

Characterization of production units of cured foods in the Isthmus Region, Oaxaca, Mexico

Vásquez-Aragón, Rubén¹, Santiago-Martínez, Gisela M.^{2*}, Castañeda-Hidalgo, Ernesto²,
Vásquez-García, Adela², Lozano-Trejo, Salvador²

¹ Instituto Tecnológico del Valle de Oaxaca, Tecnológico Nacional de México. Posgrado en Ciencias en Productividad en Agroecosistemas. Ex Hacienda de Nazareno, Xoxocotlán, Oaxaca, México. 71230.

² Instituto Tecnológico del Valle de Oaxaca, Tecnológico Nacional de México. Ex Hacienda de Nazareno, Xoxocotlán, Oaxaca, México. 71230.

* Correspondence: gisela.sm@voaxaca.tecnm.mx

ABSTRACT

Objective: To characterize the family production units (FPUs) that produce and market cured foods in the Isthmus Region.

Design/methodology/approach: The approach was descriptive and correlational. The methodology used was proposed by Chayanov (1925), which proposes the assessment of six factors. A survey was applied and 75 variables were evaluated, Spearman's correlation and chi-square test were carried out, and contingency tables were generated with the most significant variables.

Results: With a higher the level of studies of the head of the family, the number of members was greater and women participated more in decision-making. The production of cured foods is a tradition inherited from one generation to another, and 73% learned the activity from a family member. The workforce is family-based and only family members are involved in 95% of the FPUs.

Limitations on study/implications: The vastness of the region makes it difficult to cover other municipalities and insecurity makes it difficult to obtain information.

Findings/conclusions: The family structure at the FPUs is nuclear. The woman directs the elaboration of cured foods, so it is considered that she plays an important role in conserving artisanal production.

Keywords: Artisanal activity, traditional knowledge, cured foods.

Citation: Vásquez-Aragón, R., Santiago-Martínez, G. M., Castañeda-Hidalgo, E., Vásquez-García, A., & Lozano-Trejo, S. (2023). Characterization of production units of cured foods in the Isthmus Region, Oaxaca, Mexico. *Agro Productividad*. <https://doi.org/10.32854/agrop.v16i10.2592>

Academic Editors: Jorge Cadena Iniguez and Lucero del Mar Ruiz Posadas

Received: June 01, 2023.

Accepted: December 28, 2023.

Published on-line: February 16, 2024.

Agro Productividad, 17(1), January, 2024. pp: 101-107.

This work is licensed under a Creative Commons Attribution-Non-Commercial 4.0 International license.



INTRODUCTION

The state of Oaxaca is among the states of highest index of marginalization and poverty in Mexico; Reyes (2021) and Mariscal *et al.* (2019) mention that it is one of its main characteristics. It is reported that 61.7% of the population is in poverty and 70% of its territory is rural, with agricultural activities predominating as the basis of its economy (Consejo Nacional de Evaluación de la Política de Desarrollo Social, CONEVAL, 2020).

The importance of the study is because the FPUs in rural communities establish strategies to obtain foods and at the same time they contribute to sustaining the family economy (Ramírez *et al.*, 2015; Zepeda *et al.*, 2021). These FPUs generate a large variety of artisanal products for auto-consumption or commercialization, based on their traditions (Abril *et al.*, 2019; Ávila, 2021); it is necessary to understand this, which gives importance to the present research. It is of great interest to know the functioning of these FPUs and the family-based employment generated within the social and economic dynamics, and the way in which they are integrated in order to understand their strategies (Muñoz *et al.*, 2019; González and Sacco, 2015).

Bustos (2009) considers that artisanal production consists in elaborating products with basic raw materials and non-industrialized processes. In this regard, Gallego and Hernández (2021) state that artisanal production is strengthened with collective work.

In the FPU, women's knowledge and experiences in terms of food conservation can have a positive impact on the development of the community and to attain better living conditions (López *et al.*, 2015; Yong *et al.*, 2017). The objective of the study was to characterize the family production units devoted to the production and commercialization of fruit-based cured foods in the Tehuantepec Isthmus, Oaxaca.

