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CHARACTERIZATION AND TYPIFICATION OF DOMESTIC UNITS THAT PARTICIPATE IN THE MAIZE-TLACOYO AGRI-FOOD CHAIN

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ABSTRACT

The sociohistorical construction of the maize-tlacoyo agri-food chain (MTAC) is based on the preparation of a food of pre-Hispanic origin and is representative of a process of social innovation led by the community itself. During the production and marketing phase, the MTAC is operated by farmers, becoming an important strategy for generating employment and income based on their own resources, including land, maize crops, work and knowledge concerning the preparation of tlacoyos, where the participation and work of women is critical. In this context, the aim of this study was to characterize and classify the Domestic Units (DU) that participate in the MTAC based on the availability of local resources. The study was carried out in a town in the central highlands of Mexico, and was construed as an exploratory and analytical case study; for this, field trips, bibliographic and documentary review were carried out and 56 DUs were interviewed. Results indicate that the factors that influence whether DUs become inserted into the maize-tlacoyo agri-food chain are: land ownership, family labor, production of inputs, knowledge and salaried work. Likewise, it is evident that DUs make exclusive use of local resources when participating in the MTAC, granting them their autonomy, consolidation and permanence. Pluriactivity was also identified as a component among the system of strategies that they employ for their social and economic reproduction.

Keywords: family farming, local resources, regional marketing circuits.

INTRODUCTION

From a general perspective, stagnation and backwardness in the Mexican countryside over the last 40 years in Mexico, derives from the demise of the model for industrialization by import substitution and the impact of the application of neoliberal policies, which has generated globalization of the economy, while exacerbating circumstances of social inequality, impoverishment, unemployment and migration on the part of the country's rural population that depends on agriculture; as well as establishing relationships of welfare and patronage to combat poverty. In this regard, scientific production, associated with the processes of modernization and globalization and their impacts on Mexican agriculture have been far reaching (Wallenius and Concheiro, 2016; López, *et al.*, 2018; Méndez *et al.*, 2021).

In particular, family farming represents a fundamental activity for the sustenance of rural households, not only because of the quantity, which in the Mexican case is estimated at

just over 4 million productive units, of which 73% own less than 5 hectares. Furthermore, because of "social inequality, which is not only explained by the attributes of families and resources, whose condition and assessment is defined as income poverty, but also by the relationships and structural conditions found in the vicinity" (Ramírez, 2022: 561).

In this problematic context, where reproduction of the country's productive social sector takes place, various initiatives have emerged, in order to manage, control and organize rural spaces, with dependence on specific knowledge and resources that indicate the territoriality of peasant agriculture, as well as its flexibility, adaptation and outlook, in the face of exclusion tactics on the part of the various markets where they participate - offering traditional products and manpower - (Boucher and Riveros, 2017; Solís *et al.*, 2020; Moreno and Ávila, 2022; Solís *et al.*, 2022). Evidence of this refers to how they diversify and intensify their rural-urban links, in order to develop and insert themselves in agricultural and non-agricultural activities, so as to secure extra-farm income; while providing community social networks, as support and mutual aid for social and productive reproduction of peasant domestic units (Ramírez, 2008; Custodio, 2021; Warman, 2001, Méndez *et al.*, 2021).

Likewise, for Arias (2020), today rural household income is derived from a combination of multi-tasked activities, multi-employment, subsidies and remittances, but arranged in a variety of ways in different regional and micro-regional contexts. This article aimed to characterize and epitomize domestic units to discern their differential insertion in the maize-tlacoyo agri-food chain in San Miguel Tianguizolco, municipality of Huejotzingo, Puebla.

THEORETICAL FRAMEWORK

Globalization and new trade opportunities in the late 1990s modified the model for Rural Agroindustries (RAI) (Boucher and Riveros, 2017). New perspectives became available to these organizations, endorsed by their geographically concentrated groups and the emergence of market niches, linked to traditional products. Likewise, "since the nineties of the last century, one of the most ongoing issues concerning food policies and sciences has to do with the pervasiveness of foods linked to specific territories, societies and cultures" (Torres, 2017: 20).

In this regard, experiences related to the construction of regional agri-food chains based on the use of local resources are significant, as they contribute to reducing the vulnerability of rural households by generating jobs and additional income and guaranteeing food security. In this way, the solutions that are being explored are based on the proximity of the participants in production and consumption by means of short-term value circuits that are based not only on geographical, but also on social and institutional proximity (Torres, 2017).

