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Artículo

Vulnerability for food insecurity:
Experiences of indigenous families in the Huasteca Potosina region, Mexico

Vulnerabilidad por inseguridad alimentaria:
experiencias de familias indígenas en la región de la Huasteca Potosina, México

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Andrea Daniela González-Martell*
<https://orcid.org/0000-0002-0745-1870>

Edison Enrique Sánchez-Quintanilla*
<https://orcid.org/0000-0003-2584-4763>

Nadia García-Aguilar*
<https://orcid.org/0000-0002-8993-6002>

Tiaré Contreras-Hernández**
<https://orcid.org/0000-0002-1723-2356>

V. Gabriela Cilia-López***
<https://orcid.org/0000-0003-0064-4490>

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*Catedra Conacyt. Coordinación para la Innovación y Aplicación de la Ciencia y la Tecnología (CIACYT).
Universidad Autónoma de San Luis Potosí, México.

**Montpellier SupAgroInstitut National d'Etudes Supérieures Agronomiques Montpellier. Montpellier, France.
Facultad de Medicina-CIACYT. Universidad Autónoma de San Luis Potosí. México.

Autora para correspondencia: V. Gabriela Cilia-López

Dirección postal: 78210. Tel. 444-826-23-00 ext. 8467

Dirección electrónica: gabriela.cilia@uaslp.mx

Centro de Investigación en Alimentación y Desarrollo, A. C.
Hermosillo, Sonora, México.



Abstract

Indigenous communities in Mexico are vulnerable to food insecurity (FI) due to a series of factors that prevent them from having access to sufficient and nutritious food. Therefore, this population group has the highest chronic malnutrition in the country. Objective: This study describes the FI conditions of an indigenous community in the Potosina Huastec. Methodology: FI was measured with the Household Food Insecurity Access Component Scale (HFIAS). Results: There is food insecurity ranging from concern about food lack, food reduction, and hunger. The 95.57% of households with children under 18 years were in some state of food insecurity, with severe food insecurity dominating. Limitations: Was a cross-sectional study carried out in a community of the Potosina Huastec. However, it is the municipality with the highest degree of marginalization in the area, but the community chosen is the largest in the municipality. Nonetheless, the results can be considered representative of the area. Conclusions: The food security community depends on climatic, socioeconomic, demographic, geographic, cultural factors, food preference conditions, among others. In addressing food insecurity, it is necessary to consider all factors to have a real diagnosis of food insecurity conditions in rural and indigenous communities.

Key words: food security, vulnerability, indigenous communities, food access, indigenous households.

Resumen

Las comunidades indígenas de México son vulnerables a la inseguridad alimentaria (IA) debido a una serie de factores que les impiden acceder a alimentos suficientes y nutritivos. Por ello, este grupo poblacional presenta la mayor desnutrición crónica del país. Objetivo: este estudio describe las condiciones de IA de una comunidad indígena de la Huasteca Potosina. Metodología: la IA se midió con la Escala del Componente de Acceso a la Inseguridad Alimentaria en el Hogar (HFIAS por sus siglas en inglés). Resultados: existe inseguridad alimentaria que va desde la preocupación por la falta de alimentos, la reducción de los mismos hasta el hambre. 95.57% de los hogares con menores de 18 años se encontraban en algún estado de inseguridad alimentaria, predominando la inseguridad alimentaria severa. Limitaciones: fue un estudio transversal realizado en una comunidad de la Huasteca Potosina. Sin embargo, es el municipio con mayor grado de marginación de la zona y la comunidad elegida es la más grande del municipio. Por lo tanto, los resultados pueden considerarse representativos de la zona. Conclusiones: la seguridad alimentaria de la comunidad depende de factores climáticos, socioeconómicos, demográficos, geográficos, culturales, condiciones de preferencia alimentaria, entre otros. Al abordar la inseguridad alimentaria es necesario considerar todos estos factores para tener un diagnóstico real de las condiciones de inseguridad alimentaria en las comunidades rurales e indígenas.

Palabras clave: seguridad alimentaria, vulnerabilidad, comunidades indígenas.

