Agricultura, Sociedad y Desarrollo

SOCIOECONOMIC AND PRODUCTIVE CHARACTERIZATION: ASPECTS OF GENERATIONAL TRANSITION AMONG COCOA PRODUCING FAMILIES IN MIAHUATLÁN, CUNDUACÁN, TABASCO

Evangelina **Díaz-Méndez**[1], Nélyda **Solana-Villanueva**[1], Hilario **Becerril-Hernández**[1], Guadalupe de Jesús **Cruz-Clemente**[2*]

[1]Colegio de Postgraduados, Campus Tabasco. Periférico Carlos A. Molina s/n km 3 carr. Cárdenas-Huimanguillo Cárdenas, Tabasco. 86500. México.
[2]Universidad Autónoma de Chiapas - Facultad Maya de Estudios Agropecuarios Carretera Catazajá-Palenque Km. 4 C.P. 29980, Catazajá, Chiapas
*Corresponding author: guadalupe.cruz@unach.mx

Citation: Díaz-Méndez E, Solana-Villanueva N, Becerril-Hernández H, Cruz-Clemente, GJ. 2026. Socioeconomic and productive characterization: aspects of generational transition among cocoa producing families in Miahuatlán, Cunduacán, Tabasco.
Agricultura, Sociedad y Desarrollo
https://doi.org/10.22231/asyd.v23i2.1768

ASyD(23): 228-248

Editor in Chief:
Dr. Benito Ramírez Valverde

Received: April 4, 2025.
Approved: July 31, 2025.

Estimated publication date:
March 25, 2026.

ABSTRACT

Cocoa (*Theobroma cacao* L.) cultivation, native to the humid neotropical forests of the Americas, is a key productive sector in the state of Tabasco, with significant social, economic and agro-ecological impacts. The Chontalpa region appears to be the main producer. The objective of this study was to portray relevant socioeconomic and productive factors related to generational succession among cocoa-producing families in Miahuatlán, Cunduacán, Tabasco. The research approach was quantitative; to generate data, 20 questionnaires were administered at a census level. Variables such as land size, family size, number of heirs and socio-productive profile were analyzed. Unit size was defined and in the analysis, the age of the owner and the immediate successor were taken into account ANOVA was used in InfoStat version 2020e. In Miahuatlán, cocoa farming is managed 45% by women and 55% by men, with an average age of 56.65 years (±2.59) and 36.75 years of experience (±3.65), indicating an aging agricultural sector with no generational succession. Currently, cocoa remains the primary activity in 30% of the farms. Diversification is evident, in the form of staple crops, forestry, livestock and fruit orchards. The farms produce Criollo and Forastero varieties. The main products marketed include fresh, wet cocoa beans, fermented cocoa, washed dried cocoa, fermented dried cocoa and byproducts such as artisanal chocolate and cocoa powder. Generational succession will not be ensured unless social issues are addressed.

Key words: family farming, generational succession, *Theobroma cacao L.*

INTRODUCTION

In Greek, Theobroma means "food of the gods". Currently, cocoa and its derivatives play a prominent role in international markets, especially in the agro-industry (Rivera *et al*., 2019). The word cocoa comes from the Nahuatl word "Cacahuathl." This crop has great social and economic significance in the Chontalpa region of Tabasco, Mexico. Historically, it has been consequential in local and regional production and marketing activities (Córdova *et al*., 2018). In Mexico, cocoa possesses natural characteristics that ensure high prices for the product in the international market. 59,675 hectares are cultivated throughout

the country, directly benefiting 41,000 families. The states of Tabasco, Chiapas, Guerrero, and Oaxaca represent the principal cocoa producers, with the first two accounting for 99% of national production. Tabasco accounts for 64.8% and Chiapas 34.9%. These two states produced a total of 22,452.79 tons in 2020, with an average yield of 0.54 t ha^{-1} (Mariscal *et al*., 2023). In Tabasco, the main factors affecting cocoa production are the advanced age of the plantations, low prices for cocoa beans and the presence of moniliasis (*Monilia roreri*) (Ramírez, 2008), a disease first reported in Mexico in April 2005. It is highly invasive and endemic to cocoa (Ortiz *et al*., 2015). Studies conducted in Tabasco report that most cocoa producers own old plantations (over 70 years old), which directly impacts production levels. Therefore, most producers' income is derived from various agricultural activities involving other crops associated with cocoa (De la Cruz *et al*., 2015). Miahuatlán 2ª Sección, Municipio de Cunduacán, Tabasco, is characterized by its agricultural tradition, with cocoa cultivation being its main source of income. This town has a total population of 1,038 inhabitants (INEGI, 2024).

Cocoa production is primarily carried out on family farms (Ramírez, 2008). This production and the farming families are concentrated in the states of Tabasco and Chiapas (Mariscal *et al*., 2023).

In his study of the livelihoods of cocoa producers in the Chontalpa region of Tabasco, Martínez-Arboleya (2007) indicates that generational renewal in this production system is essential to ensure the livelihoods of these families. Most of the producers on these farms were over 66 years old. Lack of renewal on the part of new generations has prejudiced the adoption of new technologies and increased land fragmentation. On cocoa farms, descendants increasingly worked away from the plot, destroying their connections to the cocoa plantation, with the gap between producers and their descendants, in terms of rural traditions and urban habits, widening.

Gómez (2014), in his research on rice in the Chontalpa Region of Tabasco, states that 60% of producers were 56 years old and only 5% were 35 years old, revealing a lack of generational succession. Payró (2021), in his research conducted in Comalcalco, Tabasco, emphasizes the value for society that generational succession in the beekeeping sector has for the conservation and continuity of this activity.

De la Cruz-Landero *et al*. (2015) point out that there is no generational renewal in cocoa production; over 50% of producers were over 50 years old, meaning they are an aging population. This negatively impacts cocoa production, as this is a labor-intensive and physically demanding job. Migration is one of the factors resulting in a lack of generational renewal (Salas-Fuente *et al*., 2021).

According to Sánchez-Albores (2022), in his study of business development in the fruit sector in Teapa, Tabasco, training of the young children of producers is important to increase productivity and improve competitiveness, representing a priority and important task, as a factor that helps ensure generational succession.

Based on this, the aim here was to characterize the relevant socioeconomic and productive aspects of generational succession in cocoa-producing families in Miahuatlán, Cunduacán, Tabasco, Mexico, in order to devise proposals intending to fortify and maintain cocoa production.

THEORETICAL FRAMEWORK

Family farming

Peasant and indigenous family farming is characterized by the management of the farm and labor force by the family or community, diversity of productive activities (crops, livestock, gathering, fishing), and a strong interrelationship between social reproduction and economic production. These family units combine subsistence, income generation and cultural reproduction; furthermore, they often maintain local knowledge and agro-ecological practices that promote biodiversity and resilience, in the face of environmental changes (Agriculture and Economic Development Analysis Division, 2014; Graeub *et al*., 2016).

In the case of peasant and indigenous agriculture, the territorial dimension and the tenure of resources (soil, seeds, water) are combined with community norms and traditional knowledge that regulate land use and the transmission of practices; this cultural-territorial articulation distinguishes these forms of agriculture from industrialized business models (Daza and Artacker, 2025; Aguirre *et al*., 2025).

Among the characteristics that sustain social and productive reproduction, intergenerational succession (the incorporation of young successors into productive management and their absorption of knowledge, rights, and assets) appears recurrently in the literature, as a critical factor for the continuity of family farming. Succession implies not only the transfer of land and physical capital, but also the transmission of technical and cultural knowledge, market networks, and social legitimacy. Where succession fails, aging of the agricultural population accelerates, local practices are lost, and productive vulnerability increases (Zhang *et al*., 2023; Nandi *et al*., 2022).

