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Food Security and Nutrition in Mexico

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Report Highlights:

This report provides a broad-based overview of the food security and nutritional situation in Mexico and highlights the areas of greatest concern. Specific challenges and affected populations are discussed, such as food security, food availability, and food access as well as populations in Southern Mexico, children under five years of age, and indigenous populations.

Executive Summary:

This report is based primarily on a wide array of publicly-available reports and summarizes the main findings concerning food security and nutrition in Mexico. Though Mexico suffers from the problem of food insecurity, food availability is not one of the causes of this problem. However, low-income households in Mexico are particularly vulnerable to increases in food prices. Moreover, food poverty is highest in the poorest regions, notably southern Mexico, reaching as high as 47 percent in Chiapas and averaging over 18 percent nationally. Unfortunately, the price of the food basket has risen significantly in recent years, while household purchasing power has deteriorated.

At least 10 percent of the residents of *all* Mexican states suffered from inadequate food access, with inadequate food access reaching between 25 and 35 percent of the populations of nine states. In addition, more than 10 percent of the populations of seven Mexican states currently fall into the category of Serious Food Insecurity. Though life expectancy and infant mortality rates are still inadequate based on the World Health Organization (WHO) GDP-based standards, these rates have improved steadily over time. The greatest problems are faced by the more impoverished states in the south, which also suffer from inadequate sanitation and a lack of running water.

Currently, Mexico is plagued by problems of malnutrition, anemia, overweight and obesity. Though acute malnutrition has dropped significantly, the prevalence of chronic malnutrition in children under five is almost 13 percent nationally, with Southern Mexico suffering the most at over 18 percent. Moreover, chronic malnutrition is significantly higher in rural areas than urban ones. In addition, one in four children is overweight or obese, and that number increases to one in three for teenagers. Nationally, over 65 percent of the adult population is overweight or obese, with the problem being more prevalent in urban populations.

Finally, the indigenous population in Mexico is significantly worse off than other groups. This population suffers from a higher nutritional risk and the over 33 percent chronic malnutrition rate of children under five dwarfs the national average.

General Information:

In February 2010, the National Council for the Evaluation of Social Development Policy (CONEVAL) published a study [1] that reviewed the major challenges to food security and nutrition for the Mexican population. The main objective of this study was to assess the response of the Government of Mexico (GOM) in addressing the major nutritional problems facing the Mexican population. The main sources of information used in this study were:

- The National Survey of Household Income and Expenditure 2008 (ENIGH 2008) [2] ;
- ENIGH Socioeconomic Conditions Module 2008 (MCS 2008) [3] ;

- The National Survey of Health and Nutrition 2006 (ENSANUT 2006) [4] ;
- The National Survey of Wholesale, Food and Nutritional Status in Rural Areas (ENAAEN); and
- The simplified module of the "Diagnostic Evaluation of Part- and Full-Time Public Primary School Environments for Mexico City and Cities in Northern and Southern Mexico" (Hospital Infantil de Mexico Federico Gómez, 2009).

CONEVAL is a public agency, which aims to regulate and coordinate the assessment of social development policy, as well as the actions and programs implemented by public agencies. According to official sources, CONEVAL is recognized for the academic and technical rigor of its studies.

CONEVAL prepared this study as part of its responsibilities and considering the significance of nutrition in Mexico. It includes a diagnosis of the population's nutritional status, specifically focusing on malnutrition, anemia, overweight and obesity.

CONEVAL carried out this evaluation to analyze Mexico's nutrition and food security status and to develop recommendations for improving the design and implementation of public policies on health and the right to food. From the perspective of food security, and based on the ENAAEN, the ENSANUT and the "Diagnostic Evaluation of the School Environment", the following results were identified in the study:

Determinants of Food Security

According to the Food and Agriculture Organization of the United Nations (FAO, 2009), "food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life."

According to CONEVAL, the problem of food security is multi-faceted. In Mexican households, food insecurity is a problem of availability, access and consumption of food. However, food security does not guarantee good nutritional status. Food should be of adequate quality and diversity as well as be consumed in a sanitary environment and by a healthy body.

Food Availability

According to FAO data, the Mexican food supply averaged 3,270 kilocalories (kcal) per capita per day between 2003 and 2005, well above the minimum requirements of 1,850 kcal per capita per day.

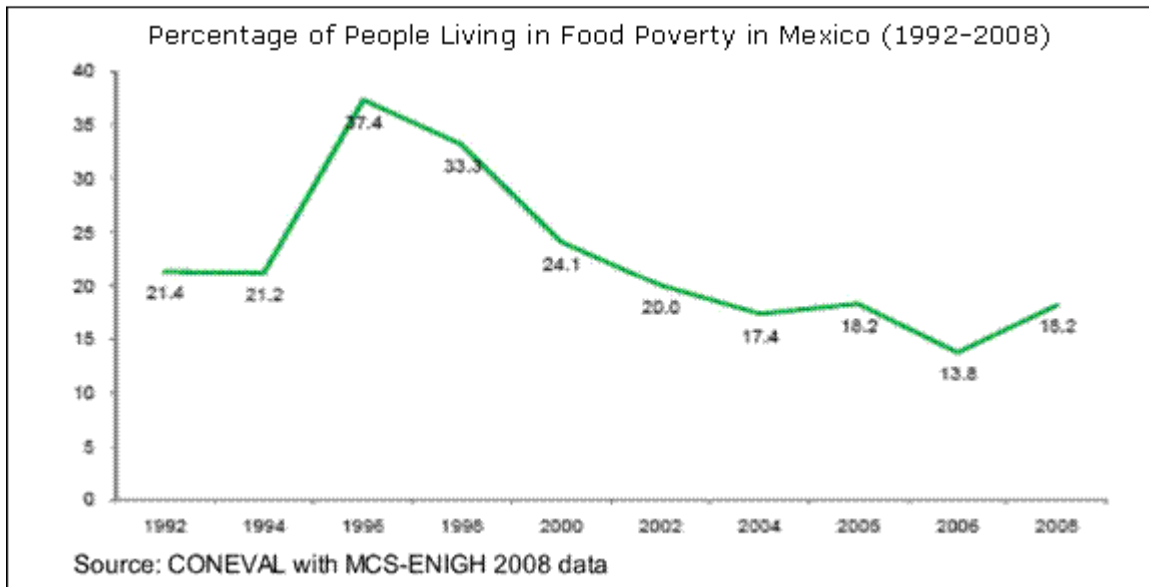
Based on this data, average consumption was actually greater than the minimum requirements and the food supply was sufficient to meet the requirements of the Mexican population.

According to the ENAAEN data obtained for 90 rural areas in 2008, all food groups were available for sale in most rural localities surveyed, including cereals, eggs, fats and sugar. More than 90 percent of these localities sold dry beans, chick peas, dairy and meat, while 86.7 percent sold vegetables and 78.9 percent sold fruit. These results suggest that food availability is not a problem for the Mexican population, both urban and rural. Hence, the problems lie in other areas.

