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Review Article

Social Welfare and Vulnerability of Rural Households in Different Agro-Economic Environments of Puebla, Mexico

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Abstract

The importance of the study of social welfare of rural households at the municipal level lies in that the results can be used to propose specific intervention strategies, addressing productive, socioeconomic and environmental characteristics. The poverty alleviation has become an important component of public policy in decades. The inequality and poverty are major concern over many developing countries, including Mexico, the strategies to contribute to find the solution is evident. This study had the objective of calculating and analyzing indicators or socioeconomic welfare, poverty and income inequality, and their relationship with socio demographic and productive characteristics of rural households. The data were obtained using a structured questionnaire applied to a sample of 141 households and through in-depth interviews with key informants. Simple random statistical sampling was used. The size of the sample was determined with a reliability of 95% and an accuracy of 5%. The study was performed in three municipalities of the state of Puebla: San Salvador el Verde, Tlapanalá and Coatzingo. The results indicate that there are significant differences in the income and consumption of the households, explained by the diversification of income, access to productive assets, and quality of seasonal rains. The inequality, estimated by the Gini index, is high: 0.502, 0.439 and 0.416 para San Salvador el Verde, Tlapanalá and Coatzingo, respectively. The explicative factors of inequality are the value of the inheritance assets, the human capital index, and the value of transferences at the municipal level. The poverty index for the three municipalities is higher than the one reported by CONEVAL in 2014. .

Keywords: Food security; Inequality; Poverty; Vulnerability; Welfare

Introduction

Mexican agriculture provides between 60 and 65% of the volume of food consumed by Mexicans; that is, there is a serious dependence on food from abroad. Due to the above, rural communities are directly affected by the availability and movements of food price both in the national and international markets. The nation's food security has always been a political priority. Until recently, the government has heavily subsidized basic foodstuffs through support for producers and consumers. The balance of subsidies has changed over time, sometimes supported on the production side, most often benefiting consumers.

The objectives of the study are to analyze the structure of income, consumption and vulnerability of rural households in three regions with different climatic, cultural and socio-demographic conditions of the state of Puebla, as well as the relationships between sources of income, consumption and inequality to make recommendations on public policies aimed at generating welfare and food security in the regions studied.

Mexico has a national territory of 198 million hectares of which 145 million are dedicated to agricultural activity. Nearly 30 million hectares are farmland and 115 million hectares are agricultural land. In addition, the forests and jungles cover 45.5 million hectares FAO.

Agriculture is a fundamental activity in rural areas, where a highly significant part of the national population. In the small scattered rural towns (with a population of less than 2,500 people), 24 million Mexicans live, that is, almost a quarter of the national population. However, rural life in Mexico extends far beyond these small towns. Sometimes a threshold of 15 thousand inhabitants is considered since the localities with a population inferior to that number have characteristic rural life forms. Using this threshold, the rural population is more than 38 million people (37% of the national total). Far from being marginal, rural development (employment, income, productive articulations, and living conditions) is a very important part of national development Inegi & Conapo [1].

In the literature, different approaches were identified to address the concept of social welfare. Sen [2] carries out a critique of two approaches that are very often used. Utilitarian equality based on classical welfare economy; and distributive justice, sustained by Rawls 1971. Utilitarian equality is the one that can be derived from the concept of marginal utility, according to which each person obtains higher utility to the extent that he/she consumes a higher amount of certain good, and his/her utility increases at a decreasing rate, without taking into account aspects of distribution. Distributive justice is characterized by equality in the endowment

of "primary social goods"; these are "things that are presumed to be needed by every rational human being", including "the rights, freedoms and opportunities, the income and wealth, and the social bases for self-respect". The basic freedoms have priority over the other primary social goods.

Definition and Justification of the Problem

Studying the welfare rural households is important to understand the income and expenditure pattern of household, as well as the resources and strategies they use to deal with adverse situations. The study area in the State of Puebla, from here, three contrasting regions selected based on agro-ecological, social, economic and cultural aspects. It is intended that the knowledge of this type of households can contribute to the formulation of better public policies of a non-welfare nature. Puebla is one of the 5 poorest states in Mexico. Puebla is one of the most populated states in Mexico, having a population of 5,794,763 habitants. It has a good climate; the average rainfall per year is 1304.5mm while the national average is 830.9 mm Annual Report 2014 Conagua.

