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Agriculture and non-agricultural activities in the income strategies of family farming

Ramírez-Juárez, Javier

Colegio de Postgraduados-Campus Puebla, Programa en Estrategias para el Desarrollo Agrícola Regional, Boulevard Forjadores de Puebla No. 205, Santiago Momoxpan, Municipio de San Pedro Cholula, Puebla, México, C.P. 72760.
Correspondence: rjavier@colpos.mx

ABSTRACT
Objective: To identify agricultural and non-agricultural income strategies of family farming in the Puebla Valley.
Design/Methodology/Approach: A case study was conducted in the community of Tlaltenango, with family farming as the unit of study. A qualitative and quantitative approach was used, involving semi-structured interviews with farmers and an opinion-based survey of 72 family farming units. The resulting data were processed using the Statistical Package for the Social Sciences (SPSS v.23). A typology of family farming was determined based on the data, considering the percentage of agricultural and livestock income as a classification criterion to identify income strategies.
Results: Two categories of family farming were identified as income strategies. The first category includes 41.7% of family units, with an average agricultural income of 34%. The second category encompasses 58.3% of family units, where agricultural income accounts for 70.3%.
Study Limitations/Implications: Since this research is a case study, the results and conclusions are framed within a regional context, distinguishing themselves from the agricultural dynamics of other areas and regions.
Findings/Conclusions: The persistence and importance of agriculture and livestock as the main source of income in family farming is a significant proof, challenging the notion of the technical and economic unviability of small-scale production.

Keywords: Family farming, income strategies, typology.

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INTRODUCTION

The structural reforms and the 'outward-oriented' development model implemented in Mexico in the mid-1980s deeply transformed the economic and social conditions of family farming. The reforms were aimed at deregulating and privatizing the economy. In the agricultural sector, these measures eliminated instruments and support for farming. These reforms included the amendment of Article 27 of the Mexican Constitution in 1992, aimed at commercializing ejido and communal lands, and trade integration through the North American Free Trade Agreement (NAFTA) in 1994. This measure was justified by the stagnation, technical unviability, low productivity, and rural poverty generated by small-scale land ownership, known as *minifundio* (Presidencia de la República, 1992).

The consequences of the reforms included a decline in family farming incomes, along with an increase in migration, poverty, pluriactivity, and deagrarianization (Kay, 2007; Escalante *et al.*, 2007; Carton de Grammont, 2009; Pérez, 2001). However, according to the available statistical data, small productive units can still be found in Mexico, where family farming accounts for 81.3% of the approximately 5.3 5.4 million rural economic units (REU) (SAGARPA and FAO, 2012). The 2022 Agricultural Census (INEGI, 2022) revealed that 71.8% of production units have a surface area of up to five hectares.

Family farming is a persistent and socially heterogeneous phenomenon in various Latin American countries. It has social, economic, and environmental significance for food production, rural poverty alleviation, and the conservation of natural resources (Baquero *et al.*, 2007; World Bank, 2008; Salcedo and Guzmán, 2014; Schneider, 2014; Ramírez, 2016). A conceptual approach to family farming includes the family labor predominance, the production unit management led by the head of the household, and small-scale land ownership. For Chayanov (1974) and Shanin (1976), family labor defines farming units, as the basis for producing and generating output and income for its social reproduction. Additionally, it maintains ties to the market and non-agricultural economic activities and incomes. The social approach and characterization of family farming are associated with the typology system (Carmagnani, 2008).

In this context, the study addresses the persistence of agricultural and livestock activities and incomes in family farming in the Puebla Valley. Within the framework of the neoliberal model, the family farming that emerged in the region is characterized by a market-oriented and diversified agriculture, including higher profitability crops (*e.g.*, flowers, fodder, and vegetables) and livestock raising. Therefore, the objective of this research was to identify the agricultural and non-agricultural income strategies of family farming in the Puebla Valley. The income strategies of family farming are part of the reproduction strategies that rely on the assets and relationships available to households to maintain their social position (Bourdieu, 2016).

MATERIALS AND METHODS

A case study was conducted in the community of Tlaltenango, located in the upper basin of the Atoyac River, focusing on family farming as the unit of study. The Puebla Valley is situated at 2,200 m.a.s.l., with fertile soil and favorable conditions for agriculture. According to FAO, the local soils are classified as fluvisols with a sandy loam texture, with a 20 to 40 centimeters superficial layer (CIMMYT, 1974).

