Household water security is a mediator of household food security in a nationally representative sample of Mexico

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Abstract

Objective: Explore the relationship between water insecurity and food security and their covariates in Mexican households.

Design: A cross-sectional study with nationally representative data from the National Health and Nutrition Survey-Continuous 2021 (in Spanish, ENSANUT-Continua 2021), collected data from 12,619 households.

Setting: Water insecurity was measured using the Household Water Insecurity Experiences (HWISE) Scale in Spanish and adapted to the Mexican context. Food security was measured using the Latin American and Caribbean Food Security Scale (ELCSA). A generalized path model was used to produce two simultaneous logistical regression equations--of water insecurity (WI, HWISE $\geq$12) and moderate-to-severe food insecurity (FI)—to understand key covariates as well as the contribution of WI to FI.

Participants: The head of the household, an adult of >18 years of age, consented to participate in the survey.

Results: Households experiencing WI were more likely to experience moderate to severe FI (OR=2.35; 95%CI: 2.02-2.72). The odds of WI were lower in households with medium (OR=0.74; 95%CI: 0.61-0.9) to high (OR=0.45; 95%CI: 0.37-0.55) asset scores. Water insecurity also depended on the region of Mexico. FI is more prevalent in Indigenous people (OR=1.29; 95%CI: 1.05-1.59) and rural households (OR=0.42; 95%CI: 1.16-1.73). Notably, wealth and household size did not contribute directly to FI but did so indirectly through the mediating factor of WI.

Conclusions: Our study shows that there are structural factors that form part of the varied determinants of water insecurity, which in turn is closely linked to food insecurity.

Keywords: Water insecurity, food insecurity, national survey, Mexico, nationally representative

Introduction

Water security, defined as the reliable availability of adequate, acceptable, and safe water is key for basic household needs, and to achieving an adequate, nutritious, and high-quality diet.[1] Currently, the inadequate use of water globally presents significant risks to health, food, and development.[2] Water is needed for agriculture, raising livestock, and all processes of production; in 2014, nearly 70% of the available fresh water was used to produce food.[3]

Even when there is enough water physically available to fulfill human needs, some vast geographical areas are near the total water scarcity, affecting millions of people, of which many are the most vulnerable, poor, and disadvantaged. Therefore, the implementation, and management of integrated and sustainable policies for water conservation throughout the agricultural production chain are critical.

The concept of water for food security and nutrition (FSN) is gaining prominence.[4] FSN includes potable water and sanitation; water used to produce, process, and prepare food; and water use across all livelihood and income sectors.[5] The latter implies a direct pathway to economic food access, that is, food affordability. Furthermore, FSN includes the objective of sustainable management and conservation of water resources and the ecosystems that sustain them.[6]

In the nutrition literature, the role of water access and use in food security, nutrition, and well-being has not been thoroughly documented.[7,8] Instead, the role of water in this literature has been focused on the role of sanitation and hygiene (WASH) in diarrheal illnesses and child development, and more recently, on environmental enteropathy.[9] Hydration in the context of sports nutrition has also received some attention.[8] Although water plays roles beyond enteric infections and homeostasis of corporal water, it has received far less attention than other essential nutrients. Water insecurity affects many other nutrition-related phenomena, such as agricultural production, food preparation and handling, dietary behavior, dietary diversity, infant and child feeding practices, and energy use[10–14], and therefore deserves more attention.

It has been established that the availability of adequate and safe water is fundamental to promoting the four pillars of food security: availability, accessibility, food utilization, and stability.[15] For this reason, the universal guarantee of water is one of the United Nations Sustainable Development Goals for 2030. The corresponding 2030 Agenda states that to monitor the progress of this objective and understand the role of water in the fight to reduce FI, it has become critical to develop a scale to measure household water insecurity.[16]

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However, Young et al. recently documented that experiencing water insecurity significantly increases the likelihood of also experiencing food insecurity in several regions of the world. This suggests the importance of considering water insecurity when designing food and nutrition policies and interventions, although more research is needed to fully understand the connections between these insecurities.[17]

In Mexico, experiences of household food security have been measured for the last several decades using the Latin American and Caribbean Food Security Scale (in Spanish, ELCSA).[18,19] In 2012, Mexico's National Institute of Public Health added it to the national health and nutrition survey[20],and has since been measuring it regularly. In the last decade, moderate to severe food insecurity in Mexico has hovered between 25.9% and 28.2%.[20,21]

There is growing concern about water issues in Mexico, including scarcity, flooding, and contamination.[22] To understand how problems with water affect public health, the National Institute of Public Health innovated by adding a national-level measurement of water insecurity experiences in Mexico in 2021. The Household Water Insecurity Experiences (HWISE) Scale, which measures experiences of difficulties with water availability, access, use, and stability[23], was applied as part of the Nutrition Survey-Continuous 2021 (in Spanish, ENSANUT-Continua 2021).