The construction of numerous types of Short Marketing Circuits (SMC), which have been constructed as market mechanisms for products that require proximity, has gained fundamental importance for the resilience of Farmer's Domestic Units (FDU). They

reduce intermediation and promote relationships of trust between producers and final consumers and, consequently, greater retention of value; as well as access to related jobs for members of domestic units (Catrip, *et al*., 2020; Moreno and Ávila, 2022; Solís *et al*., 2022; Villatoro, *et al*., 2023). In this sense, "self-consumption, direct sales, farmer's markets, among other innovative forms of commerce, such as home delivery and electronic commerce, are being established in an emerging scheme of association between producers and consumers" (Torres, 2017: 28)

According to Riveros and Heinrichs (2014), the process and the product in agri-food chains involves a strategy that consists of making changes to the physical state of the product or the way its specific attributes are assigned value. Although the concept of chains has been evolving and adjusting in terms of the reality it seeks to explain, agri-food chains comprehend the process in which an agricultural, forestry or fishing product undergoes production, transformational processes and transportation, until reaching the final consumer, while also considering necessary inputs, equipment and services.

Thus, marketing in urban centers by household units is integrated into the set of practices they develop to integrate a global income that guarantees their domestic and productive reproduction based on family farming. In this sense, the debate referring to the multiple functions and benefits of peasant or family agriculture has intensified. Regarding this analytical category, Ramírez and de la Tejera (2014) affirm that Family Agriculture (FA) is peasant agriculture without its inappropriate name. For Sabourin, *et al.* (2014: 20), this type of agriculture, as a public policy aim, corresponds to evolution initiating from a category termed "small scale agriculture", "peasant agriculture" or "subsistence agriculture". The National Forum on Family Farming (Foro Nacional de la Agricultura Familiar FONAF, 2006) proposes a qualitative definition of FF, which highlights a way of life, whose main objective is the social reproduction of the family under dignified conditions, while simultaneously, achieving the transmission of values, practices and experiences.

For Schejtman (1980), the principal characteristic of the peasant economy is that it does not employ wage labor for production; likewise the peasant unit is based on family labor and simultaneously represents a unit of production and consumption. Despite this, not all peasant domestic units have sufficient family labor, so it is possible to define FF as an agricultural and forestry production unit, whose employees consist of more than 50% family labor, considering the total workforce (Yúnez *et al*., 2015). Similarly, Chayanov (1974) recognizes that the technically organizational element of any production process is labor and family, considering that these constitute the main factors in the organization of the Peasant Economic Unit.

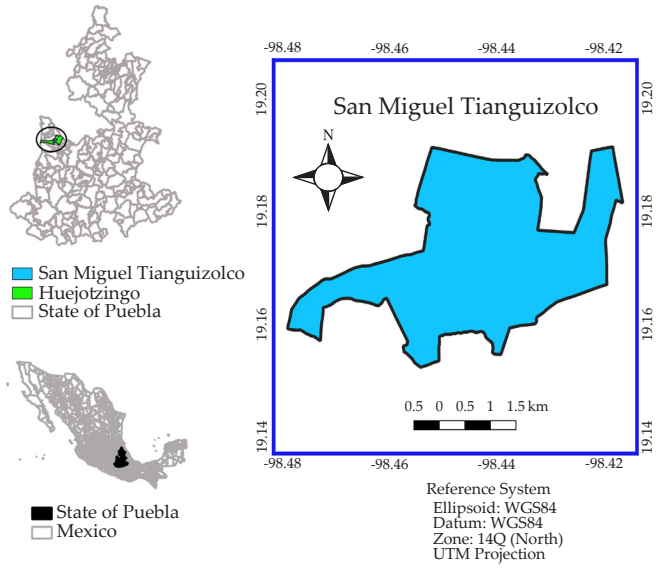
For this reason, family farming represents an organization with relatively identifiable limits, a normative order, ranges of authority, communication systems and coordinated systems of belonging (Hall, 1983). In this research, peasant or family agriculture is considered as a unit of production and consumption, whose main objective is their social reproduction, for this reason they are built or reconstructed, as deemed necessary, to achieve specific objectives. This type of agriculture has specific characteristics, such as direct control of its

means of production, and is organized based on the availability of family labor and their land resource, as well as the physical-biological conditions of the reproductive space and the social relationships that it establishes within the community.