Food Access

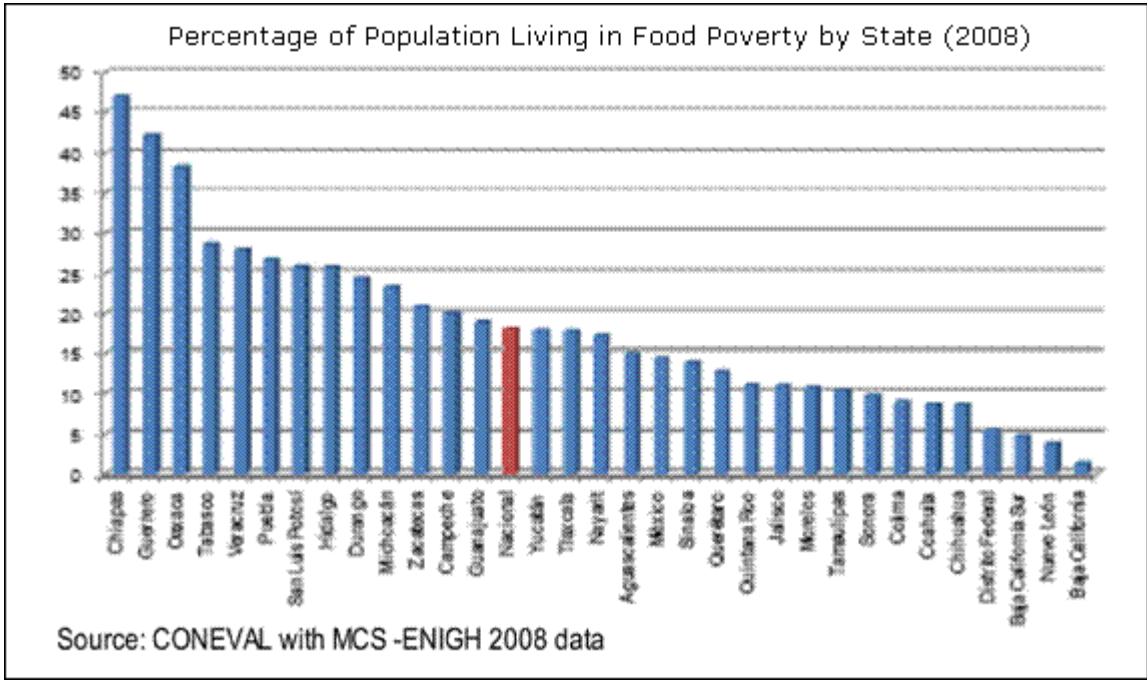
In 2008, 18.2 percent of the Mexican population was in food poverty, meaning that they did not have enough income to purchase goods from the basic basket, even if they used their total income (see Figure 1).

Figure 1



CONEVAL analysis found that the states with the highest percentages of food poverty in 2008 were Chiapas, Guerrero and Oaxaca with 47, 42 and 38 percent of their total population, respectively (see Figure 2).

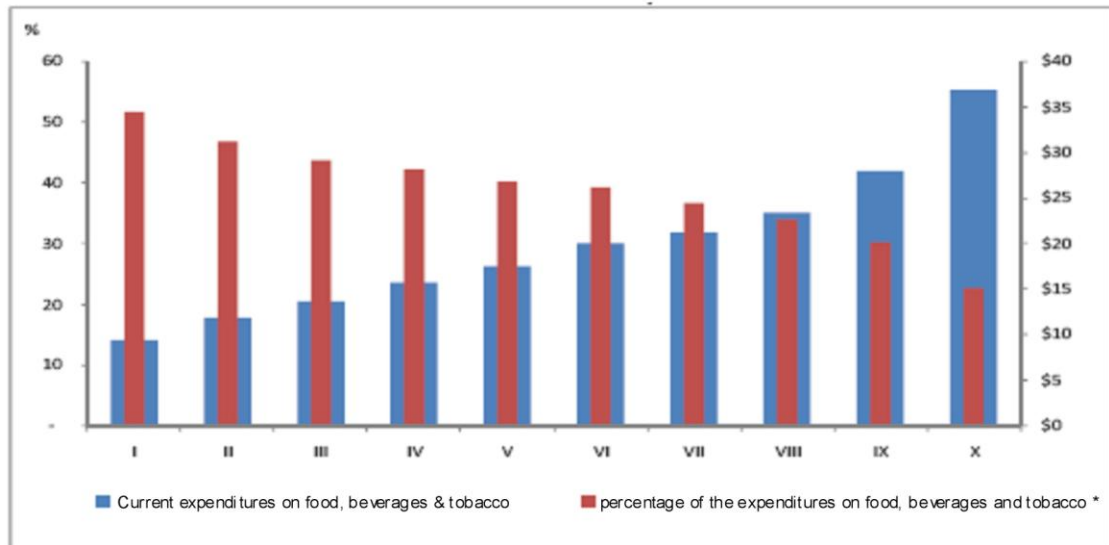
Figure 2



According to ENIGH (MCS, 2008) information, the vulnerability to food price increases grows as you move toward the lower income deciles [5]. Thus, Mexican households in the lowest income decile spent an average of 52 percent of their expenditures to purchase food, unlike those in the highest income decile, who spent only 23 percent. These results clearly show greater dependence on and vulnerability of low-income households to an increase in food prices (see Figure 3).

Figure 3

2008 Expenditures and Percentage of Expenditures Spent on Food (Billion pesos)



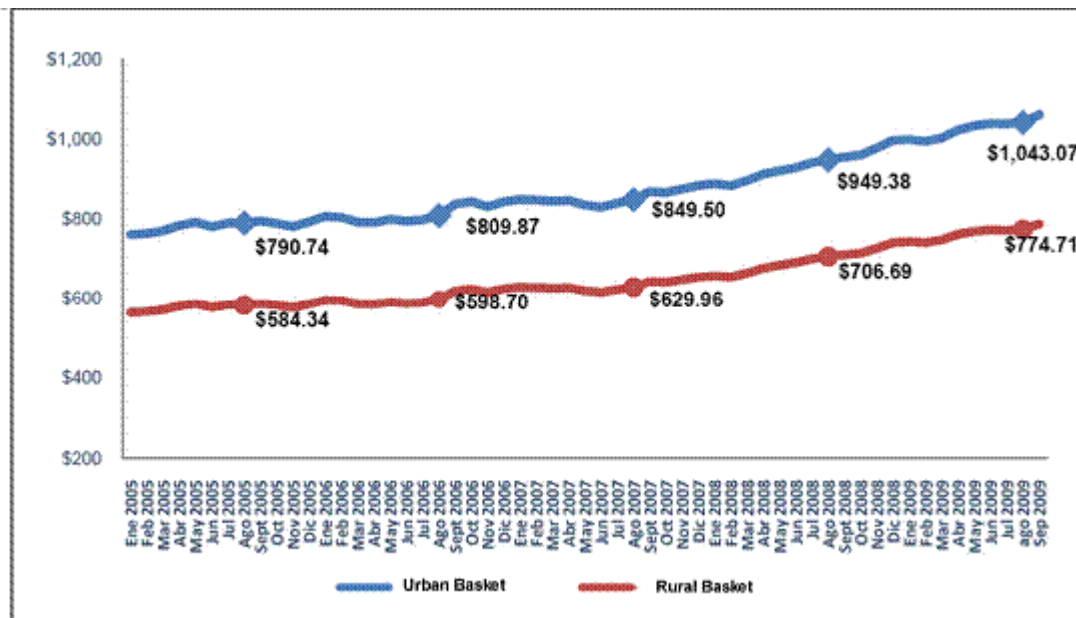
Source: ENIGH 2008 - INEGI

*PERCENTAGE OF EXPENDITURES IN FOOD REGARDING TO THE TRIMESTRAL CURRENT MONETARY EXPENDITURES

In addition, Figure 4 shows that the price of the food basket has risen significantly in the last two years and, according to the CONEVAL analysis, this has had a major impact on the evolution of poverty in the Mexican population. According to the latest estimate of food poverty published by CONEVAL, household purchasing power has deteriorated in recent years. While 13.8 percent of the population was in food poverty in 2006, this proportion increased to 18.2 percent in 2008.