Small farms predominate in the region. They began transitioning towards more profitable crops by the late 1970s, when wells were drilled for irrigation units. This transformation included the production and expansion of the area destined to fodder, flowers, vegetables, and fruit trees, without abandoning maize (*Zea mays*) production. By 2018, 52,414 ha were sown in the municipalities of the upper basin of the Atoyac River; 17% of those ha was irrigated, contributing 35.8% of the agricultural production value. Fodder was grown on 5,347 hectares; 53.3% of that area was used for forage maize, 37.4% for alfalfa (*Medicago sativa*), and 9.3% for vetch (*Vicia sativa*) (SIAP, 2024). The dominant crop remains maize, covering 77.1% of the area cultivated in the region.

Semi-structured interviews were conducted from January to April 2019, using an opinion-based sampling method (Ruíz, 1999) that included farmers from the community of Tlaltenango. The survey obtained the percentage of economic income from agricultural, livestock, and non-agricultural activities, as well as other variables related to the family unit.

The resulting data were processed using the Statistical Package for the Social Sciences (SPSS v.23). A typology of family farming was determined, considering the percentage

of agricultural and livestock income as the classification criterion. The classification of family farming was based on the theoretical model of Palerm (1980), which describes the relationship between family farming and capital based on the formation of economic income. Two types of family farming were determined: Category I, with incomes ranging from 1% to 49.9% of agriculture and livestock; and Category II, with incomes ranging from 50% to 100% of agriculture and livestock.

RESULTS AND DISCUSSION

Farmer families constitute the analytical instance for addressing the mechanisms of social reproduction, in which incomes stand for resources, activities, and relationships.

Land in the production unit

In the context of production units, the average size of family farming plots is 3.8±1.6 ha. These small farms combine private property and ejidos. The average area of rainfed and irrigated plots is 2.5±1.5 and 1.2±0.70 ha, respectively. The typical agrarian structure of the country is determined by the size of the production units. Mexican agriculture is characterized by the predominance of small plots, since 67.9% of the rural production units (RPU) of the country have ≤5 ha (INEGI, 2012). This characteristic sets Mexico apart from other Latin American countries, such as Argentina, Chile, and Brazil, where the average size of the RPUs is 107.4, 46.0, and 24.1 ha, respectively. The Mexican situation is closer to the Andean countries, such as Colombia (4.5 ha) and Ecuador (3.5 ha). However, Mexican RPUs are larger than RPUs in Peru (1.3 ha) and Guatemala (1.2 ha) (Leporanti *et al.*, 2014). Land ownership is a fundamental asset in the reproduction strategies of family farming, both as heritage (Appendini, 2010) and as a source of employment, belonging, and holding for a community (Warman, 2001).

The farming family

The number of household members is one of the main assets that allows farming families to perform many activities and generate economic income. The average age of the head of the household is 48.8±13.5 years, with an average education of 6.9±2.2 years. The average number of family members is 4.6±1.9 individuals. Family members establish solidarity and cooperation relationships, that maintain the household as a social and economic unit for agricultural work, contributing with economic resources through non-agricultural activities. Wives participate in agricultural production, harvest management, and surplus production marketing. Women, as resource providers, have become a part of the new configurations of family structures, leading families to move away from the more traditional nuclear family model, where women primarily engaged in domestic work.

Agricultural production

In the production units, various associated and intercropped crops are established. The total agricultural area cultivated across all production units was 287.0 ha, with maize, milpas, vegetables, and fodder accounting for 59.6, 6.8, 7.8, and 25.8% of the sowing area,

respectively. Agricultural production was enhanced by the construction and expansion of irrigation units in the late 1970s, which enabled the production of fodder and vegetables.

The productive system of family farming relies on the development of local production capacities, the creation of irrigation units, and the integration of agriculture and livestock. Maize and fodder, in various proportions, are used to feed beef and dairy cattle, as well as sheep, goats, pigs, and poultry. Livestock farming is an alternative for improving income and retaining economic surplus within the production unit. This process is not imposed by agribusiness or capital, but rather allows the local RPUs to integrate into the regional market. Livestock farming, especially dairy cattle production, is the most significant activity, with an average of 6.0±5.4 heads of cattle per production unit. Livestock farming is not a recent development; it has always been a source of savings and labor for family farming. This remarkable process tends to strengthen through the production of fodder, facilitated by irrigation, as well as the increase in maize productivity and production. Livestock farming constitutes a strategic savings asset and a safety net (FAO, 2009) to face the demands of social reproduction. This condition is not exclusive to Mexico: in Latin America and the Caribbean, small-scale production contributes over 60% of the production of beef, poultry, and pork, as well as meat from other species and dairy products (Díaz and Valencia, 2014).