METHODOLOGY

This study was carried out in the auxiliary board of San Miguel Tianguizolco in the municipality of Huejotzingo, Puebla (Figure 1), located at an altitude of 2,340 meters above sea level and located 4.4 km away from the municipal seat and approximately 30 km from the state capital and 139 km from Mexico City (CDMX), which is the main destination for the tlacoyo trade by domestic units. Huejotzingo has 90,794 inhabitants (Population Census, 2020).

In relation to the municipality's poverty indicators, the National Council for the Evaluation of Social Development Policy (2020) reports that 61% of the population was in poverty in 2015 but by 2020, this had increased to 64.3%. Concerning indicators of social deprivation, lack of access to social security stands out with 81.7% of the population for 2020, increasing by 8 percentage points compared to 2015. This study was elaborated as an exploratory and analytical case study, with the purpose of deepening and generating knowledge related to the characteristics and integration of the domestic units that participate in the local maize-tlacoyo agri-food chain. The case addressed allowed us to identify the characteristics and structure of the maize-tlacoyo agri-food chain. In addition, it enables us to understand the complexity of the case and the point of view of participants (Coller, 2000).



Source: self-elaborated.
Figure 1. Location of study area.

In order to highlight the DUs that participate in the maize-tlacoyo agri-food chain, an ex-ante typology was implemented based on empirical work, for which structured interviews were carried out to ensure validity. To construct this, the following variables were considered: ownership or availability of land, destination of product, employment of labor, participation in the chain and involvement in other activities.

For analysis of the agri-food chain, two types of domestic units (DU) were defined: peasant and rural. The former are mainly differentiated by the possession of land; the latter do not own land and participate as providers of labor force in the chain, mainly during the production phase (day laborers) and product transformation (tlacoyo making).

During the primary information capture phase, a structured interview guide was used to comprehend the dynamics of the domestic units that participate, either partially or totally in the maize-tlacoyo agri-food chain. The structure was integrated by the composition and characteristics of the household members, agricultural production, maize transformation and tlacoyo trade. Prior to this phase, an initial approach was implemented with a focus group of six tlacoyo producers, intending to identify the family organization of the domestic units as a strategy for social reproduction of domestic units, by the Auxiliary Board of San Miguel Tianguizolco.

Besides this, a semi-structured interview was designed in order to detail the organization and reorganization of activities within domestic units, according to Coller (2000), the intention is to clarify view points on specific events or data.

Collection of primary information was based on the saturation criterion, which is reached when the researcher does not have access to other data that would contribute to the development of research, or from which more questions could be formulated; implying that nothing new emerges (Ardila and Rueda, 2013; Hernández, 2014). During this stage, 56 structured interviews and eight semi-structured interviews were applied to the DUs that participate, either partially or totally in the maize-tlacoyo agri-food chain. Data were analyzed using descriptive statistics, particularly averages and percentages.

RESULTS

Origins of the maize-tlacoyo agri-food chain

The maize-tlacoyo agri-food chain, in San Miguel Tianguizolco, is linked to the mobility of members of domestic units (DU) towards Mexico City (CDMX), to market seasonal fruits and vegetables and seek employment and income; predominantly employing men as bricklayers and women as domestic employees.

In the early 1950s and late 1960s, women who participated in the marketing of products in Mexico City sought to increase their income. Consequently, they began a diversification process to offer other types of products, such as handmade tortillas, associated with traditional knowledge and which form part of their diet. This is how the commercialization of tlacoyos initiated, driven mainly by domestic units that produced maize; in order to provide added value.

Subsequently, in the seventies and until the end of the eighties, due to success in terms of the commercialization of basic agricultural products, the number of domestic units

dedicated to commercialization in CDMX increased. By the end of the 1980s, the DUs strengthened their marketing circuit with the sale of tlacoyos and other similar products. This data coincides with that presented by Almeraya (2017), who recorded a 40-year history of tlacoyo commercialization in the Mexico City community.

At the end of the eighties and beginning of the nineties, the consolidation of the local maize-tlacoyo agri-food chain in San Miguel Tianguizolco began, not only offering basic local products – seasonal fruits and vegetables – but also with greater diversification, in the sale of traditional products linked to local consumption patterns, such as tortillas, sopes, tamales; but mainly, tlacoyos.

The direct marketing of agricultural products in CDMX, over 70 years enabled the establishment of a regional marketing circuit, characterized by strong interaction between urban consumers and farmers, as well as relationships of trust and loyalty between both of these participants. This benefited the DUs, because habitually the production of food and its marketing is guided by constant communication with the consumer; as corroborated by Salgado (2015) and Catrip, *et al.*, (2020), who establish that in local chains, producers make supply decisions based on the information provided by consumers, favoring adaptation and guaranteeing the flow of income to peasant agriculture.