The Concept of Social Welfare

The concept of social welfare is defined in many ways, Zarzosa [3] states that the welfare of a community is a concept that is practically impossible to measure. Tinbergen [4] argues that welfare is synonymous with utility or satisfaction. Amartya Sen asserts that the term social welfare refers to the "ethical value or quality of the state of affairs of society" and that as such it is used in literature, both by the pioneers of modern welfare theory Bergson 1938, Samuelson 1956 and Arrow 1963 as by later economists, is "simply the representation of the goodness or good quality of the social state".

Concept of Poverty

Poverty, in its broadest sense, is associated with conditions of life that undermine the dignity of people, limit their rights and fundamental freedoms, prevent the satisfaction of their basic needs and make their full social integration impossible. Even though there is a great variety of theoretical approaches to identify what makes an individual poor, there is an increasingly broad consensus about the multidimensional nature of this concept, which recognizes that the elements that every person needs to decide in a free, informed way and with equal opportunities over their life choices, they cannot be reduced to only one of the characteristics or dimensions of their existence Alkire & Foster 2007, CDESC, 2001; Kakwani & Silber 2008.

Sen A [5] defines it as the deprivation of basic capacities to function in society, World Bank 2004, saying that Poverty is the lack of what a society considers to be the basic minimum to have well-being, Pucutay 2002 points out that the Poverty is a situation where people do not have the necessary means to develop and reflect the lifestyle of a social group.

Atkinson [6] says that the lower the income, the greater the vulnerability to transitory factors such as episodes of morbidity or loss of employment.

Concept of Food Safety and Vulnerability

Food security as a concept originated only in the mid-1970s, in the discussion of international food problems at a time of global food crisis. The initial focus of attention was mainly on the problems of food supply to ensure the availability and to some extent the stability of prices of staple foods at international and national levels ODI 1997.

For its part, food vulnerability reflects "the likelihood of an acute decrease in access to food, or its consumption, in relation to a critical value that defines minimum levels of human well-being" WFP 2002. In Mexico, the law of Sustainable Rural Development defines food security as the timely, sufficient and inclusive supply of food to the population Congreso de la Nación de México 2001.

Hoddinott and Quisumbing 2003 propose that there are three main approaches to estimating vulnerability:

A. Vulnerability as expected poverty (VEP),

B. Vulnerability as low expected utility (VEU),

C. Vulnerability as exposure to risk without insurance (SEE).

All these approaches share a common characteristic; they all build a model that predicts a measure of well-being. These authors use consumption to exemplify their proposals. The VEP and VEU approaches also share two other things in common; these measures refer to a baseline as an indicator of well-being, Z, and list a probability of falling below this reference line.

The inhabitants of rural areas, especially the poorest, face various risks and therefore their ability to initiate and sustain economic projects is limited. As indicated by the Economic Commission for Latin America ECLAC 2011 vulnerability is the result of exposure to risks, coupled with the inability to face them and the inability to adapt actively.

According to ECLAC, social vulnerability is directly observed in the most unprotected social groups and whose identification obeys different criteria: some contextual factor that makes them more likely to face adverse circumstances for their social insertion and personal development, the exercise of behaviors that entail greater exposure to harmful events, or the presence of a shared basic attribute (age, sex, ethnicity) that is supposed to confers common risks or problems.

Methodology

Location of the study area

The municipality of San Salvador el Verde is located in the central-west part of the state of Puebla. Its geographic coordinates are parallels 19° 12'18'' and 19° 21' 54'' N and meridians 98° 26' 54'' and 98° 93' 18'' W. The transition from temperate climates in Valle de Puebla to semi-cold in the low parts of Sierra Nevada is present in the municipality. The mean annual temperature is 12-18°C. The temperature of the coldest month is between-3 and 18 degrees. The highest zones of the Iztaccíhuatl are covered in snow and there are high-mountain meadows around them; the lower slopes of the

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Sierra Nevada are devoted mostly to rainfed agriculture. To the east, there are zones of irrigation agriculture that are part of the large irrigation zone that surrounds San Martín Texmelucan and the largest from Valle de Puebla.

