

Homegardens and the dynamics of Totonac domestic groups in Veracruz, Mexico

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Abstract

The Totonac are an ethnic group that have used homegardens as a strategy for production and social reproduction since pre-colonial Mexico. These homegardens, associated with a family dynamic exhibiting various stages of the domestic group cycle, are flexible elements that allow them to adapt to changing environmental conditions. Fieldwork in the Totonac area suggests that several types of homegardens are associated with different stages of the domestic group cycle. The author concludes that it is not convenient to approach the study of homegardens only through production logic, as this prevents observing the dynamics within them and perceiving their relationship with the organisation of everyday life and the domestic group reproduction in a changing context and with different styles of adaptation, resilience, storage, reprocessing and cultural continuity.

KEYWORDS: Culture, nuclear families, extensive families, survival strategies, social reproduction

Introduction

Since precolonial times, the region inhabited by the Totonac people has encompassed the Central Gulf Coast of Mexico, from the coastal plain to the foothills of the Sierra Madre Oriental mountain range. This region is part of the Mesoamerica geographical-cultural area, where the original people living there share certain cultural, material and ideological features (Ochoa et al. 1999 70).

During the classical period (600–900 AD), the town of El Tajin emerged as the most prominent cultural and economic center, until it was abandoned due to Toltecan-Chichimecan invasions (Manzanilla 1999: 168). Subsequently, the city of Cempoala emerged as the Totonac capital. At that time, the Totonacs were dominated by Mexica groups and became subjects of the Emperor Moctezuma. They were obliged to pay a heavy tax burden consisting of cotton, corn, chili, feathers, gems, textiles, and other products; consequently, this situation strongly influences the Totonacs to attempt to throw off the Aztec Empire by supporting the Spaniards in their conquest of Mexico. However,

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during the colonial period, the imposition of a new religion and servitude, the effect of diseases brought by the Spanish conquerors, and the rearrangement of indigenous peoples in highland areas, caused a decline in the Totonac population. It can be said that throughout their history, the Totonacs have been subjected to a series of processes that have led to a continual integration and reduction of its ethnic features.

Currently, Totonac territory has been reduced to what is now known as the Papantla region and the surrounding mountain area, in the Mexican states of Veracruz and Puebla (Velasco 1985; Daneels 2006; Rojas & Garcia 1999). They occupy a territory composed of a complex microenvironment that offers various opportunities and constraints for food production, so the landscape consists of a series of patches that include cropland, forests, thickets, and towns (Whitmore and Turner II 2000: 121–2). Given its importance for Totonacs' everyday life and reproduction, this area shows evidence of protection-oriented forest management. In this sense, Toledo et al. (2003) found that adaptive management includes the manipulation of various species, mainly those with multiple uses, as well as the understanding and application of ecological processes (i.e. crop rotation, landscape management, plant succession and interaction) in activities related to the local reproduction of the domestic groups, where homegardens represent a clear example.

Some archaeological evidence in connection to the use of forest and homegardens by the Mayas (Ford & Emery 2008: 151) has demonstrated that it was the knowledge of ecology and environment management of the ancient and modern Mayas that added flexibility to their adaptation to environmental and cultural changes. This can be seen in the diversity of landscapes in homegardens and private orchards, which strengthen family solidarity and sustenance, while reflecting contemporary species that exist in the forest.

García (2000: 53) has discussed the origin of homegardens, and highlighted their role as a support in the transition from an agricultural gathering society to another sedentary society, in which the cultivation of plants around the house was a way to bring closer food resources to domestic groups. Similarly, due to their intensive production, homegardens are linked to high population densities (Killion 1992: 8; Whitmore & Turner II 2000: 121–2), since the presence of such gardens might be able to support highly populated agricultural societies, such as those that flourished in tropical America in the first millennium BC and which possibly also played an decisive role in the domestication of plants and training of existing farming systems. Moreover, in those societies in which monoculture was predominant, homegardens met some specific consumer needs, as well as growing various species to supplement the diet.

Sanders and Killion (1992: 29) point out that because Mesoamerica agriculture focused on growing plants with a high energy content (such as corn and sweet potatoes), homegardens created adjacent to houses had different crops aiming to complement and enrich food. García (2000: 50) notes that the loss of soil fertility in humid regions may have been a serious problem for growers in prehistoric Mesoamerica; the cultivation of homegardens thus emerged as a strategy to meet nutritional needs. Whitmore and Turner II, (2000: 122) argue that Mesoamerican farming systems were linked to the tribute paid to the Aztecs, specifically for the Gulf Coast of Mexico; hence, homegardens helped to solve internal food needs as well as paying the imposed tax. These authors distinguish

two types of homegardens in the Totonac territory: the first is the backyard homegarden or *calmil*, which provided domestic groups with vegetables, fruits, spices, medicines and fibres, and the second is the typical cocoa or fruit orchards. The difference between the two is that the former was possibly related to local livelihoods while the second was linked to trade and tax payment to the Aztec Empire.

