

RELEVANCE OF THE AGRICULTURAL SECTOR AS AN INCOME GENERATOR IN THE STATES WITH THE HIGHEST POVERTY RATES IN MEXICO

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ABSTRACT

Mexico has undergone a transition from a predominantly agricultural society to one that is more diverse in terms of sources of income. Nevertheless, how this transition has affected the welfare of families and their members has not been thoroughly investigated. Therefore, the study's objective was to analyze the effect of each source of income on the welfare of family units experiencing conditions of poverty in Mexico. The states studied were those with the highest poverty rates, such as Campeche, Chiapas, Guerrero, Oaxaca, Puebla, and Veracruz. An econometric model was used, and based on the results, elasticities were calculated to determine the impact of each income on welfare in percentage terms. Data from the National Survey of Household Income and Expenditure were used to generate the model. The sum of the expenses in the food and non-food baskets was considered as the dependent variable, whereas the income was taken as the independent variable. The results indicated that the income from subordinate work is the one that makes up the largest contribution, with an increase of 0.346%, followed by transfers, which presented an increase of 0.107%. On the other hand, remittances had better growth than agricultural and livestock income, with an increase of 0.008%. The current situation that shows a decrease in the relevance of the agricultural sector as a generator of welfare is reaffirmed, which has led to a high dependence on government transfers.

Keywords: welfare, income, econometric model, elasticities, remittance.

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INTRODUCTION

During the period from 1992 to 2018, in Mexico, there was a marked decrease in income from agricultural activities classified as self-employment, both in urban and rural areas, going from 20% to 14% of Total Current Income Per Capita (TCIPC) in that period. At the same time, there was an increase in income from subordinate work, transfers, and financial and capital receipts in urban areas; these types of income increased from 58% to 62% of total income between 1992 and 2018, whereas in rural areas, they increased from 36% to 50%. This change reflected significant transformations in the country's economic structure (Gordillo and Plassot, 2019). Despite this scenario, the Gross Domestic Product (GDP) has maintained relatively stable growth in recent years, averaging 3%. However, it is critical to recognize and consider the limitations of wealth in influencing people's quality of life or welfare. The mere output

expansion cannot be seen as the sole determining factor (London and Formichella, 2006).

There was also a reduction in the share of the agricultural sector in GDP and the number of people employed in it. This worsened the poverty situation in rural areas since, in Mexico, these regions depend to a large extent on income from agricultural activities (Martínez and Salazar, 2022).

The situation described above forced the economically active population to diversify their productive activities in order to generate monetary income and guarantee family survival. Despite the fact that the agricultural sector continues to stand out as one of the primary sources of income due to its direct contribution to food, monetary inflows from these are usually low for family units (Román *et al.*, 2020; Arteaga *et al.*, 2021).

This phenomenon has gained relevance in the last two decades, generating a transition from an agricultural society to one with different economic

activities (Grammont, 2004; Florez and Luna, 2018). This was observed more frequently in the poorest households in the country; diversification has become a constant tool and strategy for their development, that is, for the improvement of their welfare (Yúnez and González, 2008; Grammont, 2010; Reboul and Escobar, 2019; Román *et al.*, 2020; Arteaga *et al.*, 2021; Florez, 2021).

In addition to the above, in Mexico, agricultural activities were characterized by concentrating a high percentage of low-wage labor sources in the market, which leads to a high density of population living in poverty conditions (Bernal *et al.*, 2015). Given this scenario, it is imperative to implement policies consistent with the needs and expectations of the country's rural communities (Martínez and Salazar, 2022). To this end, it is essential to have accurate knowledge about the conditions of sources of income (Arias *et al.*, 2020). Therefore, it is essential to carry out a thorough diagnosis and analysis of this phenomenon, starting with evaluating the impact of each source of income on the welfare of family units. This aspect has not been addressed at the national level in the studies mentioned above. Nonetheless, the analysis of this approach will make it possible to identify the source that contributes to the increase in family welfare, that is, the one that generates the greatest monetary income to acquire satisfiers. It highlights the importance of directing special attention to this sector of the economy from public policies, which could reduce poverty by increasing monetary income in this area. As Paredes and Escobar-Mamani (2018) point out, it is essential to have clear regional and state development policies. They should focus on enhancing the capacities of the country's regions and communities in order to increase monetary income, reduce poverty rates, and promote more solid welfare (Yúnez and González, 2008; Arias *et al.*, 2020).

