

## RURAL FAMILY ECONOMY AND THE STRATEGIC PROJECT FOR FOOD SECURITY AS GENERATOR OF WELFARE IN ACAMBAY, MEXICO

Adalberto **Magdaleno-Hernández**<sup>1\*</sup>, Aníbal Griceldo **Quispe-Limaylla**<sup>2</sup>, Lenin Gerardo **Guajardo-Hernández**<sup>3</sup>, Martín **Hernández-Juárez**<sup>4</sup>, José Miguel **Omaña-Silvestre**<sup>5</sup>, Ignacio **Caamal-Cauch**<sup>6</sup>, Nancy Vianey **Cruz-Cruz**<sup>7</sup>, Edgar **Magdaleno-Hernández**<sup>8</sup>

<sup>1</sup>Universidades para el Bienestar Benito Juárez García-Aquismon SLP.

<sup>2</sup>PSEI-Estudios del Desarrollo Rural, COLPOS Montecillo.

<sup>3</sup>PSEI-Estudios del Desarrollo Rural, COLPOS Montecillo.

<sup>4</sup>PSEI-Estudios del Desarrollo Rural, COLPOS Montecillo

<sup>5</sup>PSEI-Economía, COLPOS Montecillo.

<sup>6</sup>DICEA- Universidad Autónoma Chapingo.

<sup>7</sup>Centro de Investigación en Economía y Matemáticas Aplicadas ( CIEMA-Chapingo).

<sup>8</sup> Universidades para el Bienestar Benito Juárez García-Milpa Alta, CDMX.

\*Corresponding author: adalmh@gmail.com

### ABSTRACT

PESA analyses are abundant, although studies that consider the contributions they have in the rural family economy are scarce, as well as on opinions of the recipients in this regard. The objective was to determine the annual economic income of families and to analyze the contribution of PESA projects to the income, in order to identify whether this contribution influenced welfare favorably and in particular the diet of families. The study was conducted in two communities of Acambay, Estado de México. In August 2018, a census was carried out with 39 recipients and 20 families were interviewed as control; the annual economic incomes were estimated and the contribution of PESA projects in them; ANOVA and Tukey's means comparison were carried out, to determine if there is a statistical difference between economic incomes of both populations. The results showed that annual incomes range between \$69,000 and \$73,300, 77% and 80% corresponded to payments that they obtained for their labor; agriculture and livestock production together contributed between 7 and 14%, and government transferences represented 7%. PESA projects contributed, on average, 2% of the economic incomes. The conclusion is that PESA had an insignificant contribution in the welfare of rural families and that participants recognize the marginal effect of the projects on their incomes and food production, but they are satisfied with what they receive from the program.

**Keywords:** ANOVA, PESA, rural income, rural employment.

### INTRODUCTION AND THEORETICAL DISCUSSION

Until the 1980s, the literature about rural economy referred to it as peasant economy. An important theoretical contribution was made by Redfield R (1973) and Chayanov (1974), who confirmed that peasant economy is a non-capitalist form of production based on the work of the producer himself and his family, where paid employment is scarce and, therefore, peasant economy is family economy. For Chayanov (1974), work performed by peasants has the aim of satisfying their needs and their cultural subsistence.

De Janvry *et al.* (1986) showed that peasants in Latin America had less land than in prior decades and that they were dependent on income generation outside of their production units and obtained their incomes from seasonal jobs in agriculture. In addition, there

**Citation:** Magdaleno-Hernández A, Quispe-Limaylla AG, Guajardo-Hernández LG, Hernández-Juárez M, Omaña-Silvestre JM, Caamal-Cauch I, Cruz-Cruz NV, Magdaleno-Hernández E. 2023. Rural family economy and the strategic project for food security as generator of welfare in Acambay, Mexico. *Agricultura, Sociedad y Desarrollo* <https://doi.org/10.22231/asyd.v20i4.1555>

ASyD 20(4): 475-487

**Editor in Chief:**  
Dr. Benito Ramírez Valverde

Received: July 19, 2022.  
Approved: November 5, 2022.