Several authors have discussed the importance of homegardens. However, most studies had focused on biological aspects, such as the management of species diversity and the number of species converging in one space but at different strata. Most authors concur that homegardens are set in a seemingly chaotic arrangement of grasses, shrubs, vines and trees that offer an appearance of neglect and poor management and that, along with backyard animals, simulate the natural disposition of ecosystems (Clawson 1985; Caballero 1992). In turn, Moctezuma (2010: 50) points out the need to include in the analysis of homegardens all the environmental, cultural, physical and human resources involved in the production system. In this sense, the Totonac family homegarden is a traditional agro-ecosystem that mixes plants and animals useful in an everyday setting and a social space that reflects aspects of local culture, expressions of cultural contact and historical transformations (Del Angel & Mendoza 2004; Toro 2008: 54). Thus, the association between the various elements that support Totonac culture contribute to its social reproduction. Moreover, there is evidence that homegardens are more than merely agricultural systems that support production. They also allow social reconfiguration and socioeconomic changes that have endured in the history of human groups, constituting a representation of agro-ecosystems in history.

Howard (2006: 159) mentions that the structure, function and composition of homegardens has been associated with the household social structure; however, research supporting this argument is lacking. In this regard, most studies have focused on the homegarden's complex floral structure or its multiple ecological functions as an agroforestry system (Albrecht & Kandji 2003, Benjamin et al. 2001) as well as in its property of mixing different views and vegetation types (De Clerck & Negreros-Castillo 2000), both secondary and cultivated native and exotic plants. Management of the homegarden, its contribution with several key products for various areas of everyday life, and its dynamics with respect to changes resulting from exposure to modernity have been also studied (Mendez & Somarriba 2001; Peyre et al. 2006; Blanckaert et al. 2004). Therefore, this paper analyses the dynamics of homegardens and Totonac domestic groups aiming to show the interweaving of different social and ecological processes as a way to cope with the pressure exerted for various internal and external factors.

Methodology

The study was carried out in the Totonacapan region, which occupies an area of approximately 7,000 km² and includes the Mexican northern state of Puebla and the center-north of the state of Veracruz. In this space, there are two clearly distinctive zones (Figure 1): the *Sierra*, located in the mountain range known as *Sierra Madre Oriental* and the Gulf Coastal Plain of Mexico (Velázquez 1995: 29).

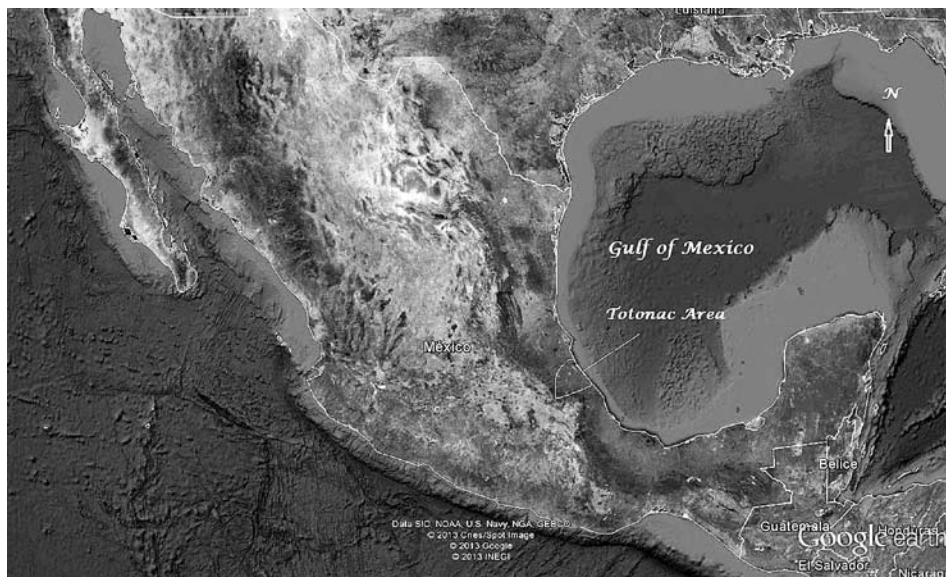


Figure 1: Location of the Totonac studied area in Mexico. Source: Google Earth, INEGI, 2013.

A total of 114 domestic groups in three municipalities is located eastward of the Sierra Madre Oriental, from the municipality of Coxquihui, Veracruz, in the lowlands, to the Plain of the Gulf of Mexico in the municipalities of Espinal and Papantla, Veracruz. The survey included open and closed questions of a descriptive nature. The data obtained aided in the generation of several statistical descriptive indicators, such as the identification of the stage in which the domestic groups were at the time of the survey, the management of the resources they have, and the use and soil productivity of the various homegardens. The quality of information was supplemented and enriched with research techniques such as interviewing various domestic group members, direct observation and secondary information. This approach added a dynamic support and helped to explain the internal organisation for each family structure, its operation and its link to diverse situations and their response to different critical moments.

The concept of domestic group development cycle has been used as an analytical tool aiding in conceptually and temporally integrating all the information (Moll and Mikelarena 1993). There were also changes in the structure and the composition of the groups as a process from the perspective of social reproduction (Robichaux 2005: 50; Robichaux 2002: 72), since homegardens also show change processes related to the domestic group development cycle.