Finally, with regard to the definition of welfare, it is complex and multidimensional since it encompasses various aspects, such as the economic dimension, basic health, nutrition, and education services, as well as subjective assessments and personal experiences (Jaime and García, 2011). According to Aguado *et al.* (2012), the conceptual basis of welfare lies in the satisfaction of human needs, and for the purposes of the research, it was established that these needs are fulfilled through consumption, which is carried out with monetary income.

In the specific case of Mexico, welfare is based on normative baskets, which are used to establish the basic levels of satisfaction that households require to achieve certain standards of living (Reyes and López, 2016), considered as a whole as the dependent variable and income diversity as the independent variables that affect the increase in the quality of life of family units. In this context, this research aimed to analyze the effect of each source of income on the welfare of family units experiencing poverty conditions in Mexico. This was

carried out through the use of an econometric model, and from the results, elasticities were calculated to determine the impact of each income on welfare in percentage terms.

MATERIALS AND METHODS

Study area: According to the National Council for the Evaluation of Social Development Policy (CONEVAL, for its acronym in Spanish) (2023), in Mexico, the proportion of the population in poverty at the national level in the last years was as follows: 36.3% in 2022; 43.9% in 2020; 41.9% in 2018; and 43.2% in 2016. The data suggested that, although there are improvements in some periods, they do not show a clear trend towards poverty reduction. Specifically, the states of Campeche, Chiapas, Guerrero, Oaxaca, Puebla, and Veracruz had the highest number of households living in poverty in Mexico.

According to CONEVAL (2020), poverty in the analyzed states is a phenomenon with little positive evolution, the figures of the latest data presented are: for 2016, Chiapas 77.9%, Oaxaca 68.0%, Guerrero 66.8%, Veracruz 60.5%, Puebla 58.1%, and Campeche 45.7%; in 2018, records show that Chiapas had 78.0%, Oaxaca 64.3%, Guerrero 67.9%, Veracruz 60.2%, Puebla 58.0%, and Campeche 49.0%; finally, in 2020, data behaved as follows, Chiapas (75.5%), Oaxaca (61.7%), Guerrero (66.4%), Veracruz (58.6%), Puebla (62.4%), and Campeche (50.5%). These percentages represent the total population of each state. The percentages are relevant since these states have a significant population. The National Institute of Statistics and Geography (INEGI, for its acronym in Spanish) (2023) reported populations distributed as follows: Campeche 928,363 inhabitants, Chiapas 5,543,828, Guerrero 3,540,685, Oaxaca 4,132,148, Puebla 6,583,278, and Veracruz 8,062,579.

As shown above, these states were characterized by high poverty rates compared to the states of the northern region of Mexico, which were identified as having the lowest poverty rates; for example, for 2016, the figures were Nuevo León (18.8%), Baja California (22.6%), Baja California Sur (22.9%), Sonora (27.0%), Coahuila de Zaragoza (27.1%); for 2018, Baja California Sur (18.6%), Nuevo León (19.4%), Baja California (23.6%), Coahuila de Zaragoza (25.5%); finally, for 2020, Baja California (22.5%), Nuevo León (24.3%), Chihuahua (25.3%), Coahuila de Zaragoza (25.6%), Baja California Sur (27.6%).

These states were made up of a total population for 2020 described as follows: Nuevo León (5,784,442 inhabitants), Baja California (3,769,020 inhabitants), Baja California Sur (798,447 inhabitants), Sonora (2,944,840 inhabitants), and Coahuila de Zaragoza (3,146,771 inhabitants). All of the above makes the study in question essential since the results can provide

recommendations to take measures to implement regional development policies, considering that the states analyzed are located in the southern region of the Mexican Republic.

Sample size: The data used were taken from the National Survey of Household Income and Expenditure (ENIGH, for its acronym in Spanish). Every two years, INEGI publishes this survey, and from it, detailed information is obtained on the origin of household income, how expenses are distributed, and the main differences that exist according to geographic location (INEGI, 2018).

The ENIGH provides a figure of representative households for each state. This is obtained through a probabilistic, stratified, two-stage cluster sampling, with which the institution guarantees the results it presents (INEGI, 2018). With this, the number of representative households is shown in the "CONCETRADOHOGAR" section of its platform. This study considered the following states (representative households): Campeche (2,174), Chiapas (2,123), Guerrero (2,490), Oaxaca (2,596), Puebla (2,141), and Veracruz (2,717) (INEGI, 2021). This research used data from the said platform as the sample size.