Recent research highlights three factors that positively influence succession: (1) access on the part of new generations to productive resources (land, credit, water), (2) training and innovation opportunities (technical training, support for rural entrepreneurship), and (3) institutional recognition and policies that

integrate the generational perspective. When these factors are absent, pressure to migrate, aspirations for "an alternative future," and economic insecurity hinder succession (Plana-Farran *et al*., 2023; IFAD, 2024).

Intergenerational succession integrates technical, social, and political processes; family decisions depend on gender, indigenous identity, and relationships, so policies must respect contexts and strengthen the autonomy of rural youth (Ogunjimi *et al*., 2023; Chao, 2024). Guaranteeing agricultural reproduction requires territorial interventions that enable young people to remain and produce with dignity.

Generational renewal as a process

Generational renewal is associated with the term succession. It primarily consists of the actors: predecessor and successor, who are essential due to their roles and who, at a certain point, coincide in the process (Ruiz-Tacanga, 2020). Generational renewal involves transferring management, ideally to heirs although it may fall to others, in order to prolong an economic activity, while seeking to maintain assets and provide continuity for future generations (Avellán-Herrera and Hernández-Junco, 2021).

Studies on generational renewal indicate that there are fundamental aspects that facilitate a successful transition. According to Rosa and Tejeda (2016), the generational transition process in businesses is more likely to occur when there is an emotional connection to the company, when the mentor assumes a significant role in the process, and when the successor has experience and knowledge of the business. In agriculture, Soto-Maciel *et al*. (2019) indicate that these factors include the successor accepting the responsibility, the current owner delegating the responsibility at the appropriate time and the existence of trust, given the inevitable change in leadership. Jiménez-Barbosa *et al*. (2019), in their studies on coffee farms, state that factors underlying success include: a) tradition, which they view as a motivator; b) the profitability of the plot; c) early land transfer; and d) culture which reinforces a sense of belonging.

In the rural context, farmers face difficulties identifying a successor or successors, as the rural workforce has declined in these areas, impacting how new generations work the land (David-Eche, 2018). Furthermore, rural culture considers assets such as land, plots and farms as fundamental to family and cultural reproduction, as they are assets that guarantee the continuity of future generations (Cappello, 2021). In agriculture, the absence of heirs increases the likelihood that the predecessor will abandon their agricultural assets and cease investing, unlike when an heir exists, as they can strengthen or expand agricultural production (Romero-Padilla *et al*., 2021).

Challenges to generational renewal in Mexican family farming: impacts, family dynamics and cultural challenges

Family labor sustains productive units, although limited resources affect security and sovereignty (Novo-Vázquez *et al*., 2019). Thus, family farming, and in many cases Indigenous social organization, sustain these families and communities with their sociocultural resources (Cervantes-Herrera *et al*., 2016). Family farming based on non-business organization and family labor faces the challenge of generational succession, the absence of which leads to a loss of biodiversity and knowledge, necessary for continuing sustainable agri-food systems (Grisa and Sabourin, 2019; Vizcarra-Bordi *et al*., 2015).

Escamilla-Prado *et al.* (2018) point out that two of the main problems in coffee production in Veracruz, Mexico, are the aging of producers and lack of interest among young people to participate in production. They even mention that this could lead to the disappearance of family-run farms, and that the limited integration of young people threatens the coffee-producing sectors in the region. Bobadilla *et al*. (2019) found that in Epitacio Huerta, Michoacán, generational succession occurs late and that young people from farming families migrate to work and study in large cities. These researchers also found that 96% of the producers interviewed indicated that generational succession is not a problem.

Oliveto *et al.* (2024), in their study, show that young people involved in fishing in Campeche seek more meaningful opportunities, perceiving this as a subsistence activity. Furthermore, although the role of women is changing, they remain excluded and are displaced to other labor markets because they are paid less.

Martínez-Puc *et al.* (2018) suggest in their study that it is important to promote generational change among beekeepers in Chiná, Campeche, as it is important to innovate and improve honey production and also because the ages of the beekeepers were 57 years in 2016, which put them above the regional average of 50 years.

Romero Padilla *et al.* (2021), in their study conducted on farms in central Mexico, indicate that succession planning and agricultural training are not implemented; transfer occurs to spouses or descendants, with complex situations resulting from cohabitation and socioeconomic conditions. Inheritance prioritizes male children to maintain patrimony, but frequent conflicts arise, such as intestate succession, illegal sales, abandonment and migration (Lazos-Chavero and Jiménez-Moreno, 2022).

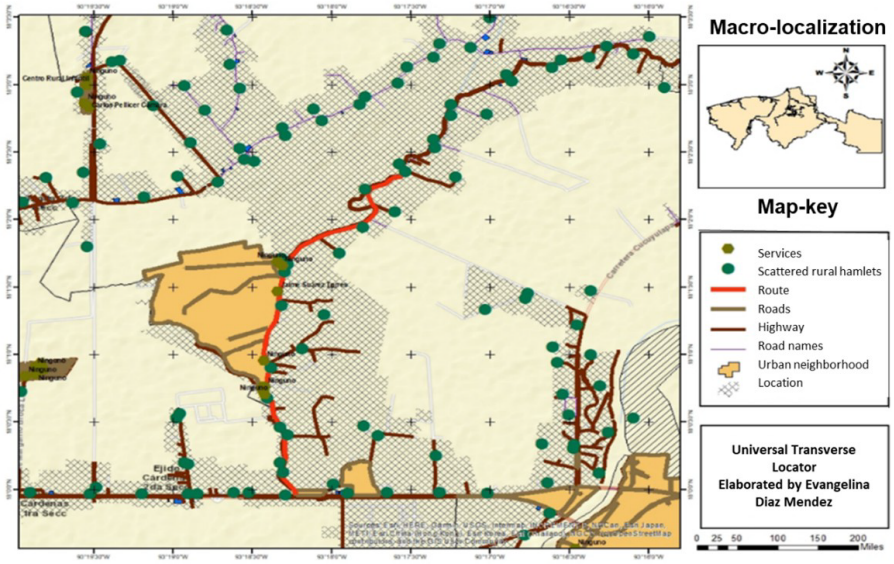
Romero Padilla *et al.* (2022) state that the choice of successor depends on profitability, family factors and customs that favor males; likewise, succession is delayed due to lack of planning and a desire for future protection.

METHODOLOGY

The study was conducted from November 2023 to May 2024 in twenty production units (PUs) in the town of Miahuatlán 2a. Sección, Cunduacán, Tabasco, México (Figure 1). This community, located in the Gulf of Mexico Coastal Plain, has a warm, humid tropical climate with an average annual rainfall of 2,750 mm. It is situated at 12 meters above sea level with flat terrain, predominantly clayey and acidic soils (pH 5.5 to 6.5), flood-prone areas and numerous expanses of water. Corn and cocoa represent the main products, although in recent years, bananas, sugarcane, coconuts, and citrus fruits have been cultivated. The main economic activities are agriculture and to a lesser extent small-scale livestock farming and small-scale commerce (INEGI, 2024).

The research took a mixed approach using qualitative data description and support from quantitative analysis to explain some variables using descriptive statistics.