Figure 4

Monthly Evolution of the Urban and Rural Food Basket from January 2005 to September 2009 (Pesos)

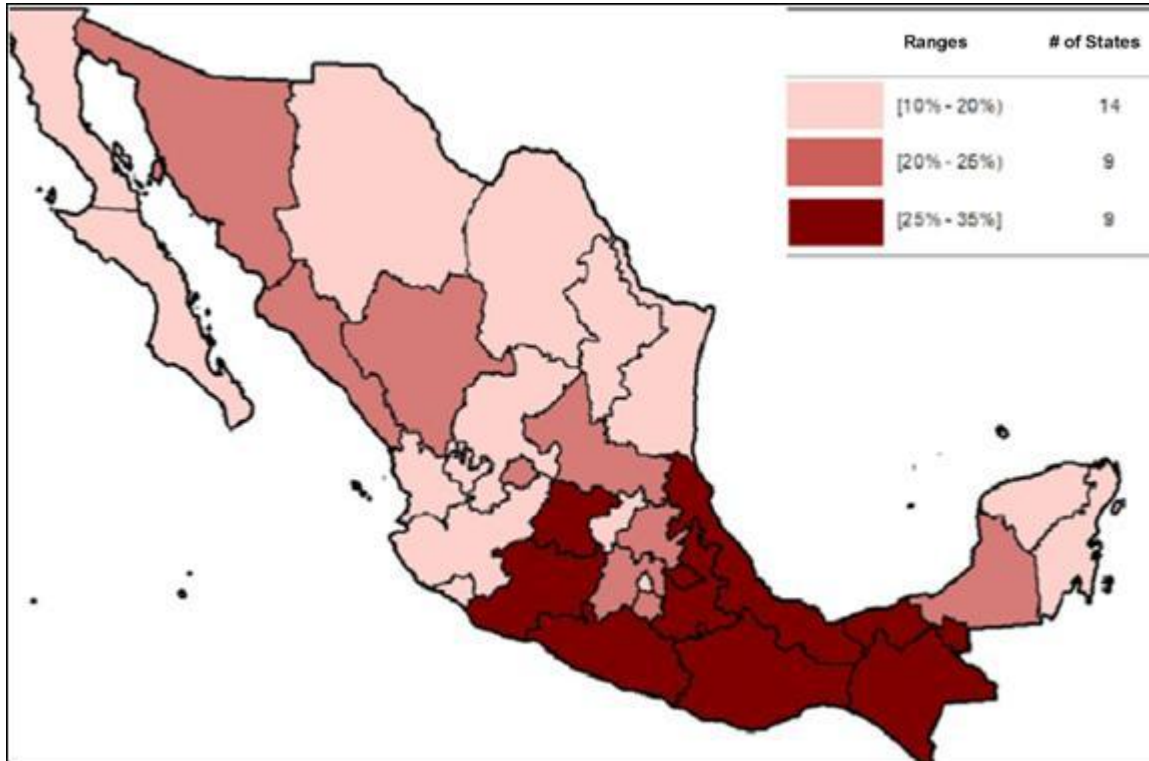


Source: Estimates by CONEVAL incorporating information from the Bank of Mexico and ENIGH 2008 (conducted by INEGI).

Moreover, according to CONEVAL’s “Multi-dimensional Measurement of Poverty” (included in its report), more than 10 percent of the residents of all Mexican states had inadequate access to food. Furthermore, Figure 5 demonstrates that inadequate food access reached levels between 25 and 35 percent in nine states in 2008.

Figure 5

Inadequate Food Access Distribution (2008)



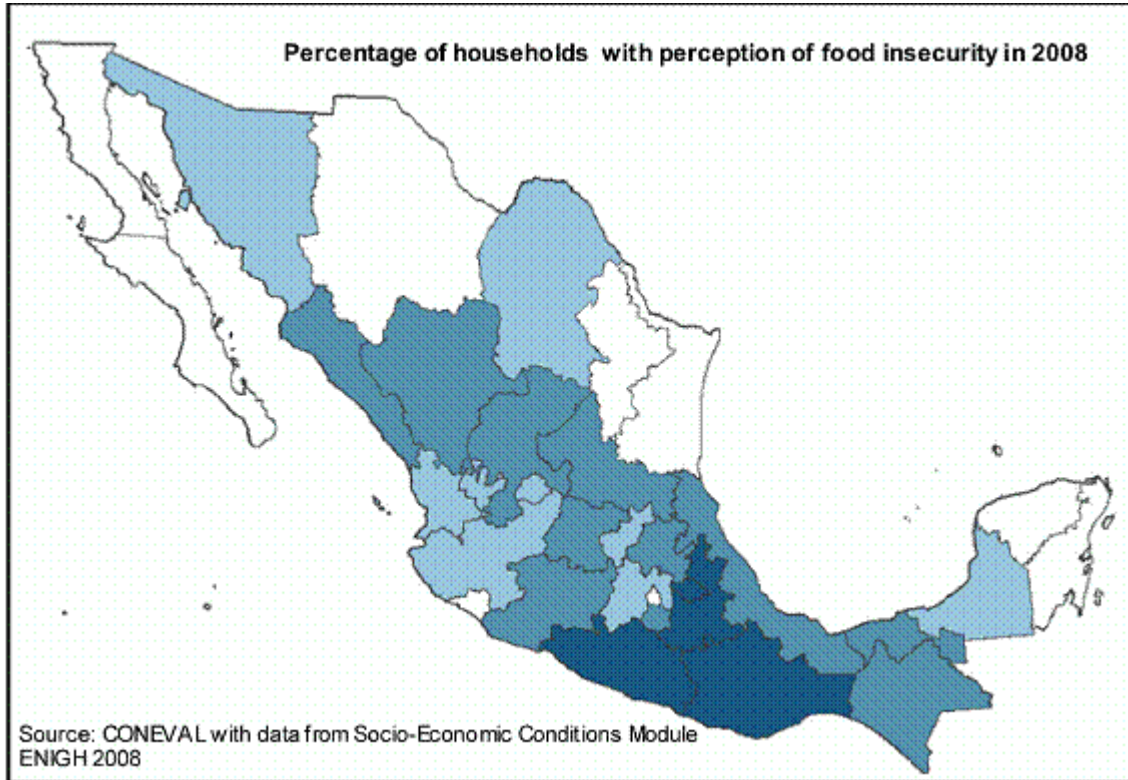
source: CONEVAL with information from the ENIGH 2008 Module of Socio-Economic Conditions (MCS), conducted by INEGI.

ENAAEN information found that in at least one of the last twelve months, 52 percent of rural households studied found they lacked enough food to meet the needs of their families (with an average of 3.7 months without adequate supplies). Moreover, the poorest deciles are those with the highest percentage of households with insufficient food, and for longer periods.

Measurement of food insecurity based on perception and experience of hunger

Analysis of the ENIGH 2008 “Module of Socioeconomic Conditions” [6], showed that more than one of every two households in Guerrero, Oaxaca, Tlaxcala and Puebla perceived that they had trouble accessing sufficient food. These states are highlighted in dark blue in Figure 6.

Figure 6

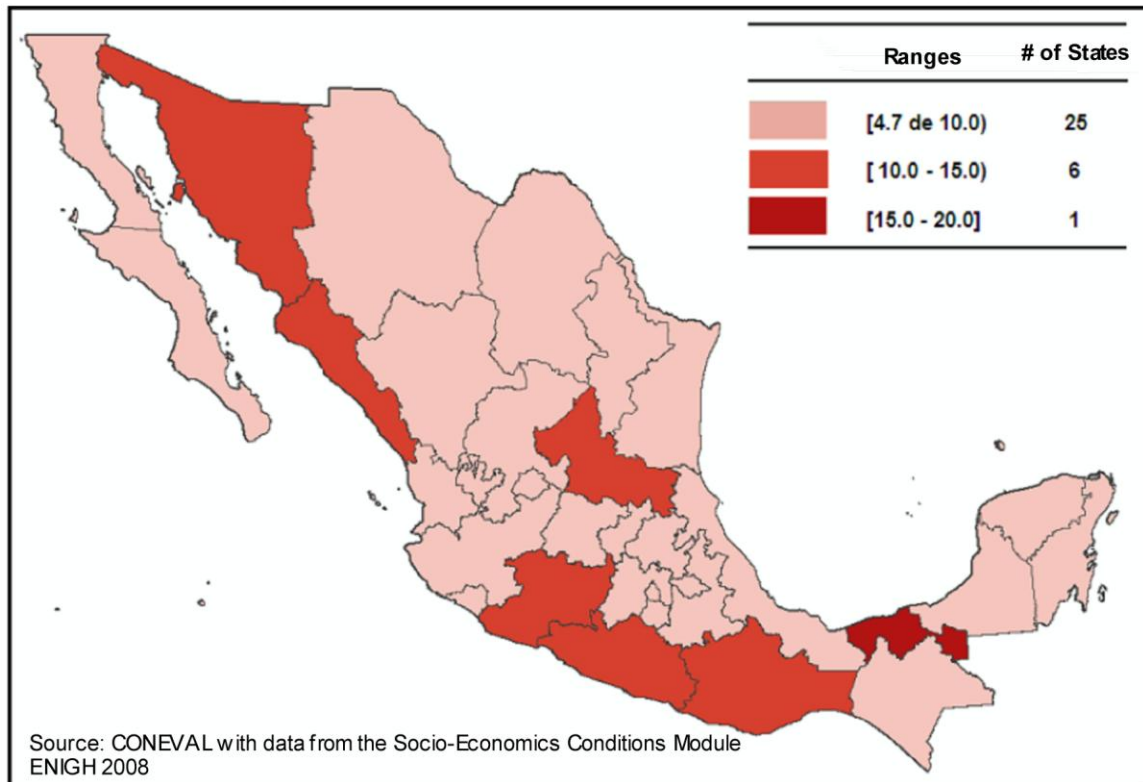


Percentage of population suffering of alimentary poverty

The following figure shows that among households that are classified as food insecure, there are seven states where more than 10 percent of households fall into the category of Serious Food Insecurity.