MATERIALS AND METHODS

Area of study. The research was conducted in the region of the Tehuantepec Isthmus, Oaxaca, made up by the districts of Juchitán and Tehuantepec, which make up 22 and 19 municipalities, respectively (Sistema de Información Cultural, SIC, 2022). According to the National Council for Culture and Arts (*Consejo Nacional para la Cultura y las Artes*, CONACULTA, 2010), the region is inhabited primarily by Zapotec people, although it houses small communities of Mixe, Zoque, Chontal and Huave peoples.

Foundation of the research. The study has a mixed, descriptive, transversal and correlational approach, with the direct generation of information in the units of analysis (Hernández *et al.*, 2010).

Methodology. The methodology used was proposed by Chayanov (1925), characterizing the FPU based on six factors:

1. Profile of the FPU. It generally describes the size of the family, its structure and composition by sex or age. Variables evaluated: number of members in the family (NMF), who is the head of the family (WHF), occupation of the head of the family (OHF), diversification of activities (DA).
2. Cultural traits. It refers to the ethnic group of the family, the language they speak, and the conception of the productive activity as tradition. Variables evaluated: language (L), ethnic group (EG), religion (R), cured foods are part of the culture (CPC), family tradition (FT).
3. Profile of the producer (a). It describes general data about the producers, age, sex, marital status, religion, language, among others. Variables evaluated: who directs the production (WDP), age of producer (AP), degree of studies (DgS).
4. Acquisition of knowledge. It describes how knowledge, techniques and the production process are transmitted in the FPU. Variables evaluated: from whom did the producer learn (FWPL), transmitted knowledge (TK), time directing the activity (TDA), years working with their supplier (YWS).
5. Family workforce. It characterizes the origin of the workforce and the participation of family members in the FPU's activities. Variables evaluated: workforce (WF), work in society (WS), family participation (FP).
6. Tools, inputs and raw material. It characterizes the use of tools, inputs and raw materials used in production. Variables evaluated: use of tools (UT), raw materials required (RMR), fruit purchase (FP), and inputs used (IU).

Research technique. The survey was used, with a questionnaire structured by 75 questions, where the six factors mentioned before were considered. According to Hernández *et al.* (2010), the survey is supported by a questionnaire that is generally applicable in different contexts.

Unit of analysis. The unit of analysis was the FPUs of cured foods. To identify the FPUs, a census was conducted within the municipalities selected: Santo Domingo Tehuantepec, Salina Cruz, Ciudad Ixtepec and Santa María Jalapa del Marqués, which are the municipalities with the highest and lowest number of inhabitants. According to the National Statistics, Geography and Information Institute (*Instituto Nacional de Estadística, Geografía e Informática*, INEGI, 2022), there were 19 FPUs registered, yet 38 were found when the survey was applied, twice as many as those officially recorded; the decision was made to apply the questionnaire to the entire population.

Information analysis. A database was integrated in the Excel 2013 software, and statistical analyses were carried out with the SPSS[®] Statistics software version 2019. Spearman's correlation tests were applied, as well as the chi-square independence test and frequency tables.

RESULTS AND DISCUSSION

Profile of the FPUs

Of the FPUs, 45% are made up of two people, 26% three, 18% four, and 11% five people. They present a nuclear family structure, similar to the FPUs that produce pozole corn in Tlaxcala where the number of members and the structure is similar (Román *et al.*, 2019).

Regarding WHF, it is reported that it is the father in 61% of the FPUs, the mother in 26%, and 13% manifest that both. Ramírez *et al.* (2015), in the community of Vícam, Guaymas, Sonora, reports a similarity where 22% of the FPUs that produce grains and vegetables have a woman as head of the family.

Regarding the OHF, 32% are employees, 29% pensioners, 21% housewives, 8% merchants, 5% bread makers, and 5% farmers. This indicates that the income is generated from various sources, the same as a FPU from Pueblo Nuevo, Acambay, Estado de México, where Magdaleno *et al.* (2014) report that 59% of the heads of the family diversify their sources of income.

Concerning the DA in the FPUs, 50% of the FPUs carry out two or more activities, as it happens with bean producers in Zacatecas, farmers in Tanhuato, and FPUs focused on livestock production and soy crops in Cerro Largo, Uruguay, which perform two or more activities to complement their income (Ramírez *et al.*, 2022; Román *et al.*, 2020; Gonzáles and Sacco, 2015).

