

Analysis of the productive structure of a rural economy; relationship and effect of institutions on agricultural households in a Michoacan community

Análisis de la estructura productiva de una economía rural; relación y efecto de las instituciones sobre los hogares agrícolas de una comunidad michoacana

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ABSTRACT

The rural household economy is characterized by a diverse network of economic activities and external connections. Income and expenditure patterns in Cofradía de San José are complex, generated by local productive activities and external transfers, such as remittances, government transfers, and extortion payments. The objective of this research is to describe the structural characteristics of the Cofradía de San José economy, its labor market, the impact of organized crime in the community, and its relationship with the outside world through the construction of a population social accounting matrix. The community is divided into agricultural (45 %), migrant (37 %), and non-agricultural (18 %) households. Institutions play an important role in the community; organized crime retains 5.4 % of the income from agricultural activities and causes the abandonment of productive activities. In 2022, agriculture, especially avocado cultivation, was fundamental to the economy, followed by commerce and services. Remittances are an important source of income, constituting 30 % of household income, and are used for family expenses, agricultural investment, and education.

KEY WORDS: Village economy, organized crime, remittances, migration, social accounting matrix.

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RESUMEN

La economía de las familias rurales se caracteriza por una red diversa de actividades económicas y conexiones con el exterior. Los patrones de ingresos y gastos en la Cofradía de San José son complejos, generados por actividades productivas locales y transferencias externas, como las remesas, las transferencias gubernamentales y el pago de extorsiones. El objetivo de esta investigación es describir las características estructurales de la economía de la Cofradía de San José, su mercado laboral, el impacto del crimen organizado en la comunidad y su relación con el exterior a partir de la construcción de una matriz de contabilidad social poblacional. La comunidad se divide en hogares agrícolas (45 %), migrantes (37 %), y no agrícolas (18 %). Las instituciones juegan un papel importante en la comunidad; el crimen organizado retiene el 5.4 % de los ingresos de las actividades agrícolas y provoca el abandono de actividades productivas. En 2022, la agricultura, especialmente el cultivo de aguacate fue fundamental en la economía, seguida del comercio y los servicios. Las remesas son una fuente importante de ingresos, constituyen el 30 % de los ingresos de los hogares y son utilizadas para gastos familiares, inversión agrícola y educación.

PALABRAS CLAVE: Economía familiar rural, crimen organizado, remesas, migración, matriz de contabilidad social.

Introduction

Generally, it is believed that the economy of a rural community is simple, composed of few production accounts reflecting its structure; however, the economy of rural communities is far from simple, presenting a broad network of relationships and activities that integrate their economy (Gutiérrez *et al.*, 2020). Countries with rural sectors at intermediate levels of market development are characterized by the commercialization of surplus production and the incursion of inhabitants into labor markets within and outside the community (Taylor & Adelman, 1996). Rural communities interact with various institutions, including organized crime. Ornelas (2018) exposes that organized crime is attracted to rural communities because they extort producers in traditional sectors of the economy with a high degree of territorial specificity, making it easier for them to control them. Because there is a relatively low technological level in the community and because in the public sector (which can be relatively large) legal institutions are often weak compared to urban regions.

Detotto and Otranto (2010) mention that crime acts as a tax on the entire economy by discouraging domestic and foreign direct investments, reducing business competitiveness,

and creating uncertainty and inefficiency. Together, crime and organized crime are a factor in the decision to migrate to Mexican towns, displacing community labor abroad (Soto & Saramago, 2019).

Organized crime imposes a significant burden on society and the economy. In Wales and England, organized crime represents an expenditure equivalent to 6.5 % of the Gross Domestic Product (GDP); in the United States, it represents 11.9 % of GDP and 2.6 % of GDP in Italy (Detotto & Otranto, 2010). In Mexico, estimates of the negative effect of organized crime on GDP range from 7 % to 15 % (Guzmán, 2023).