The municipality of Tlapanalá is located in the southwestern part of the state of Puebla. Its geographical coordinates are parallels 18° 38' 24'' and 18° 44' 06'' N and meridians 98° 28' 18'' and 98° 35' 36'' W. The municipality has a flat topography in general with a soft descent in the northeast-southwest direction, which ranges from 1500 to 1300m of altitude. The municipality is located within the zone of warm climates in Valle de Izúcar de Matamoros, with two identified: semi-warm and sub-humid warm. The greater part of the municipality presents areas devoted to agricultural activities; there are large rainfed agricultural zones. The mountainous areas are covered with low deciduous forest associated to secondary tree and shrub vegetation.

The municipality of Coatzingo is located in the central-southern part of the state of Puebla. Its coordinates are parallels 18° 31' 36'' and 18° 39' 36'' N and meridians 98° 08' 18'' and 98° 14' 60'' W. It presents a single climate of warm type: subhumid with summer rains. A large part of its territory is covered with low deciduous forest; its location coincides with that of Litosol and Regosol soils, and both with the zones that present a certain slope in their relief. There is an important area devoted to irrigation agriculture in the flat zone; intermediate between the irrigation zones; and in the areas of low deciduous forest there are rainfed agriculture zones that cover a considerable area.

A sample was built by conglomerates in two stages. This method was selected because there is no framework for household sampling, although the communities within each one of the municipalities selected were known. The primary units were formed by municipalities, and the secondary units by households, inside each municipality. This is a probabilistic sampling design, whose principal characteristic is that the population is divided into natural groups; in this case, municipalities and communities that we call conglomerates.

In the first stage, three municipalities with probabilities proportional to their size were selected; in the second, a simple random sampling was carried out. For the random selection of households, each population units were divided into quadrants and in each one the predetermined number of households was distributed. The pilot survey and its final application were carried out in September and November 2014, with the participation of four professionals with socioeconomic training who were previously trained. In this stage, three actions were carried out simultaneously; the surveyors were trained, the pilot survey was applied, the structured questionnaire was corrected, and the structured questionnaire was applied, face to face, to heads of family. To understand in greater detail aspects of consumption habits and expenditure throughout the year, two in-depth interviews were performed in each municipality, with key informants; reliable heads of household, with whom the researchers have kept working relations for several years.

The municipalities selected for the study are San Salvador el Verde, Tlapanalá and Coatzingo, and the main selection criterion was the contrast detected in field visits, in their productive and sociodemographic characteristics. Table 1 presents the household sample and their distribution.

Table 1: Number and Distribution of people in a situation of poverty or vulnerability, and non-poor and non-vulnerable population according to state, Mexico, 2012.

Federal Entity	Thousands of People						
	Poor Population			Vulnerable Population		Population not Poor and not Vulnerable	Total
	Extreme	Moderate	Total	Due to Social Lack	By Income		
Puebla	2,819.00	1,059.10	3,878.10	1,320.90	253.9	562.5	6,015.30
	-17.6	-46.9	-64.5	-22	-4.1	-9.4	-100
United States of Mexico	41,821.00	11,529.00	53,349.90	33,516.70	7,228.60	23,210.90	117,306.20
	-9.8	-35.7	-45.5	-28.6	-6.2	-19.8	-100

Source: CONEVAL estimations based on the MCS-ENIGH 2012.
*Figures in parentheses are percentage

Questionnaire design and data analysis method

The questionnaire was made up of 10 sections: sociodemographic and housing characteristics; agricultural and livestock productive activities; commerce and services; transferences, migration, financing; natural and unforeseen resources; household consumption; organization, commercialization and other services; and food security. The measuring scales were nominal, ordinal and rational, with a total of 157 questions Table 2.

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Table 2: General index of the municipalities.

	San Salvador el Verde	Tlapanalá	Coatzingo	Puebla
Population	24,812	7,063	2,714	5,794,763
	-0.43	-0.12	-0.05	-100
IDH	0.8147	0.8048	0.7502	0.693
Degree of marginalization	Medium	Medium	High	High
Gini Index	0.4267	0.3786	0.4313	0.452
Poverty	69.50%	80.90%	76.60%	61.20%
Extreme poverty	13.20%	24.90%	30.80%	16.70%
Moderate poverty	56.30%	56.00%	45.70%	44.50%

Source: Inegi [7]
*Figures in parentheses are percentage.

Result and Discussion

The data presented in Table 3 indicated that, male heads of family predominate; the participation of women as head of family is more evident in the community of San Salvador el Verde. In the other two communities with more traditions in their culture, male heads of family continue to predominate.

