrable. They were used to

Table 1 The top twenty dominant plants of the Maya forest

Scientific name	Common name	Pollinator	Primary use
Alseis yucatanensis	Wild mamey	Moths	Food
Aspidosperma cruentum	Malerio	Insects	Construction
Attalea cohune	Corozo	Insects	Oil
Brosimum alicastrum	Ramon	Wind	Food
Bursera simarouba	Chaca	Bees	Medicine
Cryosophila stauracantha	Escoba	Beetles	Production
Licania platypus	Succotz	Moths	Food
Lonchocarpus castilloi	Manchich	Insects	Construction
Manilkara zapota	Chicle	Bats	Food
Piscidia piscipula	Jabin	Bees	Poison
Pouteria campechian	Mamey criolla	Insects	Food
Pouteria reticulata	Zapotillo hoja fina	Insects	Latex
Sabal morrisiana	Escoba	Insects	Production
Simira salvadorensi	Palo colorado	Moths	Instruments
Spondias radlkoferi	Jocote	Insects	Food
Swietenia macrophylla	Mahogany	Insects	Construction
Tabebuia rosea	Macuelizo	Bees	Construction
Talisia oliviformi	Kinep	Bees	Food
Vitex gaumeri	Yaxnik	Bats	Construction
Zuelania guidonia	Tamay	Bees	Medicine

eating beef daily, and merely tolerated local maize. There was no appreciation for the diversity of the Maya forest as a garden (Schwartz, 1990). The conquistadors' success in provisioning their armies belies perceptions of a useless landscape (Cortez, 1971; Diaz, [1568], 1927). By acknowledging the bounty relied on during their brutal conquest, we dismantle the received perspective and begin examining ancient Maya cropscapes free from its bias.

3 The Cropscape of the Maya Forest

When Maya agricultural techniques are viewed through a Western European filter, forest and field become opposites—the expansion of one comes at the expense of the other. Crops need open space, and more forests must be cleared to support growing populations. How could the ancient Maya maintain the forest while continuing land clearance for agriculture? Environmental destruction is at the core of reputed causes of the Classic Maya collapse in the ninth century, with some researchers suggesting the Maya are reenacting the story today (Townsend, 2009; Turner & Sabloff, 2012; Webster, 2002). The destructive "slash-and burn" system, as supposedly revealed by satellite imagery, is seen, without question, as the root of contemporary threats to the forest. These satellite images clearly expose the expansion of cattle pasturage and plowed fields, not the smallholder milpa farming characteristic of traditional agriculture (Fig. 2).

There is no reservation that land use intensification came with ancient Maya development, but the question of how that was accomplished remains unaddressed. Archaeological data show a steady increase in residential sites that reflects population growth, and many archaeologists imagine this landscape overrun by people and fields. Importantly, there is clear archaeological evidence of centuries of steady growth and expansion of monumental civic centers, denoting the smooth operation of a hierarchical system. How can this system grow if the environment is at risk? This is an important issue and bears on the present and future of the Maya forest in terms of conservation and development.

The ancient Maya cleared fields with hand tools, managed lands with skill, and used knowledge of fire to develop their landscape. These adaptations are integral to the human–environment relationship (Fedick, 2003, 2010; Gómez-Pompa & Kaus, 1992; Graham, 1999; Martinez-Reyes, 2016; McNeil, 2012; McNeil et al., 2010). This system sustained the Maya over millennia of growth and development, demonstrated by the well-known chronology of the Maya civilization (Ford & Nigh, 2015). The archaeological remains indicate settlements expanded and centers grew, land use was intensified. Farming settlements were established founded on resource management and the hierarchy at the civic centers was dependent on the farming populace (Ford, 1986). The source of Maya wealth lay in their landscape and how it was managed, thus the maintenance of that landscape was essential. Land use intensification was achieved with labor, skill, and knowledge. Maya civilization grew with consistent, predictable, and reliable resources.