Introduction

Food security (FS) exists when all people ever have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (PESA, 2011). On the other hand, food insecurity (FI) exists when there is limited or uncertain availability of nutritionally adequate and safe food; or a limited and uncertain ability to acquire sufficient food in socially acceptable ways (Andersen, 1990).

FI involves a drastic decrease in food access, or the quantity of food consumed, due to environmental or social risks, or a reduced coping capacity (PESA, 2011). FI is a concept that encompasses malnutrition, poverty, and hunger and is closely related to vulnerability. According to the latest multidimensional poverty assessment, in Mexico 25.5 million people (20.4% of the population) presented food access poverty. The number of people in poverty increased from 49.5 to 52.4 million people in the period of 2008-2018 (Coneval, 2019).

To evaluate FI by access to food is divided into four categories for its analysis. Each one represents the intensity with which households experience the FI. The first category corresponds to food security. The second category corresponds to mild food insecurity, including worry and anxiety about the lack of food or resources to buy it. The third category corresponds to moderate food insecurity, which includes a decrease in quantity/quality of food and fewer food portions per day. The fourth category is severe food insecurity and is when there are experiences of hunger in which adults are affected first, children are affected then. In severe food insecurity, adults are the first to experience hunger as adults, especially by mothers, protect children. This continues until food insecurity reaches levels that make it impossible to protect children (Radimer, 1992; Coates, 2006; Villagómez et al., 2013; Hanson and Connor, 2014).

According to the National Health and Nutrition Survey 2012, in Mexico 83.9% of households, where the head of the household. This is in rural areas and is an indigenous person were in some degree of food insecurity as opposed to the non-indigenous population, where only 68.7% were in some degree of food insecurity (Gutiérrez et al., 2012) mainly in mild food insecurity (36.5%) (INSP, 2020). The problem is more severe if we consider that the indigenous population presents the highest chronic malnutrition to the country in children under five years of age (Coneval, 2010, Coneval 2015). Although there have been improvements in child malnutrition, its prevalence continues to be very high (33.1%) compared to the non-indigenous population (11.7%), reflecting the marginalization in which this population group lives in Mexico (Gutiérrez et al., 2012).

A study conducted in Mexico by the Food and Agriculture Organization of the United Nations (FAO) compared municipalities with indigenous and non-indigenous people. The highest percentage of people lacking access to food lived in municipalities with indigenous populations (Villagómez, 2013). Other factors related to food insecurity in Mexico are low income, head of household under 25 years of age, women head of household, low education of the head of household, and households with members aged 70 years or older (Félix-Verduzco, Aboites-Manríquez, and Castro Lugo, 2018; Vilar-Compte, Gaitán-Rossi, Flores, Pérez-Cirera, and Teruel, 2020).

In Mexico, there are few studies related to the evaluation of food insecurity in the indigenous population, which, as previously mentioned, is the most vulnerable to food insecurity at the national level. Given the heterogeneity of social, cultural, and environmental conditions in which indigenous groups live, it is essential to know the perception and experiences that this population group has about their food security. This allows to understand the causes and consequences at the household level and to be able to generate relevant intervention strategies. Therefore, the objective

of this study was to evaluate the vulnerability to food insecurity, due to access to food in an indigenous community of the Huasteca Potosina, classified as very highly marginalized.

Materials and methods

Description of the study area

A descriptive cross-sectional study was conducted from June to April 2015 in the community of Toco, the municipality of San Antonio in the state of San Luis Potosi, Mexico. Its total population is 1,061 people, of which 555 men and 506 women are distributed in 229 households. The community is within the *Huasteca* or *Teenek* region of the state. Most of the population speaks two languages: Spanish and *Teenek* (Sedesol, 2015). The basis of the family economy is agriculture. The main crop is sugar cane to produce *piloncillo* and corn for self-consumption. In addition, coffee is cultivated on a small scale. Households have a plot (*solar*) of land where they grow medicinal, edible, and other plants (Gallardo, 2004).

In May 2015, an informative workshop was held to invite the community to participate in the study. The objectives and implications of their participation were informed. At this meeting, the verbal consent, and personal data of those interested in participating were obtained. The food security assessment was conducted using the Household Food Insecurity Access Component Scale (HFIAS) in its Spanish version and without modifications. The HFIAS is a tool to measure access to food in the household, and that has been validated for cross-cultural use and provides valid and comparable results (Coates et al., 2006).