Cultural traits of the FPU

In relation to language, 100% of the FPUs speak Spanish and only 26% Spanish and Zapotec. The EG that predominates is Zapotec in 79%, the rest manifests not belonging to an EG. This is because according to CONACULTA (2010), the Zapotec are one of the five ethnic groups that inhabit the region and have greater presence in the state. The religion that predominates is the Catholic with 92% and the rest Baptist.

Regarding whether CPC of the PFUs, 100% considers that yes, 90% also considers FT and the rest doesn't. It is generalized as a characteristic activity of a region and inheritance of their ancestors. Gallego and Hernández (2021), in the municipality of Magdalena Sonora, report that the FPU's devoted to the elaboration of fruit conserves and quince caramel consider this activity as family and cultural tradition inherited from their ancestors.

Profile of the producer

In the production of cured foods, the variable WDP is the woman (100%), and this highlights the importance of the feminine gender to preserve the activity as part of family culture and tradition. Data reported by Ortiz and López (2015) in the community of Nariño, Colombia, indicate that women's participation predominates in the elaboration of handcrafts made of porcelanocrón, migajón, ceramics and pottery, and this highlights the importance of the feminine gender in artisanal activities.

The AP varies from 29 to 79 years, 71% is concentrated in the range of 50 to 79 years. This age range is similar to that reported by Mariscal *et al.* (2019) in FPU's devoted to agriculture and livestock production, in Santa Gertrudis, Zimatlán, Oaxaca, where the age ranges from 18 to 75 years and 24% are over 65 years old, and this is because of the lack of interest by the young population and the need of older adults to conserve their culture, tradition and to generate income.

The DgS varies from six to 16 years, with an average of 8.2 years, where 47% have six years of study, 40% nine, and 8% and 5% with 12 and 17 years, respectively. Galindo *et al.* (2000) report that, of the farmers from Zacatecas, 48.7% have primary education and this is because the families destine few resources to education.

Knowledge acquisition

In the variable FWPL, 73% are of a family member and the rest of people outside the family. In TK, 68% manifests they have transmitted their knowledge and 32% that they have not yet done so. Gallego and Hernández (2021) mention that FPU's of fruit conserves and quince caramel in Magdalena Sonora agree with the form of knowledge transmission in the Isthmus region, which happens generation to generation.

The TDA of the women producers vary in a range of 2 to 50 years with average of 21, which indicates the vast experience of the farmers. As it happens in Los Ríos Ecuador, where Morales *et al.* (2018) identified that farmers have considerable experience in cacao production, this piece of data can also be related with the time that farmers (YWS) have been working with a single supplier because they have more experience time in the acquisition of their raw materials.

Family workforce

The WF used in 95% of the FPU's is contributed by the family, meaning that the main workforce is family-based, as it happens in coffee-producing FPU's in Chiapas, where 84% of them resort to family workforce with the main purpose of self-employment (Vázquez *et al.*, 2022). Similar data are reported by Flores *et al.* (2021) in Puebla, in the extraction of tomomoxtle where they use family workforce because it is a livelihood strategy. Referring to

the WS, each FPU carries out the activity individually, there is not a group or society of women producers due to the lack of initiative and because they think that they work better that way.

This factor is considered one of the most important characteristics of the FPUs, since Chayanov (1925) manifests that family workforce represents the main source of income.

In relation to the FP, it stands out that the children (55%) and husband (53%), grandchildren (11%), siblings (8%), aunts (8%) and nephews (5%) contribute their workforce, even when the person does not inhabit the FPU. The same happens in the municipality of Arismendi, Nueva Esparta, Venezuela, in the production of arepa de vieja, since in both cases family members participate who commute to the place where the FPU is located to contribute their workforce (Gómez, 2008).

Tools, raw material and inputs

In UT 100% of the FPUs used simple tools, such as pails, trays and forks, where both the tools and the elaboration process are manual; according to Flores *et al.* (2021), it is a characteristic of small-scale artisanal producers.