According to Sanders and Killion (1992: 17–8), the continuity or persistence of backyard homegardens is related to a number of factors, such as domestic consumption, the need to trade, sell, pay, and to interact with other members of the community so that

homegardens provide a base for the reproduction of the social structure. Therefore, this study treated the domestic group at different stages of the development cycle as study units, i.e. kinship groups sharing a common space, either a plot or a house, recognised as familiar and in which they interact every day (Laslett 1972). In this regard, domestic groups were considered as a cultural residential family model labelled by Robichaux (2002) as the “Mesoamerican family system”. Such a system describes a process of organisation and reproduction of domestic groups for a significant portion of the indigenous and rural Mexican people. This model also explains some specific high frequency behaviours of extended families, in terms of a cultural system or values that define behaviour patterns, and not just as an economic phenomenon. Therefore, this study considers the relationship recognised by people who share the same space, either biological, by marriage, affinity or ceremonial. The need creates affinity and the conformation or maintenance of ties between people who are not biologically related to each other.

Homegardens as a production strategy

Totonac homegardens form a complex floral structure and mix different association types of secondary or cultivated vegetation, as well as native and exotic species, which provide valuable products in various areas of everyday life (Del Angel & Mendoza, 2004). As a production strategy, the homegarden provides a balance among the needs of subsistence, the deterioration of natural resources, local knowledge, cultural contact, changing eating habits over time, and the way people relate to nature. For this reason, the inclusion and exclusion of plant species in the homegardens, as well as their diversity and importance indicate groups’ cultural dynamics against different types of pressures.

In Totonac family homegardens, it is possible to perceive secondary vegetation management and conservation, the cultivation of native species and the introduction of others within various spaces. Hence, the classic backyard homegardens are found surrounding the homes, but also in growing areas, interspersed among commercial species and on the edges of agricultural land in areas where commercial species did not germinate, even on the perimeter fences of culture lands, and in those areas in which the depletion of soil fertility obliged leaving them fallow them for some time.

Thus, these four spaces can be considered as an extension of homegardens where the type of management, conservation, the combination of species or crops, and their mere existence define some internal and external pressures of the domestic groups.

Statistical analysis consisted of testing linear correlation between the main variables of interest, as well as multiple correspondence analysis to identify the variables that contribute to defining the group stages of the domestic cycle and its link with the different types of homegardens. The program XLSTAT ver. 2012 was used for all testing. Statistical significance was declared at the 0.05 level.

Results and discussion

Stages of the development cycle of the domestic group and homegardens

The interviews revealed the existence of large and nuclear domestic groups whose organisational responses are influenced by internal and external group assessments expressing the same development cycle and stages (Figure 2). Here, each stage reflects the quantity, quality, and resilience of natural resources at some time as well as the impact of modernisation processes, market and internal pressures on the stage dynamics. The shaping of the development stages ensures the production process and regulates cultural reproduction.

At the Extensive Stage, domestic groups are related by blood, marriage or affinity (either by upward, downward, lateral, political or ceremonial kinship). This stage implies the existence of two or more nuclear families living under the same roof or on the same land. All domestic groups within an extensive family are subject to a single authority, who is usually the elder or the person who has a great deal of recognition. Nuclear families can share all or part of the farmland and homegardens, but do not necessarily share domestic groups spending. Domestic groups in the Extensive Stage were arranged in two sub-stages according to family size, ego (domestic group head respondent) age and his/her position in the group (Table 1). At the Initial Sub-stage (Ext.Ini.-DG) children are in the age of marriage. When one of the sons pairs off, the couple starts their life together in the father’s house. It could be said that the expansion phase begins domestic group.

The second stage shows a large fully Mature domestic groups (Ext.Mat.-DG) which includes different kinds of relatives and generations. This domestic groups are larger, compared to the other groups. Also, as noted by Robichaux (2002: 88), domestic groups at the Extensive Stage, allow for a lower marriage age.

Table 1: Characteristics of Totonac domestic groups at different stages of the development cycle

Stages	Domestic Groups (%)	Family average size	Ego’s average age	Average farmland (ha)
Extensive Initial Domestic Group	9	6.7±1.9	37.4±	1.0±1.6
Extensive Mature Domestic Group	34	9.0±2.2	55.5±	2.7±2.6
Nuclear 1- Domestic Group	29	4.5±1.3	42.0±	2.6±1.9
Nuclear 2- Domestic Group	13	4.2±0.8	59.7±	6.8±6.1
Fission- Domestic Group	15	2.0±0.9	69.3±	1.1±1.9

Table 1 show that the extensive Mature sub-stage (Ext.Mat.-DG) is the dominant mode, and in addition to the extensive Initial sub-stage (Ext.Ini.-DG) is slightly greater than the Nuclear stage. The Nuclear stage implies the existence of a domestic group composed of parents and children. This stage is also divided into two types; the first consists of a financially independent couple (regardless of the age of marriage), or with children under 16 years-old (Nuclear 1-DG). The second type consists of the existence of children of different ages and still single over 17, but it is possible that some of them have already left home (Nuclear 2-DG). Group survival is supported on independence, but not on individualism, because in times of economic crisis or illness, mutual assistance appears between biological or ritual kin (godparents, godchildren).