The Michoacán state is not exempt from organized crime. Since the popularity of avocados increased, exports to the United States and prices rose, so organized crime found a source of income with avocado producers (Macías *et al.*, 2022). Cofradía de San José is one of the most populated rural localities in the municipality of Tuxpan, Michoacán. Being located only 2.2 km from downtown, the community shares the production and consumption patterns of the municipality; among which fruit and vegetable production are highlighted (INEGI, 2020). The community not only shares the productive traits of the municipality but also shares social problems such as water shortages in times of extreme drought and exposure to organized crime, which affects their production patterns.

Additionally, it is important to analyze this community since the economic structure in Cofradía de San José is not limited to agricultural activity; members of the community have integrated into U.S. labor markets for three main reasons: to take advantage of the wage differential, to opt for urban work instead of rural work, and to seek refuge when fleeing organized crime. Remittances, which are the income sent by migrants, foster new forms of market interaction in the communities of origin and generate new market connections between the communities and the outside world.

Current statistical records only reveal the agricultural economic activities of the region, but they do not allow for the identification of the entire set of economic activities, especially those linked to the outside, nor those that reflect the negative impact of organized crime on the community. It is necessary to conduct a structural analysis of the economy in the town; the Population Social Accounting Matrix (PSAM) is a suitable tool as it incorporates the unique characteristics of the economy, capturing elements such as exogenous income transfers to households, which can be internal (e.g., payments of transfers from the federal government and to organized crime) and external (e.g., remittances); as well as labor income and other components of the economic system of the region.

This research aimed to describe the structural characteristics of the economy of Cofradía de San José, the impact of organized crime in the community, and its relationship with the outside world based on the construction of a PSAM. The aforementioned is to measure the impact of organized crime on the rural economy, and how it operates, and to establish the basis of information that will allow the establishment of public policies aimed at addressing this problem and promoting rural development.

Material and Methods

Study area location

Cofradía de San José is a community located in the Tuxpan municipality, in the state of Michoacán de Ocampo. It is located at an altitude of 1,780 masl; at the geographic coordinates 19.587489 latitude and 100.454548 longitude. The neighboring municipalities are Irimbo and Aporo to the north, Jungapeo, and Zitácuaro to the south, Ocampo to the east, and Ciudad Hidalgo to the west (INEGI, 2020).

Unit of analysis and sample design

The household is the unit of analysis for constructing a socioeconomic diagnosis because it is where joint decisions are made regarding consumption and production patterns, as well as decisions about migration. Members of the household share the same residence, income, and expenses. The economic and logistical costs of applying the socioeconomic questionnaire can be high, so a balance must be struck between these costs and the acceptable error of the population parameters to be studied; in other words, obtaining the required information more cost-effectively while maintaining an acceptable level of reliability through simple random sampling (Yúnez-Naude & Taylor, 1999). Population parameters for the sample size were obtained from the National Household Income and Expenditure Survey (ENIGH) 2020, with a confidence level of 95 %. The following formula (Guevara, 2003) is used to estimate the sample size n :

$$n = \frac{Z_{\alpha/2}^2 \sigma^2}{D^2 + \frac{Z_{\alpha/2}^2 \sigma^2}{N}} \dots\dots\dots(1)$$

Where:

n : Sample size

N : Total population

D : Interval of the mean of population expenditure

σ^2 : Population variance

$Z_{\alpha/2}$: Value of the abscissa

There are 147 households in Cofradía de San José. The interval for the mean population expenditure is 490 pesos. The population variance at constant prices in 2022 is 1,919,787 pesos and $Z_{\alpha/2}$ is 1.645 (according to the value of the normal distribution tables). Therefore, the minimum acceptable sample size is 19 households. Despite, it was decided to apply 27 questionnaires;

the purpose was to obtain the production patterns of a larger number of households, generate a greater source of information, and reduce error.