The RMR are the traditional fruits, plum (100% of the FPUs) and quince (84%). Some FPUs have diversified their production, 31% use also mango and 21% peach. The raw material is used directly without any process; this is similar to the raw material used to elaborate stick handcrafts in Santa Catarina del Monte, Texcoco (Rivera *et al.*, 2008), since the production process requires it. For FP, 90% acquire it with farmers from the region and from Santa María Ecatepec, municipality that belongs to the Sierra Sur region; the rest produce the fruit they use.

In the IU variable, 100% of the FPUs purchase sugar, sugarcane alcohol, and water. Both the FPUs of cured foods and the FPUs of citrus trees, avocado and corn from Yucatán perform as demanders when they purchase inputs and offerors in the sale of their products (Ávila, 2021).

Correlation of variables of the different factors

The AP variable shows negative correlation with NMF ($r = -0.724^{**}$), which means that with a lower AP the NMF will be higher, because these FPUs are still made up by parents and children. The AP also has a positive correlation with TDA which means that with higher AP more TDA ($r = 0.505^{**}$). This agrees with Morales *et al.* (2018), who report in the province of Los Ríos, Ecuador, that the older cacao producers are there are more years of experience.

Chi-square independence test

The AP variable has a high dependency ($P \leq 0.01$) with DgS, which means that young women producers have more years of study, similar to what Díaz *et al.* (2020) reported, in corn, bean and tomato FPUs in Ejutla de Crespo, Oaxaca, where there is high dependency between years of study and age range. Something similar happens with artisans of the Central Valleys in Oaxaca, where Mejía *et al.* (2018) identified that 84% of artisans are older than 41 years and 89% only study primary and secondary school.

The TDA variable showed high dependency on the YWS variable ($P \leq 0.01$), and this indicates that with women producers with higher TDA, the possibility of changing supplier is lower. Something similar happens with producers of stick handcrafts in Santa Catarina del Monte, Texcoco, who support their suppliers of raw materials, since in their community they do not have this resource (Rivera *et al.*, 2008).

CONCLUSIONS

Of the families in the FPU, 45% are made up of two people, primarily by the parents, and the remaining 55% with three or four members; in general, the structure is nuclear.

Spanish is spoken in all the FPU; the Zapotec ethnic group predominates (79%), but only 26% speaks Zapotec.

The woman is the one who directs the production of cured foods, where 71% is in an age range between 50 and 79 years, indicating that it is an activity of generally adult people and that the woman plays an important role to conserve the artisanal production of cured foods, and this activity is inherited from their ancestors; 73% acquired the knowledge from a family member, reason why it is considered part of the culture of the FPU.

The main workforce is family-based and in 95% of the FPU only the family intervenes, significant piece of data according to the methodology used for the characterization.