The Fission stage (Fission-G) involves the decay of a domestic group. The initial couple lives alone because the children have left home, but it may be possible that one of them remains to take care of the parents. As noted by Robichaux (1997) when analysing current Mesoamerican domestic groups, the increase in the proportion of some stage development, while reflecting environmental pressures, does not involve the breaking of the cultural sustenance of kinship.

The average size of domestic groups is larger in the Extensive stages, while the average age of “ego” (the respondent or domestic group head) is greater in the Fission and Nuclear 2 stages. Most people in these latter stages (even though remaining smallholders) possess the largest amount of farmland, precisely because land inheritance keeps the plot undivided or the property is not divided among sons in order to prevent its fragmentation. In nuclear groups, this system ensures a safe life for elder parents since the father culturally represents a family figure for affiliation and identification, but it does not ensure children permanence in the residence and, in fact, contributes to a higher age at marriage. Furthermore, in families in which members are migrants, this system favours no return, for there is no economic basis for survival after returning.

The average age of domestic group heads in the Nuclear 1-DG stage is greater than that of Ext.Ini.-DG, because age at marriage tends to be higher in conditions of lack of financial support. This argument is reinforced by the finding that in the Nuclear 2-DG stage, the head of domestic group’s average age (the breadwinner) is high, so that there are single males of 30 to 38 years of age who assumed group leadership because their father become too elderly. Therefore, stages define individual access or exclusion to land, farmland productivity and the incursion of family members in other activities that support reproduction, such as international or domestic migration; thus, for Totonacs, organisation and group structure are strategies built on the privacy and individualism that support their survival and, in turn, are conditioned by their ethnic community culture and under the subjection of the will of the individual to the collective.

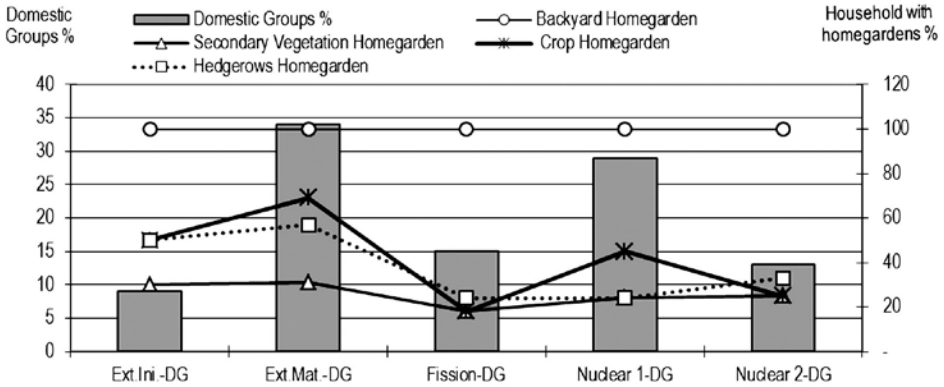


Figure 2: Totonac Domestic Groups stages by homegarden type

The backyard homegarden is common in all stages of the domestic groups' development cycle (Figure 2). These homegardens may be considered as a reproductive strategy that has persisted for the survival of the Totonac group and has allowed handling a series of internal and external pressures for the domestic group (Whitmore & Turner II, 2000, Sanders & Killion, 1992). As pointed out by Kumar and Nair (2004), homegardens are one of the oldest forms of management and land use; they are considered to be the epitome of sustainability promoting conservation of cultural diversity and showing a close association between nature and culture. For the Totonacs, nowadays a homegarden is a form of management that helps to mitigate the pressures of farmland fragmentation, caused by the mixing of various socio-economic and cultural factors, as discussed below.

The backyard homegarden, in which several species of plants and animals are grown, has been considered as a small-scale production system. This type of homegarden is located adjacent to the house and consists of a complex of domesticated or semi-domesticated plants, forming a complex structure (Ninez 1987; Price 1991; Caballero 1992). In some cases, the homegarden may function as an experimental or validation field for new species or methods (Yamada & Osaqui 2006: 229). In this study, backyard homegardens were present at all the domestic groups stages and in a high number of families that include them as a production strategy.

In turn, crop homegardens (formed with plant species of local value for Totonac life) are established in growing areas and were more abundant in the extensive stages, followed by the Nuclear 1 stage of the domestic group. Some crop homegardens developed spontaneously, but others are induced in lands planted with corn, beans and citrus fruits. Crop homegardens may include the induction of a multipurpose canopy aiding soil retention on hillsides to the production of food and timber (Figure 2). Moreover, crop homegardens provide spaces for plants, such as corn or beans that for various reasons did not germinate at other places, or plants that grow in crawl spaces or grooves. These spaces provide locally important leaves, fruit and tuber vegetables and decorative flowers, many

of which emerge only in the rainy season and are part of the secondary vegetation. This type of homegarden creates a soil cover that favours mostly steep slope lands by reducing soil loss and promoting fertility by adding organic matter (Glassman 1990). In the case of the Maya in Belize, Ford and Nigh (2009: 216) point to a similar management that corresponds to what is called the *milpa* cycle, in which some economically significant species such as maize are selected and its sprouts promoted after a forest stage, which is cleared with cutting tools and fire. At the cultivated stage, Mayan homegardens are complexes formed with corn as the dominant crop and several adjacent crops (Ford & Emery 2008).