The objective of this study was to evaluate the role that water security plays in food security in Mexican households. Specifically, we analyzed how experiencing water insecurity (HWISE $\geq$12), is related to moderate to severe food insecurity (FI) and other covariates.

Methods

The ENSANUT-Continua 2021 is a probabilistic and stratified national survey using cluster samples and regional representation. ENSANUT-Continua 2021 collected data from 12,619 households representing 36,476,972 Mexican households. Data were collected from August to November of 2021. The seasons of the year include summer and autumn, with the latter seeing major hurricanes in various regions of the country. Data were collected by trained enumerators in real-time using tablets. Further details on the survey sample can be found elsewhere.[24]

Respondents generally corresponded to the person recognized as the head of household or any other household member aged 18 or older who was familiar with the household members and conditions.

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Variables

Food security was evaluated using the ELCSA, validated and adapted for Mexico.[25,26] It includes 15 yes/no questions about lacking money for food, concerns about food supplies running out (mild FI), reduced diet diversity and quality (moderate FI), and limited food quantity and hunger (severe FI). [27] The scale, directed at the head of the household or the member responsible for food, has a 3-month recall period. Scoring depends on positive responses and the presence of children under 18. For households without children under 18, 0 indicates food security, 1-3 mild FI, 4-6 moderate FI, and 7-8 severe FI. For children under 18 years of age, 0 indicates food security, 1-5 mild FI, 6-10 moderate FI, and 11-15 severe FI. [28]

The most recent definitions of "water security" consider four dimensions: access, which refers to the ability of an individual or household to obtain water (by traveling to the water source, being able to pay for water supply, etc.). Availability considers the presence of water ("available"). Use considers and distinguishes between the acceptability and safety of the water that individuals/households have access to (for example, some types of water are used only for irrigation and not for human consumption). The dimension of stability or reliability simultaneously encompasses the uninterrupted existence of the three previous dimensions.[29] Household water insecurity is defined as the inability to access and benefit from adequate, reliable, and safe water for well-being and healthy living. [30] The Household Water Insecurity Experiences (HWISE) was developed to measure the less-explored dimensions of water security. This scale is a validated tool used in several middle- and low-income countries (including some regions of Mexico) that inquired about access to and reliability of water within households.

The HWISE scale has been established as reliable, equivalent, and valid in within- and cross-country analyses. Two Mexican cities were included in the validation study of HWISE.[23] Although the scale had already been translated into Spanish, it was considered important to pilot test the scale before including it in ENSANUT because of the cultural variety in Mexico. A group of researchers (including those who conducted the validation study) and experienced interviewers held work sessions to review and harmonize the phrases contained in each question and make the intended meaning of the items understandable. Once the first proposal of the harmonized scale was available, it was tested in 200 households in 30 states of the country, to review the comprehension of the questions and the need to include locally relevant examples. Based on the pilot study, the response to items 4, 9 and 12 was improved.[31]

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The HWISE Scale comprises 12 questions about households' experiences related to water insecurity during the previous four weeks. The questions asked about the frequency of life-disrupting water-related problems, such as worrying about water, feeling shame about the household water situation, having to change what was eaten due to water problems, and going to sleep thirsty. Possible responses are 'never,' scored as 0, 'rarely,' scored as 1, 'sometimes,' scored as 2, 'often/always,' scored as 3. The range is 0-36; scores of 12 or higher are classified as water insecure.[32]

Wealth was measured using the household well-being index (HWI) which has been used in previous ENSANUTs.[33] The HWI was constructed through principal component analysis generated using a polychoric correlation matrix.[34] The first component qualified as HWI, which included 40.5 and 51% of the total variability of the included characteristics for its construction in 2012 and 2018, respectively. These were calculated using the following variables: material used to construct the dwelling (ceiling, walls, and floors), number of rooms, provision of water and light services, possession of a car, number of household appliances (refrigerator, stove, washing machine, kettle, microwave oven, etc.), and the number of electronic devices (television, cable, radio, and telephone). As previously described, HWI was classified into tertiles (1=low, 2=medium, and 3=high).

