Latin American and Caribbean Landscape Report of Food Security and Healthy Diets

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Acronyms

SALURBAL: Urban Health in Latin America project

CIF: Integrated Food Security Phase Classification

DDS: Dietary Diversity Score

ELANS: Latin American Study of Nutrition and Health

ENSIN: National Nutrition Survey

FAO: Food and Agriculture Organization of the United Nations

FIES: Food Insecurity Experience Scale

GDD: Global Dietary Database

GDQP: Global Diet Quality Project

INE National Institute of Statistics

LAC: Latin America and the Caribbean

MDD-W: Minimum Dietary Diversity for Women

NCD: Non-Communicable Diseases

OBSAN: Food and Nutrition Security Observatory

PoU: prevalence of undernourishment

PyENSAN: National Food and Nutrition Security Policy and Strategy (Honduras)

SES: Socioeconomic status

SISESAN: Sormation System for Monitoring and Evaluation of Food and Nutrition Security (Honduras)

UNAH: National Autonomous University of Honduras

UPFs: Ultra-processed foods

Glossary

All-5: Proportion of the population who consumed at least the five essential food groups recommended globally on the previous day, including vegetables, fruits, legumes, nuts, animal-source foods, and starches.

Dietary Diversity Score (DDS): The DDS evaluates dietary diversity based on the number of food groups consumed the previous day, with a score ranging from 0 to 10. A higher score indicates that more food groups were consumed.

NCD-Protect: NCD-Protect is an indicator that assesses dietary factors that protect against non-communicable diseases (NCDs), based on the consumption of foods associated with World Health Organization (WHO) recommendations on fruits, vegetables, whole grains, pulses, nuts, and fiber. The score ranges from 0 to 9, with a higher score indicating a more protective diet.

NCD-Risk: This indicator evaluates dietary risk factors for NCDs based on the consumption of foods associated with failing to meet WHO recommendations on free sugars, salt, total and saturated fats, and red and processed meats. The score ranges from 0 to 9, where a higher score indicates a greater exposure to risk.

Executive Summary

This report examines food security, dietary quality, and nutrition trends across Latin America and the Caribbean (LAC), revealing significant gender differences that persist across multiple dimensions of food security and healthy diets. Using data from multiple sources, including statistics from the Food and Agriculture Organization (FAO) of the United Nations, the Global Diet Quality Database [1], harmonized multisite studies such as the Latin American Study of Nutrition and Health (ELANS) and Urban Health in Latin America (SALURBAL) project, and systematic reviews, the analysis applies the four principles of healthy diets (adequacy, balance, diversity, moderation) to assess regional nutrition status and highlight critical gender gaps. This work is funded by the CGIAR Science Program on Better Diets and Nutrition, and it is timely as Latin America and the Caribbean have undergone and are undergoing a significant nutrition transition, with rising rates of obesity and diet-related non-communicable diseases, while still experiencing substantial food insecurity. The findings are essential for informing evidence-based policy interventions and programs to achieve the Sustainable Development Goals and for advancing gender equity in the region. The primary audience includes policymakers, public health officials, development practitioners, researchers, and nutrition program managers in LAC countries who are designing and implementing food security and nutrition policies and strategies.

Key findings

1. **In LAC, food insecurity affects predominantly urban and peri-urban areas, and women**. Urban and peri-urban areas are home to approximately 75% of the food-insecure population in the Latin American and Caribbean (LAC) region, as well as globally.
2. **LAC has the world's largest gender gap in food insecurity**. Gender gaps in food insecurity in LAC are among the highest globally, exceeding those in Sub-Saharan Africa and South Asia, and were already larger even before the COVID-19 pandemic.
3. **LAC countries fail to meet most of the healthy diet principles**. While the region achieves dietary diversity with an average of six out of 10 food groups consumed, it falls short on three critical principles of a healthy diet: adequacy (especially vitamin E intakes), balance, and moderation. The energy balance remains poor due to very low physical activity levels and excessive consumption of unhealthy, energy-dense foods.
4. **LAC countries show inadequate consumption of health-protective foods (vegetables, fruits, and legumes) while over-consuming sugary and processed foods.** This pattern reflects the region's export-focused agricultural systems, which prioritize commodity production over ensuring an adequate domestic supply of nutritious food for local consumption. The domestic supply of sugar in LAC is 12 times the recommended intake.
5. **Men consume more unhealthy foods than women**. Gender differences were noted across diversity, moderation, and balance principles, with men consistently showing higher consumption of sugary foods, beverages, and processed foods compared to women.

[1] https://globaldietarydatabase.org/

Introduction

At the heart of food systems lies a vital intersection between four interconnected dimensions: food security, diets, nutrition, and health. Each represents a different layer of the same ecosystem, one that can't be understood or transformed in isolation. Food security ensures access to enough food, while diet quality determines whether that food can truly nourish. Nutrition connects what people eat to how their bodies function, and health reflects the broader social, economic, and environmental consequences of these interlinked systems.

Historically, policy and research have tended to address these domains separately. Yet today, their conceptual overlap is fundamental to achieving sustainable development. The classic hierarchy that links food sufficiency to food and nutrition security illustrates this continuum. At the most basic level, food sufficiency means having enough calories to meet energy needs. Food security adds stability, accessibility, and cultural acceptability. Nutrition security, the broadest concept, integrates both with the assurance that diets provide adequate nutrients and health-promoting qualities to prevent disease and sustain well-being.

According to The State of Food Security and Nutrition in the World 2024 (FAO et al., 2024), between 713 and 757 million people worldwide faced hunger in 2023, roughly one in every eleven people on the planet. Beyond hunger, an estimated 2.33 billion people experienced moderate or severe food insecurity, meaning they lacked regular access to safe and nutritious food. These figures reveal not only a persistent gap in food availability but also an urgent challenge in ensuring that what people can access leads to good health.

The situation in LAC presents a complex picture. The region's prevalence of undernourishment was 6.2% in 2023 (equivalent to ~ 41 million people), lower than the global average of 9.1%. At the same time, 28.2% of the region's population experienced moderate or severe food insecurity, marking the first time this rate fell slightly below the global average. However, Latin America and the Caribbean (LAC) remains the region with the highest cost of a healthy diet, estimated at US$4.56 per person per day (PPP), a figure higher than in any other region. Additionally, the region has one of the largest gender gaps in food insecurity worldwide, disproportionately affecting women and people living in urban and peri-urban areas. These disparities underscore that even where food is available, affordability and quality remain major barriers to nutrition and health.

This scenario calls for incorporating food security and nutrition into public policy agendas through gender-sensitive and territorially inclusive approaches that foster equitable and resilient food systems. This interplay of access, quality, and utilization reveals the importance of treating food and nutrition security as part of a shared continuum. A person may have enough to eat but still lack the vitamins, minerals, or dietary diversity required for optimal health or, conversely, may consume excess energy from ultra-processed, nutrient-poor foods that increase the risk of chronic diseases. This double burden of malnutrition, the coexistence of undernutrition and overweight or obesity, is now a defining feature of food systems in the region, driven by rapid urbanization, market concentration, and lifestyle changes.

Recognizing this overlap leads to a broader, systemic understanding: ensuring adequate food quantity is not sufficient. Transformation requires that the available food be diverse, affordable, safe, and aligned with both ecological and social well-being. It means looking beyond calories to understand how production practices, market dynamics, gender inequalities, territorial conditions, and cultural preferences shape what people eat and how healthy they can be.

Ultimately, understanding the conceptual overlap between food security, nutrition, and health invites a shift in perspective: from fragmented interventions to coherent, system-based action. It reframes food, not only as sustenance, but as a bridge between equity, biodiversity, climate resilience, culture, and human development. In this light, the transformation of food systems becomes not just a technical goal, but a collective commitment to ensure that every person—regardless of gender, geography, or income—can enjoy a healthy diet that sustains both people and the planet.

This report provides an in-depth analysis of the current situation in LAC, highlighting gender and geographic disparities. It aims to generate evidence to inform policy decisions and guide comprehensive strategies that enhance nutrition and reduce inequalities across the region. To this end, we conducted a scoping review on food security, healthy diets, and nutrition-related health trends in Latin American countries, focusing on those where the Alliance has an active presence or strategic interest. Regional (Central, South, and Caribbean) and country-level perspectives are presented where data are available.

Conceptual overlap of food and nutrition security, diets, and nutrition and health

Food sufficiency, food security, and nutrition security represent interconnected yet distinct concepts that form a nested framework for understanding dietary adequacy and health outcomes (Thorndike et al., 2022). Food sufficiency, the most basic level, focuses on having adequate quantities of food to meet caloric needs, while food security encompasses both sufficiency and the assurance of consistent access to adequately nutritious food through culturally acceptable means. Nutrition security represents the most comprehensive concept, defined by the American Heart Association as "an individual or household condition of having equitable and stable availability, access, affordability, and utilization of foods and beverages that promote well-being and prevent and treat disease" (Thorndike et al., 2022).

The conceptual relationship demonstrates that food security requires food sufficiency as a foundation, while nutrition security requires both food sufficiency and food security, with all three concepts forming overlapping circles where nutrition security encompasses the broadest scope. This nested relationship is evident in measurement approaches, where significant overlap exists between food insecurity and food insufficiency assessments, yet nutrition security extends beyond economic access to include considerations of diet quality, cultural acceptability, and health-promoting food utilization. Understanding these conceptual distinctions is critical for developing comprehensive policies and the use of appropriate tools that address not only food access but also the dietary quality necessary for preventing chronic diseases and promoting optimal health outcomes across diverse populations.

Approach

Our approach to summarizing the current status of food security, diets, nutrition, and health involved a multi-pronged data scraping exercise using publicly available global datasets, national statistics, and systematic reviews, supported by grey literature and reports as needed. Food security, dietary intake, and trends, as well as nutritional status, in the selected countries are dispersed across various sources and are generally not unified to distill trends and drivers. Table 1 provides an overview of the measures, indicators, sources, and availability of intersectional data to examine inequalities in diet, nutrition, and health outcomes.