The type of sampling for the application of the questionnaire was by convenience. The sample size was obtained by census considering the 229 registered inhabited dwellings (Sedesol, 2015). The HFIAS was applied to housewives because they are responsible for the purchase and

preparation of food. Each of the women interviewed represented her household. In the case of people who only spoke *Teneek*, a translator was on hand to assist us.

The HFIAS is composed of nine questions that pose various situations related to food insecurity related to food access. The questions represent a level of severity of food insecurity that increases as the order of the questions progresses. Each question has a secondary option, which refers to the frequency at which each situation occurred in the four weeks before the interview (one month). The frequency option is omitted if the respondent indicates that the condition described did not occur in the last month (Coates et al., 2006).

The responses obtained from the HFIAS were coded in a database previously designed in the Excel program version 2010. The responses were coded according to the methodology of the tool. Subsequently, statistical analysis was performed in the ESTATA program in which quantitative variables (age) were described in averages and standard deviations and qualitative variables (food insecurity categories) in percentages (Table 1).

Table 1. *Percentages of food insecure households by category in Tocoay, San Antonio, San Luis Potosí*

Category	Description	Households with children under 18 %	Households without children under 18 years of age %
Mild food insecurity	There is anxiety and concern about access to food and economic resources.	11.29	9.25
Moderate food insecurity	Adjustments are made to the family budget, which affects the quality of the diet. The quality, quantity and diversity of the diet decreases.	25.80	18.51
Severe food insecurity	Adults limit the quality and quantity of food consumed. There are experiences of hunger that affect adults first, in more severe cases it reaches the children in the household.	60.48	61.11

Fuente: Coates et al., 2006.

Results and discussion

Three meetings were held in which 199 women participated, representing 86% of the households in the community based on the 229 inhabited dwellings according to Sedesol data (2015). The interviewees had an average age of 46 years, with ages ranging from 45 to 64 year (Figure 1). All the women interviewed were housewives who are engaged in household chores and are Teenek speakers.

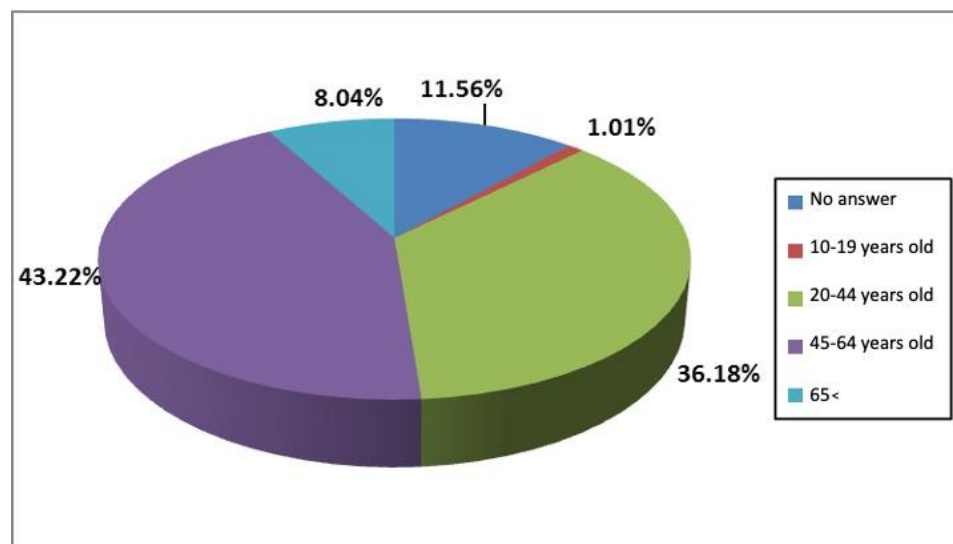


Figure 1. Ages of the women participating in the study in the community of Tocooy. Fuente: Own data.