Localities with more than 2,500 inhabitants were classified as urban areas, whereas those with less than 2,500 were classified as rural areas.

As for the region, the ENSANUT-Continua 2021 defines nine geographic regions made up of contiguous federal entities and about their population density, and have been used by the Institute of Geography and Statistics to report the country's statistics: 1) North Pacific (Baja California, Baja California Sur, Nayarit, Sinaloa, and Sonora); 2) Border (Chihuahua, Coahuila, Nuevo León, and Tamaulipas); 3) Central Pacific (Colima, Jalisco, and Michoacán); 4) Central North (Aguascalientes, Durango, Guanajuato, Querétaro, San Luís Potosí, and Zacatecas); 5) Central (Hidalgo, Tlaxcala, and Veracruz); 6) Mexico City; 7) Mexico State; 8) South Pacific (Guerrero, Morelos, Oaxaca, and Puebla); and 9) Peninsula (Campeche, Chiapas, Quintana Roo, Tabasco, and Yucatán).[24]

Household size was determined based on the number of household members reported to share common household expenditures. Households in which any member spoke an indigenous language were classified as indigenous, as the previous ENSANUTs.

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Statistical analysis

Variables of interest were expressed as estimated totals and proportions with 95% confidence intervals (CI). We described the association of experiencing water insecurity (HWISE ≥12) with geographic regions, HWI and the number of household members as covariates, as well as the role of water insecurity as a mediating factor for experiencing moderate-to-severe food insecurity (FI), including the contribution of determinants such as correspondence to rural areas and indigenous household head as FI covariates. A generalized path analysis model[35] was used to measure the contribution of different factors to the probability of experiencing water insecurity as a binomial response, and its contribution to moderate and severe food insecurity was included as a binomial response, both using a logit response transformation. The estimated coefficients and their respective odds ratios were used to support this interpretation. All analyses accounted for the design of the study in the module of complex sampling "svy" and the "gsem" command in STATA, v.16.1.

Results

Of the 12,619 households visited, 12,520 had complete information of ELCSA and, 12,463 on the HWISE scale. Of the population, 74.1% had food security or mild FI, while 15.8% had moderate FI, and 10.1% had severe FI (Table 1). Water insecurity (HWISE scores ≥12) was experienced by 16.3% of the population. The measure of wealth, given the use of tertiles of the HWI, suggests that the sample population is balanced across the index categories.

The sample included 688 households in which the head of household spoke an indigenous language, representing 5.1% of the national population. The average number of members per household was 3.36.

Table 2 shows conditional probabilities (expressed as percentages) of FI, given WI and other covariates. It is clear that 40.9% of households experiencing water insecurity showed moderate to severe food insecurity, and only 26.3% were food secure. In contrast, just 22.9% of water-secure households showed moderate to severe FI, while 41.9% were food-secure.

FI was also strongly associated with low scores of HWI. The prevalence of food security was 21.8% in households in the low WI tertile, and up to 40.2% reported moderate to severe FI. On the other hand, 57.3% of households with high HWI scores were food-secure, and only 12.7% showed moderate to severe FI.

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FI was also strongly associated with low HWI score. The prevalence of food security was 21.8% in households in the low-WI tertile, and up to 40.2% reported moderate-to-severe FI. In contrast, 57.3% of households with high HWI scores were food secure, and only 12.7% showed moderate to severe FI.

Food security was measured at 41.8% in urban areas and 29% in rural areas, and the prevalence of moderate-to-severe FI was greater in rural areas (31.3%) than in urban areas (24.5%).

The prevalence of food security was lower in households in which the head speaks an indigenous language (27.5%) than in their non-indigenous language-speaking counterparts (39.8%, Table 2).

By region, both food and water insecurity were least prevalent in the Border region (Figure 1); this region has the highest HWI scores in the country. Even though the northern region is one of the areas with the highest economic development and the largest in terms of land area, covering over 700,000 km^2, rivers are scarce. Nonetheless, the construction of several dams has facilitated the establishment of agricultural zones and water storage. In contrast to other regions, the indigenous groups residing in this area are few.[36] The Peninsula region had the highest prevalence of moderate-to-severe food insecurity, and the Mexico State region had the highest levels of water insecurity.