Model definition: In this research, an econometric model was used to make a short-term economic forecast of income and expenses in order to determine welfare expenses in the study area, and the household was considered as the unit of study. According to Gregorio (2012), the household can be considered a closed economy in which production is equivalent to total income, which is destined for consumption or savings. This situation is represented by the following mathematical identity:

$$\text{Equation 1: } y = C + S$$

Where:

- $y = \text{income}$
- $C = \text{consumption}$
- $S = \text{savings}$

To define the empirical model, the methodology proposed by Gijón *et al.* (2015) was followed, which is based on the family income equation:

$$\text{Equation 2: } FI = C + Sa$$

- FI = Family income
 - C = Consumption
 - Sa = Savings
- Which coincides with equation 1.

Consumption: As mentioned above, consumption (C) consists of a food basket and a non-food basket, which are broken down in Table 1. These baskets represent the minimum thresholds of average expenditure used to compare household incomes in the ENIGH (CONEVAL, 2022).

Table 1: Food baskets.

Group of foods that make up the urban food basket	Group of foods that make up the rural food basket
Wheat	Corn
Corn	Wheat
Rice	Rice
Other cereals	Beef and veal
Beef and veal	Chicken
Pork	Fresh fish
Processed meat	Milk
Chicken	Cheese
Fresh fish	Legumes
Legumes	Pork
Milk	Eggs
Cheese	Tubers
Milk derivatives	Non-alcoholic beverages
Processed fish	Oil
Eggs	Prepared food to consume at home
Tubers	Sugar and honey
Non-alcoholic beverages	Fruits
Oils	Vegetables and legumes
Prepared food to consume at home	Processed pork and poultry
Sugar and honey	Other milk derivatives
Fruits	Others
Vegetables and legumes	
Others	

Source: Authors' preparation with data from CONEVAL, 2022.

Table 2. Non-food basket.

Goods and services that make up the non-food basket	
Transport	Glassware, linens, and household utensils
House cleaning and care	Healthcare
Education, culture, and recreation	Household goods and home maintenance
Communications and vehicle services	Leisure items
Housing and conservation services	Self-care
Clothing, footwear, and accessories	Other expenses

Source: Authors' preparation with data from CONEVAL, 2022.

Therefore, for the purposes of this research, it was necessary to isolate the variable "C" from the original equation:

Equation 3: $C = FI - S$

Consequently, consumption (C) was represented as Family Welfare Consumption (FWC), and this variable was substituted in the corresponding equation:

Equation 4: $FWC = FI - S$

Income: The total composition of a household's income is the sum of the income of economically active agents, which may come from one or more sources of employment (Cortés, 2003). For its analysis, the sources of income exposed by the ENIGH were considered (Table 3).

Table 3. Sources of income.

Label	Variable	Definition
Income from subordinate work	Jobs	These are the remunerations for subordinate work. It is made up of salaries, commissions, Christmas bonuses, work compensation, and remuneration in kind.
Industrial businesses	Industry	Income from industrial businesses.
Commercial businesses	Trade	Income from commercial businesses.
Service businesses	Services	Income from service businesses.
Agricultural businesses	Agricultural	Income from agricultural businesses.
Livestock businesses	Livestock	Income from livestock businesses.
Property rent	Rents	Property rent groups together all the income received by the members of the household derived from the possession of financial or tangible assets that they have made available to other institutional units.
Remittances	Remittances	Income from other countries.
Transfers	Transfer	Transfers are the cash or in-kind inflows received by the members of the household for which the provider or donor does not demand remuneration of any kind.
Total perceptions	Perceptot	Other current income.
Savings	Deposit (S)	Deposits in savings accounts, batches, among others

Source: INEGI, 2021.

Empirical model: For the empirical model, the variables previously exposed were substituted, and the following model was obtained:

Equation 5.

$$FWC = \beta_0 + \beta_1 jobs + \beta_2 industry + \beta_3 trade + \beta_4 services + \beta_5 agricultural + \beta_6 livestock + \beta_7 rents + \beta_8 remittances + \beta_9 transfer + \beta_{10} perceptot - \beta_{11} S$$

The FWC, income, and savings variables data used in this study were obtained from the ENIGH database, specifically from the household concentrate called "CONCENTRADOHOGAR", which was compiled and published by INEGI in 2020.