REFERENCES

- Vasilievich Chayanov, A. (1925). La organización de la unidad económica campesina. 1a edición. Ediciones nueva visión. Buenos Aires Argentina. 1975. Págs. 3-35.
- Reyes García, M. 2021. Community added value: A strategy to boost local economic development. *ASyD*. Volumen 18. 162–178. DOI: <https://doi.org/10.22231/asyd.v18i2.428>
- Mariscal, M.A.; Morín, R.J.; Ricardi, C.L.C. 2019. Las unidades de producción familiar del municipio de Santa Gertrudis, Zimatlan, Oaxaca, México. *AICA*. 14. 154–158. <https://aicarevista.jimdo.com/n%C3%BAmeros/vol%C3%BAmen-14-2019/>
- CONEVAL (Consejo Nacional de Evaluación de la Política de Desarrollo Social). (2020). Estadística de pobreza en Oaxaca. <https://www.coneval.org.mx/coordinacion/entidades/Oaxaca/Paginas/principal.aspx>
- Ramírez García, A.G.; Sánchez García, P.; Montes Rentería, R. 2015. Unidad de producción familiar como alternativa para mejorar la seguridad alimentaria en la etnia yaqui en Vicam, Sonora, México. *Ra Ximhai*. 11(5). 113-136. DOI:10.35197/rx.11.01.e3.2015.07.gr
- Zepeda Zepeda, J.A.; Salas González, J.M.; Vega López, L.L.; Sagarnaga Villegas, L.M.; Pérez Rodríguez, P. (2021). The family farm and the economic development of the rural sector in Nayarit, Mexico. *ASyD*, 18(2), 179–196. <https://doi.org/10.22231/asyd.v18i2.714>
- Abril, X.; Vélez, C.; Yungasaca, B. (2019). Modelo de gestión para la internacionalización de artesanías en el Azuay. Caso específico Macana Ikat Gualaceo. *UDA AKADEM*. (4). 9–34. <https://doi.org/10.33324/udaakadem.v1i4.236>
- Ávila Dorantes, J.A. (2021). Estrategia de los productores del sur de Yucatán para insertarse en la economía de mercado. *Revista Mexicana de Ciencias Agrícolas*, 12(2), 331–334. DOI: <https://doi.org/10.29312/remexca.v12i2.2544>
- Muñoz Máximo, T.; Ocampo Fletes, I.; Parra Inzunza, F. (2019). Caracterización socioeconómica de las unidades de producción familiar e importancia del cultivo de chía (*Salvia hispana* L.) en los municipios de Atzitzihuacán y Tochimilco. Puebla, México. *Acta Universitaria*, 29, 1–14. <http://doi.org/10.15174/au.2019.2494>
- González Ruiz, J.; Sacco Dos Anjos, F. (2015). Estrategias de reproducción social de la producción familiar en la región fronteriza de Cerro Largo, Uruguay. *Agrociencia Uruguay*, 19(2), 101–109. <http://www.scielo.edu.uy/pdf/agro/v19n2/v19n2a13.pdf>
- Bustos Flores, C. (2009). La producción artesanal. *Visión Gerencial*, 8(1), 37–52. DOI: <https://doi.org/10.53766/VIGEREN>