We utilized the information of 12,463 households with complete data of FI and WI data for generalized path analysis. The generalized path model (Figure 2) produced two simultaneous logistical regression equations (Table 3). Equation 1 showed a significant positive association between the probability of water insecurity and the number of household members (OR=1.05; 95%CI: 1.01-1.09) and a significant positive relationship between medium and low scores of HWI and WI (OR=1.63; 95%CI: 1.38-1.93 and OR=2.22; 95%CI: 1.82-2.71 respectively), compared to high HWI.

As we can see, water insecurity was more prevalent in certain regions, such as the North Pacific (OR=2.74; 95%CI: 1.29-5.82), Central Pacific (OR=3.66; 95%CI: 1.82-7.36), Mexico State (OR=4.33; 95%CI: 2.18-8.62), Mexico City (OR=3.24; 95%CI: 1.60-6.57), South Pacific (OR=2.57; 95%CI: 1.21-5.47), North Central (OR=2.36; 95%CI: 1.23-4.56) and Peninsula (OR=2.18; 95%CI: 1.03-4.62). The Border region had the lowest prevalence of water insecurity, and only the Central region (OR=2.26; 95%CI: 0.88-5.8) came close to comparing with the relatively low water insecurity reported in the former.

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Equation 2 illustrates that there is a greatly increased probability of experiencing moderate-to-severe FI for households that are WI (OR=2.35; 95%CI: 2.02-2.72). The probability of experiencing moderate-to-severe FI is also greater in indigenous households (OR=1.29; 95%CI: 1.05-1.59) and rural households (OR=0.42; 95%CI: 1.16-1.73). Notably, wealth and household size did not contribute directly to FI but did so indirectly through the mediating factor of WI. In the bottom section of table 3, the indirect effects of household size, HWI and region on FI through WI as mediator are quite similar than those observed as direct effects on WI. This explains why direct effects of this covariates on FI disappear.

Discussion

These data demonstrate that experiences of water insecurity have a strong positive association with moderate to severe food insecurity in Mexican households. Strong associations between food and water insecurity have been observed in other studies, including a 27-site study in 21 low and middle-income countries[23,37] and a 25-country study conducted in collaboration with FAO.[17] These results are also consistent with other work that has posited water insecurity as a plausible driver of food insecurity[7,38], including the sole study with repeated measures of food and water insecurity.[39]

Our finding that FI is more severe in rural and indigenous households aligns with previous studies in Mexico, where households in rural and indigenous communities appear to be more vulnerable.[17,40] With ENSANUT 2012 it was found that nationally moderate to severe FI affected 28.2% of the households.

Rural or indigenous households, akin to those in the lowest HWI tertile, were particularly impacted by moderate to severe food insecurity (FI), with rates of 35.4%, 42.2%, and 45.2%, respectively. Close to one-third of Mexican households experienced these more severe forms of FI, especially prevalent in rural areas of the southern states, among indigenous communities, or in conditions of poverty.[26] Notably, there was a decline observed in ENSANUT 2018, with rural households reporting a moderate to severe FI prevalence of 29.1%[26], which decreased to 27.1%[41] in 2020. However, in 2021, this figure increased to 31.3% in rural households.[21]

Beyond Mexico, similar findings have been described in countries such as Guatemala and Colombia, which share similar sociodemographic characteristics and have implemented comparable strategies to address food security and water insecurity challenges. In Guatemala, the marketing of food products has limited dietary diversity and supplanted the production and

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consumption of fresh nutritive foods, even in rural communities primarily dedicated to food production. This has caused the agricultural indigenous communities of Guatemala to appear much like the urban "food deserts" described in higher-income countries.[42] In Colombia, a study among indigenous women demonstrated their vulnerability to FI, and the complexities of autonomy, gender inequalities, discrimination, and poverty.[43]

The association between WI and some of these structural factors, such as household size, area of residence, and household wealth has also been observed in previous studies.[23,44,45] To the best of our knowledge,differences by indigenous background have not been reported. It will be interesting to determine whether such inequalities persist elsewhere.