Characterization and typology of the FDUs participating in the maize-tlacoyo agri-food chain

Sociodemographic analysis of leaders of DUs, identified in the maize-tlacoyo agri-food chain, revealed an average age of 50.5 years, ranging from 20 to 80 years. DUs are made up of an average of 3.5 members and 1.67 children. A greater presence of the female gender was identified, as 53.6% corresponded to women and 46.4% corresponded to men. The average schooling of the interviewed population aged 15 and over was 8.8 years of schooling, less than that registered in the municipality of Huejotzingo with 9.8, with 9.2 at the state level; and 9.7 years of schooling at the national level (INEGI, 2023).

Interviews and field work identified five types of DUs that partially or totally participate in the maize-tlacoyo agro-food chain: 2 types of rural domestic units (RDUs) without land and 3 types of peasant households (FDCs) with land. This is described in the following:

I. RDUs that make tlacoyos on a salaried basis. This includes those DUs that do not have land for food production and obtain income through the sale of their labor, specifically in the tlacoyo making process. This activity is carried out in the FDUs that provide employment or, where appropriate, in the homes of the employed RDUs, supplying them with the necessary inputs for their preparation. These types of units are inserted only on a salaried basis for the transformation phase of the maize-tlacoyo chain.

In this type of DU, an average of 2.5 members were identified, with only 0.5 children on average; likewise, they register the highest average age among DUs analyzed, with 52.5 years between members; regarding the sex of the members of these units, 50% were men. Within this type of DU, less schooling is evident, as on average they have 5.6 years; 80% know how to read and write and 20% only know how to write. The main complementary

activities that were identified in this type of RDU were: housewife, day laborer, students and tradesmen; as well as production of tlacoyos on a salaried basis.

II. RDU s that make tlacoyos and market them. In this type of DU, we find those who do not have land and resort to purchasing inputs in local markets in order to make tlacoyos and market them. The workforce employed is family-type and when necessary, they hire local labor. The insertion of these units in the agri-food chain is based on transformation and marketing connections (Table 1).

These units registered 3.3 members on average, 1.7 children per unit with an average age of 28.3 years. Unlike other DU, this group has a greater presence of women in its family structure, with 56.4%. The average registered schooling is 8.6 years; 95.9% know how to read and write and 4.1% only know how to read. The members of this type of RDU have as their main occupations: student, housewife, producer and marketing of tlacoyo, tradesmen and day laborers.

III. FDU maize producers with salaried work in DU, who prepare tlacoyos for trade. In these units, we find those FDUs that have land for the production of maize and other foods. These are FDU smallholdings, with an average surface area of 1.5 ha. 75% of the DUs own ejido property and the rest rent land predominantly for maize production. Another crop that was identified was beans, grown by 25% of producers. The destination of this produce is mainly for self-consumption and, to a lesser extent for commerce, when there are surpluses. These units are set apart because, although they have land and produce inputs for the production of tlacoyos, they do not produce these for commercial purposes, only for family consumption. They complement their income with the salaried work they do in the DUs dedicated to the production and marketing of tlacoyos; and are marginally involved in the family production of tlacoyos for sale. The labor relations that are established between units that provide the work and the employment units, consist of the latter providing the inputs to the former, for them to prepare tlacoyos in their homes.

Table 1. Typology of domestic units in the Tlacoyo maize agri-food chain.

FDU/RDU	Type I	Type II	Type III	Type IV	Type V
Average age (years)	52.0	28.3	28.2	37.0	32.0
Average participants	2.5	3.3	4.0	4.2	4.0
Average schooling	5.6	8.6	8.8	9.1	8.2
Area (ha)	-	-	1.5	0.97	1.6
Maize production %	-	-	6.8	23.9	69.3
Domestic units	10.0	13.0	10.0	12.0	11.0
Salaried tlacoyo production	✓	-	✓	-	-
Self-employed in tlacoyo production	-	✓	-	✓	✓
Trade	-	✓	-	-	
Pluriactivity	✓	✓	✓	✓	✓

Source: self-elaborated.

This type of unit produces 6.8% of the total maize production of those interviewed. In the perception of the sufficiency of family production, it was identified that 100% manage to cover self-consumption needs. Only 75% of the units generate surpluses that allow them to sell part of their product to the market.