According to the results in 90.50% of the households, there were feelings of uncertainty or anxiety about food; this is with a tendency to few times in the last month (47.20%). This situation is characteristic of mild food insecurity. Regarding the quality of food, in 75.98% of the households, some member of the family was unable to eat nutritious food. In addition, some member of the family had to eat a limited variety of food due to a lack of resources (75.42%). Both situations characterize moderate food insecurity (Coates et al., 2006). Regarding the most severe conditions of food insecurity, 76.54% of the respondents stated that in their household they had to

eat less than what they wanted or needed because there was not enough food; this happened a few times (44.85%) in the last month. In 69.27% of the households, some member of the family had to reduce the number of meals per day due to lack of food; this occurred only a few times (43.90%) in the last month. In 53.63% of the households, there was a lack of food due to lack of resources; this situation occurred only a few times (45.26%) in the last month. Concerning experiences of hunger in the home, 39.11% said that some member of the family went to bed at night hungry because there was not enough food; this happened a few times (39.13%) in the last month. It is important to note that in 31.84% of the households, some member of the family went the whole day without eating because there was not enough food. This situation occurred a few times (45.61%) in the last month.

According to the HFIAS classification of food insecurity categories, 95.57% of households with children under 18 years of age were in some food insecurity category, especially severe food insecurity. Similarly, 88.87% of households without children under 18 were in some state of food insecurity, with severe food insecurity dominating (Table 1). Severe food insecurity implies that a household reduced the size of meals, reduced the number of meals per day, experienced a total lack of food, had a member of the household go to bed hungry, or went the whole day without eating (Coates et al., 2006).

There is currently interest in documenting the effect of food insecurity on households already at these level effects of food insecurity can be better assessed (Valencia-Valero and Ortiz-Hernández, 2014). For the total households surveyed (199), 94.94% were in one of the three states of food insecurity with a tendency to severe food insecurity (60.67%). Usually, households with underage adults tend to protect them although in the most severe cases underage may be left hungry (Kuku, Gundersen, and Garasky, 2011). The severe food insecurity founded in the present study

may be a consequence of the high marginalization in which the community finds itself (Conapo, 2015).

The results found in the present study differ from the national trend in which mild food insecurity predominates for households where the head of household speaks an indigenous language (Villagómez et al., 2013; Vega-Macedo et al., 2014). A study conducted by FAO in 2010 in Mexico, compared the access to food between municipalities with the indigenous population and those without the indigenous population. The highest percentage of the population lacking access to food lived in municipalities with a greater presence of the indigenous population. This is consistent with the results of the present study since the community is in the most worrisome degrees of food insecurity (moderate and severe). According to the results of the 2018 National Health and Nutrition Survey (Ensanut, in Spanish), in San Luis Potosi 54.3% of households were in some degree of food insecurity, mostly in mild food insecurity (36.5%). However, food insecurity was more prevalent in rural areas (69.5%) than in urban areas (46.4%) (INSP, 2020). It is important to note that the study community is among the most marginalized in San Luis Potosi. In this sense, there has been a marked prevalence of acute diarrheal diseases in rural and more marginalized areas due to the absence of elemental sanitary conditions, which increases the risk of suffering chronic malnutrition (FAO, FIDA, OMS, PMA y UNICEF, 2019).

Households without children in Tocoay are composed of older adults 66.11% of these households were severely food insecure. In a study that analyzed food insecurity in older adults in Mexico, the majority presented mild food insecurity (41.0%) (Rivera-Márquez, Mundo-Rosas, Cuevas-Nasu, and Pérez-Escamilla, 2014). Another study conducted in Nayarit found that households in which older people over 64 years of age live are among the most vulnerable to food insecurity (Haro-Mota, Marcelaño-Flores, Bojórquez-Serrano, and Nájera-González, 2016). Older adults in indigenous communities usually depend on support from social programs, economic

support from relatives or family members and do not have the physical health to work their land if they have it. Therefore, older adults are a vulnerable group to suffer food insecurity. The results of the present study feature the importance of analyzing the experiences of food insecurity in older adults, especially in indigenous communities.