Once the data were selected and the model defined, it was analyzed using an Excel spreadsheet. Subsequently, the model was generated using the Gnu Regression, Econometrics and Time-series Library (Gretl) software; multiple linear regression was used to approximate the dependence of the FWC variable in relation to income diversity and household savings in the states analyzed. Finally, the data were processed with weighted least squares. With the model's results, the

elasticities were calculated using the method proposed by Mankiw (2012).

RESULTS AND DISCUSSION

A model with a goodness-of-fit of 60% was obtained, which means that it is 60% explanatory. According to Table 4, all variables were significant with a *p*-value less than 0.0001, indicating that they are important to explain the dependent variable. In turn, the regression coefficients, the standard deviation, and the *t*-statistic value were included.

Once the formal assumptions were evaluated, it was found that the data presented heteroscedasticity, so it was decided to use the method of weighted least squares for its correction. The dependent variable was used as a weighting variable. This allowed the estimation of the parameters to be reliable, guaranteeing a constant variance and adequate confidence intervals.

The assumption of no autocorrelation was discarded since the data are cross-sectional and the errors are independent.

No collinearity problems were found; the Variance Inflation Factors (VIF) and the Belsley-Kuh-

Welsch (BKW) diagnosis of collinearity were used for the evaluation. All parameters were less than 2 (they had to be greater than 10 to be problematic). Therefore, there

was no evidence of collinearity; the variables are independent with no correlation between them.

Table 4. Model of family economies.

Model: Weighted LS., using observations 1-14241					
	Dependent variable: FWC				
	Variable used as weighting: FWC				
	<i>Coefficient</i>	<i>Standard Dev.</i>	<i>t-statistic</i>	<i>p-value</i>	
Const	17787.3	259.918	68.43	<0.0001	***
Job	0.560129	0.005083	110.2	<0.0001	***
Industry	0.441738	0.022151	19.94	<0.0001	***
Trade	0.346122	0.02031	17.04	<0.0001	***
Services	0.47574	0.025043	19	<0.0001	***
Agricultural	0.220709	0.034259	6.442	<0.0001	***
Livestock	0.252837	0.033809	7,478	<0.0001	***
Rents	0.484284	0.007362	65.78	<0.0001	***
Remittances	0.508355	0.057903	8,779	<0.0001	***
Transfer	0.396626	0.008296	47.81	<0.0001	***
Perceptot	0.394794	0.012352	31.96	<0.0001	***
Deposit	-0.205624	0.011791	-17.44	<0.0001	***
Statistics based on the weighted data:					
Sum of squared residuals	1.69e+17	SD. of the regression	3441226		
R-squared	0.607949	Corrected R-squared	0.607646		
F(11, 14229)	2005.890	<i>p</i> -value (of F)	0.000000		
log-likelihood	-234547.2	Akaike criterion	469118.4		
Schwarz criterion	469209.2	Hannan Quinn crit.	469148.6		
Statistics based on the original data:					
Mean of the dep. vbl.	26088.87	SD. of the dep. vbl.	20565.59		
Sum of squared residuals	3.64e+12	SD. of the regression	15992.08		

Regarding the assumptions of normality, they were discarded by considering the Central Limit Theorem (CLT). The theorem states that if the sample size is large enough, the distribution of sample means follows approximately a normal distribution. In this case, since the sample is 14241, this property is met.

Once the reliability of the model was confirmed through formal tests, it was expressed as follows:

$$FWC = 17787.3 + 0.560jobs + 0.442industry + 0.346trade + 0.476services + 0.220agricultural + 0.253livestock + 0.484rents + 0.508remittances + 0.397transfer + 0.395perceptot - 0.206deposit$$

The sources of income from the labor market are essential for the welfare of households in the states analyzed. This is because this income contributed to welfare spending, allowing families to cover their basic needs and access other goods and services that improve their quality of life. Therefore, it is true that the level of welfare of a family depends on the different sources of income it has, as indicated in the empirical model.

Regarding savings, it was found that they had the expected effect in the model; that is, they decrease consumption since they represented a part of the total income that is not used for acquiring goods and services. In this respect, savings are considered a form of investment in the future of households, and they can also be seen as a limitation on current consumption.

