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A Study on Poverty and Food Security in Mexico's Rural Communities

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ABSTRACT

Background: The purpose of this research was to examine the eating habits and food security of Mexican rural residents. Examining food consumption and food security in the current Mexican sample communities is the primary focus. One of the village communities, Tlapanalá residents spent an average of $767 per month on food, which is lower than the CONEVAL-recommended minimum. The current study aimed to study the income generation of the communities, money allocation to food habits, nutritional status and food insecurity of the village communities.

Methods: In this field survey was conducted during 2014-2015. A total of 141 residents from the Puebla towns of San Salvadorel Verde, Tlapanalá and Coatzingo participated in the poll. The stratified random sampling method was used to find samples. We used an ANOVA model and descriptive statistics to examine the data.

Result: As a result, $882 was the bare minimum needed to achieve the common good (September 2014). There are three types of poverty based on respondents' income: food poverty, skills poverty and wealth poverty. If you make above $1,700 per month, you may leave poverty. San Salvador el Verdeans reported a malnutrition-causing 1,848 kcal.

Key words: Calorie intake, Food consumption, Food insecurity, Household income, Poverty, Welfare.

INTRODUCTION

Mexico has different climate variability and cultural and socio-economic diversion throughout the world. It gives many ways to practise agriculture and livestock and is capable of producing different crops throughout the year. According to the World Trade Organization (WTO), Mexico places itself in 12th place in the world as a producer and exporter of food in general and fourth in organic foods (Romero *et al*., 2004).

However, the food industry is vital to Mexico's economy. The United States accounted for the bulk of the 38% of essential grains imported in 2014 (SIAP, 2015). Rough terrain and arid climate restrict Mexico's arable land to about 16% of the country's overall land area. A majority of rainfed cropland is devoted to growing corn and beans, two main crops. A wide variety of crops, from cereals and fibers like wheat and cotton to high-value export commodities like fruits and vegetables, have been cultivated on the 20% of irrigated area (Zarzosa *et al*., 1996). To be food secure is to ensure that all members of a family have enough nutritious food to eat so that they may be active and healthy without compromising on meeting other fundamental requirements. On the other hand, food insecurity is a sign of the misery that people go through when they aren't sure where they will get their next meal and when they go without food for an entire day.

MATERIALS AND METHODS

Political theory known as "food sovereignty" sheds light on issues including food production, commercialization, accessibility and people's culturally informed choices about what and how they eat. For the sake of their financial stability, many women work in this field.

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A family experiencing food poverty does not always have access to enough high-quality food to meet the nutritional needs of all members. Due to financial constraints, low-income individuals may struggle to meet their nutritional needs, making poverty the primary cause of food insecurity. The food security of the impoverished is negatively impacted by natural disasters like floods and cyclones, which impact local output and by the extraordinary spike in food costs on the global market. Rahman (2016), During times of food scarcity, many families who were already struggling to put food on the table adjusted their eating habits.

The number of hungry individuals in the globe has risen to 8.20 crores. Reaching the goal of ending world hunger by the year 2030 would not be easy (FAO, 2019).

When all members of a home go hungry at a certain time of year, it's called seasonal food insecurity. During the lean period, which occurs just before harvest, the impoverished have it particularly rough. Consequently, due

to poor income, few work opportunities and the high cost of food grains, some families are unable to always purchase meals. This often occurs just before harvest, when both job opportunities and the price of staple crops like wheat and rice are at their lowest.

Around 45.5% of Mexico's population was poor in 2012, with 4.18 million people experiencing moderate poverty and 1.15 million people experiencing severe poverty (Chambers, 1989).

Table 1 shows that of the total population, 33.5 million (28.6%) were considered vulnerable because of social deprivation, whereas 7.2 million (6.2%) were considered vulnerable because of income. Not only were 19.8% of the population (23.2 million) not poor or vulnerable, but they also did not have any issues with financial or social deprivation (SIAP-SAGARPA 2015).

The research aims to examine the food consumption habits of rural Mexican families. Three economically, socially and culturally distinct areas within the state of Puebla make up the research area during the year of 2014. The research was conducted from Colegio de Postgraduados, Campus Puebla, Puebla, Mexico during the period June 2014 to December 2014. Descriptive statistics and other statistical tools like ANOVA and contingency tables made use of mode, median, minimum and maximum frequencies, percentages and other numerical values.

RESULTS AND DISCUSSION

Table 2 shows the poverty lines based on income. The income base of the respondents was classified into three categories (food poverty, skills poverty and wealth poverty) and more than $1700 per month can escape from poverty. (INEGI, 2015)

Table 3 indicates that the cultivation of food crops is essential in the villages. There was agricultural farming on around 1 million hectares. Maize was the principal crop. It was cultivated on around 589,087 hectares with, around 71% in Tlapanalá, 66% in San Salvador el Verde and just

Table 1: Mexico poverty status.