Income strategies and the typology of family farming

Total income is comprised of economic, agricultural, livestock, and non-agricultural activities. On average, agriculture accounts for 22.7% of the annual economic income, livestock 32.5%, and non-agricultural activities 44.8%. This composition of income reflects the assets and relationships of family farming: agricultural and non-agricultural activities are essential and complementary for the overall economic income. Consequently, two types of family farming were identified: Category I, multi-active farming, where income is primarily the result of non-agricultural activities; and Category II, family farming focused on agricultural activities. The typology is outlined in Table 1.

Category I

On average, agricultural and livestock income accounts for 34%, while income primarily comes from non-agricultural activities. This situation reflects a multi-active family farming system, with less irrigated land available than in Category II. Irrigated land is a fundamental asset for fodder production and livestock farming.

Category II

Family farming obtains 70.3% of its income from agricultural activities. Family farming is centered on agricultural activities and relies on irrigation and a productive system that integrates agriculture with livestock, establishing a pathway for agricultural development.

The comparison of the categories allows the identification of their distinguishing elements (resources, activities, and income). Both categories engage in non-agricultural activities. Limited productive resources and income from agricultural activities hinder the ability of the household unit to rely exclusively on agricultural activities for its reproduction.

Table 1. Typology of family farming. Source: Table developed by the authors based on field information.

Variable	Category I (41.7%)		Category II (58.3%)	
	Mean	Standard deviation	Mean	Standard deviation
Age of household head	48.0	14.6	49.4	13.9
Years of education	6.9	2.1	6.7	2.0
Number of persons in household	5.0	1.8	4.5	1.8
Area under irrigation (ha)	0.7	0.5	1.6	0.5
Rainfed land (ha)	2.2	1.4	2.7	1.5
Total land area (ha)	2.9	1.4	4.4	1.4
Agricultural income (%)	20.1	9.6	24.5	10.0
Livestock income (%)	13.9	13.6	45.8	17.9
Non-agricultural income (%)	66.0	11.2	29.7	12.8

This situation requires non-agricultural activities. Income is a core component of family farming reproduction, albeit with a differentiated relative importance.

The income strategies of family farming and the assets that support them, particularly for Category II, enable the social reproduction of agriculture. Gordillo (2004) classifies family farming into two main groups based on the level of their assets, which lay the foundations for the reproduction and income strategies developed according to the research findings. Therefore, the transformations in family farming are not only driven by neoliberalism, but also by the capacity for change within agrarian societies (González, 2007).

The persistence of family farming is significant proof against the assertion of the technical and economic unviability of small-scale production on which the structural adjustment reforms, particularly those made to Article 27 of the Constitution, were based and which claimed that poverty is linked to minifundios. The transformation of production units is taking place within the smallest production units, functioning as a model of multiple productive evolution and technological change, driven by the innovations of the Plan Puebla, under the auspices of CIMMYT and the Colegio de Postgraduados, which demonstrated the possibility and viability of technological changes in traditional agriculture (Díaz *et al.*, 1999).

Nevertheless, the agricultural pathway of family farming faces limitations, including restricted access to irrigation, land fragmentation due to inheritance or sale, and a lack of capital and financing that could strengthen available assets, including livestock. The family farming strategy is a response to an environment that offers limited productive and social options. This response allows farmer families to maintain and improve their social and economic conditions.

Meanwhile, the persistence of the agricultural activities identified in this study contrasts with findings reported in other regions of the country, where agricultural activities and income from family farming are marginal or nonexistent, due to the transition and diversification of the rural economy and labor markets (Appendini and Torres-Mazuera,

2008). This contrast highlights the diverse trends shown by changes to family farming and the rural economy. Agrarian transformations are heterogeneous and they vary depending on the territory, according to the strategies of family farming and their economic and social assets and relationships.

CONCLUSIONS

The family farming strategy is classified into two categories, which differ depending on the magnitude (%) of agricultural income: one category is centered on agricultural activities and income, while the other is characterized as pluriactive family farming. The persistence and importance of agriculture and livestock as the primary source of income in family farming provide relevant proof for the reassessment of its social and economic viability. The income strategy was developed based on irrigation units and the selection of crop systems integrated with livestock. The strategy for non-agricultural income in family farming highlights the limitations of small-scale agricultural production, which lacks the necessary assets, particularly land and irrigation, for an income strategy centered on agriculture.

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