As established by Yúnez-Naude and Taylor (1999), it was necessary to pre-select households by creating a sampling framework based on a town map to administer the questionnaire to those households that represent the various economic activities carried out in the community. This sampling framework was developed during the 2022 production cycle to detect the subjects of interest. The sample included households engaged in agriculture, households with repair workshops, households whose main income is remittances, and households engaged in trade and services. For the selection of households, random number tables were used to guarantee the randomness of the items. The questionnaire was applied during January 2023, a period in which the households had the data for the 2022 production cycle. It consisted of seven parts:

1. Control sheet: to facilitate the questionnaire handling.
2. Household general data: general information about the household and its members.
3. Migration: information on migration activity in the household.
4. Salaried work: household members who have a local or regional salaried job.
5. Economic activities: production activities in the home (agriculture, commerce, or services).
6. Other income and savings: income that does not come from the main economic activity of the household.
7. Household expenses: household expenses that are not related to productive activity.

The population social accounting matrix

Based on the theoretical model of rural family economies, it is possible to capture the elements that make up the structure of the economic life of developing rural households through a Population Social Accounting Matrix (PSAM). This matrix is similar to the National Social Accounting Matrix (SAM) since it captures all the transactions and transfers between the economic agents in the system. In the case of the PSAM, these agents are rural family units (Becerril *et al.*, 1996).

The PSAM represents the real economy of a town. It is a square accounting matrix in which each account is represented by rows and columns. The cells in the matrix show the payment made by each account (as a column) to the account(s) in the rows. In other words, the income of the accounts appears in their respective rows, and the expenses of the accounts appear in their columns. As a double-entry accounting matrix, the PSAM must balance perfectly, meaning that total income must equal total expenses (Chapa *et al.*, 2019; Chikuba *et al.*, 2014). It is common for

row and column sums not to be equal, so an adjustment is made to balance the PSAM using the Richard Stone (RAS) mathematical method with the General Algebraic Modeling System (GAMS).

The PSAM distinguishes between activities and commodities; activities represent the entities that carry out production and commodities represent the markets for goods and services. This matrix requires three information inputs: the use matrix, the supply matrix, and the integrated economic accounts.

Therefore, the PSAM refers to an extended input-output matrix for a town. The use matrix records the value of all purchases and sales of all products between productive entities, as well as the value of consumption by households, government, and institutions. The supply matrix records the value generated by goods in the economy at consumer prices. The rows of this matrix represent the products and the columns represent the productive activities, so their interaction represents the production of a good by a specific productive activity. Finally, the integrated economic accounts reflect the transactions between the institutions of the economy, which are: households, government, financial and non-financial corporations, organized crime, and the rest of the world (Chikuba *et al.*, 2014; Jiménez & Saldarriaga, 2022).

The PSAM classifies five types of accounts:

- Production activities. Economic activities carried out by households.
- Production factors. Factors that generate the added value of the economy.
- Institutions. Homes, private institutions, and public institutions.
- Capital. This captures the savings of the institutions with which the formation of fixed capital and human capital will be financed.
- Exterior. It records the economy's transactions with foreign countries.

The PSAM records the characteristics of a complete economic system, and the linkages between its components and allows the incorporation of different institutional arrangements and economic structures (Yúnez-Naude & Taylor, 1999).

Results and Discussion

For the construction of the PSAM, the results of the representative households group were expanded to the total households of the Cofradía de San José using an expansion factor of 5.44. The PSAM consisted of five main accounts: production activities, production factors, institutions, capital, and the exterior. Production activities in Cofradía de San José include agricultural production, animal products, trade, and services (repair workshops for agricultural equipment). Institutions play a very important role in the community, some households depend on government transfers, and an important group of households is threatened by organized crime. Additionally, the community maintains a close link with the abroad sector, reflected in household income from remittances, as shown in Table 1.

The average quarterly income per household in Cofradía de San José for the 2022 productive cycle was 49,472 pesos; income that is below the national average quarterly current income per household which was 63, 695 pesos (Centro de Estudios de las Finanzas Públicas [CEFP], 2023). In the community, three types of households were categorized based on the main source of their income. 45 % of households in Cofradía de San José are agricultural households, earning income from their agricultural activities. 37 % of households depend on income received from abroad (remittances) and are labeled migrant households. 18 % of households in the community rely on activities related to trade, and services, are wage earners, or depend on government transfers to subsist; this group of households is called non-agricultural households.