Population (in 1000)	Puebla	Mexico
Extreme poor	2.819.0 (17.6)	41.821.0 (9.8)
Moderate poor	1.059.1 (46.9)	11.529.0 (35.7)
Vulnerabledue to social deprivation	1.320.9 (22.0)	33.516.7 (28.6)
Vulnerable by income	253.9 (4.1)	7.228.6 (6.2)
Non-poor and non-vulnerable	562.5 (9.4)	23.210.9 (19.8)
Total	6.015.3 (100.0)	117.306.2 (100.0)

Source: CONEVAL estimates based on MCS-ENIGH 2012.

Table 2: Poverty by community.

Categories	Number of people	Percentage	Rural (monthly income in pesos $)
Food poverty	65	46	937
Poverty of capability	75	53	1.108
Wealth poverty	94	67	1.700
No poverty	47	33	-

Source: Field survey data of 2013.

Table 3: Cultivation status by communities.

Primary activities	Tlapanalá	San salvador el verde	Coatzingo	Puebla
Total sown area (ha.)	4.828 (0.48)	6.001 (0.59)	2.080 (0.21)	1.011.921
Beans (ha.)	395 (0.63)	288 (0.46)	-	62.894
Maize (ha.)	2.019 (0.34)	4.810 (0.82)	1.201 (0.20)	589.087
Sorghum (ha.)	608 (2.90)	-	53 (0.25)	20.976
Green alfalfa (ha.)	-	206 (1.09)	-	18888
Green tomato (ha.)	-	-	58 (1.28)	4.515
Beef production (T)	34 (0.09)	-	245 (0.62)	39.503
Pig meat production (T)	30 (0.03)	370 (0.32)	87 (0.08)	115.270
Egg production volume (T)	-	-	12 (0.00)	486.250
Chicken production (T)	-	70 (0.05)	-	154.155
Sheep meat production (T)	16 (0.42)	-	-	3.845
Bovine milk production (1000 of L)	-	4.387 (1.09)	-	404132

Figures in parenthesis indicate percentage.

over 53% in Coatzingo. This is due to the favourable soil and water conditions in the study area. Among the predominant cereal crops are corn, beans, sorghum, amaranth, broad beans and peanuts. The cultivation of vegetables has grown among farmers, which allows them to increase their income. This is clearly seen in the Coatzingo municipality, where just over 46% of the producers are dedicated to this activity. Among the horticultural crops grown by the producers are tomatoes, pumpkins, coriander, broccoli and onions.

Table 4 explains the distribution of income from different sources. (Barrett *et al*., 2001) It clearly indicated that the total income per household was higher in Coatzingo due to the highly diversified activities of many members, many of whom work as day labourers out of season. In addition, they are contributing a large part of the household income: 26.2% in the case of San Salvador el Verde, 40.5% in Tlapanalá and 23.6% in Coatzingo. Likewise, agriculture and livestock are the main income-generating activities in Tlapanalá, with 22.5% and 30.6% in Coatzingo, respectively. (Dereje *et al.,* 2021) The ANOVA is significant in agriculture, livestock and backyards. It can be concluded that there is a dependent relationship between agriculture and livestock income and in this case, we can say that the different levels of the factor do influence the values of the quantitative variable. (Sánchez *et al.*, 2000) Remittance plays a vital role because most of the respondents' relatives work abroad and send money home. It was $5,081 in Tlapanalá.

Table 5 sheds light on the three hamlet populations' food consumption habits (SAGARPA, 2007) cereals, meat and eggs, milk and its byproducts, produce and drinks all fall under the umbrella of food consumption (Singh, 2018). In terms of daily food consumption, the survey found that Coatzingo had the most at 1501 gr/ml, San Salvador el Verde had the second-highest at 1110 gr/ml and the respondents from Tlapanalá had the lowest at around 942 gr/ml. (Yadav *et al*., 2021; Borah, 2008) The disparity in consumption is due

Table 4: Household income tested with ANOVA.

Municipal	San salvador El verde		Tlapanalá		Coatzingo		
Activity	Income						
	$\overline{X}$ ($)	dif	$\overline{X}$ ($)	dif.	$\overline{X}$ ($)	dif.	F
Agriculture	4.338 (6.6)	a	14.968 (22.5)	ab	25.951 (30.6)	b	6.942*
Livestock	5.355 (8.1)	a	3.016 (4.5)	a	22.427 (26.5)	b	2.774**
Backyard rearing	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
Temporary work	17.243 (26.2)	a	26.955 (40.5)	a	15.398 (18.2)	a	1.609
Other Income	35.623 (54.1)	a	16.073 (24.2)	a	20.040 (23.6)	a	2.430
Remitance	$2.433 (3.7)	a	5.081 (7.6)	a	-	a	0.451
Total income	$ 65.872	a	$66.500	a	$84.740	a	7.796

Source: Field survey data of 2013.

*Significant at 5% **Significant at 10%.

$ Pesos Mexican currency.

Table 5: Food consumption by village communities.