Figure 7

Percentage of Mexican Households with Serious Food Insecurity (2008)



Food Consumption

According to CONEVAL, the rural locations analyzed by ENAAEN consumed an average of 8.89 food groups out of the 11 groups that make up a varied diet. This result suggests that the diet of households is relatively wide. However, it does not consider the frequency and quantity of food consumed in each group. Considering these variables, it is clear that a low percentage of these households consume an adequate quantity and frequency of the different food groups based on nutritional criteria suggested by Mexico's National Public Health Institute.

This problem is more severe in the indigenous population. For example, only 10 percent of the non-indigenous rural population and 3 percent of the rural indigenous population consume meat three or more days per week. This result is important given the high levels of anemia affecting the population due to iron deficiency, according to the ENSANUT results.

Regarding the CONEVAL analysis of the "Climate Diagnostic Evaluation in Public Elementary School", the indicators show that 51 percent of children eat breakfast at home, while 9 percent eat breakfast at school. Meanwhile, 20 percent do not eat breakfast at home or at school, while another 20 percent eat breakfast both at home *and* at school.

Breakfast is made up mostly of cereals and milk (sweetened or unsweetened), while vegetables and animal products (i.e., poultry meat or beef) are virtually absent. Usually, the mother both decides the lunch menu and prepares it. In more than half of the cases, fruit and vegetables are consumed just once a week, while soft drinks are regularly included for a third of children. Surveyed children acknowledged the availability of fruit, vegetables and potable water in their households, and sometimes consumed them when struck by hunger. However, some of them also admitted to eating candies and soft drinks when hungry (Hospital Infantil de Mexico Federico Gomez, 2009).

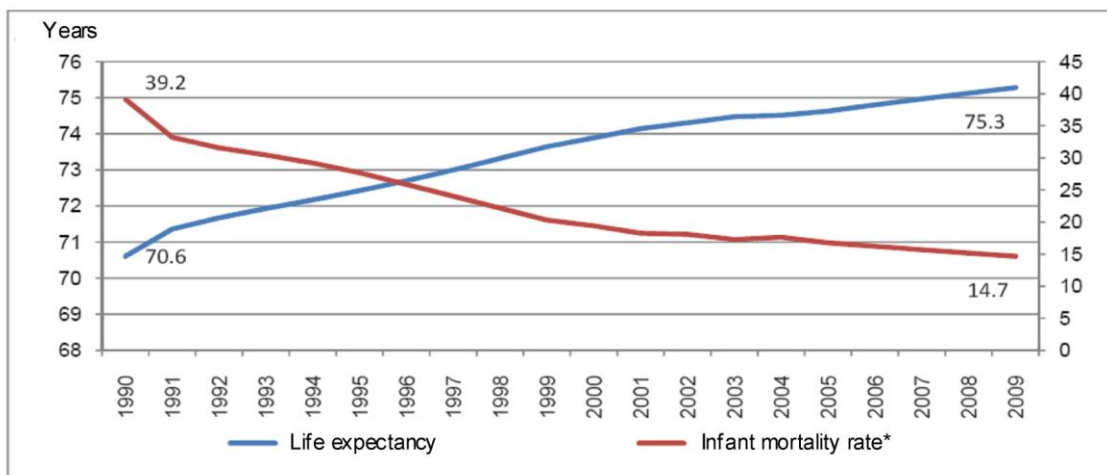
Bioavailability

One of the factors affecting nutritional status in households is bioavailability, which is directly influenced by the presence of infectious diseases. Overall levels of health and hygiene conditions in the population’s homes are also considered indicators related to food security. According to CONEVAL, it has been proven that nutritional deterioration (i.e., the prevalence of acute and chronic malnutrition and anemia) is higher when infectious diseases are common and when housing conditions are poor.

The rates of infant mortality and life expectancy at birth, which are indicators that exhibit a high correlation with the prevalence of infectious disease, along with basic sanitation and access to health services have improved over time in Mexico. Figure 8 shows the evolution of these indicators.

Figure 8

INFANT MORTALITY RATE AND LIFE EXPECTANCY 1990-2009 IN MEXICO



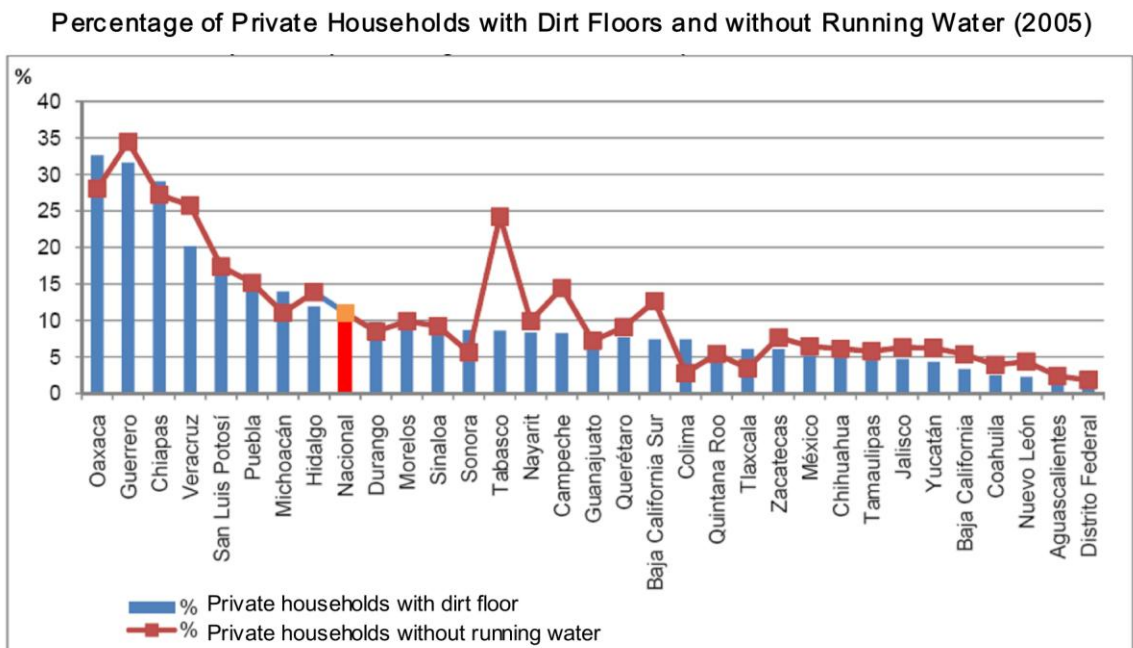
Source: CONEVAL with CONAPO data. * Number of deaths in 1-year-old minors per 1000 registered live births

Life expectancy has increased more than 6 percent in 19 years, while the infant mortality rate has

decreased significantly over the same period. Consequently, these indicators show that the conditions that allow for proper bioavailability have improved. However, considering the standards established by the World Health Organization (WHO), these rates are still far from adequate for Mexico’s gross domestic product level (GDP).