This type of FDU has, on average, 4 members and one child; within this type of unit, the lowest average age is 28.2 years; it was also identified that there is a greater presence of men (52.6%) than women (47.4%). The average schooling was 8.8 years and 100% knew how to read and write. In this type of unit, the main occupations were: housewife, student, tradesmen, agriculture and salaried work, and occasionally, making tlacoyos for trade.

On average, this type of FDU registers 2.5 members and 0.5 children; likewise, they have the highest average age among the DUs analyzed with 52.5 years; the sex of the members in these units is 50% men. Within this group, a lower education level is identified, on average consisting of 5.6 years; where, 80% know how to read and write, 20% only know how to write.

IV. FDU traditional maize producers. These types of units participate in the agri-food chain, as maize producers with minimal tlacoyo production. These FDUs own a land area for maize production; they use family labor and when necessary, depending on the production cycle, they hire day laborers from the region. The FDUs own an average surface area of less than one hectare (0.97 ha); 44% own ejido land and a similar percentage own private property; the rest (11.2%) rent land for the production of maize or other crops.

This group produces 23.9% of the total maize production of those interviewed. Production is mainly intended for self-consumption; however, 55.6% sell part of their production. Regarding production sufficiency for the family, 77.8% stated that this is not sufficient to cover family requirements. Other crops produced by these FDUs include beans, wheat and squash.

Besides this, it was identified that these FDUs consist of an average of 4.2 members; 1.9 children, with an average age of 37.4 years. Regarding sex, males predominate with 55.3%, and females with 44.7%. In relation to schooling, it was recorded that this averages 9.1 years; 97.2% know how to read and write and 2.8% only know how to write. These units are mainly employed as: students, housewives, farmers and tradesmen – bricklayers, carpenters, among others; in addition to these, other occupations that complement the dynamics of the FDUs were identified, such as the production of tlacoyos for trade and their own businesses.

V. FDU maize producers who produce and market tlacoyos. These units have a total management of the maize-tlacoyo agri-food chain, because they have land to produce maize, capacity to prepare tlacoyos and direct sales to consumers. If maize production is insufficient, this can be purchased in the local market. Preferably, the preparation and marketing of tlacoyos and other products is carried out by members of the FDU and when necessary, local labor is hired.

Among these FDUs, the average surface area was 1.6 ha, of which 38.9% is ejido property and 61.1% is private property. This group produce a greater variety of crops, such as

ayocote beans, squash, pears, wheat and other beans; the latter are for self-consumption and are also used in the preparation of tlacoyos.

This type of FDU is considered the most important producer of maize in San Miguel Tianguizolco, producing 69.3% of the total production of those interviewed. This condition represents an advantage in having the raw materials necessary for the production of tlacoyos; however it is insufficient. In this regard, only 38.9% of FDUs have a surplus in the supply of inputs, and 61.1% report a deficit to cover the annual inputs for tlacoyo production. Regarding the perception of sufficiency for family maize production for the preparation of tlacoyo, 44.4% stated that it is sufficient.

Finally, in these FDUs, it was identified that on average, they consist of four members and have the greatest number of children (2.1 children); its members have an average age of 32.2 years. This type of FDU, as in the previous one, identifies a greater presence of women (54.2%). Average schooling was 8.2 years; regarding literacy, apparently 95.6% know how to read and write, 2.9% only know how to read and 1.5% only know how to write. In these units, the main occupations are: agriculture, production and marketing of tlacoyos, and to a lesser extent, own businesses and trades.

DISCUSSION

Considering analysis and classification of DU, evidently, the factors that define their insertion in the maize-tlacoyo chain are: possession of land, family work, production of inputs, knowledge, salaried work, preparation and commercialization of tlacoyos for local sale or in CDMX. These factors with which the RDU and FDU become articulated with the food and employment market are related to territorial attributes, which result in their evaluation and differentiation (ECLAC-Economic Commission for Latin America and the Caribbean, FAO-United Nations Organization for Food and Agriculture, and the Inter-American Institute for Cooperation on Agriculture (Instituto Interamericano de Cooperación para la Agricultura-IICA, 2014).

This case assigns most importance to the pre-Hispanic gastronomy associated with the product; local inputs, local agricultural-productive vocation, as well as the culture of production and consumption of the tlacoyo. According to Torres (2017), this type of food with regional roots occupies an important place in development studies, as its preparation involves networks that relate to local history, customs and resources.