**Estimated publication date:**  
September 28, 2023.

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

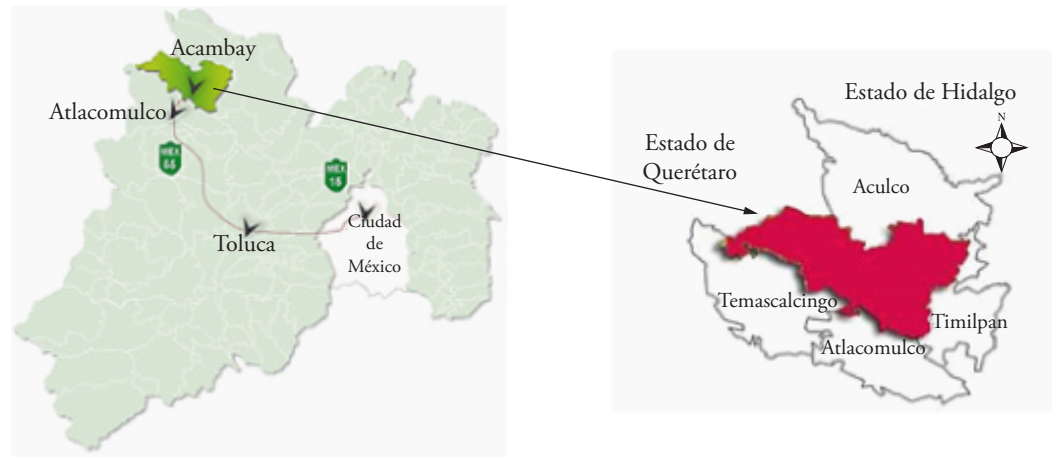


were rural families without land. This generated the interest of researchers on the topic. Klein (1992) concluded that the sources of income of rural households are multiple and that agriculture constitutes only one of them, in some cases not even the most important one. Dirven (2004) further supported this conclusion when mentioning that the rural population was increasingly less agricultural, both from the growing proportion of agricultural Economically Active Population (EAP) that lived in the urban sphere and the growing proportion of rural EAP that works in activities different from agriculture.

The topic of rural economy has been included in the agendas of governments and the main international agencies present in the region (Faiguenbaum, 2013) with the objective of promoting development and overcoming poverty in rural zones. In Mexico, after the Second World War, government programs were implemented aimed at combatting poverty in the rural area and it is considered that since the 1980s, the term peasant economy has been associated with the concept of food sovereignty (Couturier and Concheiro, 2015).

One of them was the Strategic Program for Food Security (*Proyecto Estratégico de Seguridad Alimentaria*, PESA), designed by the Food and Agriculture Organization of the United Nations (FAO) in 1994, to combat rural hunger. According to the National Technical Unit (NTU), PESA began its operation in Mexico in 2002 (UTN-FAO, 2015), and since that year the project did not cease to grow in every sense. By 2007, the House of Representatives assigned 600 million pesos (mp) to it in the Federal Disbursements Budget (FDB) to be applied in three states of the federation. In 2015 there was a record allotment of 3,381 mp, to have presence in 24 states; 2018 was the last year when it had an allotment in the FDB with 2,598 mp and was present in 24 states (PEF, 2007, 2015 and 2018). This illustrates that it was a program to which an important amount of economic resources were assigned, which it received during 17 years of government backing. In Estado de México, the program started in 2009 with 75 mp and by 2018 it was assigned 103 mp (PEF, 2018). In the municipality of Acambay (Figure 1), the program began in 2010 and ended in 2018 (Padrón de beneficiarios, SAGARPA, 2013 and 2018).

According to the NTU, the agency specialized on the PESA program, it is a strategy of methodological technical support to work with people who inhabit marginalized rural zones to contribute to improving their production systems and income and thus to strengthen their food security. It seeks to awaken the motivation and to support the development of capacities in people for them to become promoters of projects that can generate positive changes in their life systems (UTN-FAO, 2015). The federal government participated directly in the program through the Ministry of Agriculture, Livestock Production, Rural Development, Fishing and Food (*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*, SAGARPA), now Ministry of Agriculture and Rural Development (*Secretaría de Agricultura y Desarrollo Rural*, SADER) and the state government through its office responsible for rural development. FAO and the National Technical Unit (*Unidad Técnica Nacional*, UTN-FAO) were in charge of the normative, operative and technical monitoring; the Evaluation Center was responsible for the performance evaluation of



**Figure 1.** Location of the study area.

the Rural Development Agencies (RDAs) or the offices of professionals in charge of implementing the project in the rural communities.

Taking into account the number of years and the magnitude of the program, various studies have been published on PESA. They can be considered as background to this research study, where some type of causality relationship between PESA and its effects on the welfare of rural families was analyzed. Due to the size of the study and the national reach, the following stand out: Gimete and Muñoz (2017), Couturier Palma *et al.* (2013), SAGARPA (2013) and Azarcoya and Belik (2009); at the state level: Soberanes (2009), Serna and Ortiz (2011a and 2011b) and Colegio de Tlaxcala and SEFOA (2016). The publications that are based on a lower territorial coverage were more abundant, among which there are the following: Bloom *et al.* (2015), Cruz *et al.* (2016), Martínez *et al.* (2013) and Román *et al.* (2017). For Estado de México, three studies were found which analyzed the project. Two of them were Torres *et al.* (2015) and Mondragón *et al.* (2016), which used the technique of institutional ethnography; and the other study was by Orozco *et al.* (2012).