In addition, according to the 2005 National Population and Housing Count (INEGI), there are still states such as Chiapas, Guerrero, Oaxaca, and Veracruz, among others, that lack adequate sanitation in homes. More than 20 percent of homes in those states still have dirt floors or lack running water. Therefore, bioavailability may be lower in these states than in the rest of the country (see Figure 9).

Figure 9



Source: CONEVAL with data from the 2005 Population and Household Census Counting by INEGI

It should be noted that the lack of running water (Figure 9) in the regions with the highest food poverty (Figure 2) exceeds 25 percent. There are also problems ensuring the safety of drinking water.

According to the 2000 National Health Survey (ENSA), 37.6 percent of homes have water with a chlorine level below the standard (INSP, 2000) [7]. In Chiapas, for example, the 2000 ENSA reported that 80 percent of water deliveries were of substandard quality and that homes had below-standard chlorination. This is particularly disconcerting because one of Mexico’s largest food and nutrition programs is located there and its beneficiary list of children under two years of age is among the largest in the country. More than 50 percent of homes in other states such as Oaxaca, Nayarit, Michoacán,

Guerrero, Durango, Colima and Zacatecas also have below-standard levels of water chlorination.

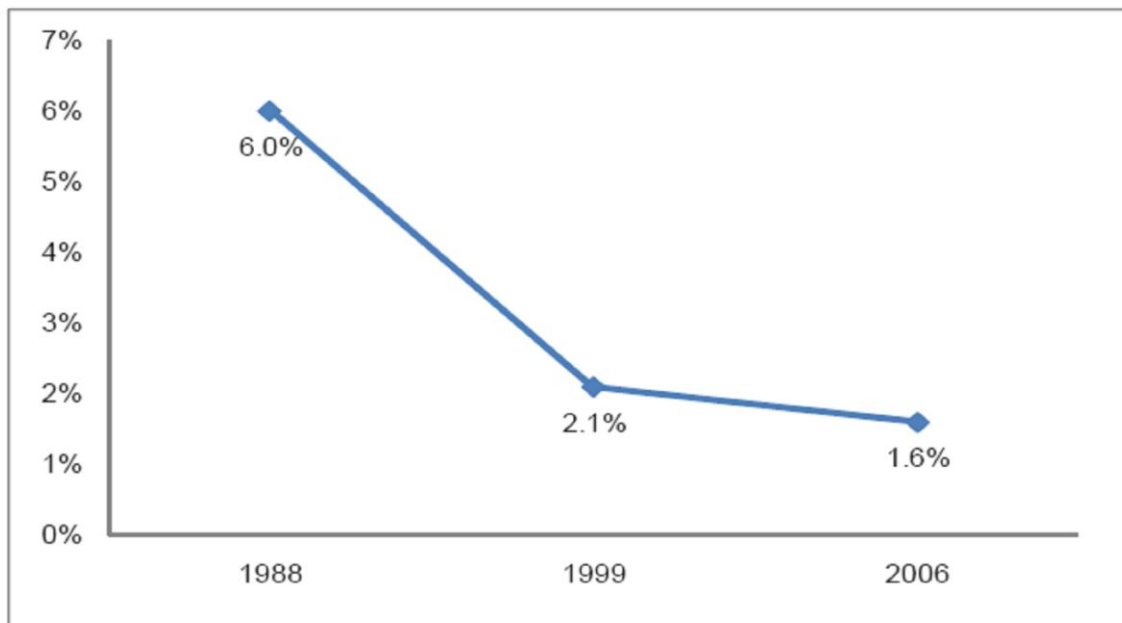
Diagnosis of Nutritional Conditions

According to the 2006 ENSANUT report (INSP, 2007), Mexico is in a nutritional transition and is simultaneously plagued by problems of malnutrition, anemia, overweight and obesity. Moreover, a recent World Bank study found that malnutrition can cost developing countries between 2 and 3 percent in GDP losses (World Bank, 2006). Applying this estimate to Mexico, it is calculated that Mexico loses up to \$250 billion pesos (over \$19 billion dollars) annually due to the effects of malnutrition on the productivity of its people.

Acute malnutrition, also known as wasting or low weight-for-height, is caused by both inadequate food intake and the presence of serious infections for prolonged periods. This condition is present in children under five years of age and adversely affects the health, skill development and survival rates for this age group. However, it should be noted Mexico’s prevalence of acute malnutrition in children under five decreased from 6 percent in 1988 to 1.6 percent in 2006 (see Figure 10).

Figure 10

Rate of Acute Malnutrition in Mexican Children under 5 (2008)



Source: World Bank and SEDESOL, *Nutrition and poverty: public policy based on evidence*, 2008

Chronic malnutrition, also known as stunting or low height-for-age, is a delay in the linear growth rates

of children, resulting from the cumulative negative effects of periods of inadequate nutrition in quantity or quality or due to the catastrophic effects of repeated acute infections. This condition occurs in the first three years of life and its consequences are irreversible, with motor development, cognitive function and school performance of children adversely affected.

According to the 2006 ENSANUT data (INSP, 2007), the prevalence of chronic malnutrition in children under five years of age is 12.7 percent. However, there are significant regional differences, with the Northern Region having the lowest rate at 7.1 percent and the Southern Region plagued by the highest rate at 18.3 percent (versus 29.3 percent in 1999). The prevalence of chronic malnutrition for this age group is considerably higher in rural areas (19.9 percent) than urban ones (10.1 percent) as shown in Figure 11.

Figure 11

Prevalence of Chronic Malnutrition in Children under 5 by State (2008)



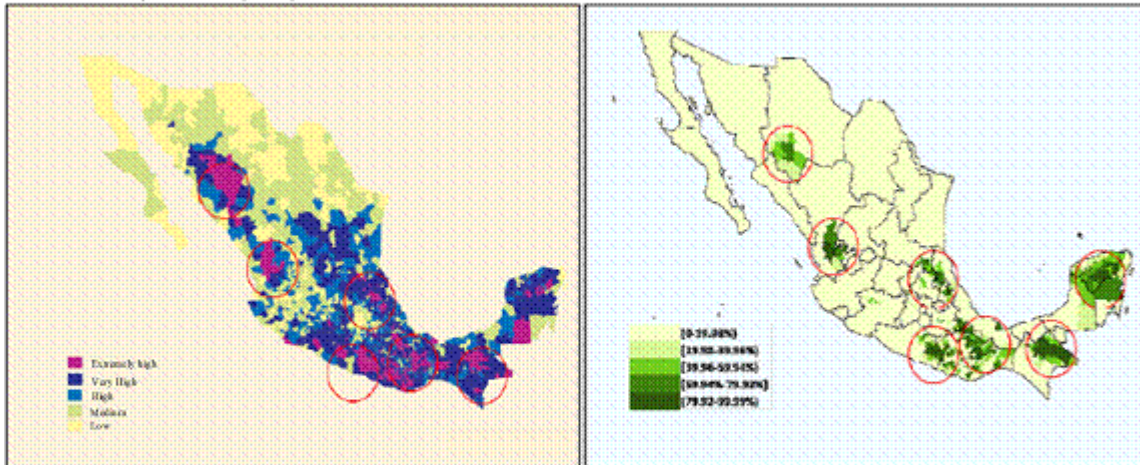
Source: CONEVAL with data from the ENSANUT 2006 *Results in nutrition* conducted by INSP

Figure 12, which displays the geographic distribution of nutritional risk (with municipalities categorized according to their percentage of indigenous population), reveals that the municipalities with higher nutritional risk coincide with the municipalities that have higher indigenous populations. The highest risk areas are located in central, southern and southeastern Mexico and in the indigenous

zone of the Tarahumara Sierra in Chihuahua.

