

THE MAYAN HOME GARDENS OF YUCATAN, INTERMEDIATE OR ALTERNATIVE SYSTEMS?

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Two land-management systems based on opposite economic conceptions of resource use have co-existed in the Yucatan Peninsula since the arrival of the Spanish conquerors and they have given rise to different agro-systems. Under the term "modern systems" we can group those focused on commercial production that were established by the Spanish and later promoted following the Mexican independence. On the contrary, "traditional systems" would be those aimed at a subsistence economy which are the main elements of the Mayan productive strategy: the slash-and-burn itinerant maize (or maize-squash-beans) cropping, the home garden and the selective extraction of different products from the natural forest remnants.

At present, most "modern" systems have disappeared due to economic and environmental reasons, leaving behind a short-term economic wealth and a long-term ecological impact. The shallow rocky soils of the area, which precluded any technification, and competition with alternative products drove them to bankruptcy, while the degradation of natural forests in Northern Yucatan evidences their environmental unsustainability. However, traditional systems have survived until today allowing for the economic subsistence (though precarious) of Mayan families and for the conservation of ecological values.

The origins of Mayan home gardens of Northern Yucatan are rooted in the ancient knowledge about the management of semi-natural forests in the humid Southern Yucatan. There, intensive forest management systems aimed at horticultural production have been described as being widely distributed before the Spanish conquest. Thus, by the XVIth Century there were already home gardens in the area, though with a different structure to the present one. At that time, the indigenous peasants cultivated many neotropical species and had applied domestication processes to many other species brought from the semi-deciduous and evergreen southern forests. Since the conquest up to the present, the Mayan peasant has progressed further towards the incorporation of new species to the home garden, mainly citruses (*Citrus* spp.), banana (*Musa* spp.), tamarind (*Tamarindus indica*) and mango (*Mangifera indica*).

The present home garden is a very diverse and finely managed system. The study of 300 Mayan home gardens from 15 villages in the five economic zones of Northern Yucatan has shown: (i) the high tree and shrub diversity of home gardens, with a total of 156 species ($21,5 \pm 0,4$ by garden); (ii) the relevance of autochthonous plants in terms of species (75% from the Yucatan Peninsula vs. 6% from the Neotropics and 19% from the Old World) and individuals (48%, 13%, and 39% respectively); and (iii) the

preponderance of cultivated plants (64%). It has also been found that the home garden is rather resistant against changes in the economic situation, with minimum tendencies towards specialization-intensification or abandonment. In general terms, the home garden is a productive unit devoted to the provision of goods for the family use, and it is maintained irrespective of the economic activity of the rural family. The minimum inputs necessary for their maintenance, its value as a sure resource during normal and slack periods, and the self-sufficiency economy of most Mayan families undoubtedly play a role in this direction.

As a result, the Mayan home garden has proven to be a rather stable system based on the indigenous wisdom on the management possibilities of the environment, and on his attitude towards including new species in the system. On the one hand, although natural conditions are very restrictive in the area, the indigenous peasants have built up and still maintain a system that harbors up to a 47% of species (and 73% individuals) with ecophysiological traits suited for diverse habitats. In this sense, the Mayan villages are islands of medium-tall semideciduous forest within a landscape of low deciduous forest characterized by a 6-8 month drought, a total lack of running waters and shallow rocky soils. On the other hand, the high species diversity reached by the combination of species with very different geographical origins leads to the year-round production of goods, and the management assures a high inter-annual stability of production. Moreover, the inclusion of domestic animals and some tree species acts as a savings account, since they are products easily transformed into cash whenever a monetary need comes up.

The Mayan home garden is thus a traditional but not static agro-system, and it is in fact a fine example of a man-made system dating to pre-hispanic times. The environmental adversity of Northern Yucatan has thus precluded the perpetuation of any form of specialized "modern" agriculture among those introduced into the area, and the Mayan home garden is by no means a byproduct of them. Therefore, the home garden should be considered an alternative system with ancient roots better than one intermediate step in the transition between ancient and modern agro-systems. Any improvement proposed for them, be they focused towards management, productive, marketing or environmental issues, should be based on this perspective, and should be derived from cooperative work between technicians and indigenous peasants.