In these studies there are two stances regarding the results offered by PESA; some detected insignificant effects of the program with regards to its general objectives, strongly questioning the pertinence and the budget allotments; the rest determined some benefits or contributions for the rural areas with highest marginalization in Mexico. It can be inferred that there are some effects of the program, although there is not agreement as to how relevant they are. On the other hand, the topic has been scarcely studied from the perspective of the rural family economy of recipient households and considering the perception of participants about the program. Based on this, the study is sustained on the analysis of the effects of the program from the perspective of rural family economy, taking into account the effective economic contribution of the projects for the families and considering the opinion of participants regarding the benefits offered by the program.

The objective of this study was to determine the annual economic incomes of the families and to analyze the contribution of PESA projects to the income, in order to identify whether this contribution influenced favorably the welfare and in particular the diet in the families. The hypothesis defined was that rural family economy has various sources of income, although the main one is the one they obtain from the sale of their workforce. Agriculture and livestock production activities have lost relevance as a source of income, and for this reason and due to the nature of the PESA projects, this program contributed weakly to the family incomes, to the diet and to family welfare.

### METHODOLOGY

The method used was the analytical descriptive from the social sciences, with a quantitative and qualitative approach. A literature review was carried out of documents such as project evaluations, scientific articles, books, institutional publications, recipients' registry, operation rules, official operation manuals for PESA, and technical files of PESA projects. The study was carried out in the municipality of Acambay (Figure 1), Estado de México; the communities of La Soledad and San José Boctó were selected, where PESA had presence from 2010 to 2017. These communities are made up by Otomí indigenous population. With prior authorization from the PESA groups, the activities that recipient families conducted related to the program were monitored, through presence and support in their work dynamics during the period of April 2016 to April 2017. Questionnaires were designed for the program's recipient families, which consisted in 50 questions and gave rise to 125 variables; for families without the program or control, there were 22 questions and 63 variables. Based on this, sociodemographic information was obtained, as well as sources of income of the families, their perception of welfare, their diet, and questions related to the program. The interviews for both families were carried out during the month of August 2018.

Unit of analysis: two population groups were defined, one of them was the recipient families of PESA and the second was constituted by the control families. For PESA participants, a census was carried out in the communities of study, which meant identifying and interviewing the 39 program recipients (19 recipients from the community of La Soledad and 20 recipients from San José Boctó). For the control families, a non-randomized intentional sample was carried out; that is, the families that were willing to answer the questionnaire were chosen, considering as requirement that they were inhabitants of the communities and that they were not PESA recipients. The size of the sample was defined taking as criterion that it was possible to carry out statistically valid comparisons with the population of interest; considering Tukey (1949), it was determined to interview 20 control families.

Impact of PESA in incomes and family welfare. This content was addressed through the estimation of the family income, effects from PESA in family income and effects of PESA in family welfare, in the opinion of the recipients.

Estimation of family income. It refers to the average incomes obtained during 2017 by each family. For the agriculture and livestock activities, the net incomes were calculated by

the difference between gross income and the costs for each type of activity, the sources of income were grouped in the rent of the workforce (temporary or permanent), agricultural and livestock production activities, subsidies received from government programs, rentals from properties or real estate, and those from other sources (Table 1). The Excel® software was used to make this estimation.

Effects of PESA in the family income. The interest was centered on defining the difference between the annual incomes of families that are recipients of PESA, compared to control families. In the second place, there was an inquiry as to whether this difference is statistically significant. For this purpose, a Shapiro-Wilk test of normality (1965) was conducted, on the variable total annual income for the three samples; this method was chosen because it is recommended in samples smaller than 50 elements. The level of significance used was 0.05. The results of the Shapiro-Wilk test of normality (Table 2) allow making the following hypothesis test.

Null hypothesis (Ho): The data have a normal distribution.

Alternative hypothesis (Ha): The data do not have a normal distribution.

If the level of significance (p - value) obtained is higher than the predefined level of significance (0.05), the null hypothesis is accepted and the alternative hypothesis is rejected (Shapiro & Wilk, 1965).

After testing the normality of the variable, an analysis of variance (ANOVA) was conducted for the hypothesis test of Tukey's means comparison ( $\alpha=0.05$ ), by which to confirm

**Table 1.** Income and sources of income of the peasant families.

Income obtained for:	PESA Families		Control Families	
	Annual average in \$	%	Annual average in \$	%
A. Rent of their workforce (paid work)	56,665.60	77.3	57,285.71	83.4
B. Livestock production	6,520.32	8.9	2,132.40	3.1
C. Government monetary transferences	5,666.70	7.7	4,585.35	6.7
D. Agriculture	3,923.56	5.3	2,899.50	4.2
E. Income from rental of a property	338.50	0.5	1,809.00	2.6
F. Incomes from other sources of income	220.50	0.3	-	0
G. Total annual income =A+B+C+D+E+F	73,335.18	100	68,711.96	100

Source: prepared by the authors based on survey data, 2018.