Figure 12

Nutritional risk in 2000 by municipality and percentage of indigenous population in 2005 by municipality



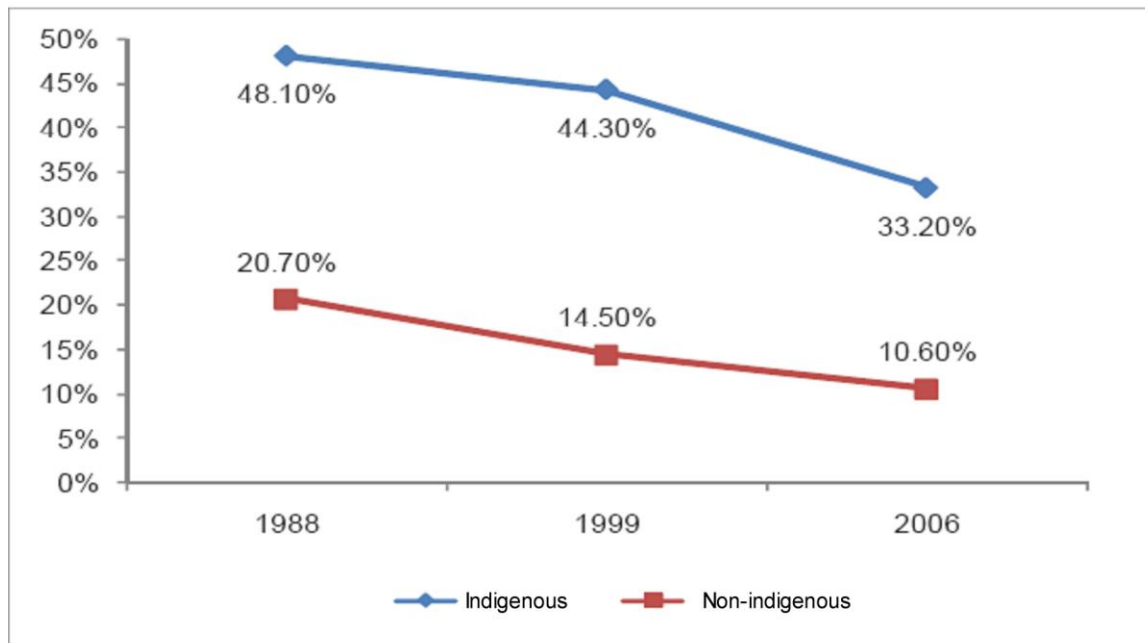
Source for nutritional risk: Medical Sciences National Institute Salvador Zubiran/ Sociedad Latinoamericana de Nutricion, 2003. Source percentage of indigenous population: CONEVAL with data from the Population and Households Counting, INEGI, 2005

Finally, in the case of the indigenous population, although the prevalence of chronic malnutrition in children under five decreased by approximately 15 percentage points between 1998 and 2006, it still stands at 33.2 percent, compared to 10.6 percent of non-indigenous children under five. Although progress has been made in addressing malnutrition for the indigenous population, this group continues to present the highest risk of malnutrition.

Figure 13 shows the decline in the rate of chronic malnutrition in children under five surveyed by ethnic status (indigenous and non-indigenous).

Figure 13

Chronic Malnutrition Rates by Ethnicity in children under 5 (1988-2006)



Source: World Bank & SEDESOL, *Nutrition & poverty: public policy based on evidence*. Mexico 2008. ENSANUT 2006 carried out by INSP.

Anemia

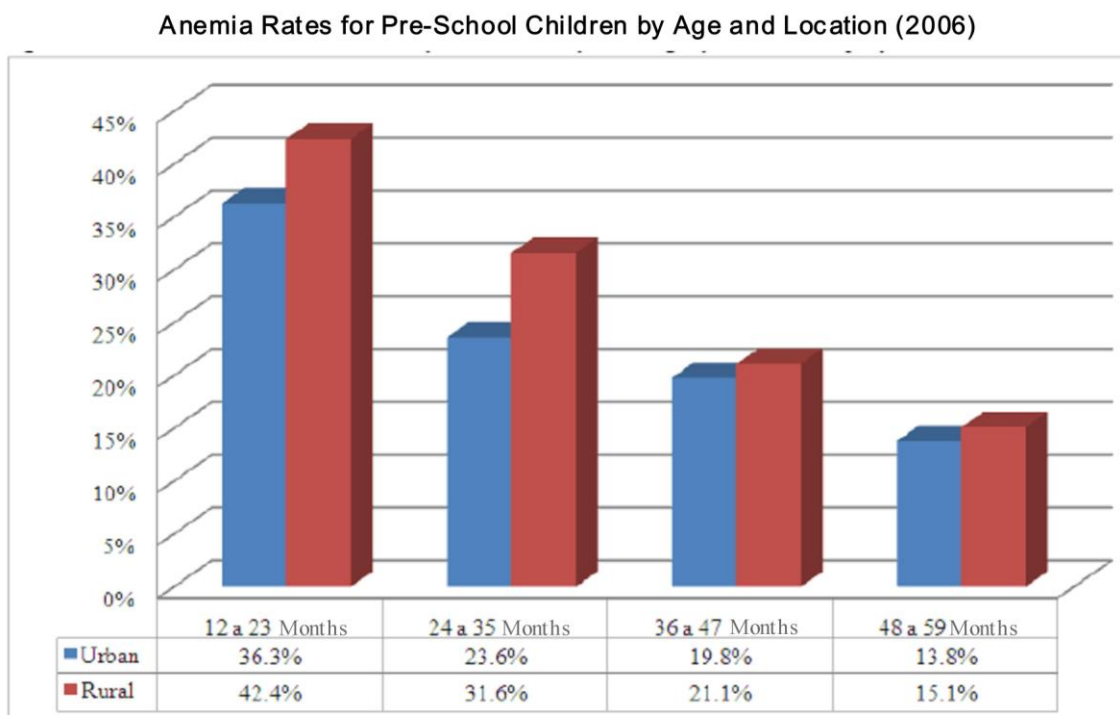
Another form of malnutrition is the deficiency of micronutrients, which can lead to a variety of diseases and damages the body's normal functioning. Anemia is among the group of illness caused by this deficiency. It is a condition in which the concentration of hemoglobin in the blood is below a minimum level, resulting in the decreased ability of red blood cells to carry oxygen to cells. More than half of anemia cases can be attributed to iron deficiency and, to a lesser extent, the deficiency of vitamins such as retinol (vitamin A), folic acid (vitamin B9) and cyanocobalamin (vitamin B12).

Children suffering from anemia during their first years of life have lower cognitive development, which leads to irreversible deficiencies in intellectual development and school performance in the medium and long term. Anemia due to iron deficiency reduces children's ability to fight infection, which has a significant impact on susceptibility to acute infections as well as growth and, in the long term, work productivity.

In Mexico, the national prevalence of anemia in all age groups remains above 10 percent. In certain populations, especially children under five and the elderly, anemia rates are above 20 percent. The highest prevalence of anemia in Mexico is found in the following groups: preschool children (23.7

percent), women of childbearing age (15.6 percent), and older adults (23.7 percent). Figures 14, 15 and 16 display the prevalence of anemia in key groups.