The criteria for selecting the production units (PUs) were: 1) producers originating from the town of Miahuatlán and 2) cocoa producers. Of approximately 120 agricultural producers in Miahuatlán, twenty fulfilled the criteria for cocoa production in the community. This served to generate a non-probability sample, known as the typical subject group (Hernández *et al*., 2014). A questionnaire with nine sections was elaborated in order to collect the



Source: self-elaborated.

Figure 1. Miahuatlán, Cunduacán, Tabasco.

data: 1) Identification of the property, 2) Sociodemographic information, 3) Information on the production system, 4) Aspects of roles of those participating in the production unit, 5) Aspects of the planning process for successor selection and transition, 6) Aspects concerning the production unit and the cocoa plantation, 7) Aspects of the renewal of the production system, 8) Marketing aspects, and 9) Infrastructure and equipment. The instrument was validated by means of a pilot test previously applied to various agricultural producers. A database was created with the collected information, coded and classified into open and closed responses (where yes=1 and no=2). The variables studied are presented in Table 1.

Data analysis

Descriptive statistics were used for data analysis, employing the statistical software InfoStat version 2020e (Di Rienzo *et al*., 2020). Production units

Table 1. Characteristics of the cocoa production system in the town of Miahuatlán, from November 2023 to May 2024.

Section	Variable	Measurement Unit
Information about producer	Age	Years
	Gender of manager	Man-Woman
	Producer's education	Years
	Years of experience in cocoa production	Years
	Size of plot	Hectares
	Members of PU*	Number
	Members of family	Number
	Land tenure	Ejido member, private or undefined
Information about the productive unit	Size of PU*	Hectares
	Manager of the PU*	Head of household or other member
	Records	Economic, productive
	Installations and equipment	Number
	Government support received	Number
	Distribution of roles in the PU*	Number of members in the family unit
	Choice of generational succession in PU*	Man or woman
Information on roles in the PU*	Sales destination	Local, regional, international
Trade	Sales criteria	Does not apply
	Products that it sells	Cocoa in different presentations
	Price of products it sells	Mexican pesos
	Age of successor	Years
	Age when management began	Years
	Generations of ownership	Number

* PU: Production Units
Source: adapted by Cruz-Clemente *et al.*, 2024.

(PUs) were classified according to the size of the plot area dedicated to cocoa production, measured in hectares. This classification aimed to identify different management practices across generations and analyze generational succession, revealing three unit sizes: Small (0.1–0.750 ha), Medium (0.751–2.0 ha) and Large (≥2.1 ha). Economic variables were expressed in Mexican pesos. An analysis of variance (ANOVA) with P<0,05 was performed on the social, cultural, technical, and economic variables, where the only factor of variation was unit size. Means were compared using the Tukey-Kramer test.

RESULTS

Socioeconomic characteristics of cocoa producers according to type of Production Unit (PU)

Basic characteristics were obtained from the selected cocoa PUs, highlighting the distribution of surface area for each activity developed, with cocoa cultivation being the one that is given the most space and attention by management (Table 2), indicating that the unit that assigned the largest surface area to cocoa production consisted of 20 hectares (UP XE5), while the one with the smallest

Table 2. Basic information on the PUs of cocoa producers in Miahuatlán.

PU name	Cocoa (ha)	Banana (ha)	Cattle (ha)	Maize and beans (ha)	Other crops distributed in the cocoa plantation		Plot total (ha)
					Timber trees	Fruit trees	
C1	1.4	3	1.45		Intercropping	Intercropping	5.85
IC2	3				Intercropping	Intercropping	3
PR3	1				Intercropping	Intercropping	1
AH4	0.5				Intercropping	Intercropping	0.5
XE5	20		5	1	Intercropping	Intercropping	26
L6	1	5			Intercropping	Intercropping	6
CM7	2	1			Intercropping	Intercropping	3
CE8	2	1			Intercropping		3
GH9	1	2	3				6
NH10	1	2				Intercropping	3
HH11	1	3	2				6
MC12	1				Intercropping	Intercropping	1
GH13	0.7	0.8					1.5
CA14	0.5	0.5			Intercropping	Intercropping	1
BR15	2.5					Intercropping	2.5
FH16	4	9	10			Intercropping	23
MA17	2						2
MS18	0.5				Intercropping	Intercropping	0.5
MR19	1	4					5
GH20	1					Intercropping	1
Total	47.1	31.3	21.45	1			100.85

*PU: Production Units.

surface area consisted of 0.5 hectares (UP AH4), with evident intercropping between cocoa consisting of less important plants such as fruit trees and some trees for timber.

The most commonly observed cocoa production units in Miahuatlán were found particularly among those of small and medium size, whose owners had fewer years of experience; apparently producers with more education and years of experience owned large production units, in contrast to the age variable among producers, where younger producers had small PUs, although there was no apparent significant difference, when comparing these variables between the classification ranges of the size of the PU (P<0,05) (Table 3).

Forty-five percent of cocoa producers in Miahuatlán do not rely on agriculture as their primary economic activity. This suggests that additional labor is used to support the management of the PU, while for some cocoa producers this primary activity provides them with medical services (Figure 2).

Productive characteristics of the production unit

Regarding the distribution of the different productive areas observed in the cacao production units in the study, low agricultural diversification was noted in relation to the management of the four areas identified in the PU's organization. A greater number of production units incorporate an area of fruit trees, illustrating the fact that cacao is an agro-ecological system found in this stratum. The incorporation of staple crops such as beans and corn in the area is less common (Figure 3).

In cocoa production units, we find Criollo and Forastero cocoa varieties. The term Forastero encompasses a wide range of distinct populations with unique characteristics; it originates from the Amazon region and is mainly cultivated in West Africa and Southeast Asia (Bhattacharjee and Akoroda, 2018).

Regarding the age in years of trees planted in the PUs, large ones stand out with an average age of 81.25±16.23 years, of which the small (31.66±6.83) and large (32.50±6.49) PUs predominate, with trees with greater production, observing

Table 3. Mean ± SE of the social characteristics of cocoa producers in Miahuatlán.

Size of PU*	Age in years	Years of experience	Education of the manager
Small	50.50 ± 5.21[a]	28.60±5.53[a]	4.10± 0.36[a]
Medium	60.20 ± 2.92[a]	39.50±5.48[a]	3.80±0.40[a]
Large	57.00 ± 5.64[a]	42.00±6.36[a]	4.75± 0.64[a]
Total	56.65 ±2.59	36.75±3.65	4.10±0.29

SE: standard error. Different letters indicate significant differences (P<0.05), n=20; PU: Production Units.

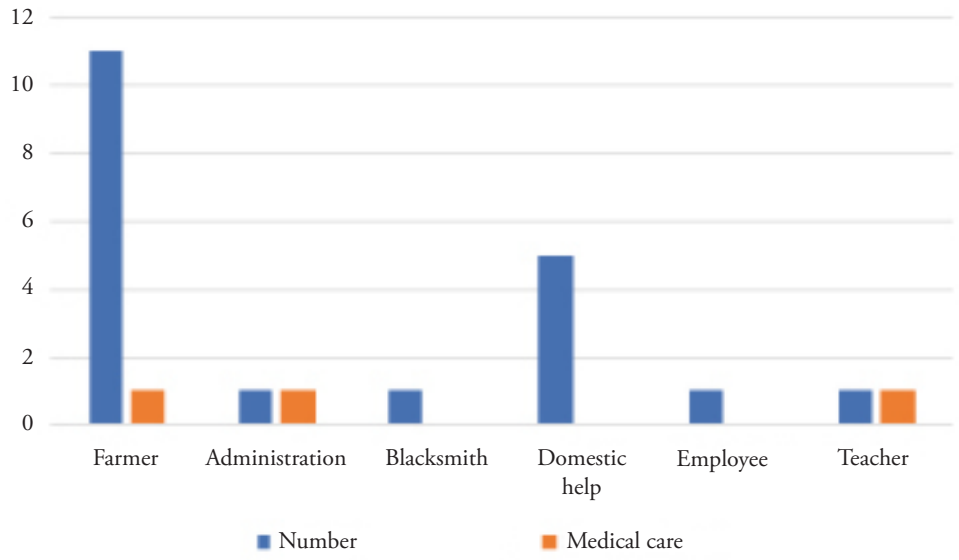


Figure 2. Main occupation of cocoa producers in Miahuatlán, who have access to medical services.

a significant difference to the medium PUs, concerning the age of productive trees in relation to the different sizes of PUs (Table 4).