The ecological interaction of vegetation in different environments, as well as its seasonal management, not only favours the conservation of natural resources, but also shows the Totonacs' deep knowledge of the environment they occupy. Here, a strong link between nature and culture is manifested in a way similar to what Ford and Emery, (2008) found for ancient and contemporary Maya.

Family size and the small amount of land that domestic groups in the extensive stage possess has led to the search for increased food production and materials in other areas, such as at the fences or boundaries of agricultural lands or pastures, which are handled as an extension of the homegarden. The number of hedgerow homegardens is greater than the amount in the Nuclear and Fission stages (Figure 2). These spaces are an arrange of different trees and shrubs species, mixed with low-rise herbs and grasses, and are usually planted and developed to form a barrier or to mark the boundary of an area.

Challenger and Caballero (1998) believe that hedgerow homegardens are not an indigenous traditional practice of land use and speculates on its chronological origin. For him, one possibility is that such homegardens are a remnant of windbreaks established during colonial times in windy areas; later, some species were selected and planted for the purpose of obtaining food, fuel or medicine. They (1998) also speculate that hedgerow homegardens may be a pre-Hispanic reminiscence of agricultural terraces built on hillsides to preserve and consolidate the soil using the roots of multiple use tree species. Furthermore, such spaces provide an ecological function connecting fragments of secondary vegetation and allowing the transit of wild animals.

Finally, secondary vegetation homegardens (locally known as *acahual*) seem to be less important in all domestic group phases (Figure 2). Second vegetation homegardens are considered by Gómez-Pompa & Kaus (1990) to be forest-gardens because this homegarden type results from being left fallow and natural secondary succession and less from selection; hence, natural regeneration and forest management are matched to protect valuable plants (i.e. useful or disperse species). Secondary vegetation homegardens are the result of a strategy the Totonacs use as a form of fallow after several years of land cultivation with annual species. This allows the development of secondary vegetation and of the herbaceous layer that grows unchecked in an attempt to restore soil fertility. As pointed out by Ford and Nigh (2009), this space is mostly part of a rotation *acahual*-cornfield cycle, because the field is not abandoned, but continues in use by collection, enrichment and dispersion of seeds of economic importance. Since the stage at which the field was opened, relevant species are selected, cultivated, and protected to develop

a canopy. This type of management, characterised by a non-destructive extraction and a rational use of vegetation shows (Toledo et al. (1992:105)) that the sustainable use of tropical forest is possible. However, such spaces have decreased significantly because of the reduction of agricultural land due to land heritage and cattle ranching (Del Amo 2008: 270). Consequently, fallow periods that allow the development of secondary vegetation have shorter intervals because of the increased pressure on land use.

For the Totonac, the type of products obtained and the use of spaces in second vegetation homegardens is related to the provision of local materials, mainly wood, firewood, fruit, fodder and some herbal species of cultural meaning (medicinal and ritual), and determined by food demand within the group, access to farmland and the impact of external factors that affect the market such as commercial production. All these factors influence the amount of managed species and the size of the *acahual*, as observed in the fieldwork.

Figure 3 shows that a great deal of domestic groups have access to land for cultivation, but its average size is small in the Nuclear-2-DG and extensive Mature- DG phases. The lack of access to land motivates an elongation of time permanence at the virilocal residence (home of the male’s father) and raises the age for couple formation.

The succession of land rights by patrilineal ties is growing, and when there is enough land, it is distributed to the children when they start their own family and become separated from the parental home. This system has had an impact on the amount of individual land available for cropping and fallow intervals because when children separate from their father’s home, the original size of the plots is reduced and residency practices are also impacted. As a result, the residence time varies according to the socio-economic conditions of the family. Interviews to extended families suggest that although patrilineal inheritance of land prevails, land is maintained as long as possible under the older man’s domain, forcing new couples to extend the residence time at the parental home.

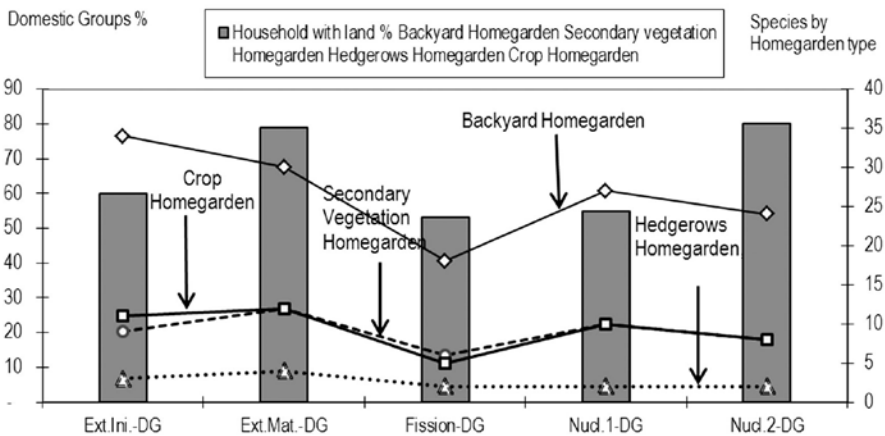


Figure 3: Domestic groups (DG), cropland owned, and number of plant species by homegarden type