Table 3: Frequency and percentage of sex of heads of family.

Municipalities	San Salvador el Verde		Tlapanalá		Coatzingo	
Sex	Frequency	%	Frequency	%	Frequency	%
Man	61	63.5	29	78.4	7	87.5
Woman	35	36.5	8	21.6	one	12.5
Total	96	100	37	100	8	100

Source: own elaboration with data of survey 2013.

Land tenure

Table 4 indicates that 79.7% of the producers have ejido land, and 21.3% have small property, of them those that own land have an average of 1.98 ha of crops with cereals and / or vegetables and / or flowers.

Table 4: Percentage of land tenure of family heads.

Kind	Frequency	Percentage
Private	Eleven	18.6
Communal	One	1.7
Ejido	47	79.7
Total	59	100

Source: own elaboration with data of survey 2013.

Opportunities

Table 5 indicates that 54.2% of respondents from San Salvador el Verde and 59.5% of respondents from Tlapanalá did not obtain the Oportunidades program of $831, or $1754 Mexican pesos, respectively. According to the Operational Rules of the Oportunidades Program 2014, the objective is to increase the education, health and nutrition capacities of the members of households in poverty conditions, who, with their effort, and the support of society and the State, access to better levels of welfare.

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Table 5: Frequency and percentage of program access opportunities.

Municipality	Frequency	Percentage	Half Month
San Salvador el Verde	44	45.8	831
Tlapanalá	fifteen	40.5	1754
Coatzingo	8	100	-

Source: own elaboration with data of survey 2013.

The Oportunidades program guides its actions to support the enrollment (Table 6), permanence and regular attendance at primary, secondary and upper secondary education of the children of the beneficiary families Oportunidades 2014.

Table 6: Difference of mean (ANOVA) in selected variable in household income.

Municipalities	San Salvador el Verde		Tlapanalá		Coatzingo		
Activities	x̄ MN pesos	dif.	x̄ MN pesos	Dif.	x̄ MN pesos	Dif.	F
Income from agriculture	$4,338 (6.6)	a	$14.968 (22.5)	ab	$ 25,951 (30.6)	b	6,942*
Income from livestock	$5,355 (8.1)	a	$3.016 (4.5)	a	$ 22,427 (26.5)	b	2,774**
Income from backyard	$70 (0.1)	a	-	a	$ 633 (0.7)	b	3,252*
Goods and services	$585 (0.9)	a	$408 (0.6)	a	$ 450 (0.5)	a	0.117
Natural Resources	$226 (0.3)	a	-	a	-	a	1,327

Source: Field survey 2013

*Significant of 5%

**Significant of 10%

The highest income was observed in Coatzingo ($84,740) and followed by Tlapanalá ($66,500). Nonagricultural income was high in San Salvador el Verde is around $ 65,872. It means that household members were engaged in jobs from other sources. In Tlapanalá, income from temporary work is higher than other income sources ($26,955). But in Coatzingo Income from agriculture and livestock were contribute around 57.1% of household income ($48,378).

Table 7 explains that food consumption among the 3 municipalities. The food category contains cereals, meat and eggs, milk and its derivatives, fruits and vegetables and beverages. Based on the results, higher food intake by Coatzingo 1595gr/ml per day, followed by San Salvador el Verde, per day consumption was 1105gr/ml per day, and Tlapanalá respondents have lower consumption of Food, around 947gr/ml per day. The difference between consumption is due to the access and acquisition of food determined by income and food prices. The Tlapanalá income per capita was $1,566.79, which is lower than the other two municipalities. The lower income of respondents that leads to lower consumption of food. Even the consumption of cereals is higher in Tlapanalá (320gr/day), but in lower consumption of vegetables and fruits compared to the other two municipalities, 155.57gr and 132.56gr respectively was due to lower income of respondents. The strategy to deal with this problem is the diversification of income, which is used to buy Food. Figure explain that the food composition of each municipality.

Table 7: Difference of average (ANOVA) of food consumption.