**Table 2.** Test of normality of the variable total annual income for the 3 samples.

Sample	N	Degrees of freedom (df)	Statistics	Level of significance ( $p=0.05$ )
La Soledad	19	19	0.973	0.843
San José Boctó	20	20	0.957	0.492
Testigo	20	20	0.915	0.079

Source: prepared by the authors based on survey data, 2018.

whether there was a statistically significant difference of income between the 3 samples. The statistical software used was SPSS® version 15.0 for Windows.

This test contains the following hypotheses:

Null hypothesis (Ho): The average value of the variable total annual income is statistically equal between the populations compared.

Alternative hypothesis (Ha): The average value of the variable total annual income is statistically different between the populations compared.

The predefined level of significance is 0.05; if the level of significance obtained in the ANOVA is higher than alpha (0.05), Ho is accepted and there is no difference in the means of the population groups under study (Tukey, 1949).

For the analysis of the effects of PESA in family welfare, two complementary procedures were used: the first was direct observation during the field work and the second was the perception of interview respondents regarding the topic, for which some questions were included in the questionnaire with response options in Likert scale. These responses were analyzed through SPSS® and Excel®.

## RESULTS AND DISCUSSION

Gender of the heads of family. Although the program is not directed to women, the project's recipients were mostly women (92%). The reasons that explain this situation have to do with the role of "head of household" traditionally given to men. Therefore, they are in charge of obtaining money that their families require, and this implies having time for the workday; therefore, they could not be responsible for the activities that the program requires. The average age of the recipient population of PESA was 48 years old, with a maximum of 75 and a minimum of 29; the control group had an average age of 45 years, which implies a difference of low significance between the two population groups (Table 3).

The average size of rural households ranges from 3 to 5 members, with 4 being the most frequent number. The families with PESA were larger than the control (Table 3). A characteristic shared by the households studied with more than 5 members is that relatives reside in the households, such as parents or grandchildren of the heads of household or another type of family member, generally nieces or nephews.

**Table 3.** Age, schooling and size of the family.

Characteristic	PESA Recipients. N=39			Control. n=20		
	Average	Minimum	Maximum	Average	Minimum	Maximum
Age	48.1	29	75	45.3	27	68
Schooling	7.5	0	14	7.9	0	17
Size of the family	4.36	1	8	3.76	2	6

Source: prepared by the authors based on survey data, 2018.

The average schooling of the program’s recipients was 7.5 years and that of the control heads of households was 7.9 years. These data suggest that most of the heads of households finished their primary education, which means that those who participated in the program have the ability to read and write, although their participation in workshops confirmed that most had difficulty taking notes of the talks that the technicians offered. In both population groups it was found that people 50 years and older showed a lower number of years of schooling, and it could even be null.

Number and type of projects implemented in 2017. Thirteen types of projects were implemented, most of them were for livestock production, and investments in infrastructure predominated. In order of importance, the livestock species that projects were directed to were the following: sheep with 15 projects, rabbit production with 11, followed by those for sheep and cattle with 5, and finally backyard poultry with 4 projects (Table 4).

The amounts of investment were variable with a minimum of \$9,500 and a maximum of \$90,000, showing an average amount per project of \$18,200. The total annual income of PESA recipient families was \$73,335 and of the control group \$68,712, with a difference of \$4,623 in favor of the recipient families (Table 1). According to the UTN-PESA, it was expected that with this type of projects and the monitoring and technical support of the RDAs, the recipient families would increase their productivity, increase their food production and their economic incomes. Table 4 shows that the incomes obtained by PESA recipients were higher than the \$52,422 estimated by Zárata *et al.* (2017), in Tlahuilotepec, located in the Sierra Norte of Oaxaca. It can be stated that the families interviewed in this study exceed the parameter from 2019 of the National Council for Evaluation of the Social Development Policy (*Consejo Nacional de Evaluación de la Política de Desarrollo Social*, CONEVAL) for the extreme poverty line of the rural food basket

**Table 4.** Characteristics of the projects backed by PESA 2017.

Type of project	Number	Amount/project (\$)	Total amount (\$)
Sheep pen with wire mesh roof and enclosure	4	15,700.00	62,800.00
Sheep pen made with block and sheet roof	1	90,000.00	90,000.00
Sheep pen with sheet roof	1	35,000.00	35,000.00
Warehouse for fodder storage	1	32,500.00	32,500.00
Water tank to capture rainwater	2	11,000.00	22,000.00
Farmyard for cattle	1	12,000.00	12,000.00
Material for henhouse	4	13,200.00	52,800.00
Module for lombricompost	1	12,300.00	12,300.00
Gasoline-powered fodder mill	4	13,500.00	54,000.00
Shed for rabbits (partial support)	1	75,000.00	75,000.00
Cages for rabbits with ramada	10	16,345.00	163,450.00
4 heads of ewes	8	11,200.00	89,600.00
Sheep stud	1	9,500.00	9,500.00
<b>Total</b>	<b>39</b>		<b>710,950.00</b>

Source: prepared by authors based on survey data, 2018.