Table 1. Databases, indicators, and availability of sub-regional intersectional data.

Measure	Indicator	Source	Inter-sectional data availability	Used in this report?
Food Security	Food Insecurity Experience Scale (FIES)	FAO, see index https://bit.ly/3MBDZbF	Country-level data available (possibly by urban and rural settings); it would be ideal to obtain sub-regional data	Yes
	Integrated Food Security Phase Classification (IPC)	https://bit.ly/3XvNbkc	Country and sub-regional level data available	Yes
Diet Quality	Global Diet Quality Project—Dietary diversity, NCD-protect, and NCD-risk, % consuming vegetables, number of food groups consumed, and other indicators	https://www.dietquality.org	Data available, by rural, urban, and sex.	Yes
	Alternative Healthy Eating Index	Overall consumption of healthy and unhealthy food groups	No	No
	Harvard Dataverse + CG databases*	Search for dietary diversity, or vegetable consumption.	Not searched.	No
	Systematic Reviews or summary from harmonized studies across Latin America	Search for dietary diversity, or vegetable consumption.	NA	Yes
Dietary and Nutrient Intakes	FAO GIFT Surveys	https://bit.ly/440GElo		No, because the surveys are older and/or specific subpopulation
	Global Dietary Database (GDD)	Bayesian estimates of intakes using nationally representative data, developed by the Tufts group	Data available by 1 dimension: sex, age, rural-urban binary.	Yes

	Harvard Dataverse+ CG databases* [2]	Search for 24-hour recall or Quantitative food and nutrient intakes or vegetables.		No
	Systematic Reviews or summary from harmonized studies across Latin America	Search for 24-hour recall or quantitative food and food group and nutrient intakes.		Yes
Nutritional + Health Status	NCD-RISC database, underweight, overweight, obesity, hypertension, diabetes	https://ncdrisc.org	Yes, has data over decades, and on rural-urban and by sex, and the intersection of those two axes	Yes
Health	IHME and Global Burden of Disease	Mortality and Morbidity due to Dietary risk factors	Country level	Yes
Health	Web of Science or Google Scholar (limit to 2015)	Search for - Double and triple disease burden + country name	Not searched	Yes
Health	DHS and MICS studies	Some of this fed into NCD-Risc dataset from above but there might be data available by inequalities	Yes, by rural-urban, sex, and age	No, because this is fed into the NCD-Risc database above

For food security, we use two measures to summarize the current status in LAC. The first food security metric is sourced from the FAO, which utilizes the World Gallup Poll for data collection using the Food Insecurity Experience Survey (FIES) tool—an eight-question survey that asks individuals about their experiences with food insecurity over the past 12 months. The second commonly used food security indicator is the Integrated Food Security Phase Classification (IPC), which is based on evidence-based consensus developed by on-the-ground experts using local knowledge. The IPC is commonly employed in fragile contexts, including conflict-affected areas and regions vulnerable to climate-change impacts.

There are numerous ways to characterize nutritional exposures, including multiple indicators that describe diets in terms of dietary patterns, quality, quantity, adequacy, moderation, and composition, as well as meal frequency and timing. For the purposes of this report, we apply the four principles of the healthy diet framework to present the current nutritional status in the LAC region. Healthy diets are a powerful determinant of population nutrition and health outcomes. Recently, the FAO and WHO released a joint report on the principles of healthy diets, as illustrated in Figure 1, which emphasizes four key components: adequacy, balance, diversity, and moderation (FAO and WHO, 2024).

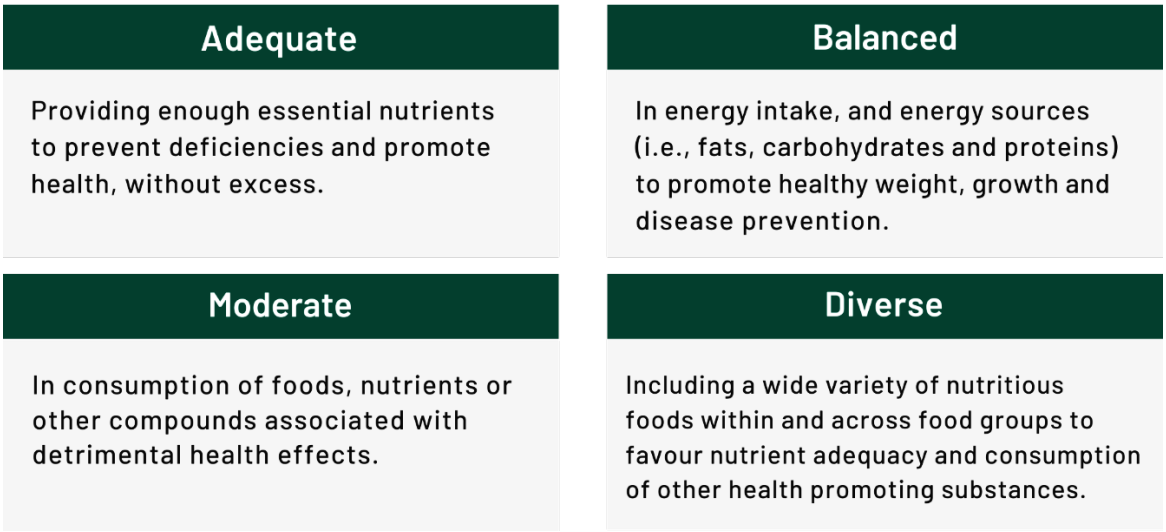


Figure 1. Four principles of a healthy diet
Source: Adapted from FAO-WHO report, 2024.

Nutrient intakes estimated from quantitative surveys, such as 24-hour recalls, are compared to recommended dietary allowances to assess adequacy. Some LAC countries, such as Colombia, Ecuador, Mexico, and Peru, routinely collect national-level quantitative dietary data. Others conduct one-off data collections, often in

[2] https://www.anh-academy.org/scanr/research-guidance/data-repositories

collaboration with external universities or institutions, such as those in Honduras and Bolivia. It is essential to note that many of these surveys are conducted only once every decade. Figure 2 shows that LAC countries have fewer dietary surveys (both national and subnational, although the LAC region has fewer countries) than Africa and Asia, presenting a significant opportunity to engage national statistical institutions in expanding this critical data collection (De Quadros et al., 2022). For adequacy and balance, we summarize results from the Latin American Study of Nutrition and Health (ELANS), which has the most recent data (Gómez et al., 2020; Busso et al., 2021). The ELANS study is a harmonized cross-sectional, multicenter study conducted across eight urban Latin American populations, with data on 24-hour quantitative recall, physical activity, and anthropometry.

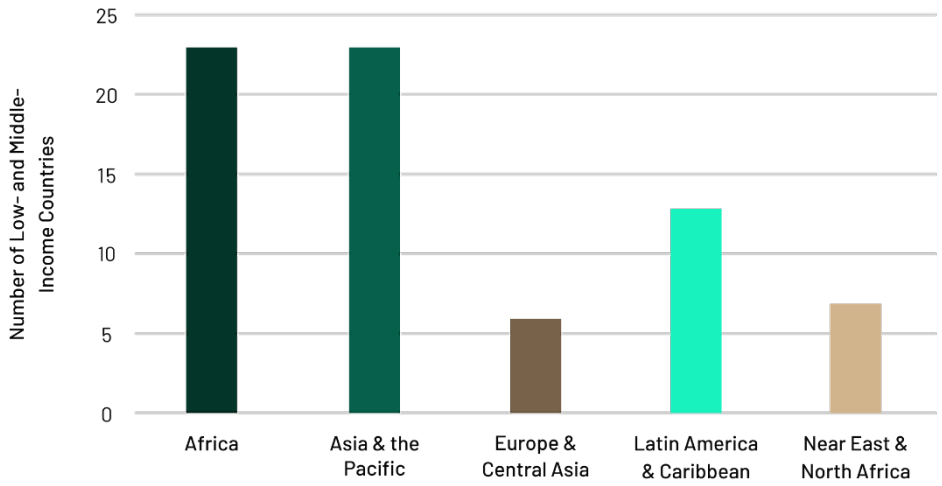


Figure 2. Number of quantitative nationally representative dietary surveys collected among low- and middle-income countries from 1980 to 2022.
Source: Adapted from De Quadros et al., 2022.

For diversity and moderation, we draw from multiple diet quality indicators from various sources. The most recent publicly available resource is the Global Diet Quality Database, which compiles country-specific diet quality questionnaires from around the world to summarize multiple measures of dietary quality. These diet quality measures are of particular interest to researchers and practitioners because the tools are easy to use and are more cost-efficient than conducting detailed quantitative 24-hour recalls for nutrient intake assessments. Depending on the specific diet quality metrics employed, numerous validation studies have been conducted that examine correlations with micronutrient adequacy and diet-related non-communicable diseases. Although many dietary indices tend to be highly correlated, they provide valuable measures for addressing different contextual challenges.