The low amount of land available for cultivation among domestic groups at the Extensive Mature stage has created a greater dependence on homegardens for reproduction and the species that they can grow, which also explains that at this stage the number of species established in backyard homegardens in the growing areas is higher (Figure 3). Family food demand at the Extensive Mature domestic groups stage is higher because it contains more members. A positive correlation between domestic group size and number of species managed at each type of homegarden was found ($r = 0.5613$, $p < 0.05$). In contrast, the lack of alternatives to achieve economic independence encourages the abundance of larger domestic groups. The search for options is easier in a larger group; for example, in cases of migration (32%), the domestic groups became responsible for the close family of the migrant and creates a support space for them until the migrant returns (Del Angel & Rebolledo 2009: 12).

Backyard homegardens, located at all domestic group stages, are a sign of the importance that production has for all the domestic groups although the number of plant species managed at the different domestic group phases varies. A total of 75 different plant species at different levels and types of vegetation (grasses, shrubs, trees and vines) were identified.

Table 2: Average number of plant species grown in all homegarden types by Domestic Group Development Cycle

Stage	Average number of species*
Extensive Initial-Domestic Group	34.0 ± 14.0
Extensive Mature-Domestic Group	30.0 ± 11.9
Fission-Domestic Group	18.0 ± 7.7
Nuclear1-Domestic Group	27.0 ± 11.2
Nuclear2-Domestic Group	24.0 ± 9.6

*Arithmetic mean ± standard deviation.

Crop homegardens do not have the same importance in quantity or diversity that backyard homegardens have, but they play an vital role in food and domestic group economy, because they are formed by temporal short-cycle species mainly oriented to human consumption. Thus, it contains spontaneous and cultivated species that appear each year (Table 2). Crop homegardens, as well as backyard homegardens, have the largest average number of species managed at the Extensive domestic group stages (Figure 3).

Species selection and enrichment of secondary vegetation is a common practice in Totonac culture, extended only in those domestic groups that have cultivation areas large enough to annually maintain a part at rest or in fallow after cultivating the land for three or more years. Thus, the existence of secondary vegetation homegardens depends on the amount of land available, as land lays fallow for 12 years on average. However, field work shows that this range is decreasing due to the widespread need to grow more food or earn more income.

Aside from its ecological importance, secondary vegetation homegardens are relevant for the conservation of some wild species used for medicinal, magical and religious purposes. Many of these species can be located in backyard homegardens, but some of its characteristics are preserved only in the “mountains”, as in the case of *Urtica urens* L. (locally known as *Chichicaxtle*) and *Cnidioscolus tubulosus* Muell. et Arg IM Johnston (locally known as *mala mujer*). These plants produce a rash when in contact with the skin, but are part of traditional medicinal practices.

On hillside land, major colonising herbaceous and shrub species are plant of the Piperaceae family. Secondary vegetation is dominated by evergreen trees and shrubs, such as cedar (*Cedrela odorata* L.), chico zapote (*Manilkara sapota* (L.) Van Royen), wild avocado (*Persea schiedeana* Nees), black sapote (*Diospyros digyna*), mamey sapote (*Calocarpum sopota* Merr.), bay laurel (*Laurus nobilis*), Mexican rubber (*Castilla elastica* subsp. *elastica* C.C. Berg.), *ojite* (*Brosimum alicastrum* Swartz), pigeon wood (*Guazuma ulmifolia* Lam), *cocoite* (*Gliricidia sepium* (Jacq.) Kunth ex Walp and wild black cherry (*Prunus serotina* subsp. *Capuli* (Cav.) McVaugh) (Evangalista & Mendoza, 1987).

In the secondary vegetation homegarden, woody species necessary for food supply materials for everyday life used as common wood for poles, fences, firewood and fruits or edible flowers are preserved (Table 3). Moreover, if pressure in the demand for food is expanding, a secondary vegetation homegarden can be converted at some point to farmland, when this happens, it is common to allow the survival of useful species in the tree layer (i.e. fruit, timber, rubber or allspice) and prune some branches to prevent them shading annual crops (i.e. corn, beans, squash-pipián) or leave the stumps (logs) to allow tree buds grow and regain their foliage.

Secondary vegetation homegardens have an ecological value present in Totonac cosmogony as the habitat that fosters continuity of life. This type of homegarden allows the existence of wildlife, burrows and nests. Many of the animal species are part of the eating habits of the population since the limit of their ecological value surpasses everyday life and the reproduction of the group. In the case of species cultivated or protected in homegardens established within living fences, there are essential plant species for Totonac life such as timber, firewood, pods and flowers of commercial value, fruits, and fodder. These spaces are valuable only for the two Extensive stages of domestic groups (Figure 3). The average number of species found in all homegardens at each domestic group stage showed a broad variation.