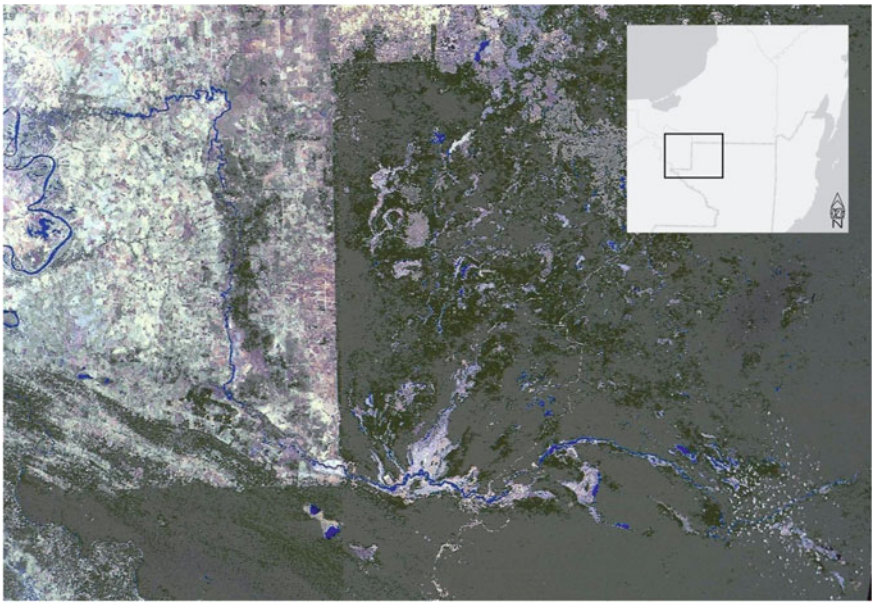

Fig. 2 National air and space administration landsat composite image 1986–1988 showing the impact of pasture and plow at the Mexican-Guatemala border, with inset location. Satellite image produced by NASA https://www.nasa.gov/mission_pages/landsat/news/40th-top10-mexico-guatemala.html. Compiled by MesoAmerican Research Center

Ancient Maya settlements were located among resources necessary to meet the regular needs of their lives. Everyday belongings used to fulfill routine household activities were in the orbit of the household. From the mundane to the esoteric, to the vernacular and the ritual, these daily activities were the fundamentals of the household economy. Food and condiments were a daily requirement for energy. Kitchen supplies, cooking utensils, and home furnishings were essentials for maintaining daily activities. Clothing, shelters, and tools were also essential. House construction and maintenance, as we all know, would be constant. Constructing and maintaining dwellings sourced perishable building materials from the nearby forests, directed second growth, and mature closed canopy. (cf. Arvigo & Balick, 1993; Balick et al., 2000; Cook, 2016; Roys, 1952; Wauchope, 1938). In short, everything we do on a regular basis would be stocked from the fields, gardens, and forests. The diversity of needs met by the products of the Maya milpa cycle provide solutions to address disparities identified in the UN SGDs in the world today.

4 Crop Stocks of the Maya Forest

The traditional milpa cycle opens the forest to emphasize annual crops while conserving useful trees of the forest. Fields are replete with many crops, selected by farmers from a basketful of over 100 potential choices (Ford & Nigh, 2015). Managed for useful plants that fix nitrogen and provide herbs, spices, and medicine—as well as attracting pests from menacing crops—fields cleared with fire provide access to sunlight for domesticated annuals that ripen in months. Edible plants are found in every habitat: Fedick counts nearly 500 indigenous food plants, from grasses to trees, providing a considerable range of choices for traditional Maya farmers. Fedick (2020) attests that more than 60% of edible plants are shrubs, trees, and palms. These plants are found in the forests and gardens, in shaded or sunny environs, and their harvests are important components of the Maya cropscape. Many trees of the domesticated cropscape tolerate, and even proliferate, in response to the cutting and burning humans use to build forest gardens (Ford et al., 2021; Gammage, 2011). Thus, the cycle initiates with deliberate clearing for fields, and is followed by consistently favoring preferred trees and nurturing useful volunteers (Ford & Nigh, 2015).

A varied mosaic of staggered stages created by generations of farmers emerges from interaction with the landscape, encouraging economic values that become the cropscape. Selection is part of the opening of a suitable field, and slope and drainage are critical factors (Ford et al., 2009). Areas too steep or too wet, making up about 40% of the region, are consequently avoided (Dunning et al., 2002; Fedick & Ford, 1990). Such habitats would be maintained as part of the perennial component for the extraction of plants and animals. On average, open fields are developed in approximately 20% of the landscape at any one time (Ford & Clarke, 2019). The remaining 80% of the area would be maturing as the forest garden, divided between maturing perennial and the established closed-canopy mature forest. Perennial generation would take at least 16 years, making the complete milpa-forest garden cycle last a minimum of 20 years. The resultant patchwork matrix would supply the varied economic needs of residents, serving as a storehouse for use on demand.