Figure 14



Source: CONEVAL with data based on ENSANUT 2006 *Results on nutrition* (conducted by INSP)

Figure 15

Anemia Rates in Women of Reproductive Age by Region (2006)

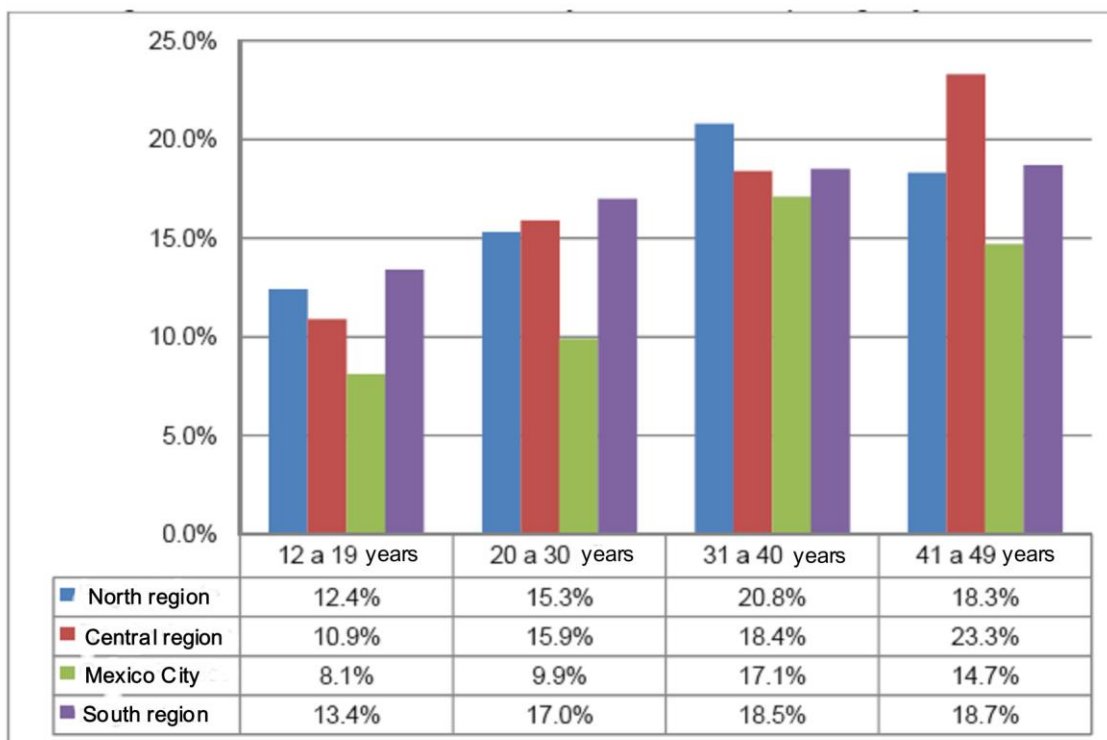
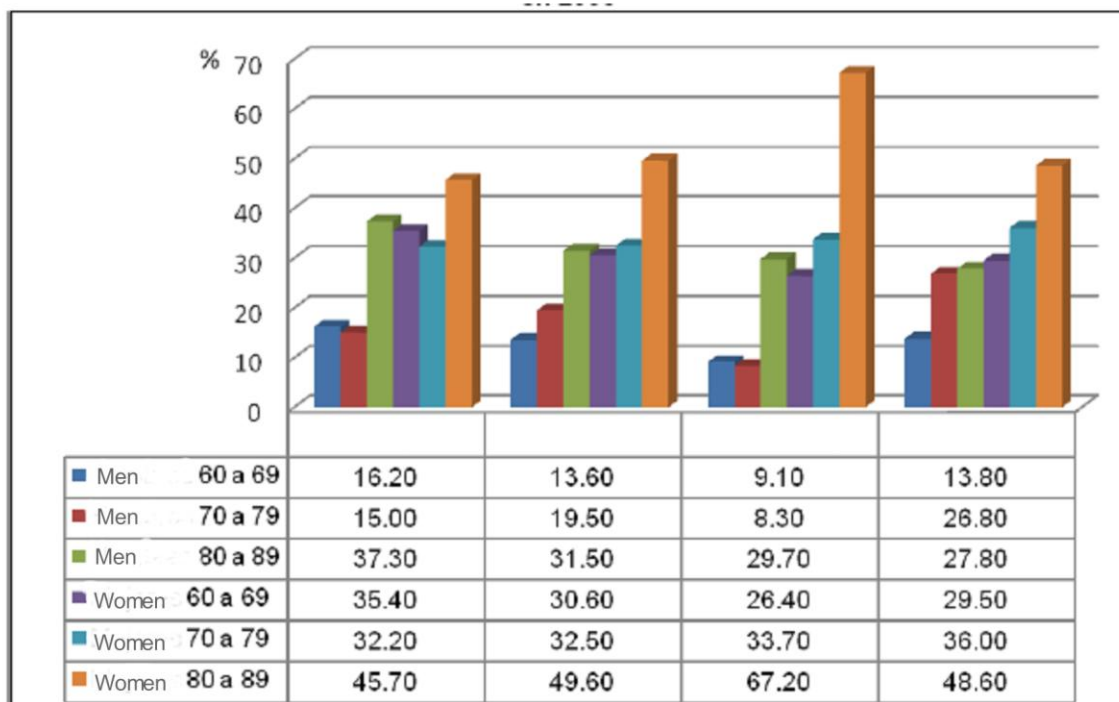


Figure 16

Anemia Rates by Age and Gender in Adults 60 Years and Older by Region (2006)

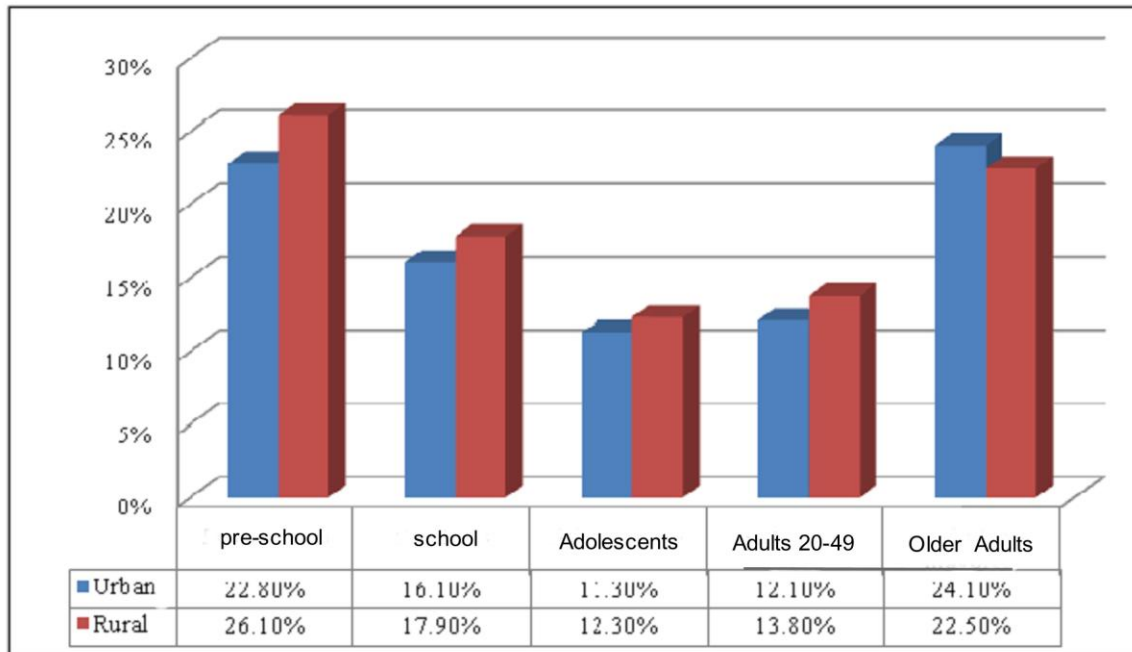


Source: CONEVAL with data from ENSANUT 2006 *Results in nutrition* conducted by INSP

Moreover, for all age groups except the elderly, the prevalence of anemia was higher in rural communities (see Figure 17).