Municipalities	San Salvador el Verde		Tlapanalá		Coatzingo		
Foods	(gr/ml x day)	Dif.	(gr/ml x day)	Dif.	(gr/ml x day)	Dif.	F / sig
Cereals	264.71	a	320.8	a	289.29	a	2.979**
Meat	62.28	a	40.82	a	116.37	a	5.360*
Milk and other derivatives	98.36	a	96.55	a	186.31	b	2,547**
Oil and fats	51.41	a	56.78	a	51.19	a	0.145
Legumins	79.57	a	60.54	a	103.87	a	1,718
Vegetables	286.21	a	155.57	a	303.62	a	2.920*
Fruits	195.59	a	132.56	a	332.08	b	4.836*
Sugars and honey	34.24	a	44.5	ab	65.77	b	3.569*
Drinks (ml)	37.6	a	33.4	a	52.7	a	4.038

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Table 8 illustrates that calorie consumption in the municipalities. The average calorie consumption per day was less than 2,254 kcal (CONEVAL) for respondents from San Salvador el Verde and Tlapanalá because lower per capita income automatically worsened calorie consumption. This is mainly due to a decrease in the consumption of cereal grains, although there has been an increase in meat and fruits and vegetables.

Table 8: Per capita calorie consumption.

Municipalities	N	Per Capita Calorie Consumption (Kcal)	Dif.	F/sig.
San Salvador el Verde	96	1848	a	3,689*
Tlapanalá	37	2006	ab	
Coatzingo	8	2633	b	

Source: own elaboration with data of survey 2013
Source: CONEVAL estimations based on the ENIGH 2006 and ECLAC (2007b).
*Significant of 5%

Gini index of the Municipalities

In various consulted literatures, inequality is conceptualized as the dispersion of a distribution, where the variable of analysis is the level of income of individuals and inequality is considered as a useful indicator of the welfare of the population. Unequal income distribution is associated naturally to the idea of concentration: the more unequal is the more consent bay is in some individuals (Anonymous).

Conclusion

Agriculture is a fundamental activity in rural areas, where a highly significant part of the national population still lives. In 2012, Mexico had 53.3 million people living in poverty (45.5%), of which 41.8 million lived in moderate poverty and 11.5 million in extreme poverty. Food insecurity is a manifestation of the general phenomenon of poverty; and a way to identify the most vulnerable groups is through the analysis of income levels (Table 8).

The three municipalities had an average family size of 4.9 members, which is lower than the national average reported by CONAPO 2007. In this study it was found that 68.8% of heads of family are male and 31.2% female. Literacy in people is measured by the ability of the person to read and write. In the study it was found that 94.3% of producers know how to read and write Spanish, the remaining 5.7% cannot read or write.

Study explained that 12.5% to 32.4% of the interviewed people do not have water availability in 2013 on their municipalities. And also, 17.7% to 29.7% of the respondents do not have easy drainage in their housing. At the national level, in 1990, 62% of households had drainage, the percentage rose to 75% in 2000, for 2005 it was 85% and in 2010 it was 89% Inegi [7].

The diversified activities undertaken by respondents to generate income. The Livestock activities were 57.4%, which was higher, and cultivation agriculture was 39.7%. These activities not only generate income but use as self-consumption of family members who increase dietary intake.

Total income for the month was greater in Coatzingo, $2,931.95 for the most diversified sources of income from agriculture, livestock, temporary and non-agricultural work has a 28.8%, 19.8%, 26.9 and 22.9% respectively. Diversification of agricultural work is associated with higher income and more stable food and income consumption and consumption in the year Reardon 1992.

The average cost for food was $ 564 pesos per month for 5 people in the family. This cost was minimum is required level recommended by the CONEVAL. Recommended minimum wellness was around $881.39 months by September 2014. In addition, the amount of food spent by Tlapanalá was $766.63, but it was still less than the minimum welfare of CONEVAL [8-10].

Food consumption on the basis of the results, food intake of Coatzingo 1595gr/ml per day, followed by San Salvador el Verde, consumption per day was 1105gr/ml per day, and Tlapanalá respondents have lower consumption of Food, around 947gr/ml per day. The difference between consumption is due to the access and acquisition of food determined by income and food prices. The average calorie consumption per day was less than 2254 calories (CONEVAL) for respondents from San Salvador el Verde and Tlapanalá because of lower per capita income automatically worsened calorie intake. The calorie intake was higher than the recommended calorie intake per day in Coatzingo was 2633 kcal.

Rural agriculture can contribute to the diversity of direct feeding, through the production of a variety of foods, or indirectly, by releasing money to buy additional food. It is important to note that, although the diversity of the diet can serve as a useful indicator of household food safety micronutrient intake is not a measure of the quality of the diet, diversity of the diet does not capture adequacy or diversity of the consumption of fruits and vegetables, the key factors in the reduction of risk of disease [11-13].