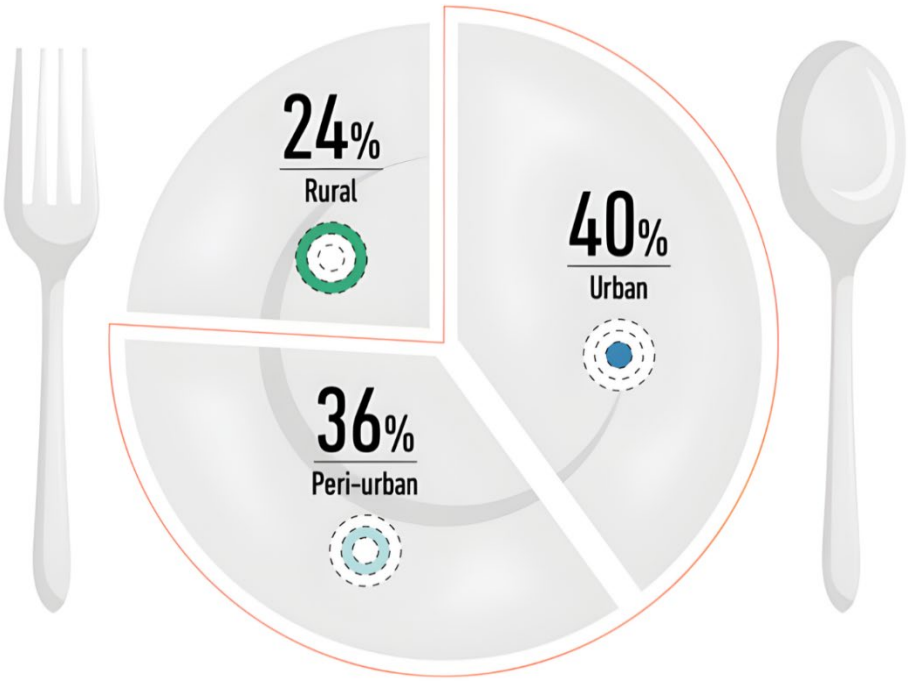
What are the significant food (in)security trends in LAC?

Food insecurity in LAC is primarily urban and gendered: 76% of food-insecure people globally and 74% in LAC live in urban and peri-urban areas. Compared to other regions, LAC has the most significant gender gap in food security between women and men—a disparity that existed even before the pandemic. Overall, the LAC region has a lower prevalence of undernourishment (6.1%) compared to the global average of 9.1% (FAO et al., 2023). The prevalence of undernourishment (PoU) refers to caloric availability—the quantity aspect of food security—measured by food balance sheets at the national level. Regional estimates in LAC mask significant disparities in food security. The Caribbean region has seen a rise in PoU in recent years, with a current estimate of 17.2% In comparison, Central America remains unchanged at 5.8%, and South America has experienced a decline in PoU, with a current estimate of 5.2%.

Globally, nearly a third of the population (28.9%) experiences severe or moderate food insecurity, as measured by the Food Insecurity Experience Scale (FIES), which assesses household perceptions of food security (FAO et al., 2023). LAC's severe or moderate food insecurity rate (28.2%) is comparable to the global average. Regionally, the Caribbean has the highest prevalence of food insecurity (58.8%), with some fragile countries such as Haiti experiencing severe or moderate food insecurity in over 80% of households. Central America has an average of 28.2% moderate or severe food insecurity, and South America has 25.1%.

Further disaggregation reveals urban disparities. The recent High Level Panel of Experts report on urban and peri-urban food systems published landmark statistics showing that 76% of the global food-insecure population resides in peri-urban and urban areas (Figure 3, Panel A) (HLPE, 2024). Figure 3 (Panel B) illustrates an iceberg plot of regional prevalence (light green at the top) and absolute numbers (dark green at the bottom). Overall, 248 million people in the LAC region experienced moderate to severe food insecurity in 2023. Similar to the global average, 74% of these individuals reside in urban and peri-urban areas. The difference between relative percentage and population headcount, and how these indicators may obscure how we understand food insecurity, has been well documented (Pingali, 2016). The drivers of food insecurity are occurring through two-way synergistic effects, primarily driven by population growth in these locations and the urbanization of peri-urban and rural areas, i.e., both densification and expansion. This is particularly relevant for LAC because urbanization rates took off dramatically during the 1950s–1990s, during which an estimated 70% of the population became urban (Ebanks, 1993; Romero-Lankao and Gnatz, 2013). Urbanization has implications for both food security and nutrition, and the broader food systems, most notably in terms of land-use change, market systems, ecosystem services, and related governance.

Panel A. State of Food Security by urban, peri-urban, and rural area (2023).



Panel B. State of Food Insecurity by urban, peri-urban, and rural relative percentage (light green) and absolute population headcount (dark green).

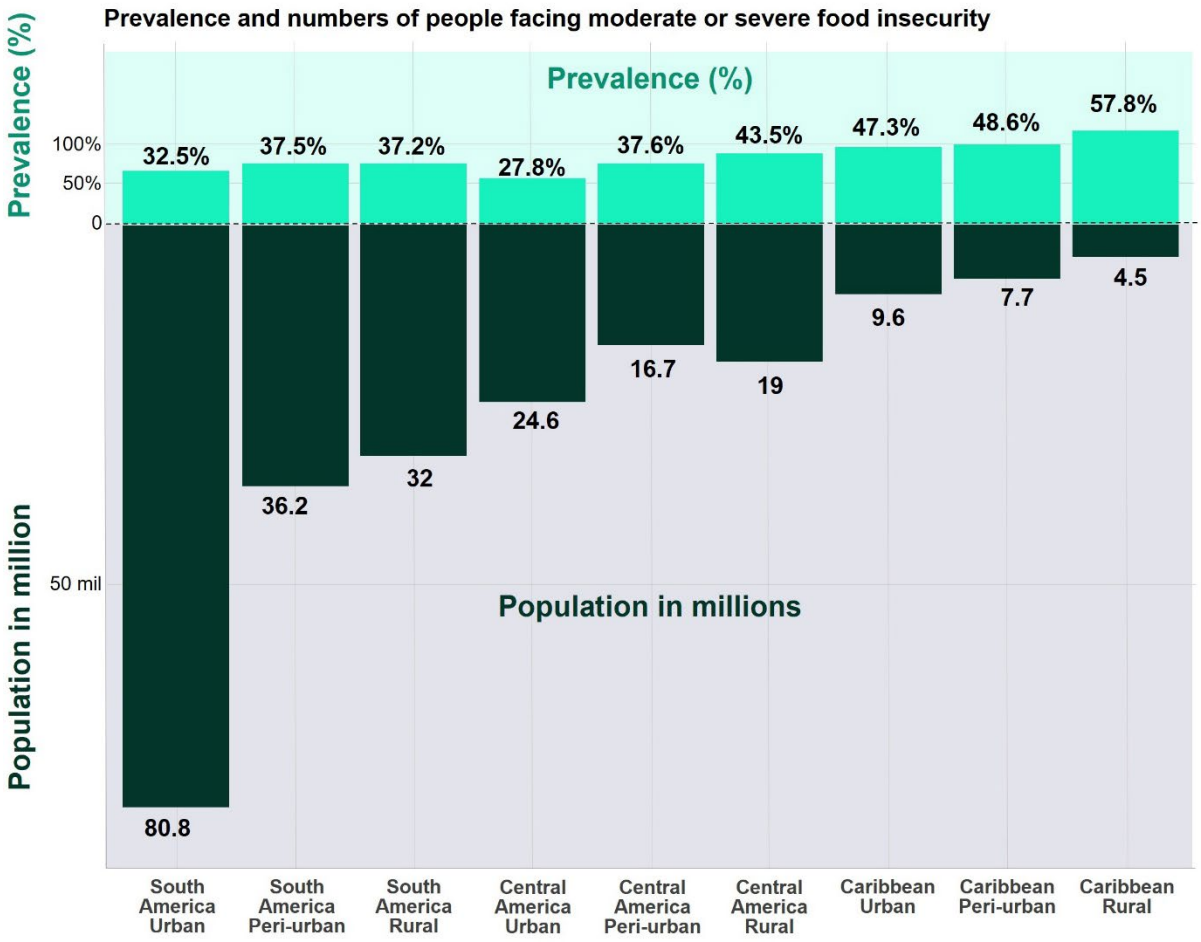
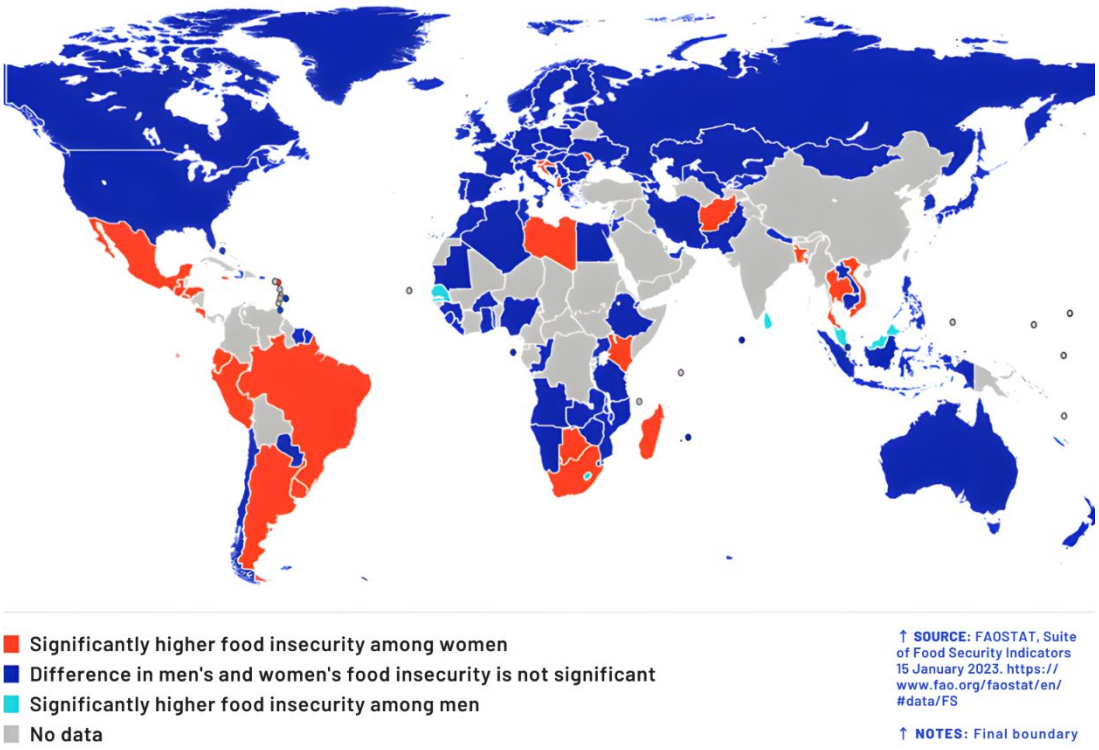


Figure 3. Food security status and the prevalence of food insecurity in LAC.
Source: PANEL A: HLPE, 2024; PANEL B: Authors' calculations based on data from FAO et al., 2023.