Marketing of cocoa products and by-products

The cocoa produced by the PUs is marketed in different presentations and prices. The first presentation is wet cocoa, valued at $18.00 pesos per kilogram in the region. The second is washed, dried cocoa, valued at $80.00 pesos per

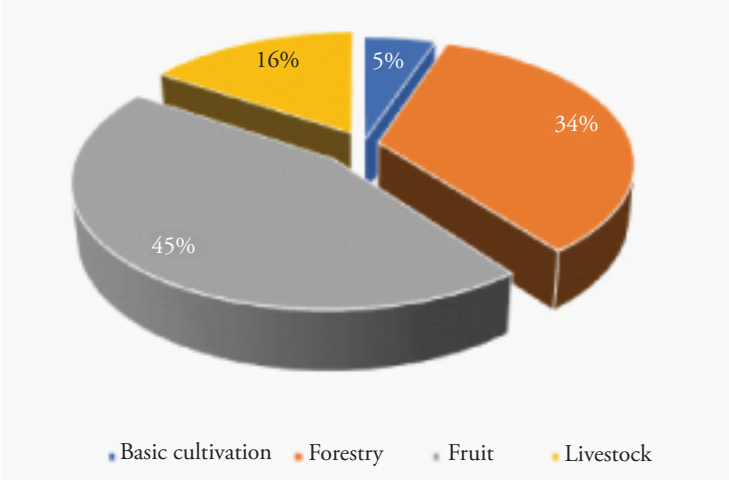


Figure 3. Distribution of the areas of the cocoa PU in Miahuatlán.

Table 4. Mean ± SE of the number of years of trees planted and age of the most productive trees in the Miahuatlán PU.

Size of PU	How long ago planted	Age of productive trees
Small	45.00±11.05[a]	31.66±6.83[a]
Medium	40.20±07.57[a]	9.00±1.37[ab]
Large	81.25±16.23[a]	32.50±6.49[a]
Overall total	49.85±06.95	20.50±3.60

SE: standard error. Different letters indicate significant differences (P<0.05), n=20; PU: Production Units.

kilogram. The third presentation is fermented cocoa, valued at $100.00 pesos per kilogram. Two by-products are also offered: pure artisanal chocolate, priced at $700.00 pesos per kilogram and cocoa powder, priced at $250.00 pesos per kilogram. The marketing outlets used range from intermediaries or middlemen to direct sales to local consumers, and in some cases, they target international markets (Figure 4).

Factors that determine generational change

Generally, in PUs of different sizes, the age of the producer is close to old age, an equity relationship was observed in the choice of the successor's gender, with disparity in the small PUs, while the age of the producer (50.5) and successor (22.5) is lower in the case of the of medium and large size PUs (Table 5).

In Miahuatlán 2ª sección, 45% of cocoa production units (PUs) are managed by women and 55% by men. The average tenure of the cocoa PU successor is 9.94 ± 0.83 years. The greatest number of generations since the acquisition of the

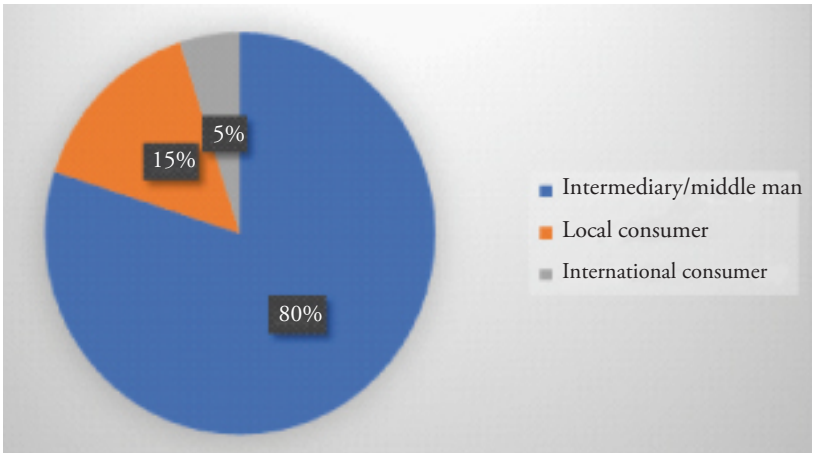


Figure 4. Destination of the products and by-products of the cocoa PU in Miahuatlán.

Table 5. Average age of the producer, successor and gender, manifested in the Miahuatlán PU.

PU size	Age of producer	Gender of producer		Age of legal successor	Gender of successor	
		M	W		M	W
Big	57	3	1	30.75	2	2
Medium	60.2	5	5	37.9	5	5
Small	50.5	2	4	22.5	4	2

n=20; PU: Production Unit; M: man; W: women.

cocoa PU was observed in small and medium-sized PUs. This is probably due to the fact that properties decrease in size with each succession. No significant difference was observed between the sizes of PUs with respect to the variables analyzed. Regarding the age at which management of the PU is handed over to the successor, this data averages 31.85 ± 3.12 years (Table 6). Meaning that is it is not until adulthood that people begin to take charge of the plot.

The cocoa production units presented an average of 3.10 ± 0.27 members involved in management activities. The size of the land when the current owners inherited was 5.14 ± 1.53 hectares (Table 7).

DISCUSSION

The cocoa production unit in Miahuatlán is typically managed as agro-forestry, where cocoa crops coexist with various plant species, always intending to combine with other productive species. Theoretically, this type of arrangement corresponds to an agro-forestry system that integrates cocoa crops with other crops and/or trees, creating a diversified ecosystem that offers multiple ecological, economic, and social benefits. Cocoa agro-forestry systems involve the coexistence of cocoa with tree species and associated crops that provide shade, protection against pests and diseases, microclimate improvement and soil conservation. These aspects favor local biodiversity and the resilience of the production system in the face of climatic variations and adverse events (Jiménez, 1980; Limachi *et al*., 2018). Various productive species,

Table 6. Mean ± SE of the characteristics of the cocoa production unit successor in Miahuatlán, Tabasco.

Size of PU	Age of successor (years)	Age when started to manage (years)	Number of generations of ownership
Small	22.50±4.11[a]	10.00±1.54[a]	2.83±0.28[a]
Medium	37.90±3.70[a]	9.44±0.77[a]	2.30±0.27[a]
Large	30.75±8.01[a]	11.00±1.75[a]	4.50±1.95[a]
Overall total	31.85±3.12	9.94±0.83	2.90±0.46

SE: standard error. Different letters indicate significant differences (P<0.05), n=20; PU: Production Unit.

Table 7. Average ± SE of the characteristics of the cocoa production unit depending on generational renewal in Miahuatlán, Tabasco.