It will be useful to understand *how* WI shapes FI and nutrition, e.g., in food production, cooking and improving the palatability and digestibility of foods, or in hygiene and the prevention of food and water-borne diseases.[46] Evidence of this relationship so far has shown that the lack of access to water affects agricultural production, especially in rural areas where agriculture is the primary source of both income and food. Contaminated water causes illnesses such as diarrhea and reduces the quality of food produced. Furthermore, water scarcity can limit the overall production of food and increase prices, which can further reduce the capacity for low-income households to afford food.[47]

Our study had certain limitations. The cross-sectional nature of the data did not allow us to infer causality. Additionally, in Mexico, no national-level indicator exists that allows the comparison of our measurements with others. Nevertheless, the data presented were derived from a representative and probabilistic national survey that previously used the ELCSA for food security measurement, and the HWISE scale used to measure water insecurity has been previously validated in other countries, Mexico, and the context of the ENSANUT. The scale was also adapted to the country context, further strengthening the data presented which are derived from it.[31]

Both FI and WI are key determinants of population well-being that require immediate attention.[48,49] Given the close interaction between the two, it may be impossible to reduce FI without evaluating if WI is at play, which suggests that household food security interventions should include improvements in household water security.[4] This area requires further exploration. It is critical to sensitize Mexican citizens and leadership to the responsible use of water, in addition to implementing strategic investments in water infrastructure and sanitation to guarantee access to

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safe potable water. This would not only improve the health and food security of the population but would also contribute to the national economy.

Authorship: All the authors have contributed to the conception and design of the work and the analysis of the data in a manner substantial enough to take public responsibility for it; each one of us has reviewed the final version of the manuscript and approved it for publication. The authors had full access to the data and took responsibility for the integrity of the data and the accuracy of the data analysis.

Ethical Standards Disclosure: "This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by three Committees: Research, Ethics in Research, and Biosecurity Committee of the National Institute of Public Health of Mexico. Written informed consent was obtained from all subjects.

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Table 1. Characteristics of sampled households in Mexico, ENSANUT-Continua 2021

Variable	n	Prevalence (95% CI)
HH food security		
Food secure	4,712	39.2 (37.8-40.6)
Mild FI	4,498	34.9 (33.6-36.2)
Moderate FI	2,006	15.8 (14.9-16.7)
Severe FI	1,304	10.1 (9.3-11.0)
HH water security		
Secure	10,426	83.7 (81.9-85.4)
Insecure	2,037	16.3 (14.6-18.2)
Household Wellbeing Index[e]		
Low	4,209	31.0 (29.2-32.8)
Medium	4,214	31.8 (30.3-33.4)
High	4,196	37.2 (35.2-39.2)
Area of residence		
Urban	9,735	79.9 (78.6-81.1)
Rural	2,884	20.1 (18.9-21.4)
Region		
North Pacific	1,589	9.9 (8.9-10.9)
Border	1,001	13.6 (12.7-14.7)
Central Pacific	1,056	10.9 (10.2-11.7)
North Central	2,843	12.4 (11.9-12.8)
Central	951	10.2 (9.6-10.8)
Mexico City	1,153	7.8 (7.4-8.2)
Mexico State	1,199	13.0 (12.5-13.5)
South Pacific	1,236	12.4 (11.5-13.3)
Peninsula	1,591	9.9 (9.4-10.5)
Indigenous background*		
Yes	688	5.1 (4.0-6.6)
No	11,931	94.9 (93.4-96.0)
Number of household members		
	12,619	3.46±1.73*

[e]HWI was classified in terciles

*Indigenous background if any member of the household spoke an indigenous language, was classified as an indigenous household

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Table 2. Characteristics of the ENSANUT-Continua 2021 participants, by food security status