The Cofradía de San José shares the historical migratory traits of the municipality of Tuxpan and the state of Michoacán. Fifty-nine percent of the households had members who migrated to the United States of America, to the states of Oklahoma, Florida, Texas, California, and Alabama, and mainly to Illinois, where they have an unofficial network of migrants in the Chicago city. Community emigrants to the United States are young adults, with an average age of 30 years and an average of 7.5 years of schooling. Migration occurs in three ways: regular labor migration, irregular migration, and refuge migration. In the latter, the migrant initiates a legal process in which they flee conflicts or persecutions (such as escaping from organized crime), request asylum in another country, and accept its protection, rights, and civil obligations.

Tabla 1. Matriz de contabilidad social poblacional para la Cofradía de San José.

		ACTIVITIES			FACTORS				
		Agricultural	Animal products	Trade and services	Land	Capital	Salaried work	Family work	
		1	2	3	4	5	6	7	
ACTIVITIES	Agricultural	1							
	Animal products	2							
	Trade and services	3							
FACTORS	Land	4	3,121,200						
	Capital	5	513,270	113,610	23,459				
	Salaried work	6	599,877		1,252,348				
	Family work	7	8,037,575	149,824	874,682				
INSTITUTIONS	Agricultural household	8			2,918,518	480,443	804,800	7,256,401	
	Migrant household	9			152,060	124,206	471,877	976,710	
	Non-agricultural household	10			50,622	45,690	575,548	828,970	
	Government	11						196,605	
	Organized crime	12	(756,000)						
CAPITAL	Investment in physical capital	13							
	Investment in human capital	14							
Exterior	Rest of the region	15	1,779,079		6,658,026				
	Rest of the country	16			2,853,440				
	Rest of the world	17							
TOTAL		18	13,295,001	263,434	11,858,559	3,121,200	650,339	1,852,224	9,062,081

Continuation

Tabla 1. Matriz de contabilidad social poblacional para la Cofradía de San José.

			INSTITUTIONS					
			Family work	Agricultural household	Migrant household	Non-agricultural household	Government	Organized crime
			7	8	9	10	11	12
ACTIVITIES	Agricultural	1		1,461,209	74,332			(756,000)
	Animal products	2		263,434				
	Trade and services	3		2,549,222	2,575,643	2,438,087		
FACTORS	Land	4						
	Capital	5						
	Salaried work	6						
	Family work	7						
INSTITUTIONS	Agricultural household	8	7,256,401		38,504	126,500	608,000	
	Migrant household	9	976,710	171,031		3,550	124,523	
	Non-agricultural household	10	828,970				456,000	
	Government	11		499,200	262,662	230,056		
	Organized crime	12						
CAPITAL	Investment in physical capital	13		1,920,000	655,385	220,000		
	Investment in human capital	14		324,267	247,408	55,000		
Exterior	Rest of the region	15		932,546	1,342,223	944,921		
	Rest of the country	16		1,807,335	909,540	455,499		
	Rest of the world	17		3,171,191	4,725,956	685,058		
TOTAL		18	9,062,081	13,099,433	10,831,652	5,158,672	1,188,523	(756,000)

Continuation

Tabla 1. Matriz de contabilidad social poblacional para la Cofradía de San José.

		CAPITAL		ABROAD			TOTAL	
		Investment in physical capital	Investment in human capital	Rest of the region	Rest of the country	Rest of the world		
		13	14	15	16	17		
ACTIVITIES	Agricultural	1	709,819		6,820,349	4,985,293	13,295,001	
	Animal products	2					263,434	
	Trade and services	3	2,085,566		2,210,041		11,858,559	
FACTORS	Land	4					3,121,200	
	Capital	5					650,339	
	Salaried work	6					1,852,224	
	Family work	7					9,062,081	
INSTITUTIONS	Agricultural household	8		94,001	492,800	76,800	202,667	13,099,433
	Migrant household	9		376,005	177,776	94,375	8,159,538	10,831,652
	Non-agricultural household	10		156,669	1,955,829	869,345	220,000	5,158,672
	Government	11						1,188,523
	Organized crime	12						(756,000)
CAPITAL	Investment in physical capital	13						2,795,385
	Investment in human capital	14						626,674
Exterior	Rest of the region	15						11,656,795
	Rest of the country	16						6,025,814
	Rest of the world	17						8,582,205
TOTAL		18	2,795,385	626,674	11,656,795	6,025,814	8,582,205	