An important finding related to food insecurity in LAC is that, in addition to being an urban/peri-urban problem, LAC also has the most significant gender disparities in food insecurity rates—gaps that existed even before the pandemic, and a gap that seems to be persistently higher than in South Asia and sub-Saharan Africa. Globally, the current gender gap in moderate and severe food insecurity (2023) shows 25.4% in men compared to 26.7% in women. In LAC, these rates are 25.1% in men as compared to 30.3% in women, with the highest gap in Central America at 5.8%, followed by 5.3% in South America and 3.9% in the Caribbean. Figure 4 (Panel A), from The Status of Women in Agrifood Systems report, illustrates the significant gender gaps that exist, particularly in a substantial portion of Latin America and the Caribbean (FAO, 2023b). This trend in LAC is puzzling, given women's higher political voice and representation, as well as higher social protection coverage than in the rest of the world (FAO et al., 2023; Mane et al., 2025). Further inquiry into this topic is warranted. Communications with leading experts in the field suggest that male migration, the percentage of female-headed households, gendered norms, especially among women from lower socioeconomic backgrounds, reliance on markets/higher rates of purchased foods, as well as urbanization, are key determinants of gender gaps in food insecurity in the LAC region. In panel B, we observe that, although the gender gap has narrowed in most of the regions, the prevalence of food insecurity remains consistently higher among women than among men, both globally and across all regions.

Panel A. Gender gaps in food insecurity (2019–2021)



Panel B: Prevalence of food insecurity (2019–2023).

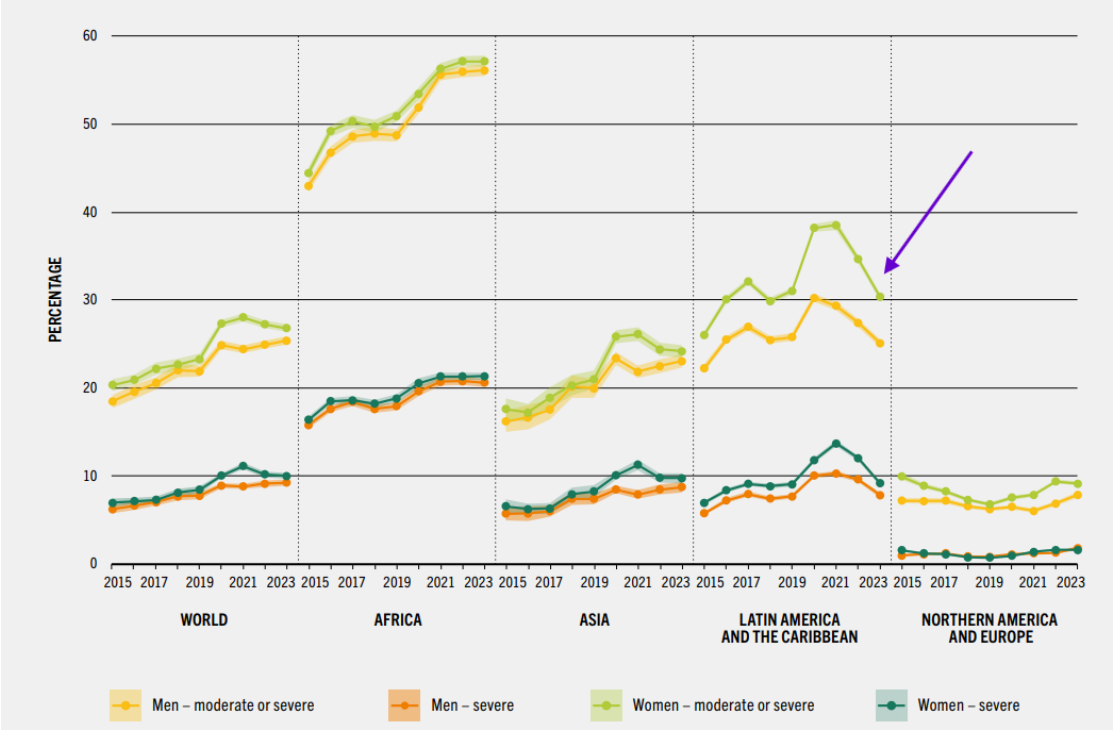


Figure 4. Panel A: Gender Gaps in Food Security; and Panel B: Temporal trends by region on Gender Gaps in Food Security.
Source: PANEL A: FAO, 2023a; PANEL B: Adapted from FAO et al., 2024.

Social inequalities drive alarming rates of food insecurity across LAC. Inequality, poverty, gender, indigeneity, Afro-descendant status, climate change, education, and household size are the most common factors associated with food insecurity in this region (Basurko et al., 2025; Hernández-Vásquez et al., 2022; Mohammadi et al., 2022;

Espinosa-Cristia et al., 2019; Dabone et al., 2022). Here, we summarize several systematic reviews on food security in the LAC context—conducted among pregnant women, older Indigenous populations, African descendants—as well as food security policy challenges in the Caribbean, where there is a high prevalence of food insecurity. A systematic review of food security rates among pregnant women revealed rates ranging from 24% in Brazil to 70% in Haiti (Basurko et al., 2025). One study from Colombia included in this systematic review showed that food insecurity was as high as 60% among pregnant women, which is significantly higher than the national average (Basurko et al., 2025).

Another systematic review of 56 papers covering the older Indigenous population revealed that the majority (52%) of studies were from Canada and the US, with only 11% from Africa, 14% from LAC, and 14% from Asia (Hernández-Moreno et al., 2024). This review highlights the Indigenous rural population, particularly the elderly (over 60 years of age), as a key evidence gap. It also highlights a gap in joint community partnerships that explores holistic approaches to addressing food insecurity challenges in Indigenous communities in the LAC region. The third review of African, Caribbean, and Black populations during the COVID-19 pandemic highlighted the social determinants of nutrition and health that influence how these communities respond to various shocks (Dabone et al., 2022) . For example, Dabone et al. (2022) emphasize that even in Canada, where universal healthcare and social protection are in place, disparities in food security manifest in poorer health outcomes.

Photo: Ella Jardim / Unsplash

Box 1: Food security in Honduras

By Susan López, SISESAN council, Government of Honduras

The guiding framework for food and nutrition security (FNS) in Honduras is the National Food and Nutrition Security Policy and Strategy (PyENSAN) 2030. This policy stems from previous instruments, such as the Food and Nutrition Security Law (2011) and is directly aligned with Sustainable Development Goal (SDG) 2: Zero Hunger, aimed at reducing food insecurity and all forms of malnutrition in the country.

Monitoring and Surveillance System (SISESAN)

To support the implementation of the PyENSAN and decision-making, Honduras has maintained monitoring and surveillance systems. Among these, the Information System for Monitoring and Evaluation of Food and Nutrition Security (SISESAN) stands out as a key component of the National FNS System established by the 2011 FNS Law.

SISESAN integrated data produced by various institutions, including the Ministries of Agriculture, Economic Development, Labor, Health, and Social Protection, as well as the National Institute of Statistics (INE), the Meteorological Directorate, and the Emergency Committee, among others.

SISESAN indicators

The system provided information at the national level and in historical series, organized according to the four dimensions of food security (availability, access, consumption, and biological utilization), in addition to social and economic indicators:

- Structural indicators: Population growth, average number of household members, maternal and infant mortality rates, among others.
- Availability Indicators: Total and per capita GDP, and evolution of national debt.
- Access Indicators: Economically active population (EAP), poverty, and extreme poverty rates.
- Consumption and Utilization (Biological Utilization) Indicators: Child health indicators, breastfeeding rate. Use of health services.
- Nutritional status indicators: child malnutrition (acute and chronic), anemia, overweight/obesity (by age group), low birth weight.

Current Challenges and Mechanisms

The reactivation of SISESAN remains a crucial challenge for the country, as it is considered the main platform for tracking and monitoring the Food and Nutrition Security (SAN in Spanish) situation. Despite this, ongoing monitoring efforts are being carried out:

Periodic Analyses (CIF): Periodic studies, such as the Integrated Food Security Phase Classification (CIF) analysis, are conducted to assess the acute food insecurity situation in the country's 18 departments.

FNS Observatory (OBSAN): Academia and key organizations, coordinated through the National Autonomous University of Honduras (UNAH), manage the Food and Nutrition Security Observatory. It observes, analyzes, and monitors situations, providing accurate data to decision-makers, researchers, and the public to combat hunger and malnutrition, and to facilitate the implementation of the FNS Law and PyENSAN.

Gender Approach and Women

There is clear recognition of the need to incorporate a gender perspective into FNS policies, in line with SDG 5: Gender Equality. Specific programs that have contributed to the implementation of the FNS policy—such as the Dry Corridor Alliance (focused on reducing chronic undernutrition and rural poverty), in addition to programs like EUROSAN Budget, EUROSAN Occidente, EUROSAN DeL, and Honduras Advancing Nutrition—have implemented actions with this perspective. These actions include:

- Priority nutritional surveillance for pregnant and breastfeeding women.
- Promoting equality in access to resources.
- Encouraging women's participation in productive and organizational activities.