Size of the PU	Number of members in the PU	Size of inherited plot (ha)
Small	3.50±0.31[a]	1.10±0.3
Medium	3.20±0.41[a]	3.77±0.53
Large	2.25±0.54[a]	13.62±5.46
Overall total	3.10±0.27	5.14±1.53

SE: standard error. Different letters indicate significant differences (P<0.05), n=20; PU: Production Unit.

such as banana, vanilla, taro, and pigeon pea, complement cocoa cultivation, providing benefits such as diversification of production and improvements in farmers' food sovereignty, as well as reducing competition and increasing the efficiency of the system, when properly managed (Castillo *et al*., 2022Reyes-Diaz, 2020).

From an agro-ecological perspective, the presence of different productive species allows for the provision of ecosystem services, such as biological pest control, soil protection against erosion, and the maintenance of habitats for beneficial fauna (Limachi *et al*., 2018; Government of the State of Tabasco, 2021). This induces a natural balance that can reduce the need for chemical inputs and improve the sustainability of cocoa production. Similarly, Zegada-Herbas *et al*. (2020), in a study conducted in Bolivia, describe how cocoa is grown in different production systems, including conventional monoculture (CM), organic monoculture (OM), conventional agroforestry (CA), organic agroforestry (OA), and successional agro-forestry (SA).

In the Municipality of Tumaco in particular, Nariño Department of Colombia, cocoa is established in a diversified manner maintaining American customs that include various agro-forestry arrangements such as: cacao Theobroma cacao associated with *Musa paradisiaca*, *T. cacao* associated with fruit and timber trees and *T. cacao* associated with palms and sometimes, *T. cacao* in pastureland (Preciado *et al*., 2011).

Agricultural activities in Mexico, particularly cocoa production in Miahuatlán, were currently found not to be a primary activity. On average, producers are mostly elderly, with an average of 4.5 years of schooling and 36.5 years of experience in cocoa management. A 2015 study conducted in a rural community in the municipality of Comalcalco, Tabasco, found that the majority of those interviewed were elderly, with only 4% having any formal education (De la Cruz *et al*., 2015). This tendency is similar in the southeastern region of Mexico, as shown in the study by Mariscal-Aguayo *et al*. (2025), indicating that more than half of the producers (395) included in the research live in poverty

(Mariscal *et al*., 2023). It was apparent that the producers of Miahuatlán have ample experience compared to other places where cocoa is produced, such as in the Recinto El Rosario, Cantón Naranjito, Guayas, Ecuador, where the producers are new to the crop, with averages of 1 to 5 years and a maximum of 20 years of experience, in addition to mostly having only a basic level of education (Damián *et al*., 2022).

Cocoa production in Miahuatlán is not usually the primary economic activity of the producers, who generally have another primary occupation. Theoretically, this situation is related to rural multifunctionality and income diversification in agricultural communities, where agriculture, and particularly cocoa cultivation, may constitute a complementary or secondary activity for producers. Rural multifunctionality implies that producers do not depend exclusively on a single economic activity, but instead combine various sources of income to ensure their subsistence and well-being. In contexts like Miahuatlán, cocoa production coexists with other occupations, which may be agricultural, commercial, or even service-related and are fundamental to the family economy (Reyes *et al*., 2018). This diversification contributes to reducing economic vulnerability to price fluctuations and adverse weather conditions that affect agricultural production (Tadeo-Sánchez, 2023).

In contrast, the need for medical services faced by producers reveals a common problem in rural areas, where access to healthcare can be limited. The precariousness of health services directly impacts the quality of life of producing communities and can influence their work capacity, as experiences in projects in rural cocoa-growing communities indicate (Ferrero, 2024). Insufficient medical care limits productivity and long-term sustainability in the production system, as health is a key component of rural human capital (Secretariat of Agriculture and Rural Development, 2002).

Pabón reports a high dependence on cocoa in Santander, Colombia, scoring it four on a scale of 1 to 4, and producers indicate that this crop improves their income by an average of 3.5 (Pabón *et al*., 2016). In contrast, in the municipality of Tumaco, Nariño department of Colombia, agriculture is the main economic activity, with cocoa production in its various forms constituting one of the main activities in the study area (Preciado *et al*., 2011).

Cocoa cultivation in Miahuatlán takes place as a part of agro-forestry systems that integrate diverse plant species within the production unit. These cocoa agro-forestry systems promote biological diversification, enhance ecological and productive functions, and maintain a sustainable balance (Integrated Management Plan, 2021). These systems provide important ecosystem services, such as biological pest control, climate change mitigation through carbon

sequestration, soil protection, and microclimatic improvement (Ramos-Prado *et al*., 2023; Limachi *et al*., 2018).

In Miahuatlán, the design and management of these systems take into account the appropriate selection of species, spatial distribution, planting distance, and economic and environmental sustainability (Government of the State of Tabasco, 2021). These agro-ecosystems foster the social and cultural participation of rural communities, in addition to strengthening the local economy through diversified production and environmental conservation (Government of Tabasco, 2021). This strategy not only enriches the biodiversity of the agricultural ecosystem but also allows for the diversification of income sources through the sale of various products and byproducts (Comprehensive Management Plan, 2021; Cruz, 2022). In Comalcalco, Tabasco, the same tendency was observed regarding the association of cocoa with other crops, such as the incorporation of plantain (*Musa balbisiana*), orange (*Citrus sinensis*), black bean (*Phaseolus vulgaris*) and black pepper (*Piper nigrum*) (De la Cruz *et al*., 2015). A similar situation was reported by Pavón *et al*. in 2016 in Santander, Colombia, where 67.7% of farms, in addition to cocoa, also cultivated plantains; 67.2% had fruit trees; 52.2% alternated their income with cassava cultivation; and to a lesser extent, they cultivated other crops such as coffee and vegetables, at 16.7% and 8.1%, respectively (Pabón *et al*., 2016).

Cocoa cultivation in Miahuatlán, Cunduacán, Tabasco, shows that tree age, averaging 20.50 ± 3.60 years for the most productive trees, does not appear to be a determining factor for production, depending on the size of the production units. Cocoa production depends on agronomic and environmental factors, although age also plays a role and in well-managed systems, yields are maintained. In traditional and agro-forestry systems, cocoa plants initiate production between 3 and 5 years, reaching their peak between 8 and 10 years, and can continue producing for 30 to 40 years (Vázquez Vidal and López Rodríguez, 2021). Productivity does not necessarily decrease with age if practices such as pruning, fertilization, and pest and disease control are applied (Government of the State of Tabasco, 2021). Therefore, the average age of 20.5 years for the most productive trees may represent an optimal maturity stage for continuous production under the conditions of Miahuatlán. Cocoa production depends on the diversity of the system, soil, nutrients, water, and management; in mixed systems with shade, the ecological balance allows for stable productivity, even among older cocoa trees (Ramos-Prado *et al*., 2023). De la Cruz and colleagues indicate that plantations with trees older than 30 years begin to experience a decline in their productive life (De la Cruz *et al*., 2015). This is a situation that Miahuatlán will need to take into account in a few years' time, in order to avoid a decrease in production.

The results regarding succession planning in cocoa production units in Cunduacán reveal no marked tendency towards a particular gender taking over, as both men and women actively participate in cocoa production. Rural social and cultural change is driving greater gender equality in productive activities. Traditional agricultural succession is analyzed from social, cultural, and economic perspectives that explain these transformations (Cruz, 2022).