Figure 17

Anemia Rates by Age Group and Location (2006)



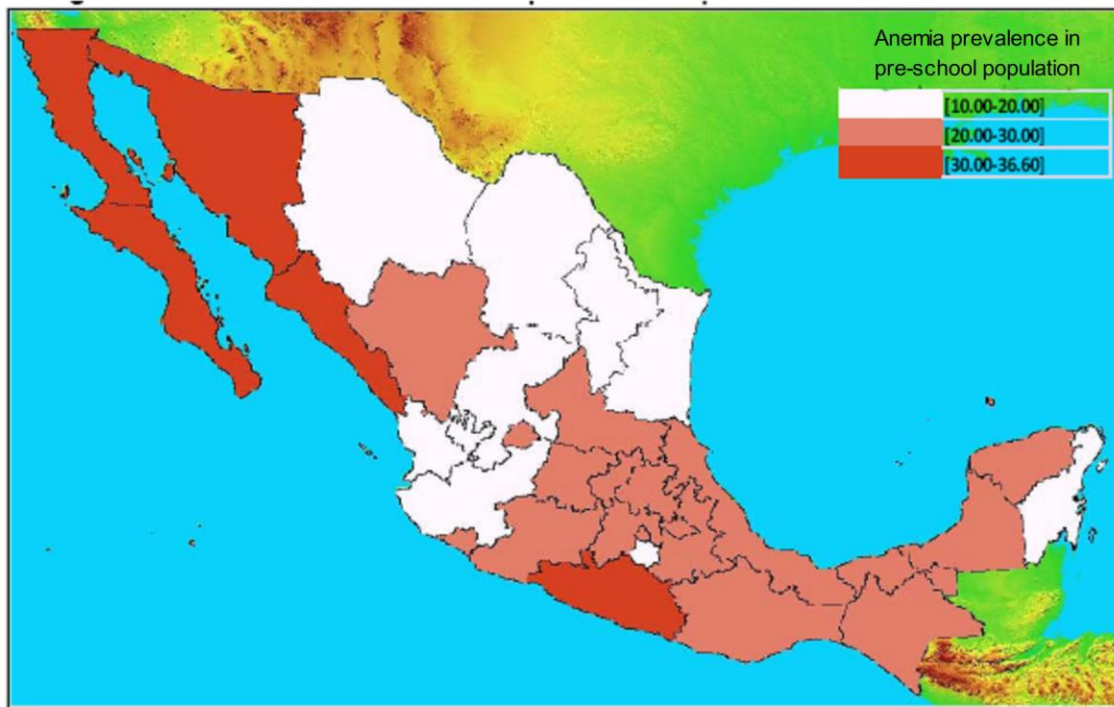
Source: CONEVAL with data from ENSANUT 2006 Results in nutrition conducted by INSP

For preschoolers, the prevalence of anemia was higher in the southern region when considering aggregate data (26.9 percent). However, the states with the highest prevalence for this age group were the following (see Figure 18):

- Baja California (36.6 percent),
- Sinaloa (34.5 percent),
- Baja California Sur (31.8 percent),
- Guerrero (32.7 percent), and
- Sonora (30.9 percent).

Figure 18

Anemia Rates in Pre-School Populations by State (2009)



Source: CONEVAL with data from ENSANUT 2006 Results in nutrition conducted by INSP

Overweight and Obesity

In recent years, Mexico has experienced a general increase of overweight and obesity in schoolchildren, adolescents and adults. Among children, one in four children is overweight or obese, while for teenagers the rate increases to one in three.

More than 65 percent of the adult population is overweight or obese, with 71.9 percent of adult women and 66.7 percent of men falling into this category (see Figure 19). The frequency of this condition is higher among urban than among rural populations. Moreover, according to Juan Angel Rivera, Director of the Center for the Study of Nutrition and Health of the National Institute of Public Health (INSP), the direct and indirect costs of obesity to the Mexican government are expected to reach \$80 billion pesos in 2010 (Cuenca, 2010).

Overweight and obesity results from an energy imbalance, with more energy (calories) consumed in the diet than energy expended. The unexpended energy in the body turns into fat, which accumulates and causes obesity. Among the factors causing an energy imbalance in the Mexican population are low

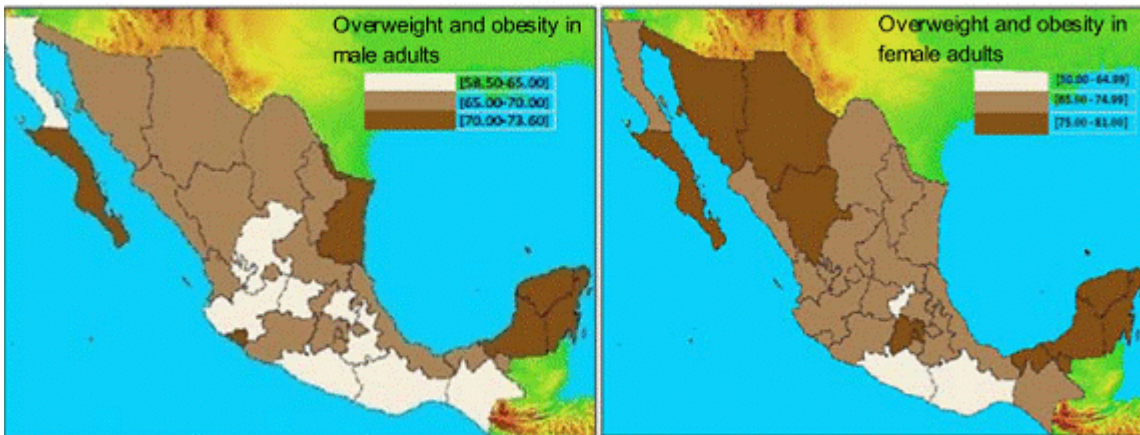
physical activity rates and high-calorie diets.

The 2006 ENSANUT results confirm these conclusions, finding sedentary behavior patterns in children and adolescents. Only a low percentage (35 percent) of this age group was classified as physically active.

A Mexican school environment case study found that children preferred consuming foods with high caloric contents to the detriment of fruits and vegetables. Moreover, Mexican schools were found to offer few opportunities for physical activity. The lack of physical activity in schools can lead to sedentary behavior and unhealthy eating, especially when coupled with the time demands of work, transportation, entertainment and eating in urban lifestyles. This situation presents a worrying picture as overweight and obesity are risk factors for developing diabetes, heart disease and certain cancers.

Figure 19

Overweight and obesity prevalence in adults by State in 2006



Source: CONEVAL with data from ENSANUT 2006 *Results in nutrition* conducted by INSP

Appendix 1

ENSANUT 2006 Household Sample Size, by State (2006)

State	Households
Aguascalientes	1 620
Baja California	1 476
Baja California Sur	1 476
Campeche	1 476
Coahuila	1 476

Colima	1 620
Chiapas	1 476
Chihuahua	1 476
Distrito Federal	1 476
Durango	1 548
Guanajuato	1 512
Guerrero	1 476
Hidalgo	1 476
Jalisco	1 620
México	1 620
Michoacán	1 476
Morelos	1 620
Nayarit	1 584
Nuevo León	1 476
Oaxaca	1 476
Puebla	1 476
Querétaro	1 512
Quintana Roo	1 620
San Luis Potosí	1 476
Sinaloa	1 548
Sonora	1 476
Tabasco	1 476
Tamaulipas	1 476
Tlaxcala	1 548
Veracruz	1 476
Yucatán	1 584
Zacatecas	1 476
TOTAL	48 600

Source: INSP, 2007.

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^[1] *Dimensions of Food Security: Strategic Assessment of Nutrition and Supply*

^[2] The ENIGH 2008 survey is based on a sample of 35,146 households distributed throughout Mexico, according to the National Institute of Statistics and Geography (INEGI, 2008a).

^[3] The MCS 2008, published by INEGI, provides a statistical panorama of the required variables necessary for reaching an accurate multidimensional measure of poverty. The report includes findings at the national, state, and local (populations both over and 2500) levels. It considers data such as income, health, education and social security, and was collected via a national survey from August 21 to November 27, 2008. The total sample is comprised of the total ENIGH 2008 sample (see footnote 3) and the total MCS 2008 survey sample (34,960 households in Mexico), which was funded by CONEVAL.

^[4] The ENSANUT 2006 survey included survey results from 48,600 Mexican households and was spread proportionately among states and socioeconomic groups (INSP, 2007). Please refer to Appendix 1 for a more detailed breakdown of the geographic sample distribution.

^[5] Decile: Any one of the numbers or values in a series dividing the distribution of the individuals in the series into ten groups of equal frequency. Also, it is one of ten segments of a distribution that has been divided into tenths.

^[6] This module studied household perceptions of the effect of scarce resources on their ability to access food (quantity and quality).

^[7] The 2000 ENSA survey is based on a sample of 45,726 households surveyed. In total, 190,214 individuals were surveyed for that report (INSP, 2000).