Source: Own elaboration

The structure of the rural population in Mexico is highly diverse, but its characteristics can be understood at the regional level. According to Ramírez and Contreras (2015), in the north of the country, there are agricultural producers whose production is destined for export, national and local sales. In contrast, in the southern zone, there are small-scale producers whose production is essentially for self-consumption. Cofradía de San José exhibits characteristics more similar to the northern region of the country, as agricultural production is primarily intended for local and national sale.

Cofradía de San José has two particular characteristics: the first relates to an open economy with significant links to the Abroad sector, and the second highlights an economy with little diversification of productive activities. The former is evidenced by observing the importance of foreign trade in agricultural activities and through the allocation of labor in external labor markets, mainly due to the community migration phenomena to the USA. The second characteristic may be more complex and is a reflection of the social issues in the town. The lack of diversification of productive activities responds to two factors: on the one hand, it responds to the opportunity cost of labor due to the existence of attractive labor markets abroad, which creates a labor deficit in local markets and promotes the abandonment of productive activities.

Production and commerce in the Cofradia de San Jose

In Table 1, the sum of all factors in the column set of productive activities can be referred to as the value-added production (14.69 million MXN) which is equivalent to the Gross Village Product (VGP) of 2022.

Cofradía de San José is not an economically isolated community. Agricultural producers actively participate in foreign trade, altering consumption and investment patterns in the community with respect to other small rural towns with subsistence economies.

Foreign trade primarily occurs between the community and the rest of the country through small and medium-sized traders located in other states. The investment of agricultural households is primarily directed towards physical capital (transportation, tractors, and agricultural equipment) to improve their value chain. Given this, a displacement of labor from the agricultural sector to other sectors of the economy would not be expected.

The agricultural sector represents 52.0 % of the production, thus holding the first position of production among the economic activities in the town. The main crops produced are avocado, peach, chayote, guava, and others. In the 2022 production cycle, avocado cultivation contributed 42.1 % of the total agricultural income, being the crop with the highest share of household income in the community. Michoacan agricultural households have altered the use of their available land, switching from cultivating other fruits to avocado cultivation. One of the main advantages is that the area has optimal territorial suitability for avocado production; however, the increase in avocado cultivation in the state has come at the expense of the loss of forested areas, emphasizing the importance of regulating production with environmental protection policies (Jerónimo, 2021; Ramírez *et al.*, 2019). In other regions of the country, despite the importance of the agricultural

sector in rural areas, the trade and services sector has a greater weight in the regional economy. An example of this is rural areas in Sonora, where the trade and services sector contributes 50 % to production, while agriculture and livestock contribute 40 % and 24 % to production, respectively (Méndez-Barrón, 2016).

Guava contributed 16.0 % of total agricultural income, chayote 15.0 %, peach 10.5 %, and other crops (including tomato and corn) contributed 16.3 %. Eighty-nine percent (89 %) of agricultural products are sold outside the village to merchants responsible for distribution and logistics, transporting the products to wholesale markets in the State of Mexico (mainly in Toluca) and Mexico City.

Forty-seven percent of the income generated by productive activities belongs to trade and services, including workshops for repairing equipment used in the field and grocery stores. Nineteen percent of the income in these sectors comes from abroad, strictly speaking, from consumption by inhabitants of other communities. Finally, in Cofradía de San José there are no livestock-related activities; organized crime has played a role in the abandonment of this type of activity by imposing extortions that do not allow producers to make a profit. Some households engage in poultry farming, with their main function being egg production, the only animal product maintaining a very small link to income from productive activities (barely 1 %). We can deduce that most of the production in this sector is for self-consumption, and the surplus is sold within the village.

In the Cofradía de San José there is no production of handicrafts and, as can be observed, the link of the labor market with the exterior is very strong, which causes a lower distribution of the labor force occupied in other types of economic activities within the town.