FDUs that produce maize, and also prepare and market tlacoyos (Type V), constitute units that own a larger average surface area (1.6 ha); however, land ownership is mostly private, unlike FDUs, which only produce maize (Type IV), where the average surface area is less than one hectare (0.97 ha) and the land is either private or ejidal property. FDUs that produce maize and make tlacoyos for other DUs (Type III) have the highest percentage of ejido property (75%), of the three groups with land ownership. In this way, it is corroborated that the processes of social differentiation are related to differentiated access to land, "leading to upward mobility as a result of the accumulation of resources and downward mobility due to lack of land" (Espín, 2002: 9). Differentiation between

FDUs in terms of land ownership could be indicative of how this process has given rise over time, to a stratified community (Massa, 2010).

The relationship between land size and family farming performance is complex and depends on a variety of factors. Although there is no single answer to the question of what is the ideal size for a FDU, some studies indicate that as agricultural land becomes fragmented, yields are reduced and costs increase (Lu *et a*l., 2018). It is no coincidence that FDUs with larger average extensions (Type V) produce a greater diversity of products. Productive and occupational diversification reduces the risks associated with agro-climatic factors and increases the stability of family income, thereby favoring reproduction of the family (Román, *et al*., 2020).

Considering the different economic occupations of those in domestic units, involved in the maize-tlacoyo agri-food chain, principal activities include agriculture, salaried work and the production and marketing of tlacoyos. These findings coincide with that reported by Almeraya (2017), who comments that the production of tlacoyos in the community of San Miguel Tianguizolco represents a source of income and an alternative to traditional productive activities, assigning additional value to maize.

Likewise, the pluriactivity and multi-employment dynamics of income integration were identified in the five types of domestic units, confirming the portrayal of features that currently define family farming or rural households (Ramírez, 2022; Arias, 2020).

From the sociodemographic data found, apparently FDUs that produce maize, whether or not they participate in the preparation of tlacoyos have the greatest average number of members. Thus, availability of labor force, together with possession of land, is defined as a fundamental requirement for undertaking agricultural activities and, in the case of type III and V, FDUs tend to combine, in order to undertake transformation and marketing of the product.

Those FDUs that make tlacoyos and market them manifest greater participation on the part of women, although men are not excluded from this activity. The greater participation of women in the preparation and marketing of tlacoyos concurs with what Solís *et al*. (2020) reported in their study on the traditional trade of products in San Pedro Cholula, Puebla, Mexico, where women play an important role in family reproduction, based on their participation in traditional trade.

In this case, it is apparent how the sociodemographic characteristics of the families, in particular their magnitude and composition, both in generic and age terms, determine more precisely, which particular activity or activities, will be the focus of the domestic group (Hernández, *et al*., 2014). In the case analyzed, it is evident how the close connection between members of different generations enables the FDUs to take advantage of available labor and establish conditions of complementarity and cooperation in multiple activities, thereby facilitating family reproduction.

CONCLUSIONS

Based on this study, we conclude that the domestic units that participate in the Maize Tlacoyo Agri-food Chain can be grouped into two large groups: the first, made up of

rural domestic units (RDU) that do not own land and consequently do not produce maize; however, they participate in the agri-food chain by providing salaried work; and the second, made up of farmer's domestic units (FDU), mainly characterized by land ownership and maize production, which by various arrangements, participate in the chain. Both groups produce tlacoyos for consumption or sale, in varying quantities.

These two groups can be divided into five types of domestic units: I) RDU that make tlacoyos on a salaried basis, 2) RDU that make tlacoyos and market them, 3) FDU producers of maize and salaried work in DU that make tlacoyos for trade, 4) FDU producers of traditional maize, and 5) FDU producers of maize that prepare and market tlacoyos.

Category five is the most consolidated, in terms of production and trade; however it integrates and involves other types of domestic units, within the dynamics of the agri-food chain, where employment and income are generated. Thus, at the community level, an integrating network of units is formed. Likewise, the domestic units that participate in the maize-tlacoyo agri-food chain mainly use local resources for their reproduction; principally land, family labor force, native seeds, water, technology and traditional knowledge. This has ensured their autonomy, consolidation and permanence.

Evidently, pluriactivity is fundamental to the economic dynamics of the DUs that participate, either partially or totally in the chain.

Finally, we conclude that in a future study, the MTAC can be presented as a Regional Marketing Circuit, as it has managed to reduce intermediation in the marketing circuits used by domestic units, consolidating itself over time, as an activity that favors the continuity of agriculture, while having important multiplier effects at the local level.

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