The equal interest of men and women to participate in productive succession reflects significant progress towards gender equality, breaking with paradigms where agricultural production was traditionally the exclusive domain of men (Martínez, 2024). Women's participation in productive activities not only contributes to the economic sustainability of the production unit but also strengthens the social fabric and promotes inclusion in the decision-making processes (Government of Tabasco, 2022). In Tabasco, as in the rest of Mexico, in cocoa cultivation, as with other economically important crops in the region, generational succession is not occurring, with the average age of workers consistently exceeding the national average of 51 years (Gómez, 2014; De la Cruz *et al*., 2015; Padilla-Vega *et al*., 2021).

Cocoa production units in Miahuatlán generate three main products and two by-products destined for the national and international markets, although their marketing channels are not always well- defined or formally structured. However, the prices set by the producers are respected, and only a small percentage, around 5%, is sold directly to foreign visitors on-site, representing international trade. Traditional and agro-forestry cocoa systems produce beans, paste, chocolate, and various by-products, whose destinations and added value diversify income. (Mata *et al*., 2018).

Marketing is complex, with limited outlets, but price autonomy strengthens negotiation and maintains fair margins (Tadeo-Sánchez, 2023). Limited exports, with only 5% sold to foreign visitors, reveals the potential for expanding international participation by applying strategies and certifications. In contrast, Ecuador is the main supplier of fine aroma cocoa to the US and Europe, and the fourth largest producer worldwide, with projections to soon become the third (León-Villamar *et al*., 2016).

CONCLUSIONS

The cocoa production system in Miahuatlán, Cunduacán indicates a tendency towards monoculture; a result of generational transition. The producers are elderly and possess considerable experience in managing Criollo and Forastero cocoa. While early participation in cocoa cultivation activities is observed, no production unit has been owned by more than two generations. There is a

notable loss of generational succession, which poses risks to the sociocultural, technical, and economic aspects that characterize the system.

ACKNOWLEDGMENTS

We would like to thank Mr. Efrén Hernández Maldonado, cocoa producer from Miahuatlán, for his support, as well as all the producers who collaborated in this study. We would also like to thank Conahcyt for their support in the development of this research.

REFERENCES

Agriculture and Economic Development Analysis Division. 2014. The State of Food and Agriculture 2014: Innovation in family farming. FAO: Roma, Italia. https://openknowledge.fao.org/items/63a33bc3-5c8c-410a-b41a-2716460085ca. 161 p.

Aguirre T, Bayres K, Yáñez R, Lindemann R, Reinoso D, Quispe M, Valenzuela R, CESDER PRODES, APROBA SANK. 2025. Entre querer y poder hacer. Tensiones de jóvenes rurales indígenas sobre la agroecología, proyecto Redes para la Transformación Agroalimentaria. Tesis Master. Rimisp: Santiago Chile. https://rimisp.org/wp-content/uploads/2025/05/DOC-295-ENTRE_EL_QUERER_Y_PODER_HACER-Mayo2025.pdf. pp. 32.

Avellán-Herrera V, Hernández-Junco V. 2021. Caracterización del proceso de relevo generacional en empresas familiares de países sudamericanos. Entreciencias: diálogos en la sociedad del conocimiento. 9(23). https://doi.org/10.22201/enesl.20078064e.2021.23.80242.

Bhattacharjee R, Akoroda M. 2018. Taxonomy and classification of cacao. *In*: P Umaharan (ed), Achieving sustainable cultivation of cocoa. Burleigh Dodds Science Publishing: Cambridge, UK. https://cgspace.cgiar.org/items/7d094ab2-604a-4f09-9558-e232da6b04e3. pp: 3–16.

Bobadilla E, Chávez EM, Flores JP, Ochoa F, Perea M. 2019. El extensionismo integral, una estrategia para incentivar el relevo generacional en el medio rural. *In*: I Congreso Iberoamericano y XXXI Internacional en Administración de Empresas Agropecuarias–2018. http://repositorio.uptc.edu.co/handle/001/6293.

Cappello HA. 2021. La herencia agro-cultural como síntoma de estancamiento en los pequeños productores. Revista Geográfica Digital. Universidad Nacional de Formosa. 18(35). 112-126 http://dx.doi.org/10.30972/geo.18355137

Castillo MJ, Morejón M, Suárez GM, Acuña IR. 2022. Diversificación de cultivos en un sistema agroforestal cacaotero en el macizo del jamal, municipio Baracoa. Revista Cubana de Ciencias Forestales, 10(3). 364-379. https://cfores.upr.edu.cu/index.php/cfores/article/view/754 .

Cervantes-Herrera J, Cruz-León A, Salas-González JM, Pérez-Fernández Y, Torres-Carral G. 2016. Saberes y tecnologías tradicionales en la pequeña agricultura familiar campesina de México. Revista de Geografía Agrícola, (57). 219-232. https://doi.org/10.5154/r.rga.2016.57.011.

Chao K. 2024. Family farming in climate change: Strategies for resilient food systems. Heliyon, 10(7). e28599. https://doi.org/10.1016/j.heliyon.2024.e28599.

Córdova CE, Jaramillo JL, Córdova V, Carranza I, Morales J. 2018. Chocolate casero tradicional en la región de la Chontalpa Tabasco México: actores y saberes locales. Estudios Sociales, 28(52). https://doi.org/10.24836/es.v28i52.577.

Cruz-Clemente GJ, Estrada-León RJ, Sierra-Vásquez AC, Severino-Lendechy VH, Piñeiro-Vázquez AT, Bojórquez-Cat JC. 2024. El bovino criollo de Nunkiní, Campeche, México un recurso zoogenético en riesgo. Agronomía Mesoamericana. 35. 54368. https://archivo.revistas.ucr.ac.cr/index.php/agromeso/article/view/54368.

Cruz V. 2022. Influencia de elementos intergeneracionales en la continuidad de áreas cultivadas con cacao (*Theobroma cacao* L.) en Tabasco. Tesis de doctorado. Colegio de Postgraduados Campus Veracruz, México. http://colposdigital.colpos.mx:8080/jspui/bitstream/handle/10521/5179/Cruz_Palacios_V_DC_Agroecosistemas_Tropicales_2022.pdf?sequence=1&isAllowed=y.

Damián LF, Angulo AJ, Villavicencio JA, Santander MO. 2022. Caracterización agro-socioeconómica de los productores de cacao (*Theobroma cacao* L.) en el recinto El rosario, cantón

Naranjito, Guayas. Pro Sciences. 6(42). 399–408. https://journalprosciences.com/index.php/ps/article/view/499.

Daza E, Artacker T. 2025.Agriculturas familiares campesinas en los Andes. Entre las múltiples crisis y la transformación. Friedrich-Ebert-Stiftung FES-ILDIS: Quito, Ecuador. https://library.fes.de/pdf-files/bueros/quito/22295.pdf. 219 p.

De la Cruz E, Córdova-Avalos V, García-López E, Bucio-Galindo A, Jaramillo-Villanueva JL. 2015. Manejo agronómico y caracterización socioeconómica del cacao en Comalcalco Tabasco. Foresta Veracruzana. 17(1). 33-40. https://www.redalyc.org/pdf/497/49742125005.pdf.

Di Rienzo JA, Casanoves F, Balzarini MG, Gonzalez L, Tablada M, Robledo CW. 2020. Centro de Transferencia InfoStat, FCA, Universidad Nacional de Córdoba, Argentina. http://www.infostat.com.ar.