(\$1,120.44 per person) and they are left on the extreme poverty line of income (\$2,017.6 per person).

Table 1 shows that paid work is the most important type of income and that it represents 77% of the total income in families with PESA and 83% in the control population. Oliver (2013) estimated that this income was 44% for 2008, and this confirms that this source of income has increased in a sustained way. Paid agricultural and livestock work has decreased its relevance in the rural economy, and in this study it was estimated that 10% of the incomes obtained by rural families are the result of agricultural and livestock work that is generated in the community where they live or in neighboring communities. Of the incomes of rural families, 90% come from a diversity of jobs, mostly temporary, that are carried out outside the community. In response, Faiguenbaum (2013) states that low-quality jobs, which do not have benefits and are generally in the informal economy, predominate in rural families. The incomes obtained from agricultural and livestock activities reached 14.2% for PESA beneficiaries and 7.3% for the control group. Oliver (2013) estimated that these incomes were 21% in 2008; therefore, there was a decreasing trend of agricultural and livestock incomes. This illustrates the low effect that a strategy to combat poverty sustained on agricultural and livestock production has in rural communities where smallholdings prevail. Government transferences in cash were the third source of income and represented between 7 and 8% of the total incomes. The supports for social assistance, such as the PROSPERA and *Apoyo al Adulto Mayor* programs were the most important. There is agreement with Faiguenbaum (2013) and Oliver (2013), and this study confirms that the importance of transferences in the rural family income has increased, being significant in the poorest rural households.

The conclusion is that the incomes obtained from rentals or other sources do not have a significant value, since only 5% of the families are the ones that have and rent a real estate property. Most of the rural households do not have the possibility of obtaining income from this concept due to their situation of poverty.

Effects of PESA in the family income. To estimate the net annual incomes as a result of the PESA projects, it was considered that the projects backed were for livestock production (Table 4); therefore, the effect that the program has on family income will be reflected in the incomes from agriculture and livestock production activities. Taking into account the data presented in Table 1, there was a difference in incomes from agriculture and livestock production activities of \$5,412 in favor of the PESA families. However, it is not possible to state that this amount is the effect of PESA backing, since recipient families already carried out these activities, for which they had infrastructure, knowledge and inputs. Thus, the net family income from the activities supported by the program was obtained and then the average income was estimated. It was defined that the difference in average income between families would represent the money that is obtained from the program's influence; hypothetically, it is expected that the families benefitted will attain a higher income from their activities by receiving technical assistance and their projects. This average difference was \$1,473 (Table 5).

**Table 5.** Comparison of incomes obtained in PESA projects with the control group in agricultural and livestock activities.

Type of livestock or product obtained.	PESA families			Control families	
	Number of projects.	Average amount of investment. In \$	A. Net income (PESA). In \$	B. Net income (control) In \$	D. Difference. D=A-B In \$
Backyard poultry	4	13,202	-323	25	-348
Cattle	1	27,050	-4,328	300	-4,628
Rabbits	11	21,677	1,040	0	1,040
Water tank for rainwater capture	2	11,000	0	0	0
Lombricompost	1	12,286	0	0	0
Sheep and cattle	5	17,300	16,000	4,047	11,953
Sheep	15	19,113	6,041	3,747	2,294
Sum	39	Average value	2,633	1,160	1,473

Source: prepared by the authors based on survey data, 2018.

In this sense, Soberanes (2009) determined these incomes from sale and auto-consumption to be \$1,446 and, on the other hand, Serna and Ordáz (2011a) only considered a value from auto-consumption of \$178, although according to Gimete and Muñoz (2017), production costs were not contemplated in either study.

The amount of \$1,473 is equivalent to 2% of the total income. As consequence, it can be stated that PESA has had an irrelevant impact on family incomes and consequently on the indicators of family welfare, as the following studies have concluded: Gimete and Muñoz (2017), Chaires-Palma *et al.* (2013), Bloom *et al.* (2015) and Martínez *et al.* (2013).

Although the program's contribution to the income of 2% is marginal, it is necessary to show statistically if PESA has an effect on the total incomes of rural families, when conducting the hypothesis test of normality of the total annual income variable, for the three samples (Table 2), the result is that the levels of significance obtained allow accepting the null hypothesis. Therefore, the data from the samples come from populations with a normal distribution and parametric statistical tests related to the family income can be applied.

Based on this, the analysis of variance (ANOVA) was conducted to study whether there is a significant statistical difference of the total annual income between the 3 samples. This was through a hypothesis test of Tukey's means comparison (Table 6).

In the ANOVA (Table 6), a significance level (p value) was obtained equal to 0.277, which is higher than 0.05 and therefore the  $H_0$  is accepted, and it is concluded that the average value of the variable total annual income for the populations in comparison (families benefitted with the program and families without the program) is statistically equal; therefore, there is no significant difference in the total annual income obtained by the population groups analyzed.