Distribution of value-added and household income composition

Table 2 presents the composition of income by household type in Cofradía de San José. It summarizes the distribution of income from value-added, other institutions, and income from internal and external remittances. Land ownership represents a very important factor in the distribution of household income. In 2022, non-agricultural households had the lowest average quarterly income (8,773.25 pesos), followed by migrant households (18,421.18 pesos) and the highest income corresponds to agricultural households (22,277.95 pesos).

Table 2. Composition of household income.

Home type	Average quarterly income by household type	Household income composition									Total
		Capital	Work		From other institutions			Abroad			
			Salaried	Family	Agricultural household	Migrant household	Non-agricultural household	Government	Internal remittances	External remittances	
Agricultural household	\$22,277.95	27%	6%	55%	0%	0%	1%	5%	4%	2%	100.0%
Migrant household	\$18,421.18	6%	4%	9%	2%	0%	0%	1%	3%	75%	100.0%
Non-agricultural household	\$8,773.25	5%	11%	16%	0%	0%	0%	9%	55%	4%	100.0%
Total	\$49,472.38	15%	6%	31%	1%	0%	0%	4%	13%	30%	100.0%

Source: Own elaboration

As expected, the value added from family labor is concentrated in agricultural households, as the majority of family labor is used in agriculture. In rural areas, it is common for labor to be predominantly used in agricultural and livestock goods. For example, in the community of La Quemada, municipality of Cuauhtémoc, Chihuahua, labor accounts for 56 % of agricultural goods and 76 % of livestock goods (López *et al.*, 2013). Due to high migration rates in working-age individuals, there is a decrease in income and the supply of rural labor. Migrant households have the lowest percentage of income from the value added of family and wage labor. However, labor migration improves income distribution among households in the village, as it smoothens the variability that would exist due to the unequal distribution of capital (mainly through land ownership).

This is shown in Table 2; the aggregate value of capital and family and wage labor of agricultural households represents 88 % of their total income (22,277.95 pesos). Meanwhile, migration smoothens the income distribution in village households; in migrant households, internal and external remittances account for 78 % of the total income (18,421.18 pesos). At the population level, the value added from capital and labor represents 52 % of the income for village households, while remittances represent 43 % of the same.

Relationship between institutions and households and productive activities

The government directly engages with households in Cofradía de San José through transfers. 7.4 % of households rely on income received from the universal pension program: “Pensión para el bienestar de los adultos mayores”. This group of households is classified as non-agricultural households; they are in the lowest income quartile, own only half a hectare of land

(their production is generally for self-consumption), and do not have migrant members, so they do not receive remittances.

On the other hand, while there are programs for the agricultural sector such as “Fertilizantes para el bienestar” or “Producción para el bienestar”, agricultural households did not receive support from these programs during the 2022 production cycle. Despite the shift of rural labor to non-agricultural activities, the government must provide support to improve the performance of the agricultural sector since its role is essential for food security and the preservation of natural resources in the region and the country (Martínez-Domínguez *et al.*, 2018).

Organized crime and its effect on the Cofradía de San José

According to Ornelas (2018), organized crime conditions the legal economy by extorting money from producers. Extortion ensures a fixed income for criminal groups, enabling them to finance other illicit activities and exert control over their territory and the local economy.

Extortion is a regular fee or payment (similar to a tax) demanded by criminal organizations from legal businesses in a community through intimidation or threats of violence against a person or property. Generally, the payment of fees depends on the profitability of the producers. Criminal organizations monitor the income of businesses and thus establish an “appropriate” fee in exchange for not carrying out their criminal acts in that business (Asmundo & Lisciandra, 2011).

Criminal organizations have been operating in Michoacán for years, mainly affecting avocado growers, packers, and exporters in the municipalities where this activity takes place, such as Zitácuaro, Uruapan, Tancítaro, among others. In 2013, organized crime charged a fee of 1,500 pesos per year per hectare of avocado to non-exporting producers and a fee of 3,000 pesos per year per hectare to avocado exporting producers. As the quotas were non-negotiable and applied to all producers regardless of size, organized crime forced small producers to end their operations (Ornelas, 2018).