Variable	Food Secure		Mild Food Insecurity		Moderate-to-Severe Food Insecurity	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Water security						
Secure	12,617,991	41.9 (40.3-43.5)	10,620,989	35.2 (33.9-36.7)	6,896,685	22.9 (21.5-24.4)
Insecure	1,542,139	26.3 (24.0-28.8)	1,924,876	32.8 (30.0-35.8)	2,394,320	40.9 (37.9-43.9)
Household Well-being index						
Low	2,463,543	21.8 (20.3-23.4)	4,289,120	38.0 (35.9-40.1)	4,543,015	40.2 (38.0-42.5)
Medium	4,054,414	34.9 (33.1-36.8)	4,376,296	37.7 (35.8-39.7)	3,173,112	27.4 (25.4-29.4)
High	7,783,822	57.3 (55.1-59.5)	4,068,024	30.0 (27.9-32.1)	1,725,628	12.7 (11.4-14.2)
Area of residence						
Urban	12,177,673	41.8 (40.1-43.5)	9,820,603	33.7 (32.3-35.1)	7,142,375	24.5 (23.2-25.9)
Rural	2,124,105	29.0 (26.8-31.2)	2,912,837	39.7 (36.7-42.8)	2,299,379	31.3 ([27.8-35.1)
Region						
North Pacific	1,634,074	45.5 (41.8-49.3)	1,224,405	34.1 (32.1-36.1)	733,698	20.4 (17.3-24.0)
Border	2,633,000	53.0 (47.2-58.7)	1,438,320	28.9 (25.1-33.1)	898,847	18.1 (14.8-21.9)
Central Pacific	1,765,438	44.2 (40.7-47.9)	1,241,125	31.1 (26.8-35.8)	984,038	24.7 (19.6-30.5)
North Central	1,839,253	40.8 (38.1-43.6)	1,685,722	37.4 (35.3-39.7)	979,966	21.8 (19.8-23.8)
Central	1,025,359	27.6 (22.6-33.3)	1,364,283	36.7 (30.5-43.4)	1,324,455	35.7 (30.7-41.0)
Mexico City	1,212,414	42.7 ([38.5-47.0)	1,034,654	36.5 (32.9-40.2)	590,299	20.8 (18.2-23.7)
Mexico State	1,595,053	33.7 (29.9-37.8)	1,850,419	39.1 (35.7-42.7)	1,286,824	27.2 (24.0-30.7)
South Pacific	1,328,451	29.5 (26.3-32.9)	1,620,376	35.9 (32.5-39.5)	1,561,379	34.6 (30.7-38.7)
Peninsula	1,268,738	35.0 (31.9-38.2)	1,274,135	35.2 (32.2-38.2)	1,082,249	29.9 (26.6-33.4)
Indigenous background						
Yes	516,613	27.5 (23.4-32.1)	763,883	40.7 (36.2-45.4)	595,474	31.7 (24.3-26.9)
No	13,785,165	39.8 (38.4-41.3)	11,969,557	34.6 (33.3-35.9)	8,846,281	25.6 (27.5-36.4)
Number of household members						
Average ±SD	14,301,778	3.17±0.04	12,733,440	3.52±0.03	9,441,755	3.42±0.04

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Table 3. Generalized path model on the contributions of multiple factors to water security and food security in the ENSANUT-Continua 2021

	Coefficient	*P*>t	Odds ratio	95% CI	
Equation 1: For water insecurity					
Number of household members	0.048	0.016	1.049	1.009	1.091
Wellbeing index					
Medium	0.491	0.000	1.634	1.384	1.931
Low	0.797	0.000	2.219	1.818	2.709
Region					
North Pacific	1.009	0.009	2.743	1.293	5.819
Central Pacific	1.299	0.000	3.664	1.825	7.356
North Central	0.861	0.010	2.364	1.226	4.559
Central	0.813	0.091	2.256	0.877	5.800
Mexico City	1.175	0.001	3.239	1.596	6.570
Mexico State	1.467	0.000	4.337	2.183	8.619
South Pacific	0.946	0.014	2.574	1.211	5.471
Peninsula	0.778	0.042	2.178	1.027	4.617
constant	-3.206	0.000	0.041	0.022	0.076
Equation 2: For moderate and severe food insecurity					
Water insecurity	0.854	0.000	2.348	2.024	2.723
Indigenous background	0.256	0.015	1.292	1.051	1.588
Rural area	0.347	0.001	1.415	1.155	1.734
constant	-1.304	0.000	0.272	0.250	0.295
Indirect effects of covariates on FI thru WFI as mediator					
Number of household members	0.041	0.014		0.008	0.074
Wellbeing index					
Medium	0.419	0.000		0.245	0.593
Low	0.680	0.000		0.472	0.889
Region					
North Pacific	0.861	0.009		0.211	1.511
Central Pacific	1.108	0.000		0.487	1.730
North Central	0.735	0.012		0.158	1.311
Central	0.694	0.112		-0.161	1.549
Mexico City	1.003	0.002		0.377	1.629
Mexico State	1.252	0.000		0.626	1.878
South Pacific	0.807	0.018		0.137	1.477
Peninsula	0.664	0.049		0.003	1.325