Effects of PESA on family welfare. In relation to the improvement in the economic incomes, 92% of the participants of the program agreed that the projects did not improve

**Table 6.** ANOVA of Tukey’s means comparison test, of the variable total annual income of the 3 samples.

	Sum of squares	Degrees of freedom	Quadratic mean	F	Significance (p-value)
Inter-groups	1,984,035,202.278	2	992,017,601.139	1.313	0.277
Intra-groups	42,315,753,415.104	56	755,638,453.842		
Total	44,299,788,617.382	58			

Source: prepared by the authors based on survey data, 2018.

their economic incomes at all. Those who gave positive responses did because they are families that obtained a relevant amount of incomes from livestock production activities and would hardly make the investments that the program allowed (Table 7).

These results agree with what is estimated numerically, that is, the families know that implementing these projects will not improve their economic incomes; however, they value positively what the program offered, and some interview respondents mentioned that although they know that they do not obtain incomes from their projects, they want to be in the program because then they can obtain assets that they would not purchase on their own. When they were asked to what degree the project helped them to improve their diet, most of the population (85%) considered that the project did not help them to improve it and 15% manifested that it improved their diet slightly (Table 7). These families mentioned that, sometimes, they could consume chicken meat and egg based on their backyard poultry production activity; these are families that had participated for at least 2 years in the program and received backing for this type of projects.

Taking into account that 50% of the recipients identified what a balanced diet should be, it can be said that the program managed for its beneficiaries to have knowledge about what their diet should be. However, only 15% perceived that the program allowed them to produce a greater variety of foods, and this result would indicate that the program could not achieve one of its main purposes, which was to increase food production. Therefore, there is agreement with the study by Bloom *et al.* (2015), with regards to the situation of food insecurity persisting among the population benefitted, even after the presence of PESA; and what Gimata and Muñoz (2017) mention is confirmed, about this program contributing less than 10% of the recipients’ *per capita* consumption.

The general perception of recipients regarding the impact of the PESA project on the welfare of their families can be summarized in that, for the population under study, the

**Table 7.** Effects of PESA on family welfare in the opinion of recipients.

To what degree did the project received:	Nothing	Almost nothing	Slightly	Regular	Plenty
Improve their economic income	61%	31%	5%	3%	0%
Help improve their diet	39%	46%	15%	0%	0%
Improve their family welfare	69%	26%	5%	0%	0%

Source: prepared by the authors based on survey data, 2018.

project did not improve family welfare because it did not represent an increase of incomes or food production (Table 7). However, the beneficiaries agree that when receiving the project, their family has infrastructure or assets that somehow help them in the agriculture and livestock production activities which they carry out daily and, therefore, they value positively having been part of the program. These results illustrate that, under the perspective of the recipients, PESA did not attain its main objectives.

## CONCLUSIONS

The most important sources of income for rural households are, in order of importance: paid work, agriculture and livestock production activities, and government transferences. Paid work has an increasing trend, and therefore, it can be confirmed that rural households depend, mainly, on their own effort to obtain incomes. However, this paid work is generated in economic activities that are not in the agriculture and livestock sector. Paid work in agriculture and livestock production activities have a decreasing trend on their participation in the incomes of rural households. Government transferences are a significant source of income for the households that receive them.

PESA projects for agriculture and livestock production do not have an effect on economic incomes and diet of the families, causing for the impact on family welfare to be irrelevant. It is necessary to review the conceptual proposal and the way in which the program was operated to avoid for the results obtained to be notoriously inferior to those expected. The recipient families perceive the insignificant impact of the program on their family welfare, but they manifested feeling satisfied for having participated in the program and owning infrastructure, equipment, animals and tools as a result of the backing received.

## Acknowledgements

The authors wish to thank the *Consejo Nacional de Ciencia y Tecnología* (CONACYT), for the financial support to conduct this research.