In this sense, it was also demonstrated that the contribution of income from subordinate work (0.560), remittances (0.508), property rent (0.484), service businesses (0.476), industrial businesses (0.442), transfers (0.397), total perceptions (0.395), commercial businesses (0.346), livestock businesses (0.253), and agriculture businesses (0.221). Each of these variables contributes a different level of income to consumption in household welfare.

This trend coincided with Gordillo and Plassot (2019), who indicated that it is a phenomenon that occurs from 1992 to 2018, and with this result, the same situation is reaffirmed for 2020.

It is then necessary to highlight that family welfare is directly related to the various sources of

income in the labor market, which emphasizes the need to consider the study of all available sources. In addition, it was found that savings significantly impacted current household consumption, which is why their analysis is essential in the role of long-term family financial planning.

Elasticities: Mankiw (2012) defines elasticity as the percentage change in quantity demanded divided by the percentage change in price. This concept is helpful for measuring the sensitivity of the dependent variable to changes in the independent variables. According to the author, elasticity is a dimensionless number, meaning it has no units of measurement. Therefore, if one of the income variables increases by 1%, keeping the rest constant, the FWC variable is expected to increase by 1% (Table 5).

Table 5. Elasticities of the FWC.

VARIABLE	ELASTICITY (%)
Job	0.346
Transfer	0.107
Perceptot	0.052
Rents	0.024
Services	0.021
Industry	0.016
Trade	0.016
Remittances	0.008
Agricultural	0.007
Livestock	0.005
Deposit	-0.020

According to the elasticities, it can be affirmed that the most important source of income for household consumption and welfare is "income from subordinate work", with an impact of 0.346% on welfare in the face of a 1% increase in this income.

Transfers were the second source of income with the most significant impact on welfare, generating an increase of 0.107%. It is necessary to consider that transfers include government subsidies, such as scholarships, and transfers from other institutions and between households. In turn, it is observed that remittances also have a strategic role in the welfare of households, with 0.008%. On the other hand, income from agricultural and livestock businesses are the economic sources that contribute the least changes, with an impact of 0.007% and 0.005%, respectively.

It becomes necessary to mention that remittances were essential in many households. Although their impact on welfare may seem low in percentage terms, they represented a fundamental part of the total income of recipient families. The research agrees with Florez and Luna's (2018) findings that subordinate work was the primary source of income for households in

Mexico and that they allocate it to welfare-related expenses. The authors also highlighted the importance of State transfers for families living in poverty, as they represent one of the main sources of income.

In this regard, Arteaga *et al.* (2021) argue that in households living in poverty, the primary source of income comes from activities carried out outside the agricultural plot. According to Yúnez and González (2008), salaried work was the largest source of income, representing 42.5% of the total. In the same vein, it has been found that agricultural and livestock businesses have had a lower contribution to income in recent years. The trend shows a gradual process of loss of importance of agricultural activities in the country (Florez and Luna, 2018). Despite this, poor rural households found agricultural work a significant way to reduce poverty as a whole (Bernal *et al.*, 2015; Román-Montes de Oca *et al.*, 2020). In other Latin American countries, such as Costa Rica and Colombia, subordinate work was the primary source of household income and the importance of transfers for family development (Reboul and Escobar, 2019; Arias *et al.*, 2020).

Arteaga *et al.* (2021) point out that one way to optimize income is to encourage agricultural and livestock productivity. Nevertheless, until now, Mexico's economic policy has focused on improving productivity, which has resulted in a deterioration in the quality of life of the population in states such as Campeche, Chiapas, Guerrero, Oaxaca, Puebla, and Veracruz. This has translated into negative consequences, such as a tendency towards job insecurity (Huerta, 2012). In this sense, it is highlighted that the implementation of economic policies oriented exclusively to competitiveness and economic growth can have negative effects on the most vulnerable population and income distribution. Given these scenarios, households are forced to diversify their economic sources in order to improve their living conditions.

With this, state transfer programs, remittances from other household members, and diversified and owned businesses become important (Florez, 2021). Pluriactivity is not something new; however, it has become more significant today, mainly seeking to improve welfare (Grammont, 2010).

It is essential to understand the sources of household income, especially in rural communities in situations of poverty. This can greatly help design policies and programs focused on improving economic and social conditions, thus reducing poverty and inequality. Rural development strategies should integrate social protection measures and promote productive activity in rural areas, considering the pluriactivity of families and the diversity of sources of income. The productive approach acquires special relevance in the most impoverished regions of the south-southeast of the

country (Gordillo and Plassot, 2019), the region where the states analyzed are located.