The Integrated Food Security Phase Classification (IPC) is another type of food security classification that conducts real-time sub-national analyses based on multiple indicators of food consumption, livelihoods, acute malnutrition, and other proximal and distal factors associated with food and nutrition security (IPC, 2025). In addition to using indicators for analyses, it employs a consensus-building approach with local stakeholders and experts to classify the food security of a region. IPC phases range from 1 to 5, representing Minimal, Stressed, Crisis, Emergency, and Famine conditions, with classifications supported by solid or reasonable evidence. Typically, IPC classification is important for identifying extreme consequences of hunger, such as famine and acute malnutrition. Figure 5 shows the latest (May 2025) IPC analyses for Latin America. Five countries in the LAC region have an IPC classification above 3 (i.e., Crisis and above), including Haiti (51%), Honduras (17%), Guatemala (16%), Ecuador (15%), and the Dominican Republic (8%). In addition, four sub-national areas where IPC classification was elevated for selected countries are shown. For example, in Ecuador, in the departments of Esmeraldas and Pastaza, 25% of the population lives at the Crisis level of food insecurity. In Guatemala, the central Alta Verapaz region, has a population of 32% at the Crisis level. In Honduras, a significant reduction in the IPC classification has been observed over the last year and is projected to continue decreasing over the next six months. In Haiti, 51% of its population is categorized in the Crisis (IPC level #3) phase and over 18% in IPC level #4, indicating emergency conditions.

It is worth noting that we primarily examined food security in terms of availability (PoU) and, to some extent, access, quality, and preferences, using the household FIES tool from FAOSTAT data. Global consensus on food safety indicators is currently lacking, despite extensive and emerging research in this area. Second, there is little to no information on the agency and sustainability dimensions of food security (Clapp et al., 2022).

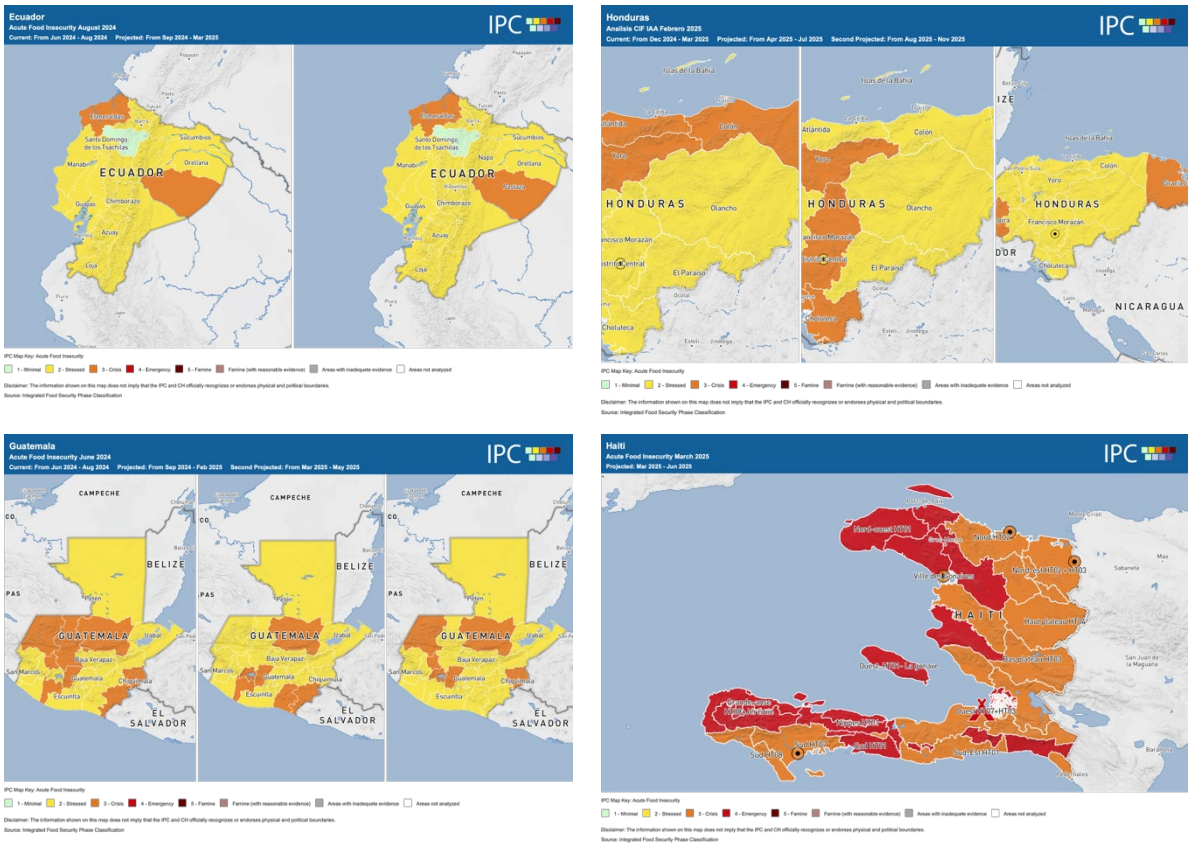


Figure 5. Integrated Food Security Phase Classification (IPC) in four LAC countries.
Source: IPC Acute Food Insecurity Classification | IPC - Integrated Food Security Phase Classification, 2025.

Does LAC have a healthy diet?

In this section, the latest available data from the LAC region is organized according to the four principles (Adequacy, Balance, Diversity, Moderation) of a healthy diet, highlighting key evidence that answers whether LAC has a healthy diet and outlining the necessary steps to advance the agenda toward healthy diets.

Adequacy

Adequacy refers to the consumption of essential nutrients in amounts sufficient to meet the globally agreed-upon requirements, known as the Estimated Average Requirements (EAR). The EAR level, which is the median value, is the nutrient requirement for a population. When intakes equal the EAR, it is estimated that 50% of the population has inadequate nutrition intakes, while 50% have adequate intakes. Typically, the average population intake should exceed the EAR, ideally by two standard deviations, ensuring that 96% of the population is adequately nourished. For this report, we also assess the adequacy of food intake relative to recommended intakes (e.g., vegetable and fruit intake).

In Table 2, we summarize the findings on nutrient adequacy among adult women enrolled in the ELANS study. Out of the 17 micronutrients estimated in ELANS for women of reproductive age, four micronutrients were problematic: Vitamin E (3%), Vitamin D (34%), Calcium (68%), and folate (70%). The lowest adequacy ratios for these nutrients are seen in Chile, Colombia, Costa Rica, Peru, and Venezuela (Gómez et al., 2020).

Table 2. Mean nutrient adequacy of 17 micronutrient intakes among women enrolled in the ELANS study (2014–2015)

	Argentina	Brazil	Chile	Colombia	Costa Rica	Ecuador	Peru	Venezuela	ELANS
Sample size	521	798	345	464	309	324	480	463	3704
Vitamin E	0.04	0.02	0.02	0.04	0.03	0.05	0.03	0.02	0.03
Vitamin D	0.31	0.19	0.30	0.46	0.26	0.56	0.52	0.27	0.34
Calcium	0.93	0.45	0.55	0.93	0.42	0.90	0.55	0.83	0.68
Folate	0.72	0.79	0.65	0.65	0.67	0.73	0.66	0.66	0.70
Magnesium	0.70	0.71	0.65	0.90	0.78	0.91	0.89	0.83	0.79
Vitamin C	0.86	0.80	0.88	0.95	0.92	0.90	0.96	0.85	0.87
Vitamin A	0.71	0.83	0.80	0.96	0.84	0.99	0.95	0.96	0.88
Pyridoxine	0.97	0.95	0.96	0.99	0.95	1.00	1.00	0.99	0.97
Zinc	1.00	0.96	0.95	0.99	0.96	0.98	0.99	0.98	0.98
Iron	0.99	0.91	0.98	1.00	0.99	1.00	1.00	0.99	0.98
Phosphorous	0.98	0.96	0.97	0.99	0.96	0.99	0.99	0.98	0.98
Cobalamin	0.98	0.97	0.96	0.99	0.99	0.99	0.99	0.99	0.98
Cobre	1.00	0.97	0.96	0.99	0.97	1.00	1.00	0.97	0.98
Niacin	1.00	0.99	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Riboflavin	1.00	0.97	0.98	1.00	0.99	0.99	0.99	0.99	0.99
Thiamin	1.00	0.96	0.99	1.00	0.99	1.00	1.00	1.00	0.99
Selenium	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MAR	0.83	0.79	0.80	0.87	0.81	0.88	0.85	0.84	0.83

Source: Adapted from Gómez et al., 2020.

Outside of the ELANS study, there has been only one review on nutrient adequacy in LAC published in the last decade. Brito et al.'s (2013) systematic review of 28 studies on vitamin D status in LAC showed that 20–30% of the population in Mexico (depending on age group), 46% of the elderly population in Guatemala, 46–51% of Colombian children, 9–19% of the Ecuadorian elderly population, and about 27–60% of women experienced vitamin D insufficiency.

Box 2: Cost and affordability of adequate diets in Cali, Colombia

By Sara Rankin, Alliance of Bioversity and CIAT

Recent evidence on the **cost and affordability of three levels of diet quality** for urban households in Cali, Colombia (the third largest city in the country) reveals critical insights into the economic barriers to healthy eating (Yoshioka Vargas et al., 2025). Using nationally representative prices and household income data, the study applied the Cost and Affordability of Healthy Diets (CoAHD) framework to estimate daily per-person costs for three diet types:

1. **Energy-Sufficient Diet**—meeting caloric needs only.
2. **Nutrient-Adequate Diet**—meeting energy and essential nutrient requirements.
3. **Healthy Diet**—aligning with national (based on WHO) recommendations for balanced and diverse food groups.