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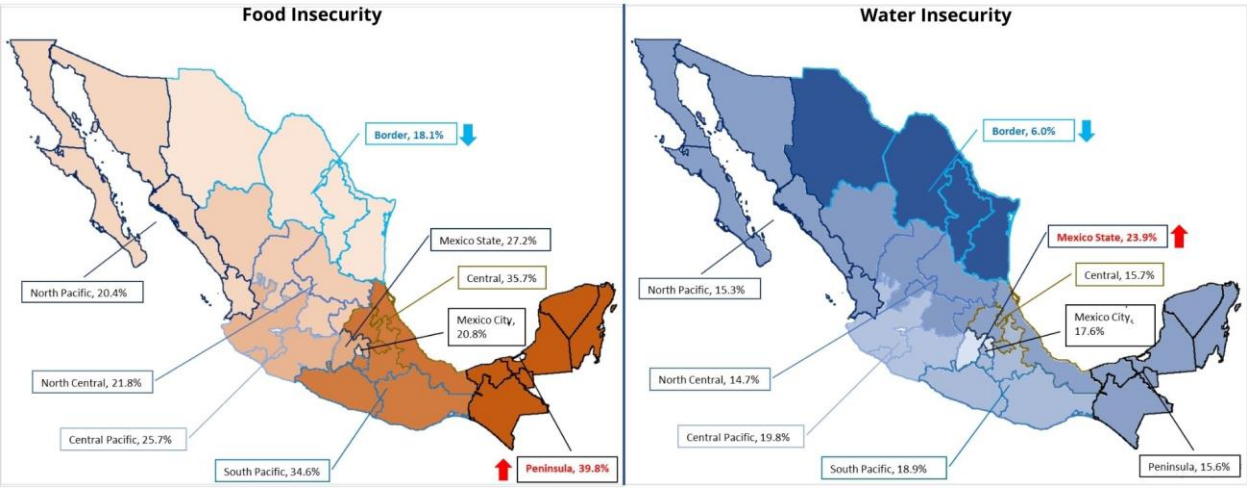

Figure 1. Proportion of households with moderate-to-severe food insecurity and water insecurity, by region of Mexico in the ENSANUT-Continua 2021.

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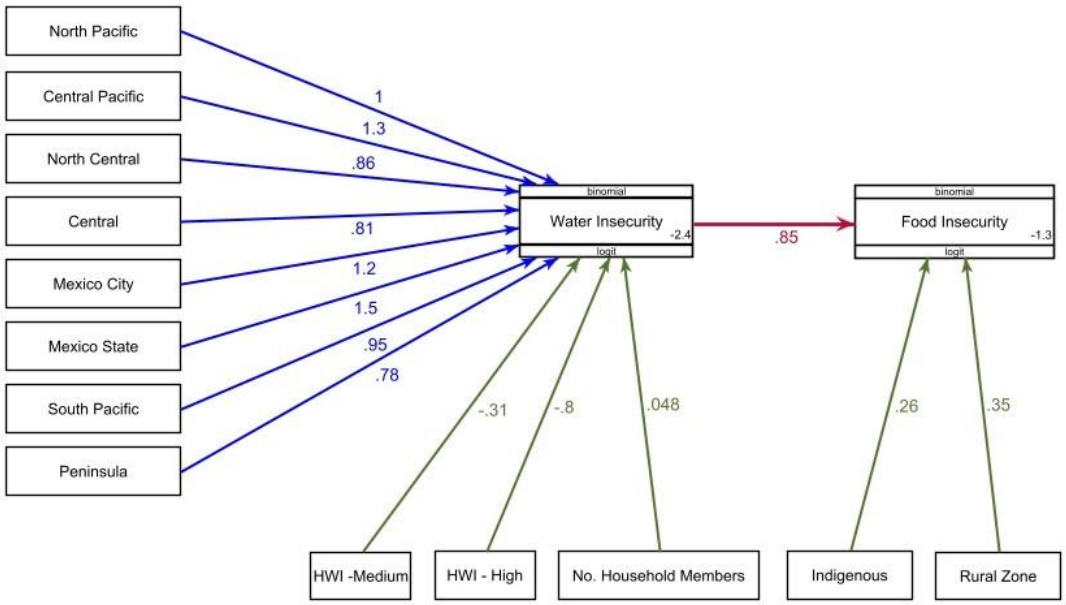

Figure 2. Visual representation of the general path analysis model of water and food insecurity in the ENSANUT-Continua 2021

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