As Paredes and Escobar-Mamani (2018) point out, this type of research is essential to have clear regional and state development policies. Policies can focus on enhancing the capacities of the country's regions and communities in order to increase monetary income, reduce poverty rates, and foster stronger welfare (Yúnez and González, 2008; Arias *et al.*, 2019). A targeted social program, which provides benefits to specific groups, contrasts with a universal program that benefits the entire population. In societies where poverty and income inequality are relevant problems, targeting becomes a crucial tool to direct social assistance towards those who lack the capacities and opportunities to improve their welfare (Delgado, 2017).

In short, it is necessary for the government and other entities to get involved in establishing new job opportunities with a productive approach and in designing development policies that stimulate the reactivation of agricultural resources in the least favored regions of the country.

Conclusion: The results of this study disclosed that the model helps analyze household income in Mexico, and the methods used in this study demonstrated a scientific robustness that allowed them to be replicated in other countries/studies. The current situation that shows a decrease in the relevance of the agricultural sector as a generator of welfare is reaffirmed, which has caused a high dependence on government transfers. The implications of these results are crucial for decision-making in public policy matters. It is necessary that the government and other institutions work on creating new productive jobs and generating development policies that promote the use of agricultural resources of the country's poorest states.

REFERENCES

- Aguado, M., D. Calvo, C. Dessal, J. Riechmann, J. A. González and C. Montes (2012). La necesidad de repensar el bienestar humano en un mundo cambiante. *Papeles de relaciones ecosociales y cambio global*, 119(2): 49-76. https://www.fuhem.es/media/cdv/file/biblioteca/Analisis/Buen_vivir/Repensar_el_bienestar_humano_M_Aguado_y_otros.pdf
- Arias, R., L. Sánchez and M. Rodríguez (2020). Pobreza y desigualdad en Costa Rica: una mirada más allá de la distribución de los ingresos. *Estudios del Desarrollo Social*, 8(1): 1-25. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2308-01322020000100016
- Arteaga, M., P. Sánchez, O. Romero, I. Ocampo, A. Rivera and I. G. García (2021). Diversificación de ingresos de la agricultura familiar durante 2018 en Tehuatzingo, Libres, Puebla. *Revista Mexicana de Ciencias Agrícolas*, 12(3): 295-408. <https://doi.org/10.29312/remexca.v12i3.2170>
- Bernal, E., B. Muriel and G. Olivarez (2015). Pobreza, ingresos laborales y trabajo en Bolivia. *Econstor*, 9: 1-23. <http://hdl.handle.net/10419/129298>
- CONEVAL (2020). Anexo estadístico de pobreza en México. https://www.coneval.org.mx/Medicion/MP/Paginas/AE_pobreza_2020.aspx
- CONEVAL (2022). ¿Qué son las canastas alimentaria y no alimentaria?. <http://blogconeval.gob.mx/wordpress/index.php/2022/02/15/que-son-las-canastas-alimentaria-y-no-alimentaria/>
- CONEVAL (2023). Pobreza en México: Resultados de pobreza en México 2020 a nivel nacional y por entidades federativas. Recuperado 6 Junio, 2023, de https://www.coneval.org.mx/Medicion/MP/Paginas/Pobreza_2020.aspx
- Delgado, F. (2017). Efectividad en la selección de beneficiarios de los programas avancemos y bienestar familiar. *Economía y Sociedad*, 22(52):1-24. <http://dx.doi.org/10.15359/ey.s.22-52.1>
- Cortés, F. (2003). El ingreso y la desigualdad en su distribución en México. *Papeles de Población*, 9(35), 138-153. <http://www.redalyc.org/articulo.oa?id=11203507>
- Florez, N. (2021). Pobreza, desigualdad y perfil sociodemográfico de los hogares rurales y agropecuarios en la región sur de México. *EntreDiversidades*, 8(1): 36-63. <https://dialnet.unirioja.es/servlet/articulo?codigo=7796139>
- Florez, N., and M. Luna (2018). Hogares rurales y estrategias familiares de vida en México. *RELAP*, 12(23): 109-147. <http://dx.doi.org/10.31406/n23a6>
- Gijón, A., A. Sánchez and J. Ángel (2015). Modelo econométrico del bienestar familiar en tres comunidades en la cuenca del río Atoyac, Oaxaca. 20° Encuentro Nacional sobre Desarrollo Regional en México. Cuernavaca, Morelos del 17 al 20 de noviembre de 2015. AMECIDER – CRIM, UNAM. <http://ru.iiec.unam.mx/2954/1/Eje6-089-Gijon-Sanchez-Angel.pdf>
- Gordillo, G., and T. Plassot (2019). Transformaciones en los ingresos de los hogares mexicanos (1992-2018). *Economíaunam*, 16(48):19-54. <https://www.scielo.org.mx/pdf/eunam/v16n48/1665-952X-eunam-16-48-19.pdf>