Key findings:

- The **average daily cost** of an *energy-sufficient diet* was **US$1.81**, a *nutrient-adequate diet* **US$2.36**, and a *healthy diet* **US$3.03** per person (2022 prices).
- The **healthy diet is 67% more expensive** than a calorie-sufficient diet and 28% more than a nutrient-adequate one, mainly driven by the higher cost of fruits, vegetables, and animal-source foods.
- **Healthy diets are unaffordable for 28–35% of urban households**, depending on the city and income quintile, particularly among low-income and female-headed households.
- **Fruits and vegetables** account for 34% of the total cost of a healthy diet, followed by **animal-source foods (28%)** and **starchy staples (17%)**.
- The analysis used **city average retail prices** for urban areas (from a regional supply center and a mid-class supermarket), without geospatial differentiation. However, **affordability gaps were most pronounced among the lowest income quintiles and female-headed households**, **highlighting socioeconomic** rather than spatial **disparities.**
- The **relative price of nutrient-dense foods** such as legumes and vegetables was 2–3 times higher than starchy staples, underscoring food environment inequities that limit diet quality even in urban areas.

Policy implications:

This analysis demonstrates that **economic access remains a major constraint** to achieving healthy diets in Colombia. Aligning social protection programs (e.g., school meals, cash transfers) with dietary diversity goals, improving urban food distribution systems, and investing in peri-urban production of fruits, vegetables, and legumes could significantly enhance affordability. These findings provide a quantitative baseline to monitor progress toward SDG 2.1 (“Access to Safe, Nutritious, and Sufficient Food for All”) and to inform municipal food policies under Colombia’s *Food Systems Transformation Agenda*.

National averages also conceal stark urban inequalities: while 36.3% of Colombians cannot afford a healthy diet at an average cost of US$4.06 per person per day (Del Pilar et al., 2023), city-level analyses reveal even higher costs and lower affordability in major urban centers, where food prices and income disparities are more pronounced (FAO et al., 2025). These contrasts underscore how national figures mask localized vulnerabilities, particularly among low-income and female-headed households in urban areas.

Diversity

Consuming a diverse diet means diversity across food groups (fruits, vegetables, pulses, meat, fish) as well as within food groups (Box 3 is an example of embedding local biodiversity into food consumption). A foundational principle underpinning the value of dietary diversity is achieving higher nutrient adequacy (Amoussa Hounkpatin et al., 2023; Gómez et al., 2024; Hjertholm et al., 2019; Ruel, 2003). In addition, there is an array of bioactive compounds (flavonoids, terpenoids, sterols) that vary tremendously across species. These compounds offer numerous protective benefits that help prevent the development of chronic disease. Science is advancing in understanding the gut microbiome, and a key to gut microbiome health is the consumption of a diverse array of plant species.

Box 3: Biodiversity, agrobiodiversity, and food-based dietary guidelines in Colombia

By Elizabeth Valoyes Bejarano, National University of Colombia

Colombia is a highly biodiverse country, boasting 311 types of continental and coastal ecosystems, including natural areas and transformed landscapes. It is also culturally diverse, home to populations of African descent, *Palenqueros*, *Raizales*, Roma, and 115 Indigenous peoples who speak 69 languages (65 of which are Indigenous). This diversity reflects the multiple interactions and co-evolutionary possibilities between humans and their environments, generating a wealth of biocultural knowledge for the conservation and sustainable use of biodiversity.

However, Colombia's dietary guidelines up until 2025 overlooked the significant agrobiodiversity evident in local cuisines and food systems. These systems reflected the diverse economic and social life that underpins the territory, from food production to consumption and the use of inedible elements. Faced with a unifying approach to nutrition that was reflected in food-based guidelines, Colombia moved from the Good Nutrition Train (1996)—even though many communities where it was used as an educational tool had never heard of a train—to the Healthy Plate for Colombian Family (2015). During this period, individual proposals emerged that recognized local foods and territorial and cultural characteristics (Ardila, 2016), as well as institutional proposals such as the Food Guide Based on Traditional Cuisines and Sustainable Food Systems (Saurith López, 2018). Other efforts include: the adaptation of the Guidelines from an ethnic-territorial perspective (UNAL & ICBF, 2019)); “El gran Balai del buen comer” based on ecological calendars; and the Guide for the Afro-Wayuu population of the Camarones River (Figure 6) (SINERGIAS, 2022).

Figure 6. My plate based on local biodiversity, Colombia

Source: Adapted from ICBF-UdeA, 2025.

Based on these proposals and their dissemination at national and international events, a call is beginning to be made for the need to highlight the food systems of the territories derived from the interdependence between biodiversity, agroecosystems, and knowledge systems that shape the natural and cultural assets of Colombia's diversity. These exercises will lay the foundations for a major commitment that, within the framework of the Government Plan “Colombia, World Power of Life,” is entering the national political agenda.

In 2025, Colombia launched “The Food Guide for the Colombian Population based on Biodiversity and Real Food” (ICBF-UdeA, 2025) an example of the scalability of territorial exercises and the scope required for nationwide implementation, highlighting the importance of recognizing agrobiodiversity as reflected in everyday food consumption for the fulfillment of the right to food.

The most common indicators used to measure diversity are dietary diversity scores. Dietary diversity scores assess the number of food groups consumed (grains, legumes, nuts, dairy, meat, eggs, dark green leafy vegetables, vitamin A-rich fruits, other fruits, and other vegetables). For women of reproductive age, a threshold of minimum dietary diversity (MDD) is met by consuming five or more out of the ten food groups (FAO, 2021). Table 3 presents the nationally representative dietary diversity scores for women of reproductive age (Global Diet Quality Project, 2022). **Overall, we see that selected LAC countries have high DDS scores, with an average of six food groups and an MDD-W of 70–80%, indicating they consume at least five food groups. The most commonly consumed food groups include staples, other vegetables, fruit, dairy products, and meat.** This finding is similar to those from the ELANS study (Fisberg et al., 2018), which employed the 24-hour recall method (Gómez et al., 2020). Eggs and legumes exhibit variability in prevalence by country (Table 4), whereas green leafy

vegetables and vitamin A-rich foods have a low prevalence of consumption across all the countries studied (Figure 7).

Simple measures of food group diversity do not indicate quantities consumed, nor do they disaggregate all the elements of a healthy diet. New indicators, including All-5, NCD-protect, and NCD-risk, are proposed to add more granularity to rapid dietary assessments (see Table 3). The "All-5" indicator, proposed by the WHO for optimal health, reveals that only 40–50% of the population consumes all of the recommended five food groups (grains, vegetables, fruit, pulses, meat/fish/dairy). The second set of dietary indicators shown in Table 3 distinguishes between protective food groups and high-risk food groups that are linked to NCDs. The variety within food groups may be worth exploring. Populations in most LAC countries consume three to four out of the nine protective food groups and an average of 2–3 NCD risk food groups. Overall, Peru, Mexico, Ecuador, and Bolivia demonstrate the best diet quality scores for the region. **These findings have implications for the types of tools and indicators used to evaluate studies conducted in LAC, with a greater emphasis on tools that assess NCD-risk foods and nutrient-dense plant sources.**

Table *3.* Diet quality indices for adults' Global Diet Quality Project (GDQP) data (2024).

Region	Country	MDD-W (%) [3]	All-5 (%) [4]	Dietary Diversity Score (DDS) [5]	NCD-Protect Score [6]	NCD-Risk score [7]
Central American	Costa Rica	71.0	41.5	5.9	3.4	3.4
	Guatemala	77.8	49.2	6.1	4.5	3.3
	Honduras	72.8	41.5	5.9	3.8	3.4
	Mexico	85.8	54.8	6.7	4.9	2.8
Caribbean American	Dominican Republic	61.0	29.1	5.2	2.8	3.0
South American	Bolivia	87.1	48.4	6.7	4.7	2.7
	Chile	88.8	39.1	6.5	4.1	3.3
	Colombia	71.7	31.4	5.9	3.5	2.6
	Ecuador	83.7	44.3	6.4	4.1	2.1
	Paraguay	80.0	24.5	6.0	3.3	3.2
	Peru	77.9	41.3	6.1	4.4	2.2
	Venezuela	63.0	20.9	5.3	2.5	2.7

Source: (Diet Quality Project, 2024).

[3] Proportion of women of reproductive age (15–49 years) who consumed at least five out of ten defined food groups the previous day. The groups include foods such as grains, legumes, nuts, dairy, meat, eggs, dark green leafy vegetables, vitamin A-rich fruits, other fruits, and other vegetables.
[4] Proportion of the population who consumed at least the five essential food groups recommended globally on the previous day, including vegetables, fruits, legumes/nuts, animal-source foods, and starches.
[5] The DDS evaluates dietary diversity based on the number of food groups consumed the previous day, with a score ranging from 0 to 10. A higher score indicates that more food groups were consumed.
[6] This indicator assesses dietary factors protective against non-communicable diseases (NCDs), based on consumption of foods associated with WHO recommendations on fruits, vegetables, whole grains, pulses, nuts, and fiber. The score ranges from 0 to 9, with a higher score indicating a more protective diet.
[7] This indicator evaluates dietary risk factors for NCDs, based on consumption of foods associated with failing to meet WHO recommendations on free sugars, salt, total and saturated fats, and red and processed meats. The score ranges from 0 to 9, with a higher score indicating greater exposure to risk.