Every stage of the cropscape, horizontally and vertically, offers utility for the commons of society: home gardens, fields, regenerating second growth, and mature forests (Atran, 1993). Plants are recognized for utility, directly for human consumption or indirectly as landcover. Plants supply food, shelter, shade for temperature and water conservation, and to provide animal habitats. In a word, all household needs—at the daily, monthly, annually, and generational timescales—were supplied from the managed biodiverse cropscape that inhibits erosion and enhances soil fertility to maintain a life of land (SDG 15).

Forests are also homes for animals. Archaeological data show that deer remains were consistently present in household middens, suggesting the ready availability of meat protein. Deer habitat is enhanced by a varied and diverse patchwork of forests and interspersed fields, which create ecotones containing many resources. The supply of deer, the conquistador Diaz ([1568], 1927) observed, were “innumerable and so tame almost to come to our hands [and] in very little space of time we killed above

20." The deer themselves were not domesticated, but the landscape they inhabited was, managed for food sovereignty (SGD 2).

Additionally, the caretaking of the local honeybees, *Melipona* spp., never fully domesticated, at ease living in the forests as well as in gardens. Known for their expertise at the time of the conquest as beekeepers, the Maya were confident beekeepers, recognizing bees in the forest: *K'axil kab*, and, like the deer, were part of the cropscape. As with all bees, they would need a consistent supply of water and flowers for the production of honey and wax, prized by the colonial powers as tribute (Farriss, 1992; Jones, 1977). This is possible when winter never comes (Bates, 1952). Bees thrive in a healthy environment, an essential indicator of ample water (SDG 6), with moderate temperatures and a diversity of flowers for year round pollination (SDG 13).

Materials for kitchen tools and containers, fibers and colorants, toys and instruments, burden baskets and hammocks, necklaces and head gear, and constant construction and maintenance all derive from the management of the cropscape. Fuel selection considers size, burning qualities, and the destination of use—in hearths or kilns, for smoking or charcoal, or for use as kindling (Cook, 2016). Long-lived palms, representing as much as half the forest trees, have a myriad of economic uses and are literally subsidies from nature (McKillop, 1994; cf. Anderson et al., 1991). This biological capital provides a wide array of essential products: beverages, building materials, cosmetics, feeds, fertilizers, food, fuel, medicines, oils, ritual materials, roofs, and shelters. Medicinal plants of the Maya pharmacopeia are found in home gardens and milpas, in succession forest plots, and in the deep shade of the mature canopy. Forests are the pharmaceutical commons. Remedies cover most general ailments encountered in the household. Medicine/poisons are managed carefully and prescribed in doses refined by trial and error through time, such as Cola de Faison for sore throat and Chaya for vitamins and protein (See Arvigo & Balick, 1993; Cook, 2016, Schwarcz et al. 2021). This provides a snapshot of the products available through the careful management of the cropscape (SDG 3).

A dependable cropscape results from interacting with and maintaining the life on the land (SDG 15). The interactions of people with forests and fields, based on farmer choices and plant adaptations, produce the forest garden. Developed over successive generations of trial and error, the resultant cropscape of adaptable annuals and perennial plants is managed with sophisticated skill and environmental knowledge. This is an intensive land-use system of agroforestry that engages with natural processes to minimize risk over time and maximize production across space.

Maya forest garden practices evolved for flexible and changing land cover to ensure cycling and staggered conversion from annual crops to perennial trees at all times (Ford & Nigh, 2015). The mosaic of land cover moderates rainfall variations and builds soil fertility with each phase of the high-performance milpa field development (Handelsman, 2021; Wilken, 1987). The system retains significant complexity, dependent on the landscape gradients from field to forest. Without clearing to initiate the annual milpa polyculture field, there would be no opportunity to select and stock the forest with useful trees (see Table 1). The managed, mixed cropscapes result from integral perennial investments in the milpa forest garden. Dependent on the

knowledge and skill of cropscape managers, the horizontal and vertical distribution of forest products are sustained within the milpa forest garden cycle.