Table 2 shows in quantitative terms how Extended domestic group stages handle a greater number of Nuclear groups and those who are undergoing Fission. Statistically, there was a positive correlation between the size of the domestic groups and the total number of species managed by stage ($r = 0.5731$, $p < 0.05$).

Interviews with Nuclear groups revealed that they own cultivation land mainly devoted to cash crops, and that the income obtained allow them to obtain other products; therefore, labour and culture space cannot aim to protect or maintain worthless species from an economic point of view. In contrast, backyard homegardens provide significant plant species that do not involve economic values.

Analysis of variables

The existence of land for cultivation within domestic group was included as a variable for analysis, as well as backyard homegardens and crop homegardens with a range of crop species, the presence of hedgerow homegardens and secondary vegetation homegardens. As additional variables, the same analysis considered the stage of the development cycle in which domestic groups were at the time at which the study was carried out (Figure 4). The additional variables included in the analysis showed a differential performance. Extensive domestic groups (both, Initial and Mature) were placed in a dimension opposite to Nuclear domestic groups (1 and 2) and to Fission domestic groups.

Extensive domestic groups were located in the priority dimension that is related to its quantity. The clustering of Extensive and Nuclear domestic groups may indicate that similar features within each one of them prevail in relation to the traditional forms of reproduction associated with the handling and use of natural resources.

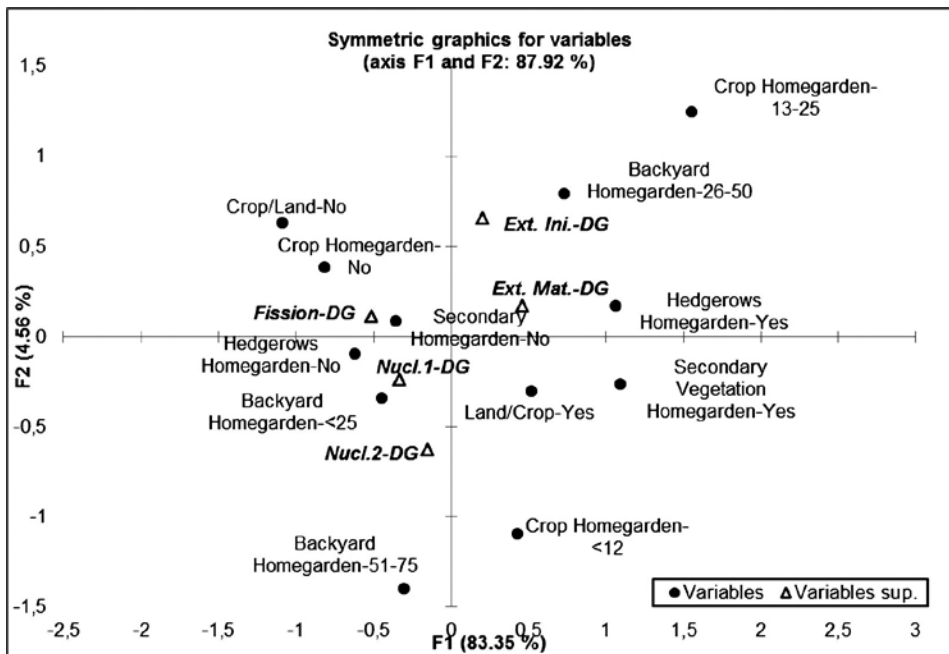


Figure 4: Stages of the Domestic Groups (DG) development cycle and importance of homegarden types

Extensive Mature domestic groups had statistically more weight in the analysis than those at an early stage (Extensive Initial domestic groups); however, the proximity of both groups to some homegardens (hedgerows-Yes, backyard 26–50, and crop 13–25) highlights the importance that the amount of cultivated species represents for these groups. For Extensive domestic groups, Crop homegardens with 13 to 25 species and

backyard homegardens with 26 to 50 plant species are essential for social reproduction. The importance of this type of homegarden and the number of species managed in them for these groups are related to the amount of land under cultivation (Land/crop-Yes). On average, they handle a remarkably small surface, lesser than in nuclear domestic groups (1.63 ha for Extensive Initial Domestic Groups and 3.42 ha for Extensive Mature-Domestic Groups). For this reason, the existence of Crop homegardens and Secondary vegetation homegardens (secondary vegetation homegardens-Yes) are located in the opposite dimension, showing that when domestic groups do not have enough land, homegardens became more important. These data show a common feature observed in field work, i.e. that having land for cultivation is a sign that the domestic groups can allocate a small area or secondary vegetation that constitutes a later stage to the use of land or letting it lie fallow.

The position of domestic groups is depicted in Figure 4. No significant association was observed between the importance of homegardens and nuclear-type domestic groups (Nuclear 1-DG and Nuclear 2-DG), since it is located extremely close to the Hedgerow Homegardens variable (hedgerows-homegarden-No), indicating that this type of homegarden is important for such a domestic group. In contrast, backyard homegardens (backyard homegarden <25) are less diversified, since most of the species they contain are ornamental and woody (fruit or timber). However, the variable backyard homegarden (backyard homegarden-51-75) appearing in the same dimension, seems to be more diversified and not closely related to the nuclear stages, so this type of highly diversified homegarden is not important.