- Gallego Gauna, C.P.; Hernández Moreno, M. del C. (2021). Escenario agroalimentario contemporáneo: desafíos y oportunidades de la producción artesanal de alimentos de Magdalena, Sonora. *Región y Sociedad*, 33, 1–30. <https://doi.org/10.22198/rys2021/33/1382>
- López Cabello, A.; Ayala Carrillo, M. del R.; Zapata Martelo, E. (2015). Estrategias de sobrevivencia de microempresarias del sur de la ciudad de México: Influencia de aprendizajes apreciados. *Ra Ximhai*, 11(2), 47–64. <http://www.redalyc.org/articulo.oa?id=46143101004>
- Yong, A.; Calves, E.; González, Y.; Permuy, N.; Pavón, M. I. (2017). La conservación de alimentos, una alternativa para el fortalecimiento de la seguridad alimentaria a nivel local. *Cultivos Tropicales*, 38(1), 102–107. <http://www.redalyc.org/articulo.oa?id=193250540013>
- SIC (Sistema de Información Cultural). (2022). Zapotecos del Istmo, Valles centrales y Sierra Norte. Disponible en URL: https://sic.cultura.gob.mx/ficha.php?table=grupo_etnico&table_id=26
- CONACULTA (Consejo Nacional para la Cultura y las Artes). (2010). ¡Mucho gusto! gastronomía y turismo cultural en el Istmo de Tehuantepec. Talleres de productos gráficos el castor.
- Hernández, S.R.; Fernández, C.C.; Baptista, L.M.P. Metodología de la investigación. 5a ed. McGraw-Hill / Interamericana Editores, SA de CV. México, 2010; págs. 656.
- INEGI (Instituto Nacional de Estadística y Geografía). DENUE (Directorio Estadístico Nacional de Unidades Económicas). (2022). Disponible en URL: <https://www.inegi.org.mx/app/mapa/denue/default.aspx>
- Román Montes de Oca, E.; Bahena Delgado, G.; Ayala Enríquez, M.I.; Licea Reséndiz, J.E. (2019). El maíz pozolero: Una estrategia de sobrevivencia de las familias rurales en Texcala Morelos, México. *Perspectivas Rurales Nueva Época*, 17(33), 59–83. <https://doi.org/10.15359/prne.17-33.3>
- Magdaleno Hernández, E.; Jiménez Velázquez, M.A.; Martínez Saldaña, T.; Cruz-Galindo, B. (2014). Strategies of peasant families in Pueblo Nuevo, municipality of Acambay, Estado de México. *Agricultura Sociedad y Desarrollo*, 11, 167–179. <https://www.redalyc.org/articulo.oa?id=360533099003>
- Ramírez Cabral, N.; Cid Ríos, J.Á.; Reveles Hernández, M.; Sánchez Gutiérrez, R.A. (2022). Tipificación de productores de frijol del PRODETER para coadyuvar el cambio climático en Zacatecas. *Revista Mexicana De Ciencias Agrícolas*, 13(4), 741-748. DOI: <https://doi.org/10.29312/remexca.v13i4.2797>
- Román Montes de Oca, E.; Licea Resendiz, J.E.; Romero Torres, F. (2020). Diversificación de ingresos de los productores como estrategias de desarrollo rural. *Entramado*, 16(2), 126–141. <https://doi.org/10.18041/1900-3803/entramado.2.6752>
- Ortiz, M.; López, R. (2015). Caracterización socioeconómica de la comunidad artesanal de Nariño, Colombia. *Lecturas de Economía*, 82(1), 247–281. DOI: <https://doi.org/10.17533/udea.le.n82a8>
- Galindo González, G.; Tabares Rodríguez, W.C.; Gómez Aguirre, G. (2000). Caracterización de productores agrícolas de seis distritos de desarrollo rural de Zacatecas. *Terra Latinoamericana*, 18(1), 82–92. <http://www.redalyc.org/articulo.oa?id=57318109>
- Morales Intrigo, F.L.; Carrillo Zenteno, M.D.; Ferreira Neto, J.A.; Peña Galeas, M.M.; Briones Caicedo, W.R. y Albán Moyano, M.N. (2018). Cadena de comercialización del cacao nacional en la provincia de Los Ríos, Ecuador. *Ciencias Agrarias*, 11(1), 63-69. <https://doi.org/10.18779/cyt.v11i1.131>
- Díaz García, D.L.; Rodríguez Ortiz, G.; Cruz-Cabrera, B.C.; Castillo Leal, M.; Santiago Martínez, G.M. (2020). Innovación en el desarrollo de unidades de producción agrícola familiar en localidades marginadas de Oaxaca. *Ciencia Ergo-Sum*, 27(3), 1–13. <https://doi.org/10.30878/ces.v27n3a1>
- Mejía Sánchez, E.; Mendoza Juárez, J.; Hernández Leyva, L.L. (2019). Artesanos y su potencial emprendedor. Valles centrales del Estado de Oaxaca, 2018. *Horizontes de la Contaduría en las Ciencias Sociales*, 11, 88–115. <https://doi.org/10.25009/hccs.v0i11.14>
- Vázquez López, P.; Espinoza Arellano, J.J.; González Mancilla, A.; Guerrero Ramos, L.A. (2022). Características de productores y plantaciones de café en la zona norte de Chiapas. *Revista Mexicana de Ciencias Agrícolas*, 28, 110–111. DOI: <https://doi.org/10.29312/remexca.v13i28.3266>
- Flores Rosales, M.C.; Hernández Guzmán, J.A.; López, P.A.; Gil Muñoz, A.; Parra Inzunza, F.; Hortelano Santa Rosa, R. (2021). Socioeconomic situation of totomoxtle production and commercialization in the state of Puebla, Mexico. *ASyD*, 18(1). <https://doi.org/10.22231/asyd.v18i1.1428>
- Gómez de Lunar, V. (2008). Gastronomía y dulcería típica: la “arepa de vieja”, como atractivo turístico del estado Nueva Esparta, Venezuela. *Gestión Turística*, 9, 61–85. DOI: <https://doi.org/10.4206/gest.tur.2008.n9-04>
- Rivera Cruz, M.L.; Alberti Manzanares, P.; Vázquez García, V.; Mendoza Ontiveros, M.M. (2008). La artesanía como producción cultural susceptible de ser atractivo turístico en Santa Catarina del Monte, Texcoco. *Convergencia revista de ciencias sociales*, 46, 225-247. <https://convergencia.uaemex.mx/article/view/1347>