Good nutrition has a positive impact on health, so food insecurity harms the health and well-being of people, regardless of their age (Gundersen and Ziliak, 2015). In Mexico, one in eight children under five years of age present low height (moderate or severe) for their age is related to the lack of a sufficient, varied, and nutritious diet associated with more than half of child deaths worldwide (INSP-UNICEF, 2016). In this regard, chronic malnutrition has been recorded in Tocoay in children between 5 and 10 years old (Rodríguez, 2015) because of the conditions of marginalization and food insecurity in which the country's indigenous communities live. Malnutrition not only affects health but also has economic effects (labor and productivity) and on education (learning capacity deficit) (FAO, OPS, WFP, UNICEF, 2019).

Community food security depends on several factors. The intensity with which households experience FI is different at the community level. In the food security analysis, should be considered food preferences. Results at the municipal level homogenize the FI data because they do not consider local factors that determine people's relationship with food as culture and food preferences, availability, and utilization. The vulnerability due to FI in indigenous communities is related to their isolation, lack of road access that hinders the availability and access to food, in addition to limited access to health and education services, and low income (Haro-Mota et al., 2016). The aforementioned coincides with the results found in the present study since the community analyzed belongs to one of the most marginalized areas of the state.

Since 2008, food security in Mexican households has been part of the indicators of the multidimensional measurement of poverty (Coneval, 2015). As of 2012, food security is included

in the National Health and Nutrition Survey (Ensanut) conducted in Mexico. With this information, it has been documented that the highest prevalence of moderate and severe insecurity occurs in households classified in the lowest quintiles (45.9%), in rural areas (35.4%), in the southern region of the country (36.1%), or households with speakers of an indigenous language (42.2%). Other factors are the inability to walk or move, as well as the lack of support from social programs, pensions, or remittances (Mundo-Rosas, Shamah-Levy, and Rivera-Dommarco, 2013; Mundo-Rosas, Méndez-Gómez, and Shamah-Levy, 2014).

One of the limitations of the present study is the time elapsed since the data were taken. However, food security has not improved for the indigenous communities. According to the latest national nutrition survey (Ensanut, 2018); the rural areas still present food insecurity conditions. Prospera was one of the existing government programs when the study was aimed. Its objective was to articulate actions to income generation, economic well-being, education, food, and health to the population living in extreme poverty. Despite this government program, indigenous communities continue to present limitations in their food security. The aforementioned demonstrates that efforts and interventions to improve the food security of Mexican indigenous communities should be a priority for institutions at all levels of government.

Food insecurity leads to inadequate food consumption, with serious consequences for learning, development, productivity, and health in households. Since 2012, it has been shown that rural areas in Mexico are the largest number of people in food insecurity. In Mexico, there are support programs for the population vulnerable to food insecurity. However, statistics show that the actions taken have not been sufficient to reduce food insecurity in Mexico. Since food is a universal human right, it is necessary to reinforce efforts in the measurement, diagnosis, and intervention food security in Mexico.

Conclusion

Experiences of food insecurity are different at the community level. According to national statistics, mild food insecurity prevails in rural and indigenous areas of Mexico. However, in the present study, was found severe food insecurity. This indicates that food insecurity in Indigenous communities is experienced with greater intensity. Nevertheless, studies related to factors associated with food insecurity in indigenous communities in Mexico are scarce. The studies at the community level are convenient for the solid diagnosis of FI conditions. This type of approach allows more interventions that is appropriate to combat this problem of food insecurity in the country's indigenous communities. Therefore, there is a need to investigate this population group since 2012 it continues to be one of the most vulnerable to FI.

After more than 15 years in which national nutrition surveys indicate that rural and indigenous communities have had the highest prevalence of food insecurity, it is necessary to reflect on the approach and interventions performed. Especially in the current scenario in which environmental changes increasingly affect agricultural production, migration exits to urban areas and recent conditions where pandemics affect the most vulnerable population.

Community food security depends on climatic, socioeconomic, demographic, geographic conditions, food preferences, among others. In addressing food insecurity, it is necessary to consider all these factors to have an appropriate diagnosis of food insecurity conditions in rural and indigenous communities that will allow for more interventions that are efficient to improving food security.