- Grammont, H. (2004). La nueva ruralidad en América Latina. *Revista Mexicana de Sociología*, 66 (1):279-300.
<http://mexicanadesociologia.unam.mx/docs/vol66/numesp/v66nea17.pdf>
- Grammont, H. (2010). La evolución de la producción agropecuaria en el campo mexicano: concentración productiva, pobreza y pluriactividad. *Andamios* 7(13): 85-117.
https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1870-00632010000200005
- Gregorio J. (2012). Macroeconomía, teorías y políticas. <http://up-rid2.up.ac.pa:8080/xmlui/bitstream/handle/123456789/1312/Macroeconomia.pdf?sequence=1>
- Huerta, R. (2012). Pobreza, distribución del ingreso y renta básica. *Economía UNAM*, 9(26): 68-81.
https://www.scielo.org.mx/scielo.php?pid=S1665-952X2012000200003&script=sci_arttext
- INEGI (2018). Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018 nueva serie. <https://www.inegi.org.mx/programas/enigh/nc/2018/>
- INEGI (2020). Encuesta Nacional de Ingresos y Gastos de los Hogares 2020 Nueva serie. <https://www.inegi.org.mx/programas/enigh/nc/2020/#Microdatos>
- INEGI (2021). Encuesta Nacional de Ingresos y Gastos de los Hogares 2020 nueva serie: descripción de la base de datos. https://inegi.org.mx/contenidos/programas/enigh/nc/2020/doc/enigh2020_ns_descriptor_archivos_fd.pdf
- INEGI (2023). Población total por entidad federativa y grupo quinquenal de edad según sexo, serie de años censales de 1990 a 2020. https://www.inegi.org.mx/app/tabulados/interactivos/?pxq=Poblacion_Poblacion_01_e60cd8cf-927f-4b94-823e-972457a12d4b&idrt=123&opc=t
- Jaime, E., and M. García (2011). La evaluación del bienestar en México. *Revista Internacional de Estadística y Geografía*, 2(2):96-112.
https://rde.inegi.org.mx/rde_03/doctos/rde_03_art7.pdf
- London S., and M. Formichella (2006). El concepto de desarrollo de Sen y su vinculación con la Educación. *Economía y Sociedad*, 11(17):17-32.
<https://www.redalyc.org/pdf/510/51001702.pdf>
- Mankiw, G. (2012). Principios de Economía. Sexta edición.
<https://clea.edu.mx/biblioteca/files/original/bd2711c3969d92b67fcf71d844bcbaed.pdf>
- Martínez, O., and J. E. Salazar (2022). Desafíos presentes en el México rural: problemas y posibilidades. *Espacio Abierto*, 31 (3):87-105.
<https://www.redalyc.org/journal/122/12272203005/html/>
- Paredes, R., and F. Ecobar-Mamani (2018). El rol de la ganadería y la pobreza en el área rural de Puno. *J. High Andean Research*, 20(1):39-60.
<http://dx.doi.org/10.18271/ria.2018.329>
- Reboul, D., and G. Escobar (2019). Determinantes de la diversificación de las estrategias de vida de la Agricultura Familiar en Colombia. *Eutopía*, (15): 79-100.
<https://doi.org/10.17141/eutopia.15.2019.3866>
- Reyes M., and M. López (2016) El método de bienestar socioeconómico (MBS) como alternativa para la medición multidimensional de la pobreza: una visión desde los salarios. *Acta Sociológica*, 70(1): 245-270.
<https://doi.org/10.1016/j.acso.2017.01.011>
- Román-Montes de Oca, E., J. E. Licea-Resendiz and F. Romero-Torres (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>
- Yúnez, A., and S. González (2008). Efectos multiplicadores de las actividades productivas en el ingreso y pobreza rural en México. *El trimestre econ*, 75(298): 349-377.
https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2448-718X2008000200349