## REFERENCES

- Azarcova B, Belik W. 2009. Evaluación de Análisis y Políticas, Proyecto Estratégico de Seguridad Alimentaria (PESA), Evaluación Específica, Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO): Ciudad de México, México, pp 171. Disponible en: <https://www.agricultura.gob.mx/sites/default/files/sagarpa/document/2018/11/14/1527/14112018-evaluacion-pesa.pdf>. Fecha de consulta: 14/10/2021.
- Bloom S, Figueroa E, Blanco G, Amtmann C. 2015. Evaluación del Proyecto Estratégico de Seguridad Alimentaria en la Microrregión cafetalera Zona Altos Cafetaleros. *Agroalimentaria*. 41(21), 37-52.
- Chaires-Palma G, Landa E, VHernández JC. 2013. Informe Final. Evaluación del Proyecto Estratégico de Seguridad Alimentaria (PESA) 2013; Universidad Autónoma del Estado de México: Ciudad de México, México, pp 278. Disponible en: [http://www.sagarpa.gob.mx/programas2/evaluacionesExternas/Diagnosticos%20de%20Programas%202014%20%202015/Informe%20final%20Evaluaci%C3%B3n%20PESA\\_ver%20sep.pdf](http://www.sagarpa.gob.mx/programas2/evaluacionesExternas/Diagnosticos%20de%20Programas%202014%20%202015/Informe%20final%20Evaluaci%C3%B3n%20PESA_ver%20sep.pdf). Fecha de consulta: 25/11/2021.
- Chayanov A. 1974. *La organización de la Unidad Doméstica Campesina*. 1ª ed. Ediciones Nueva Visión: Buenos Aires, Argentina.
- Couturier DP, Concheiro L. 2015. Educación campesina versus economía familiar. *Revista Geonordeste*. XXVI(1), 91-102. Disponible en: <https://seer.ufs.br/index.php/geonordeste/article/view/4459>. Fecha de

- consulta: 10/12/2021.
- Cruz B, Muñoz M, Santoyo VH, Martínez EG, Aguilar N. 2016. Potencial y restricciones de la avicultura de traspatio sobre la seguridad alimentaria en Guerrero, México. *Agricultura Sociedad y Desarrollo*. 2(13), 257-275. Doi: <https://doi.org/10.22231/asyd.v13i2.329>. Fecha de consulta: 8/02/2022.
- De Janvry A, Sadoulet E, Wilcox L. 1986. *Rural Labour in Latin America*; The World Bank-International Labor Office: Geneva, Switzerland. 95 P.
- Presupuesto de Egresos de la Federación (PEF) para el ejercicio fiscal 2018, 2015 y 2007. Presidencia de la República Mexicana. *Diario Oficial de la Federación* 2018, 2015 y 2007. Disponibles en: <http://www.dof.gob.mx> Fecha de consulta: 10/01/2019.
- Dirven M. 2004. El empleo rural no agrícola y la diversidad en América Latina. *Revista de la CEPAL*. 83, 49-69. Disponible en: [https://repositorio.cepal.org/bitstream/handle/11362/10963/083049069\\_es.pdf?sequence=1&isAllowed=y](https://repositorio.cepal.org/bitstream/handle/11362/10963/083049069_es.pdf?sequence=1&isAllowed=y) Fecha de consulta: 8/10/2019.
- El Colegio de Tlaxcala A.C. y Secretaría de Fomento Agropecuario de Tlaxcala (SEFOA). 2016. *Evaluación Integral del Desempeño Proyecto Estratégico de Seguridad alimentaria*, SEFOA: Tlaxcala, México. 99 p. Disponible en: [http://www.sefoatlaxcala.gob.mx/pesa/PESA\\_2015\\_INTEGRAL\\_SEFOA\\_FINAL.pdf](http://www.sefoatlaxcala.gob.mx/pesa/PESA_2015_INTEGRAL_SEFOA_FINAL.pdf) Fecha de consulta: 13/01/2019.
- Faiguenbaum S. 2013. Capítulo I. *In: Pobreza rural y políticas públicas en América Latina y el Caribe*, Tomo I. 1 Faiguenbaum, S., Ortega C. y Soto-Baquero, F. (eds); FAO. Santiago, Chile. Disponible en: <http://fao.org/alc/u/y2>. Fecha de consulta: 7/02/2021. pp: 15-99.
- Gimate-Baños SA, Muñoz-Rodríguez M. 2017. Capítulo III. *In: El PESA en México*. 1ª ed.; Barradas, P. y Baca, J., Eds.; Universidad de Quintana Roo. Cancún, México. pp: 237-260.
- Klein E. 1992. El empleo rural no agrícola en América Latina. Documento de Trabajo N° 364; Organización Internacional del Trabajo, Programa Regional de Empleo para América Latina y El Caribe (PREALC, OIT). Santiago, Chile.
- Martínez-González EG, Muñoz-Rodríguez M, Santoyo-Cortés VH, Gómez-Pérez D, Altamirano-Cárdenas JR. 2013. Lecciones de la promoción de proyectos caprinos a través del Programa Estratégico de Seguridad Alimentaria en Guerrero México. *Agricultura, Sociedad y Desarrollo*. 10(20),177-193. Disponible en: [https://www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S1870-54722013000200003](https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1870-54722013000200003). Fecha de consulta: 15/01/2019.
- Mondragón DM, Vizcarra-Bordi I, Thome OH, Herrera TF. 2016. Capítulo II. Sin hambre: El papel del maíz en el Proyecto Estratégico de Seguridad alimentaria (PESA-FAO) en el estado de México. *In: El maíz nativo en México, una aproximación crítica desde los estudios rurales*. López, I. y Vizcarra-Bordi, I. (eds); México. Disponible en: <http://ri.uaemex.mx/bitstream/handle/20.500.11799/67306/cap%C3%ADtulo%20sin%20hambre-1.pdf?sequence=1&isAllowed=y>. Fecha de consulta: 8/05/2019. pp: 297-317.
- Oliver GL. 2013. Capítulo II. Caso México. *In: Pobreza rural y políticas públicas en América Latina y el Caribe*, Tomo I. Faiguenbaum, S., Ortega C., y Soto-Baquero, F. (eds). FAO. Santiago, Chile. Disponible en: <http://fao.org/alc/u/y2>. Fecha de consulta: 15/06/2019. pp: 223-270.
- Orozco HME, Mireles LP, Jaimes RS, Gomora LB. 2012. La experiencia de las estufas ahorradoras de leña en dos comunidades indígenas del Estado de México. *Ambiente y Desarrollo*, 16(31), 91-105. Código SICI: 0121-7607(201212)16:31<91:EEALCI>2.0.TX;2-4. Fecha de consulta: 10/08/2019.
- Redfield R. 1973. *The Little Community and Peasant Society and Culture*. Chicago University Press: Chicago, USA. 288 p.
- Román-Montes de Oca E, García-Matías F, Sainz-Aispuro M, Juantorena-Ugás A. 2017. Traspacios y percepción del programa PESA. *Acta Agrícola y Pecuaria*. 3(3), 70-86.
- SAGARPA. 2013. Memoria Documental. Proyecto Estratégico de Seguridad Alimentaria (PESA) 2007-2012. Ciudad de México, México. 28 pp. Disponible en: <http://www.sagarpa.gob.mx/irc/Memorias%20Documentales/MEMORIA%20DOCUMENTAL%20PESA.pdf> Fecha consulta: 01/06/2018.
- SAGARPA. 2018. Padrón de beneficiarios publicados en la página web de la Delegación de la SAGARPA en el Estado de México, Disponible en: <https://www.gob.mx/sagarpa/edomex/documentos/listado-de-beneficiarios-144105?idiom=es>. Fecha de consulta: 07/03/2019.
- Serna B, Ordaz JL. 2011a. Evaluación del Proyecto Estratégico para la Seguridad Alimentaria Guerrero Sin Hambre (PESA-GSH) Volumen I Evaluación de impacto: CEPAL, México D.F, México. 350 p. Disponible en: <https://repositorio.cepal.org/handle/11362/26052>. Fecha de consulta: 05/12/2018.
- Serna B, Ordaz JL. 2011b. Evaluación del Proyecto Estratégico para la Seguridad Alimentaria Guerrero Sin Hambre (PESA-GSH) Volumen II Evaluación de consistencia y resultados: CEPAL, México D.F, Méxi-