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References

- Andersen, S. A. (1990). Life sciences research office report: core indicators of nutritional state for difficult-to-sample populations. *Journal of Nutrition*, 120(11): 1555-1600. DOI: https://doi.org/10.1093/jn/120.suppl_11.1555
- Coates, J., Swindale, A. y Bilinsky, P. (2006). *Escala del componente de acceso de la inseguridad alimentaria en el hogar (HFIAS) para la medición del acceso a los alimentos en el hogar: guía de indicadores* (v. 2). Washington, D. C. Proyecto de Asistencia Técnica sobre Alimentos y Nutrición, Academia para el Desarrollo Educativo.
- Consejo Nacional de Población (Conapo, 2015). *Índice de marginación por entidad federativa y municipio 2015*. México, D. F.: Consejo Nacional de Población
- Consejo Nacional de Evaluación (Coneval, 2010). *Dimensiones de la seguridad alimentaria: Evaluación Estratégica de Nutrición y Abasto*. México, DF. Consejo Nacional de Evaluación de la Política de Desarrollo Social.
- Coneval (2015). *Diagnóstico sobre alimentación y nutrición. Informe ejecutivo*. México, DF. Consejo Nacional de Evaluación de la Política de Desarrollo Social.
- Coneval (2019). *10 años de medición de pobreza en México, avances y retos en política social*. Ciudad de México: Consejo Nacional de Evaluación de la Política de Desarrollo Social. Recuperado de https://www.coneval.org.mx/SalaPrensa/Comunicadosprensa/Documents/2019/COMUNICADO_10_MEDICION_POBREZA_2008_2018.pdf
- Gallardo, A. P. (2004). *Monografías de los pueblos indígenas. Huastecos de San Luis Potosí-Teenek*. México: Comisión Nacional para el Desarrollo de los Pueblos Indígenas.
- Gutiérrez, J. P., Rivera-Dommarco, J., Shamah-Levy, T., Villalpando-Hernández, S., Franco, A., Cuevas-Nasu, L., Romero-Martínez, M., Hernández-Ávila, M. (2012). *Encuesta Nacional de Salud y Nutrición 2012. Resultados Nacionales*. Cuernavaca, México: Instituto Nacional de Salud Pública.
- Organización de las Naciones Unidas para la Alimentación y la Agricultura, Organización Panamericana de la Salud, World Food Programme, Fondo de las Naciones Unidas para la Infancia (FAO, OPS, WFP, UNICEF, 2019). *Panorama de la seguridad alimentaria y nutrición en América Latina y el Caribe 2019. Hacia entornos alimentarios más saludables que Hagan frente a todas las formas de malnutrición*. Santiago. Chile.
- FAO, FIDA, OMS, PMA, UNICEF (2019). *El estado de la seguridad alimentaria y la nutrición en el mundo 2019. Protegerse frente a la desaceleración y el debilitamiento de la economía*. Roma.
- Félix-Verduzco, G., Aboites-Manrique, G. y Castro-Lugo, D. (2018). La seguridad alimentaria y su relación con la suficiencia e incertidumbre del ingreso: un análisis de las percepciones del hogar. *Acta Universitaria*, 28(4): 74-86. DOI: <https://doi.org/10.15174/au.2018.1757>
- Gundersen, C., Ziliak, J. P. (2015). Food Insecurity and health outcomes. *Health Affairs Journal (Millwood)*, 34(11):1830-1839. DOI: <https://doi.org/10.1377/hlthaff.2015.0645>
- Hanson, K. L., Connor, L. M. (2014). Food insecurity and dietary quality in US adults and children: A systematic review. *American Journal of Clinical Nutrition*, 100(2): 684-92. DOI: <https://doi.org/10.3945/ajcn.114.084525>
- Haro-Mota, R., Marceño-Flores, S., Bojórquez-Serrano, J. I. y Nájera-González, O. (2016). La inseguridad alimentaria en el estado de Nayarit, México y su asociación con factores socioeconómicos. *Salud Pública de México*, 58(4): 421-427. DOI: <https://doi.org/10.21149/spm.v58i4.8022>
- Instituto Nacional de Salud Pública-Fondo de las Naciones Unidas para la Infancia (INSP-UNICEF, 2016). *Encuesta Nacional de Niños, Niñas y Mujeres 2015-Encuesta de Indicadores Múltiples por Conglomerados 2015, Informe Final*. Ciudad de México: Instituto Nacional de Salud Pública y UNICEF. Instituto Nacional de Salud Pública y UNICEF México.
- INSP (2020). *Encuesta Nacional de Salud y Nutrición 2018. Resultados de San Luis Potosí*. Instituto Nacional de Salud Pública. Cuernavaca, México: Instituto Nacional de Salud Pública.
- Kuku, O., Gundersen, C. y Garasky, S. (2011). Differences in food insecurity between adults and children in Zimbabwe. *Food Policy*, 36: 311-317. DOI: <https://doi.org/10.1016/j.foodpol.2010.11.029>
- Mundo-Rosas, V., Shamah-Levy, T. y Rivera-Dommarco, J. A. (2013). Epidemiology of food insecurity in Mexico. *Salud Publica de México*, 55(supl 2): 206-213. DOI: <https://doi.org/10.21149/spm.v55s2.5117>
- Mundo-Rosas, V., Méndez-Gómez, H. I. y Shamah-Levy, T. (2014). Caracterización de los hogares mexicanos en inseguridad alimentaria. *Salud Publica de México*, 56(supl 1): s12-20. DOI: <https://doi.org/10.21149/spm.v56s1.5161>
- Programa Especial para la Seguridad Alimentaria (PESA, 2011). *Seguridad alimentaria nutricional, conceptos básicos*. Componente de Coordinación Regional Programa Especial para la Seguridad Alimentaria (PESA) en Centroamérica Proyecto Food Facility Honduras. Recuperado de <http://www.fao.org/3/at772s/at772s.pdf>