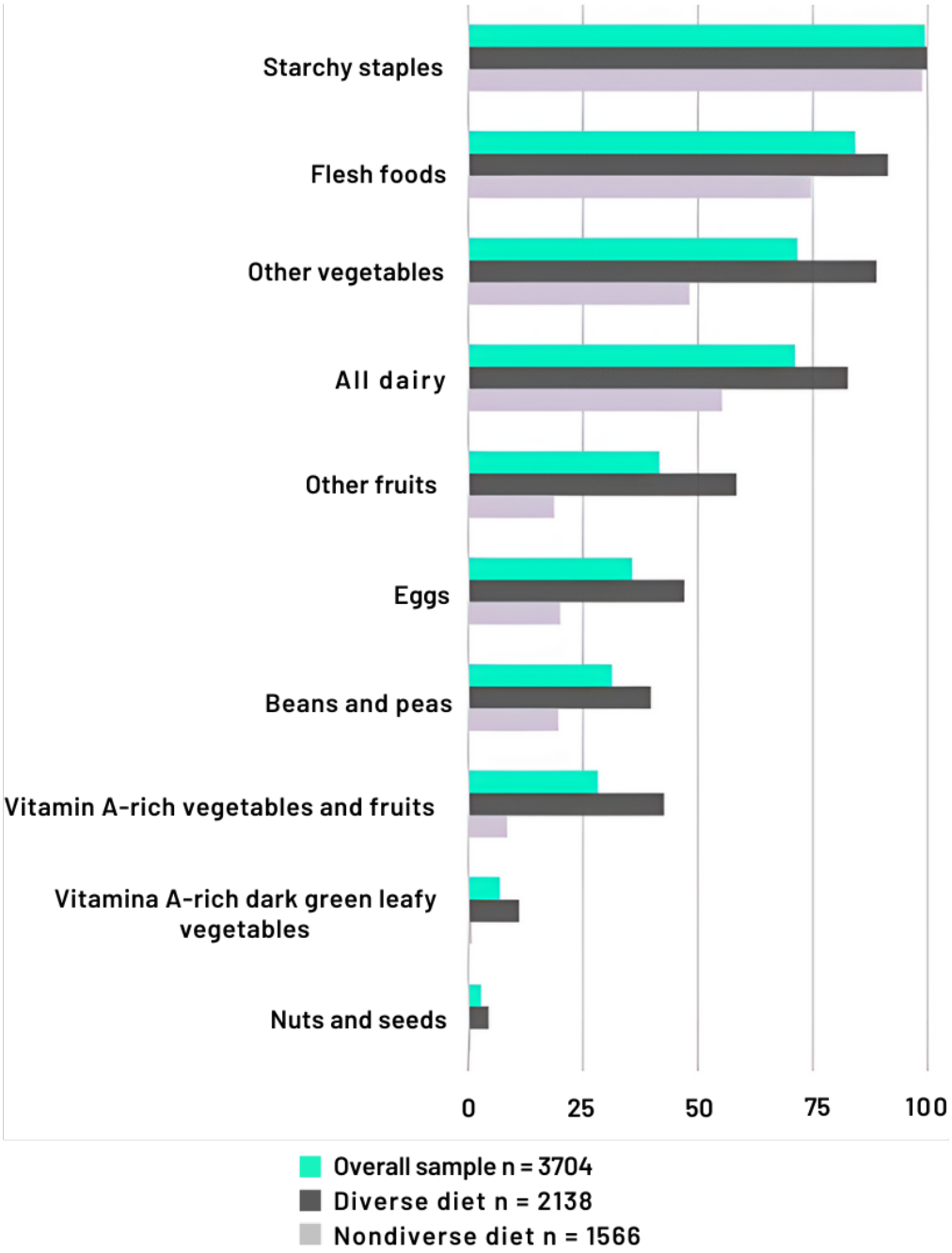


Figure 7. Proportion (%) of adult women consuming each food group over one 24-hour recall period in ELANS. Overall (n = 3704), diverse (n = 2138) consuming ≥5 food groups, and non-diverse (n = 1566) consuming <5 food groups.
Source: Gómez et al., 2020.

There are dietary inequalities between sexes, between rural and urban locations, and by education and socioeconomic level. For example, Colombian males have an average DDS score of 6.0, whereas females have a higher score of 6.7. Similarly, rural and urban areas in Guatemala show differences of 0.4 food groups, where higher diversity is observed in urban areas. Guatemala has a higher rural population than most of the LAC countries. This is consistent with the ELANS study findings, where women have significantly lower dietary diversity compared to men by 0.2 food groups (Gómez et al., 2019). There are also significant differences in intake quantity across socioeconomic levels (Ibid). Gomez and colleagues illustrate this by creating a synthetic consumption ratio indicator comparing the highest and lowest quintiles. For example, fruit consumption of the highest quintile (201 g) is 12 times the consumption in the lowest quintile (15 g). For vegetables, the disparity is four times the consumption in the lowest quintile (53 g), and for beans, it is six times the difference between the highest and lowest quintiles (81 g vs 13 g).

Table 4. Consumption of other food groups from selected LAC countries.

Region	Country	% Cheese	% Citrus	% Dairy	% Eggs	% Meat, poultry, or fish	% Milk	% Nuts or seeds	% White roots, tubers, or plantains	% Whole grains	% Pulses	% Yogurt
Central American	Costa Rica	40.9	33.7	61	69.6	87.5	36.6	13.5	46.8	23.7	67	12.7
	Guatemala	39.9	33.6	54.4	73.5	68.4	31.9	15.9	37.1	82.6	69.2	12.8
	Honduras	68.1	28.2	76.1	72.8	75.4	39.9	9	47.6	75.7	69.7	7.1
	Mexico	43.9	51.7	71.6	64.7	86.6	45.8	31.4	28.6	79.6	66.3	19.8
Caribbean American	Dominican Republic	34.5	9	54.3	52.4	87.1	34.1	13.1	64.2	23.9	52	8.6
South American	Bolivia	37.4	58.7	62.7	55.9	87.9	38.4	20.5	73.8	43.8	54.3	22.3
	Chile	51.8	47.7	74.8	64.9	87.6	38.4	25.5	59.3	35.2	33	40.5
	Colombia	39.6	38.6	61.9	74.5	86	36.2	9.5	65.8	40.5	40.5	14
	Ecuador	55	59.2	72	66.9	87.2	41.1	12.3	70.5	29.5	51.2	17.7
	Paraguay	45.4	40.1	84.4	61.7	93	72.3	14.2	70.8	28.6	21.3	25.6
	Peru	37.5	59.1	54.6	53.8	89.4	27.1	16.2	74.4	53.4	45	17.6
	Venezuela	76.3	6.3	84.6	53.4	82.4	37.6	7.7	49.3	18.6	41	1.3

Source: Diet Quality Project, 2024.

Fruits and Vegetables

We focus on fruits and vegetables, given that they are a significant part of the LAC trade and economic profile, contributing to the global economy and overall health (Springmann et al., 2023). Over 80–90% of the LAC population reports consuming 'other vegetables', while 60-70% report consuming other fruits in the last 24 hours (Table 5)(Food Systems Dashboard, 2025). The most common other vegetables across the LAC region include cabbage, cucumber, green beans, tomatoes, lettuce, and cauliflower (The World Food Map, 2025). The most common other fruits include apples, avocados, bananas, grapes, guavas, pineapples, strawberries, and watermelons (The World Food Map, 2025). However, consumption of vitamin A-rich fruits and vegetables, as well as dark green leafy vegetables, appears to be low (4–46%) and highly heterogeneous across LAC countries, likely related to geography and topography. Bolivia and Guatemala have the highest percentage of the population consuming green leafy vegetables at 42–46%, while most other countries report consumption of less than 15% of the population surveyed. In LAC, the most commonly consumed green leafy vegetables include spinach, broccoli, and chard (The World Food Map, 2025). Women consume dark green leafy vegetables at much higher rates than men in several countries, as noted in Guatemala (+10% difference) and Chile (+7% difference).

Table *5.* Prevalence of fruit and vegetable intake.

Region	Country	% Other vegetables	% Other fruits	% Vitamin A-rich fruits	% Vitamin A-rich orange vegetables	% Zero vegetable or fruit consumption	% Fruit juice and fruit drinks	% Dark green leafy vegetables	% Daily intake of fruits+	% Daily intake of vegetables+
		SOURCE								
		(GDQP, 2024)	(GDQP, 2024)	(GDQP, 2024)	(GDQP, 2024)	(GDQP, 2024)	(GDQP, 2024)	(GDQP, 2024)	(SALURBRAL, Valentino et al 2025+)	(SALURBAL, Valentino et al 2025+)
Central American	Costa Rica	70	62	27	32	12	40	13	*	*
	Guatemala	71	62	32	40	11	58	42	46	31
	Honduras	65	59	25	33	16	46	15	*	*
	Mexico	85	74	24	48	4	50	26	18	17
Caribbean	Dominican Republic	46	59	41	24	17	47	9	*	*
South American	Bolivia	82	62	26	77	3	41	46	*	*
	Chile	82	73	10	71	3	41	35	30	50
	Colombia	67	56	30	49	9	47	16	30	20
	Ecuador	76	68	38	53	6	46	28	*	*
	Paraguay	86	57	15	59	6	39	10	*	*
	Peru	67	66	32	68	6	38	29	36	14
	Venezuela	50	53	22	44	18	33	4	*	*

Source: Diet Quality Project, 2024; Global Alliance for Improved Nutrition (GAIN) & Johns Hopkins University, 2020; Global Dietary Database, 2018; Global Nutrition Report, 2024.

Despite the high prevalence of vegetable consumption, actual intake (in grams per person per day) is often lower than the recommended level (400 grams per person per day for fruits and vegetables together or 240-270 grams per person per day for vegetables alone), which most likely reflects availability within neighborhoods, desirability, and affordability. This is in line with a global study, which found that 61% of countries don't have adequate supply to meet recommendations (Kalmpourtzidou et al., 2020). In Table 6, we compare the availability (supply) of fruits and vegetables in each country with their intakes, as measured by 24-hour recall (GDD and ELANS study). Vegetable supply data from FAO (2022) shows considerable variation across the region (Figure 8), ranging from relatively low levels in Ecuador (61.3 g/c/day) to notably high supplies in the Dominican Republic (369.2 g/c/day) and El Salvador (250.5 g/c/day). However, actual vegetable intake, as measured by the Global Dietary Database (GDD, 2018) and ELANS (2015) studies, consistently falls short of supply figures in most countries, ranging from 33.2 g/c/day in Honduras to 206.9 g/c/day in Mexico. Ecuador, interestingly, shows the opposite pattern, with two average estimates exceeding the domestic supply. Similar patterns are observed for fruits (Figure 9), where supply levels are generally higher than reported intake, though the gaps vary considerably by country. For instance, Colombia presents a substantial difference between domestic fruit supply (408.4 g/day) and intake (102.4 g/day according to GDD), whereas Chile shows greater alignment between supply (178.1 g/day) and consumption g/d. In Figure 10, we conduct an ecological analysis of why some countries have higher intakes of fruits and vegetables, possibly due to a higher proportion of Indigenous populations. This appears to be an area worth exploring from the perspectives of poverty reduction, equity, food culture, and biodiversity (Kennedy et al., 2021).