- co. Disponible en: <https://www.cepal.org/publicaciones/xml/8/43838/2011-16-informepesa-vol-ii.pdf>. Fecha de consulta: 10/11/2018.
- Soberanes M. 2009. PESA Guerrero sin Hambre Informe Final de la evaluación externa del impacto de los componentes: Capacitación y Asistencia técnica. Colegio de México: México D.F México. 19 p.
- Shapiro SS, Wilk MB. 1965. An analysis of variance test for normality (complete samples). *Biometrika* 52(3-4), 591–611, <https://doi.org/10.1093/biomet/52.3-4.591>. Fecha de consulta: 08/03/2022.
- Torres F, Herrera F, Vizcarra I, Lutz BH. 2015. Etnografía Institucional del Proyecto Estratégico de Seguridad Alimentaria (PESA) En una Comunidad Mazahua.
- Torres-Oregón F, Herrera-Tapia F, Vizcarra-Bordi I, Lutz-Bachére BH. 2015. Etnografía Institucional del Proyecto Estratégico de Seguridad Alimentaria (PESA) en Una Comunidad Mazahua. *Nueva Antropología*. XXVIII(82), 51-81. Disponible en: <https://www.redalyc.org/articulo.oa?id=15943065004>. Fecha de consulta. 18/02/2019.
- Tukey JW. 1949. Comparing Individual Means in the Analysis of Variance. *Biometrics* (5)2, 99-114. Published by International Biometric Society. Stable URL: <http://www.jstor.org/stable/3001913>. Fecha de consulta: 05/04/2022
- UTN (Unidad Técnica Nacional). UTN-FAO. 2015. Proyecto Estratégico para la Seguridad Alimentaria. México. Disponible en: [www.pesamexico.org](http://www.pesamexico.org). Fecha de consulta: 14/10/2018. 36 p.
- Zárate FR, Flores JJ, Diego JG, Gallardo E. 2017. Capítulo II. En busca de alternativas para la soberanía alimentaria de la región Mixe. *In: El PESA en México*. 1ª ed.; Barradas, P y Baca, J. (eds); Universidad de Quintana Roo. Cancún, México. pp: 195-216.