Escamilla-Prado E, Díaz-Cárdenas S, Nava-Tablada ME, Cantú-Peña F. 2018. El relevo generacional en el sector cafetalero: la experiencia de los cursos de café para niños en Chocamán, Veracruz, México. Agroproductividad. 11(4). 48-54. https://revista-agroproductividad.org/index.php/agroproductividad/article/view/269.

Ferrero. 2024. Ferrero por el Campo incrementa los agricultores de cacao beneficiados y los impulsa hacia un futuro rentable. https://www.ferrero.com/mx/es/noticias-e-historias/noticias/ferrero-por-el-campo-incrementa-los-agricultores-de-cacao-beneficiados-y-los-impulsa-hacia-un-futuro-rentable.

Gobierno del Estado de Tabasco. 2021. Plan de Manejo Integral del Sistema Agroforestal de Cacao en el Estado de Tabasco. https://tabasco.gob.mx/sites/default/files/users/sbstabasco/PlandeManejointegralSistemasAgroforestalesdeCacaoSBSCC2021.pdf.

Gobierno de Tabasco. 2021. Boletín SBSCC. Aprovechamiento y Uso Sustentable de Sistemas Agroforestales de Cacao. https://tabasco.gob.mx/sites/default/files/users/sbstabasco/BOLETIN_SCC_ProyectoUKLaLuz_SEP2021.pdf.

Gobierno de Tabasco. 2022. Esencial fomentar el relevo generacional entre los sembradores de cacao. https://tabasco.gob.mx/noticias/esencial-fomentar-el-relevo-generacional-entre-los-sembradores-de-cac.

Gómez LA. 2014. La organización como estrategia de competitividad para pequeños y medianos productores de arroz (*Oriza sativa* L) de la región de la Chontalpa, Tabasco. Tesis de Maestría. Colegio de Postgraduados Campus Tabasco, Tabasco México. http://colposdigital.colpos.mx:8080/xmlui/handle/10521/2399.

Graeub BE, Chappell MJ, Wittman H, Ledermann S, Kerr RB, Gemmil-Herren B. 2016. The state of family farms in the world. World Development, 87: 1–15. https://doi.org/10.1016/j.worlddev.2015.05.012.

Grisa C, Sabourin E. 2019. Agricultura familiar: de los conceptos a las políticas públicas en América Latina y el Caribe. 2030-Alimentación, agricultura y desarrollo rural en América Latina y el Caribe. https://hal.science/hal-02776075v1.

Hernández R, Fernandez C, Baptista MP. 2014. Metodología de la investigación 6ª edición. México: McGraw-Hill Interamericana Editores S.A. de C.V. D. F. México. https://apiperiodico.jalisco.gob.mx/api/sites/periodicooficial.jalisco.gob.mx/files/metodologia_de_la_investigacion_-_roberto_hernandez_sampieri.pdf. 637 p.

IFAD (International Fund for Agricultural Development). 2024. Rural youth — recursos y políticas para el relevo generacional. https://www.ifad.org/en/rural-youth

INEGI (Instituto Nacional de Estadística y Geografía). 2024. Datos por municipio. https://www.inegi.org.mx/app/tabulados/interactivos/?px=EMIM_ENTIDAD_27&bd=EMIM.

Jiménez G. 1980. Asociación de especies frutales con cacao. FAO AGRIS - Sistema Internacional de Ciencia y Tecnología Agrícolas. https://agris.fao.org/search/en/providers/124212/records/6474b10c5eb437ddff72a776.

Jiménez-Barbosa WG, De la Portilla E, Basante AY, Zúñiga LA, Zambrano DF, Rojas JS, Delgado RA. 2019. Relevo generacional para la continuidad de produc-ción cafetera familiar. Caso municipio de Albán Nariño-Colombia. Revista Colombiana de Ciencias Sociales. 10(1). 67-92 https://doi.org/10.21501/22161201.3060.

Lazos-Chavero E, Jiménez-Moreno M. 2022. Vulnerabilidades rurales a partir del envejecimien-

to entre nahuas del sur de Veracruz. Trace (81). 132-161. doi:10.22134/trace.81.2022.803.

León-Villamar F, Calderón-Salazar J, Mayorga-Quinteros E. 2016. Estrategias para el cultivo comercialización y exportación del cacao fino de aroma en Ecuador. Revista Ciencia UNEMI 9(18). 45-55. http://www.redalyc.org/articulo.oa?id=582663825007.

Limachi M, Naoki K, Armengot L. 2018. Efecto de diferentes sistemas de producción de cacao sobre la composición de un conjunto de hormigas te-rrestres. Ecología en Bolivia. 53(2). 113-127. http://www.scielo.org.bo/scielo.php?script=sci_arttext&pid=S1605-25282018000200004.

Mariscal DV, Estrella H, Salas JE. 2023. Caracterización del sistema de producción de cacao en el sureste de México utilizando el modelo de asesoría Chapingo-AGROPEC Star. Revista de Geografía Agrícola, (71). 1-20. http://doi.org/10.5154/r.rga.2023.71.10.

Mariscal-Aguayo DV, Estrella-Quintero H, Salas-Barboza JE. 2025. Remote monitoring of training and technology-transfer services in vanilla cultivation (Vanilla planifolia Jackson ex Andrews). Agro Productividad, 18(7). 127-137. https://doi.org/10.32854/v7j0qx72.

Martínez AC. 2024. El cambio generacional y su impacto en la producción de cacao en Tabasco. El café de mi tierra – Revista de café. https://elcafedemitierra.com/el-cambio-generacional-y-su-impacto-en-la-produccion-de-cacao-en-tabasco.html.

Martínez-Arboleya HJ. 2007. Los medios de vida sostenibles de las familias productoras de cacao orgánico en el municipio de Cunduacán Tabasco. Tesis de Maestría. Colegio de Postgraduados Campus Tabasco. http://colposdigital.colpos.mx:8080/xmlui/handle/10521/1447.

Martínez-Puc JF, Cetzal-Ix W, González-Valdivia NA, Casanova-Lugo F, Saikat-Kumar B. 2018. Caracterización de la actividad apícola en los principales municipios productores de miel en Campeche, México. Journal of the Selva Andina Animal Science. 5(1): 44-53. https://doi.org/10.36610/j.jsaas.2018.050100044.

Mata D, Rivero M, Segovia EL. 2018. Sistemas agroforestales con cultivo de cacao fino de aroma entorno socioeconómico y productivo. Revista Cubana de Ciencias Forestales. 6(1). 103-115. http://cfores.upr.edu.cu/index.php/cfores/article/view/280/.

Nandi R, Pratheepa CM, Nedumaran S, Rao N, Rengalakshmi R. 2022. Farm parent and youth aspirations on the generational continuation of agriculture. Frontiers in Sustainable Food Systems, 5. 804581. https://doi.org/10.3389/fsufs.2021.804581.

Novo-Vázquez A, Fernández-Aller C, Silveira H. 2019. Agricultura Familiar y Derecho a la alimentación. Reflexiones desde España, América Latina y el Caribe. Ediciones Universidad de Oviedo. https://acortar.link/uygd5h. 186 p.

Ogunjimi O, Daum T, Kariuki J. 2023. The Farming Question: Intergenerational Linkages, Gender and Youth Aspirations in Rural Zambia. Rural Sociology, 88(1). 71-107. https://onlinelibrary.wiley.com/doi/full/10.1111/ruso.12469.

Oliveto AG. 2024. Motivaciones de los jóvenes de comunidades marginadas en territorios petrolizados para participar en la pesca de pequeña escala en México. Tesis de Maestría. El Colegio de la Frontera Sur. https://acortar.link/hOxbdr.