Community / Foods	San Salvador el Verde		Tlapanalá		Coatzingo		F/sig
	(gr/day)	dif.	(gr/day)	dif.	gr/day)	dif.	
Cereals	264.71	a	320.80	a	289.29	a	2.979**
Meat	62.28	a	40.82	a	116.37	a	5.360*
Milk and derivatives	98.36	a	96.55	a	186.31	b	2,547**
Oil	51.41	a	56.78	a	51.19	a	0.145
Pulses	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	44.50	ab	65.77	b	3.569*
Drinks (ml)	37.6	a	33.4	a	52.7	a	4.038
Total	1110		942		1501		

Source: Field survey data of 2013.

Table 6: The money spent on food consumption.

Villages/ food items	San salvador el verde ($)	Dif.	Tlapanalá ($)	Dif.	Coatzingo ($)	Dif.	F value
Cereal	85.25 (17.5)	a	102.24 (23.4)	a	101.59 (13.3)	a	2.833
Meat	107.11 (21.9)	a	67.39 (15.4)	a	209.25 (27.3)	b	5.978*
Milk	36.24 (7.4)	a	36.88 (8.4)	a	69.03 (9.0)	b	2.727**
Egg	23.64 (4.8)	a	24.41 (5.6)	a	49.58 (6.5)	b	3.327*
Oil	26.79 (5.5)	a	25.22 (5.8)	a	35.29 (4.6)	b	2.087
Legumes	41.73 (8.6)	a	33.09 (7.6)	a	48.98 (6.4)	a	1.047
Vegetables	59.48 (12.2)	a	40.40 (9.2)	a	72 (9.4)	a	2.131
Fruits	65.84 (13.5)	ab	53.81 (12.3)	a	109.01 (14.2)	b	2.346
Sugar	11.39 (2.3)	a	14.94 (3.4)	ab	22.09 (2.9)	b	3.710*
Coffee	7.32 (1.5)	a	15.85 (3.6)	a	13.43 (1.8)	a	4.099*
Cool drinks	21.98 (4.5)	a	22.98 (5.3)	a	35.78 (4.7)	a	0.175
Others	1.26 (0.3)	a	0.33 (0.1)	a	0.60 (0.1)	a	0.604
Total cost	$488.03	a	$437.54	a	$766.63	b	6.424*

Source: Field survey data of 2013.

Table 7: Per capita calorie intake.

Villages	Number of respondents	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.

* Significant of 5%.

to the fact that income and food costs dictate one's ability to acquire food. Tlapanalá had a lower per capita income than the other two municipalities, coming in at $1.566.79. Food intake is lower among those with lower incomes. Tlapanalá has a greater grain intake (320 gr/day), but lower income means that villagers eat less vegetables and fruits (155.57 gr/day and 132.56 gr/day, respectively) than the other two villages. Income diversification is the plan to handle this issue.

Food expenditures by the village communities

Table 6 contains the average cost of food, which was $564 pesos per month for families of five people. But the minimum amount required for good welfare was around $882 in September 2014, as recommended by CONEVAL (2014). The lower expenditure on food was due to the self-consumption of crops and livestock. Also, the lower expenditure on food affects dietary intake. It was 1,848 kcal for respondents from San Salvador el Verde, which leads to malnutrition (Alkire and Foster, 2011).

In addition, the amount spent on food in Tlapanalá was $766.63, but it is still less than the minimum well-being established by CONEVAL to meet the dietary intake. The calorie intake was 2,633 kcal, higher than the recommended daily calories (Kumar and Upadhyay, 2019). An average per capita income is distributed as follows: 22.7% on meat, 17.1% on cereals, 13.5% on fruits and 10.2% on vegetables.

The ANOVA test was significant in the expenditure of meat, milk, eggs, sugar and coffee. In this case, there is a dependency relationship between the expenditure of the aforementioned products and the consumption variable. It can be said that the different levels of the factor do influence the values of the consumption variable.

Table 7 explains the calorie intake of the villagers. The average calorie intake per day was recommended by CONEVAL at 2,250 kcal, but the respondents from San Salvador el Verde and Tlapanalá were given less than the recommended average because of lower per capita income, which reduced the food intake (Venu *et al.,* 2018). Here there was a decrease in cereal consumption, but an increase in meat consumption would cause poor nutritional status.

Farming in rural regions may help diversify food supplies in two ways: First, by producing a wider range of foods; and second, by reducing food costs and making them more affordable to purchase (Duncan, 2008 and Felipe, 2013) One good predictor of family food security is dietary variety, so keep that in mind.

CONCLUSION

For a large portion of the country's population, life in rural regions revolves around agriculture. There were 5.33 million individuals in Mexico living below the poverty line in 2012. In order to enhance their nutritional intake,

respondents engaged in a variety of income-generating activities, including self-consumption and that of their families. With the most diverse sources of income, Coatzingo's monthly revenue was $2,932. One household spent an average of $564 pesos for groceries. Although Tlapanalá spent $767 per month, it fell short of the CONEVAL-recommended minimum welfare. Around $882 was the bare minimum needed to get common benefits (September 2014). The lowest daily food intake is in Tlapanalá, with around 947 grams, while the highest is in Coatzingo, at 1595 grams. Income and price levels determine food accessibility, which in turn determines food intake. Coatzingo had the highest calorie consumption, at 2633 kcal.

Conflict of interest

All authors declare that they have no conflict of interest.

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