Using the HFIAS scale that food insecurity is prevalent among 82.3% of respondents in general. Only 25 people have in the food security in San Salvador the green. Severe food insecurity is greater in San Salvador el Verde between 31.3% (Table 9). But few people are affected by food insecurity in Tlapanalá and Coatzingo because per capita income is better in these municipalities. In general, 31.9% of the interviewees have severe food insecurity and the interviewees of Tlapanalá have a 35.1% degree of severe food insecurity [14-20].

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Table 9: Gini index.

Municipalities	Gini Index
San Salvador el Verde	0.502
Tlapanalá	0.439
Coatzingo	0.416

Source: own elaboration with data of survey 2013.

Coatzingo has less inequality among the three municipalities. The Gini index for Coatzingo was 0.416. Municipality San Salvador el Verde was in polarized inequality, because the Gini coefficient was 0.502. The internationally accepted standard is that if the value of the Gini coefficient is less than 0.2, the observed income distribution is highly equal, if the value varies between 0.2 and 0.3, the distribution of income is relatively average, if the value is between 0.3 and 0.4, the distribution of income is moderately reasonable, whereas if the value is greater than 0.4, income inequality tends to be large You Hongbing 1998 [21-24].

References

1. Inegi C (2007) Censo agropecuario. Consultado en octubre de 2015.
2. Sen Amartya K (1999) Reason Before Identity. (1st edn), Oxford University Press, USA.
3. Zarzosa, Espina M del Pilar (1996) Aproximación a la medición del bienestar social. Cuadernos de Economía, 1996 Enero-Abril 24(68): pp: 139-163.
4. Tinbergen J (1991) On the measurement of welfare. Journal of Econometrics 50(1-2): 7-13.
5. Sen Amartya K (1984) Commodities and Capabilities. Amsterdam, North-Holland, New Yark, USA.
6. Atkinson, Anthony B (1970) On the measurement of inequality. Journal of Economic Theory 2(3): 244-263.
7. Inegi (2010) Censo agropecuario. Consultado en octubre 2015.
8. Cejudo, Córdoba R (2007) Capacidades y libertad. Una aproximación a la teoría de Amartya Sen. Revista Internacional de Sociología 65(47): 9-22.
9. Coneval (2014) Consultado en octubre 2015.
10. Coneval (2015) La pobreza por ingresos en México. Disponible en: Consultado en Octubre del 2015.
11. Cowell FA (1977) Measuring Inequality. 1st (edn), Oxford University, Philip Allan, USA.
12. De Ferranti, David GE Perry, FHG Ferreira, M Walton (2004) Inequality in Latin América: breaking with history? The World Bank, Washington, USA, p: 380.
13. Dréze Jean, Y Sen AK (1991) The Political Economy of Hunger. Clarendon Press, Oxford, UK.
14. Dréze Jean, Y Sen AK (1995) India: Economic Development and Social Opportunity. Clarendon Press, Oxford, UK 31(1): 127-130.
15. Eatwell, John M Milgate, P Newman (1987) The New Palgrave: A Dictionary of Economics, 1st (Edn),
16. Inegi (2015) Censo agropecuario. Consultado en octubre.
17. Medina F (2001) Consideraciones sobre el índice de Gini para medir la concentración del ingreso. CEPAL - SERIE Estudios estadísticos y prospectivos 9: 42.
18. Pena Trapero JB (1977) Problemas de la medición del bienestar y conceptos afines. Presidencia del Gobierno, Instituto Nacional de Estadística, Madrid, España, Spain.
19. Sen Amartya K (1970) Collective Choice and Social Welfare. Holden-Day, San Francisco, California, USA 11: 236.
20. Sen Amartya K (1973) On Economic Inequality. Clarendon Press, Oxford, Norton, New York, USA.
21. Sen Amartya K (1992) Inequality Reexamined. Oxford University Press Inc, New York, USA, p: 207.
22. SIAP-SAGARPA (2015) Producción Agropecuaria y Pesquera. Consultado en octubre de 2015.
23. Theil Henri (1967) Economics and Information Theory. North Holland, Amsterdam, New York, USA, p: 488.
24. You Hongbing (1998) A study of the income inequality in China. China Economics Press, China.