5 Distribution of Forest Cropscapes

The karst limestone platform that influences the topography of the Maya forest is essential for adaptable agricultural practices, traditional knowledge of the earth remains vital for its successful management and adaptation to climate change. Drainage features and water distribution reflect the local variations in the porous and absorbent limestones. Rainfall averages vary from 500 mm in the northwest Yucatan Peninsula to 4000 mm in the far south; the central area around the ancient sites Tikal and El Pilar receives 1500–2000 mm a year (West, 1964; White & Hood, 2004). Land cover over the limestone base varies depending on local climate, rainfall, and soil conditions (Beach et al., 2006; Dunning et al., 1998).

Within the Maya region, seasons refer to traditionally observed annual precipitation. Farmers in the Maya area, however, recognize two rainy periods. The first is a warm wet period, called *Chaak Ikal* for the thundering wind and hurricanes. This is followed by the *Ikal Ixpelon*, the cool wet period associated with *nortes*, or storms derived from the eastern US. The shortest period is the dry period, *yaxk'in*, noted as the time for preparing the milpa field. Understanding the climate patterns and adjusting to changes are essential to the millennial practices of the Maya (SDG 13 & 15).

The porosity of limestone causes rainwater to seep into subterranean flows, thus limiting access to water on the surface (Ford, 1996; Lucero, 2003; Scarborough, 1993, 2003). Rain drains from the hills, ridges, and escarpments to collect in depressions across the region. These variations of karstic topography and water access generate the four general ecosystems and habitats from uplands to wetlands that provide vital resources used by ancient and modern people in the southern lowlands. Knowledge of these general environmental zones impact access to water (SDG 6).

To visualize the cropscapes of the ancient Maya, we must turn to the well-drained uplands, where residential units were the most dense with 35–70 primary residential units per km^2 (Ford & Clarke, 2019). These densely settled residences would be surrounded by complex infields forming an agro-urban landscape (Fisher, 2014; Isendahl, 2002, 2012). The Maya term *Otoch K'aax* refers to the forest as home (Atran, 1993). Traverses from residential hubs to outfields would cross varied habitats of the lowlands and wetlands, allowing residents to accumulate an understanding of the cropscape, honing observations of supplies, habitats, and environmental changes.

The vertical tiers of the Maya forest hold a remarkable variety and abundance of useful plants (Balick & Arvigo, 2015; Campbell et al., 2006; Gómez-Pompa et al., 2003; Ross, 2011; Roys, 1931). The crops of the forest materialize from the shade and sun of home gardens, the sunny milpa fields of annuals and perennials, (Kellman & Adams, 1970) and shady mature closed canopy forest. The forest and garden tiers

give rise to a vertical diversity of crops from the ground cover, understory bush, shrubs and palms, and canopy trees.

Tropical rainfall guarantees exuberant plant growth, and the intentional management of that growth, with constant selection, intervention, and engagement with natural process creates the cropscape. Vertical diversity develops in one space over time, progressing from the field to forest, making room for layers composed of trees, palms, shrubs, grasses, vines, epiphytes, and forbs (Ford, 2008). Maya management strategies imposed priorities and preferences on the landscape, and the plants adapted to the pervasive human management style. This is evident in the frequency of re-sprouting among trees and the establishment of entire plant communities that respond well to cutting and burning (e.g., Attlea spp., see Anderson et al., 1991). The cropscape unfolds as a co-creative process of people living in the woodlands (Toledo, 1994).

Human impacts on the Maya forest in the past, as well as the present, are likely to have reduced overall diversity. Botanists indicate that the Maya forest has lower biodiversity than the Amazon forest (Campbell et al., 2006; Mittermeier et al., 2000). Given the dense ancient Maya settlements, it is not surprising that they had impact on biodiversity reflected in the forest today. In fact, a high proportion of plants have been recognized economically by economic botanists (Campbell et al., 2006; Ross, 2011). Areas of highest settlement density reveal homogeneity, in contrast to the Amazon. Outfields with low settlement density are less homogeneous. Maya resource management strategies worked with the forest landscape, prioritizing utility in the short-term that, in the long-term, developed a cropscape by working within the natural cycles. The short term daily needs of families and long term management goals are key to life on the land (SDG 15).

Over time, field crops give way to first low, and then high, shady forest crops. Pioneering plants gain dominance after a short phase of the milpa field, and the natural regeneration cycle transforms the field from annuals to perennials. Neither abandoned nor fallow, this phase of the cycle demands continuous care in the selection and direction of growth for the useful cropscape qualities. This is the steppingstone where the farmer's choices guide the nature of land cover to meet social and economic needs (Chazdon, 2014; Guariguata & Ostertag, 2001).