The fission stage of domestic groups (Fission-DG) is associated with the variable indicating that secondary vegetation homegardens are not important or have a low importance (vegetation homegardens-No). Such a situation possibly results from the fact the cropland area available for these groups is extremely low and therefore lacks the opportunity to let it lie fallow and allow secondary vegetation to recover it. This argument is confirmed by the close distance between the fission stage domestic groups and the absence of crop homegarden areas (crop homegarden – No) and crop lands (crop/land-No).

According to Figure 3, 53% of the domestic groups in the fission stage own farmland, but the average size of the plots is remarkably small (1.1 ha). The interviews showed that group size and family labor is extremely low at this stage. In contrast, the head of the domestic group, not necessarily the supplier, is older than in other domestic group stages.

Final considerations

The fieldwork has shown that the structure and function of existing homegardens is led by the continuity and change in Totonac family organisation and structures. Hence, the diverse homegardens become a dynamic tool to address internal and external pressures of the domestic group (Del Angel & Mendoza, 2004). According to the arguments of Robichaux (2002), who notes that the social reproduction of domestic groups is a process to perpetuate structural forms. The Totonac family homegarden can also be

considered dynamic and resilient to the diverse conditions and pressures that domestic groups undertake. Homegardens can grow or diminish in size or surface (e.g. number of species, area) and increase or decrease its importance, according to the area length and pressures exerted on the domestic group development cycle and its organisation. It is true that Totonac homegardens are not the most important source of economic livelihood for domestic groups, but it is undeniable that they support the continuity and perpetuate the culture, as in pre-Hispanic Mesoamerica, as has been indicated by various authors (García 2000; Killion 1992: 8; Whitmore & Turner II 2000; Sanders & Killion 1992: 29).

Homegardens have recurrently been altered at different moments of history. They exhibit a link between culture and nature, since the presence or absence of various spaces to establish homegardens displays the ecological management of nature and natural resources. The establishment and management of homegardens is based on traditional knowledge of the local tropical diversity, which allows the maintenance of fertility and soil and the prevention of the loss of key species for cultural reproduction due to deforestation, balancing arrangements of species, different spaces, management of seasons and ecological environments with the needs of production and social reproduction at the different stages of the domestic groups. For instance, Ford (2008: 192–3) noted similar dynamics for Mayan forest homegardens. Here, the breadnut or Maya nut (*Brosimum allicastrum*) was considered as an indicator, since its presence or absence at different historical horizons showed the relative importance of the species; however, its absence did not mean its disappearance from the landscape, but only an indication of a time when other species were more appreciated.

The opening of different spaces for setting homegardens other than backyard homegardens among the Totonacs is the result of internal pressures in the group and a response to the impact of external forces such as the market; therefore, it is an example of the dynamics of domestic group organisation. The convergence of ecological, material and cultural aspects of homegardens at a highly specialised era when the demands of the domestic market (cash crop monoculture), the decline of biodiversity, the increasing pressure of socio-economic factors such as changes in land use, and domestic food requirements (Del Angel y Mendoza 2004: 330) impose a need for change and continuity in homegardens through the reconfiguration of domestic groups structure and organisation to ensure production and reproduction.

Conclusions

The literature review allowed showing that homegardens' dynamics has been associated with the needs of production and reproduction of human groups throughout history, representing a mechanism to alleviate the demand for food and materials associated with human habits based on the traditional knowledge of human groups on nature and the environment. The analysis of a sample of Totonac domestic groups showed the link between the existence of spaces and species with the phases of the domestic groups development cycle, based on group size, as cultural factors that support social reproduction as a residence, age of couple formation and exclusion of members.

Farmland quantity and possibly quality, food demand and poverty, generate an intensely intimate dependence of the group's organisation, the structure and homegardens' constantly organising, producing and reproducing. The author concludes that it is not convenient to approach the study of homegardens only through logic of production, as this prevents discerning their internal dynamics and perceiving their relationship with the organisation of everyday life as well as group reproduction in a changing setting and to different styles of adaptation, resilience, storage, reprocessing and cultural continuity.

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Povzetek

Totonac so etnična skupina, ki že od časa pred-kolonialne Mehike domače vrtove uporablja kot strategijo za proizvodnjo in kot sredstvo družbene reprodukcije. Ti domači vrtovi, ki so povezani z družinsko dinamiko in kažejo različne stopnje ciklov gospodinjstev, so elastični elementi, ki ljudem omogočajo, da se prilagodijo na spreminjajoče se okoljske razmere. Terensko delo na področju Totonac kažejo, da je več vrst domačih vrtov povezanih z različnimi stopnjami ciklusa gospodinjstev. Avtorica ugotavlja, da se študije domačih vrtov ni primerno lotiti skozi logike produkcije, saj to preprečuje opazovanje dinamike znotraj njih in opazovanje njihovih odnosov z organizacijo vsakdanjega življenja, pa tudi z reprodukcijo gospodinjstev v spreminjajočem se kontekstu in z različnimi stili prilagoditev, prilagodljivosti, skladiščenja, predelave in kulturne kontinuitete.

KLUČNE BESEDE: kultura, jedrne družine, obsežne družine, strategije preživetja, družbene reprodukcije

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