Ortiz-Garcia CF, Torres- de la Cruz M, Hernández-Mateo SC. 2015. Comparación de dos sistemas de manejo del cultivo de cacao, en presencia de *Moniliophtora roreri*, en México. Revista Fitotecnia Mexicana, 38(2). 191-196. https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0187-73802015000200009.

Pabón MG, Herrera-Roa LI, Sepúlveda WS. 2016. Caracterización socio-económica y productiva del cultivo de cacao en el departamento de Santander Colombia. Revista Mexicana de Agronegocios. 38. 283-294. https://doi.org/10.22004/ag.econ.239289.

Payró G. 2021. Análisis de la productividad del sector apícola del municipio de Comalcalco, Tabasco, para el diseño de una propuesta de mejora. Tesis de Maestría Tecnológico Nacional de México. Tabasco, México. https://rinacional.tecnm.mx/bitstream/TecNM/3109/1/TESIS.%20G%C3%89NESIS%20PAYR%C3%93%20GARC%C3%8DA.pdf.

Plana-Farran M, Arzubiaga U, Blanch A. 2023. Successors' future training in family farms: The impact of intrinsic and extrinsic factors. Journal of Knowledge Economy 14. 4216–4237 https://doi.org/10.1007/s13132-022-01046-2.

Preciado O, Ocampo CI, Ballesteros W. 2011. Caracterización del sistema tradicional de producción de cacao (*Theobroma cacao* L) en seis núcleos productivos del municipio de Tumaco, Na-

riño. Revista de Ciencias Agrícolas 28(2). 58-69. https://revistas.udenar.edu.co/index.php/rfacia/article/view/15.

Ramírez SI. 2008. La moniliasis un desafío para lograr la sostenibilidad del sistema cacao en México. Tecnología en marcha. 21(1). 97-110. https://revistas.tec.ac.cr/index.php/tec_marcha/article/view/1343.

Ramos-Prado JM, Romero-Hernández E, Sánchez-Morales P, Jiménez-García D, Hipólito-Romero E. 2023. Dimensiones bioculturales y socioeconómicas de la sustentabilidad en sistemas agroforestales diversificados con cacao y vainilla. Revista Mexicana Ciencias Agrícolas, 14(3). 401-412. https://www.scielo.org.mx/scielo.php?pid=S2007-09342023000300401&script=sci_arttext.

Reyes C, Mandujano JC, Díaz BE. 2018. Organizaciones productoras sociales y privadas de cacao en Tabasco, México. *In*: Teoría, impactos externos y políticas públicas para el desarrollo regional. Rosales R, Mercado A, Sánchez A, Amparo D y Venegas C. Coords. UNAM-AMECIDER: México, https://ru.iiec.unam.mx/3770/. 860 p.

Reyes-Díaz KP. 2020. Investigadores desarrollan proyecto para incrementar producción de cacao. Universo. Sistema de noticias de la UV. Universidad Veracruzana. https://www.uv.mx/prensa/ciencia/investigadores-desarrollan-proyecto-para-incrementar-produccion-de-cacao/.

Rivera S, Gutiérrez M, Pérez F. 2019. Modelo de transporte para la distribución de cacao en México. Revista Mexicana de Ciencias Agrícolas, 10(3). 499-510. https://doi.org/10.29312/remexca.v10i3.1230.

Romero-Padilla A, Hernández-Juárez M, Santoyo-Cortés VH, Mendoza-Rosas AR. 2022. Factores que intervienen en la elección de sucesor de tierras agrícolas en la agricultura familiar. Papeles de población 28(111). 227-256. https://rppoblacion.uaemex.mx/article/view/14609.

Romero-Padilla A, Santoyo-Cortés VH, Márquez-Berber SR, Ayala-Garay AV, Altamirano-Cárdenas JR. 2021. Farm management succession by heritage. A Central Mexico case study. Agronomía Colombiana 39(2). 282-292. https://doi.org/10.15446/agron.colomb.v39n2.94999.

Rosa H, Tejeda AS. 2016. Relevo generacional y emprendimiento en Pymes familiares dominicanas: estudio de caso múltiple. Ciencia y Sociedad 41(2). 389-412. https://doi.org/10.22206/cys.2016.v41i2. pp: 389-412.

Ruiz-Tacanga RB. 2020. El relevo generacional y crecimiento de las empresas familiares en la ciudad de Trujillo 2019. Tesis Licenciatura. Universidad Nacional de Trujillo, Perú. https://hdl.handle.net/20.500.14414/17939.

Salas-Fuente H, Lescaille-Acosta J, Fernández-Maura Y, Bidot-Martínez I. 2021. Procedimiento para la evaluación de los aspectos económicos, sociales y ambientales del manejo agroecológico del cacao. Estudio de caso Baracoa, Cuba. Revista Observatorio de las Ciencias Sociales en Iberoamérica, 2(9). 181-228. https://www.eumed.net/uploads/articulos/8ac5de0d47868e7f8c0b79076fac8b73.pdf.

Sánchez-Albores AC. 2022. Desarrollo empresarial de las MYPES del sector frutícola en la comunidad de Teapa, Tabasco, México. Revista de Investigaciones Universidad del Quindío, 34(2). 178-187. https://doi.org/10.33975/riuq.vol34n2.991.

Secretaría de Agricultura y Desarrollo Rural. 2002. Programa Nacional del Cacao México. https://www.agricultura.gob.mx/sites/default/files/sagarpa/document/2018/11/20/1559/20112018-2001-fa-tab-pnca.PDF. 860 p.

Soto-Maciel A, De la Garza-Ramos MI, Esparza-Aguilar JL, San Martín-Reyna JM. 2019. La sucesión de la empresa familiar; una aproximación teórica. Cuadernos de Administración, 31(56). 105-136. http://doi.org/10.11144/JAveriana.cao.31-56.sefat.

Tadeo JM 2023. Dinámicas productivas y socioeconómicas del Sistema Agroalimentario Localizado (SIAL) del cacao en la subregión Chontalpa de Tabasco. Tesis Maestría. Facultad de Filosofía y Letras, UNAM. México. https://repositorio.unam.mx/contenidos/3670564.

Vázquez-Vidal V, López-Rodríguez WB. 2021. Comportamiento de la producción de cacao en Comalcalco, Tabasco durante 2014-2018. Publicaciones e Investigación 15(2). https://www.researchgate.net/publication/370356483_Comportamiento_de_la_produccion_de_cacao_en_Comalcalco_Tabasco_durante_el_periodo_2014-2018.

Vizcarra-Bordi I, Thome-Ortiz H, Hernández-Linares C. 2015. Miradas al futuro: el relevo gene-

racional en el desarrollo de la conciencia social como estrategia de conservación de los maíces nativos. Carta Económica Regional, 1(115). 55-73. https://n2t.net/ark:/13683/ptuO/hSz.

Zegada-Herbas LJ, Lafuente-Cartagena I, Naoki K, Armengot L. 2020. Variación en la composición de visitantes florales de cacao entre cinco sistemas de producción en San Ana, Alto Beni, Bolivia. Ecología en Bolivia 55(3). 145-159. http://www.scielo.org.bo/scielo.php?script=sci_arttext&pid=S1605-25282020000300002&lng=es&nrm=iso&tlng=es.

Zhang Q, Gao X, Abdullahi NM, Wang Y, Huo X. 2023. Asset specificity and farmers' intergenerational succession willingness of apple management. Journal of Integrative Agriculture, 22(8). 2553-2566. https://doi.org/10.1016/j.jia.2023.04.016.