The Maya land use system creates a horizontal and vertical matrix of diverse assets that make up the cropscape. Basic household materials, medicinal plants, fruits and spice trees, and important agricultural products and forest animals underwrote the Maya life. Equally, the forest was a source of wealth and prestige. Colored birds and prized felines were esteemed for ornamentation, regalia, and display. The investment in forest products and intensive land management resulted in a dependable and varied cropscape that has endured to this day (cf. Armstrong et al., 2021).

6 Reflecting on the Value of Cropscapes

Recalling that the Maya forest is a biodiversity hotspot (Mittermeier et al., 2000), that the dominant plants of the Maya forest are all useful, and that there are around 500 edible plants used by the Maya today, underscores the results of management practices of the ancient Maya. Daily investments in Maya forest gardens are subtle and even inconspicuous, construed as wild by ecological imperialists. Investments are made incrementally, initiated by farmer priorities to enhance desirable habitats and resources while remaining embedded in natural cycles (Ford & Nigh, 2015; see also Conklin, 1963; Dove, 1983). Agricultural fields, worked by hand, focused on rocky fertile soils to secure short- and long-term necessities in the cropscape. Water was conserved by the mosaic of landcover which minimizes evapotranspiration and erosion. Fields, dispersed in forested uplands and lowlands, were continually navigated, providing constant opportunities in the process of selecting and domesticating the landscape. The most visible to the ecological imperialist is the transient milpa field, with the rest of the cropscape misrepresented as abandoned.

Active and intensive investment in habitats for plants and animals enhanced life on the land. The distribution of field and forest resources created a diverse countryside that supported the economy of the Maya civilization. This is what the Spanish encountered when they first entered the region and mistook the exuberant tropical growth as unbridled chaos; not comprehending the cropscape essential to living sustainably in the forest.

Management skills and knowledge transformed the landscape into what we now can define as the cropscape. The Spaniards availed themselves of a landscape stocked with resources by long-term Maya investments, oblivious to its value and completely unaware of the impact of their actions and views. They ignored the cropscape that enveloped them and created misconceptions that endure, untested, to this day. This ecological imperialist attitude persists in pejorative views of the tropics and a reticence to discuss successful example of human adaptations, such as the Maya, in the context of planning for a viable future.

The Mesoamerican and Maya forest is a biodiversity hotspot that is the historical outcome of ancient Maya land use. With the expansion of ecological imperialism, the inappropriate and unsustainable “conventional” farming, based on cattle ranches and plowed monocrops, has expanded at the expense of the forest. This was not the trajectory of the ancient Maya, and there are lessons to be learned. Calls for conservation have promoted the creation of protected areas that restrict access to the forest and guarantee no Maya forest cropscape in the future. The real threat to the Maya forest is the loss of traditional Maya farming practices. Indigenous strategies, preserved in the archaeological record and documented by ethnography, illustrate the value of exploring the past to develop innovative solutions to address the critical sustainable development goals.

7 Sustainable Cropscapes in Review

Long-term land management is essential in the contemporary tropics, having endured extreme impacts from population growth and deforestation and are projected to host the highest levels of future population growth (Roberts, 2020). Tropical forests are regularly dismissed resource poor, inadequate to sustain large populations without substantial alteration. This is the attitude currently putting these environments at risk. At the same time, long-surviving food-production and land use practices, involving sophisticated understandings of forest ecology and the benefits of managing vegetation dovetail with the Sustainable Development coals outlined by the United Nations. The ancient Maya did indeed develop sustainable methods to support themselves in the tropics with land use principles, strategies, and practices that engage with food sovereignty (SDG 2), access to necessary resources (SDG 3), conservation of water (SDG 6), flexibility with climate change (SDG 13), and maintain biodiversity that enhances life on land (SDG 15). If we are looking for action to address climate change we need to look to practices and methods with local roots. These are time-honored answers to challenges of sustainability including lowering temperature, conserving water, building soil fertility, reducing erosion, and maintaining biodiversity (Handelsman, 2021). Local traditions developed from millennia of experimentation offer viable solutions for a sustainable future. The example of the Maya is one case among many worthy of application, and demonstrate the value of exploring solutions past to inform development programs and policies of the future.

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