- Radimer, K. L., Olson, C. M., Greene, J. C., Campbell, C. C. y Habicht, J. P. (1992). Understanding hunger and developing indicators to assess it in women and children. *Journal of Nutrition Education*, 24(1): 36S-44S. DOI: [https://doi.org/10.1016/S0022-3182\(12\)80137-3](https://doi.org/10.1016/S0022-3182(12)80137-3)
- Rivera-Márquez, J. A., Mundo-Rosas, V., Cuevas-Nasu, L. y Pérez-Escamilla, R. (2014). Inseguridad alimentaria en el hogar y estado de nutrición en personas adultas mayores de México. *Salud Pública de México*, 56(Supl. 1): s71-s78. DOI: <https://doi.org/10.21149/spm.v56s1.5168>
- Rodríguez, R. F. (2015). *Intervención nutricional como estrategia para reforzar la seguridad alimentaria en localidades vulnerables. Caso de estudio: Tocoay, San Antonio, San Luis Potosí*. (Tesis de Maestría). Programa Multidisciplinario de Posgrado en Ciencias Ambientales. Universidad Autónoma de San Luis Potosí. San Luis Potosí, México.
- Secretaría de Desarrollo Social (Sedesol, 2015). *Catálogo de localidades, Unidad de Microrregiones*, Dirección General Adjunta de Planeación Microrregional. Sistema de Apoyo para la Planeación del PDZP, 2015. Recuperado de <http://www.microrregiones.gob.mx/catloc/contenido.aspx?refnac=240260011>
- Valencia-Valero, R. G., Ortiz-Hernández, L. (2014). Disponibilidad de alimentos en los hogares mexicanos de acuerdo con el grado de inseguridad alimentaria. *Salud Publica de México*, 56: 154-164. DOI: <https://doi.org/10.21149/spm.v56i2.7331>
- Vilar-Compte, M, Gaitán-Rossi, P., Flores, D., Pérez-Cirera, V. y Teruel, G. (2020). How do context variables affect food insecurity in Mexico? Implications for policy and governance. *Public Health Nutr*, 23(13): 2445-2452. DOI: <https://doi.org/10.1017/S1368980019003082>
- Villagómez-Ornelas, P., Hernández-López, P., Carrasco-Enríquez, B., Barrios-Sánchez, K., Romero-Navarro, M A. y Aparicio-Jiménez, R. (2013). Estado del acceso a los alimentos. En Organización de las Naciones Unidas para la Alimentación y la Agricultura. *Panorama de la seguridad alimentaria y nutricional en México 2012*. (pp.75-137). Ginebra: FAO.