In Cofradía de San José, organized crime operates in the same way by extorting avocado producers. Their modus operandi involves charging an annual fee of 10,000 pesos per hectare to avocado producers, regardless of their condition and size. To ensure payment of the fees, criminals threaten producers and their families, with threats of kidnapping, death, or the partial or total theft of production. The activities of organized crime withhold 5.7 % of the income from agricultural activities in Cofradía de San José (756,000 pesos in 2022).

When compared to the income of all productive activities, the negative effect of organized crime on the GDP represents approximately 3.0 %. Organized crime withholds an income greater than the income generated by animal production in the community and represents 6.4 % of the income generated by trade and services.

As Mukherjee *et al.* (2022) point out, extortion by organized crime harms the flow of private investment. This is confirmed in the case of Cofradía de San José. The amount that agricultural

producers allocated to paying the fees imposed by organized crime is greater (by 6.5 %) than the amount allocated for investment in physical capital. The money earmarked for fee payments could be used for investments to make the agricultural sector more productive.

This institution represents a problem in the locality; as seen in Table 1, there are no livestock-related activities, this is due to the abandonment of productive activities such as pork production due to extortion by criminal groups. Furthermore, it forces small agricultural producers to halt their operations and promotes the displacement of labor abroad, confirming that organized crime and violence are factors influencing the decision to migrate to Mexican towns (Soto & Saramago, 2019).

External relations

Remittances are of vital importance to the rural economy; they increase the income of recipient households, improve income distribution, and decrease the inequality that would exist between landless households and large landowners in the community. According to Mora and Arellano (2016), an increase in internal, and external remittances generates positive effects on the rural economy, as they promote spending on health, wealth, and investments.

As a result of migration, remittances constitute approximately 30 % of household income in the community, being the second most important category after income from work in agriculture commerce, and services activities. On average, each migrant household received 98,646 pesos from the United States in 2022. Households use remittance income to finance their purchases of goods and services, as a source of agricultural and trade investment, and for investing in the education of children in the households.

Investment in education is key to regional development, as professionals participate in internal migration; 41 % of households have internal migrants working in other municipalities in the state of Michoacán, in the State of Mexico, or Mexico City.

Internal remittances constitute approximately 13 % of the income of households with internal migrants. The composition of income from external and internal remittances is similar to that of other municipalities in the state of Michoacán and has remained constant over the years. For example, in the municipality of Patzcuaro, remittances from Mexican immigrants in the United States represented 27 % of total household income. Internal remittances represented 11 % of total household income in that municipality (Adelman *et al.*, 1988).

Conclusions

Institutions play an important role in the rural economy. The government has two ways to improve income from agricultural activities; the first is to adequately deliver the support of programs such as “Fertilizantes para el bienestar”, and the second is to improve security conditions in the village by eliminating extortion by organized crime.

Fertilizers represent up to 10.4 % of the expenses incurred in agricultural activities in the village, so receiving fertilizers for free could enhance the income of small-scale producers. On the other hand, improving security and eliminating extortions by criminal organizations would have an immediate effect on the income of producers and would encourage households to continue their investment in agricultural or livestock activities.

The PSAM is limited to emphasizing the most prominent characteristics of the economic life of the village. It provides an overview of the economy in Cofradía de San José at the end of the 2022 production cycle and allows visualization of the links of households with other institutions such as the government and organized crime. However, by itself, it does not allow for quantitative estimates of the effects of policy changes. Hence, the PSAM data serves as a database for analyzing the income effects of endogenous institutions from a policy experiment. The use of input-output multipliers or applied general equilibrium models is recommended to assess income effects from security policies, assistance to non-agricultural households, or migration policies that bring about changes in the incomes of exogenous and endogenous accounts.

Author contribution

Conceptualization of the work, FATR, GBP, FPS; methodology development and experimental validation, FATR; analysis of results, FATR, GBP, FPS, MALS; data analysis, FATR; manuscript writing and preparation, FATR, MALS, AALS; drafting, revising and editing, MALS, AALS; project manager and fund acquisition, FATR.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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