These discrepancies between supply and intake data highlight potential issues in food distribution, access, or measurement methodologies, particularly in contexts where export-oriented agricultural production does not align directly with domestic consumption patterns. This disconnect may become even larger in the future. Projected models combining demographic changes and insufficient supply indicate that by 2050, Latin America and the Caribbean, and sub-Saharan Africa, will be the only two regions to fall below recommended fruit and vegetable consumption levels (Mason-D'Croz et al., 2019). This projection creates a paradox, as recent research examining global trade of food and mortality reveals that fruits and vegetables exports from Latin America (especially, Ecuador and Mexico) are reducing diet-related non-communicable disease mortality in importing countries (Springmann et al., 2023). In these commodity-driven agricultural landscapes, critical questions remain about how to reorient food environments to prioritize local biodiversity and domestic consumption while maintaining the economic benefits that support livelihoods and health outcomes for producing communities.

Table *6*. Domestic supply of fruits and vegetables (FAO STAT) with the quantitative intakes from the Global Dietary Database and the ELANS study.

Region	Country	Vegetable supply (g/c/day) (FAO, 2022)	Vegetable intake (g/day) (GDD, 2018)	Vegetable intake (g/day) (ELANS, 2015)	Fruits supply (g/c/day) (FAO, 2022)	Fruits Intake (g/day) (GDD, 2018)	Fruits intake (g/day) (ELANS, 2015)
Central American	Costa Rica	210.8	169.9	146.9	254.9	129.3	79.92
	El Salvador	250.5	143.1		240.7	134.5	**
	Guatemala	208.9	108.1	**	277.7	86.4	**
	Honduras	122.3	33.2	**	138.5	97.1	**
	Mexico	160.1	206.9	**	359	153.2	**
Caribbean American	Dominican Republic	369.2	113.5		1102.4	150.3	
South American	Bolivia	118.6	118.9	**	234.7	88.3	**
	Chile	214.5	136.8	171.7	178.1	102.4	123.3
	Colombia	141.4	102.1	89.6	408.4	102.4	66.9
	Ecuador	61.3	114.2	163.1	190.1	26.5	83.3
	Paraguay	197.1	76.3	**	224.6	106.2	**
	Peru	157.6	98	107.8	365.7	228.3	116.7
	Venezuela	137.0	98.7	96.7	256.7	112.8	27.3

*Not available
Source: FAO, 2022; Global Dietary Database, 2018; Kovalskys et al., 2019.

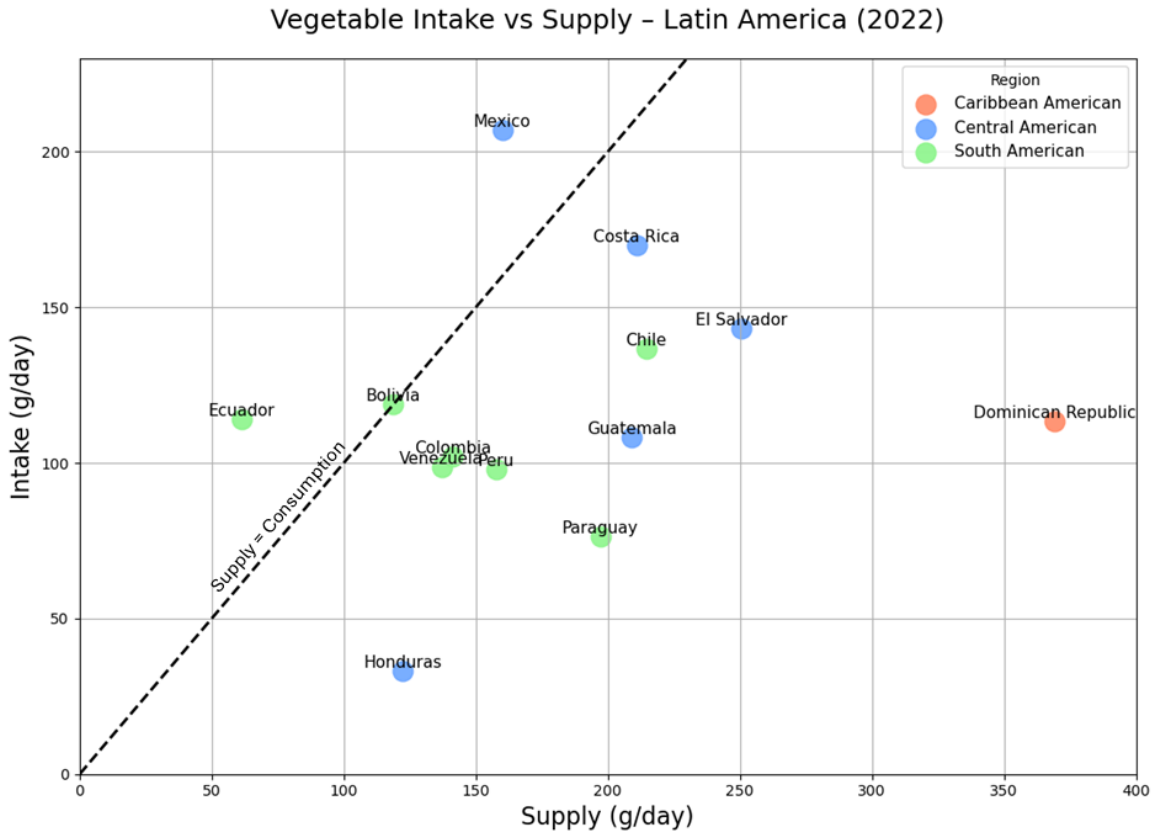


Figure 8. Vegetable intake vs. supply (g/day) in 2022.
Source: FAO, 2022; Global Alliance for Improved Nutrition (GAIN) & Johns Hopkins University, 2020; Global Dietary Database, 2018.

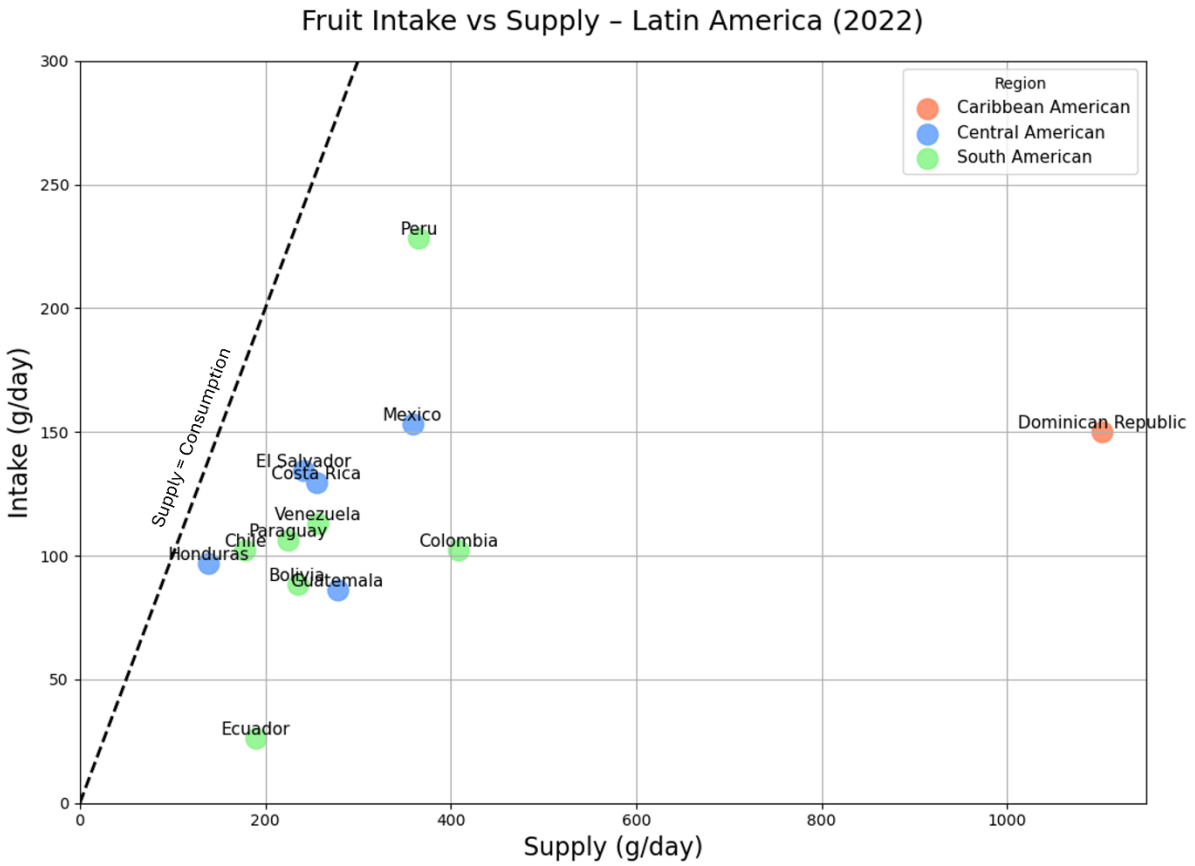


Figure 9. Fruit intake vs. supply (g/day) in 2022.
Source: FAO, 2022; Global Alliance for Improved Nutrition (GAIN) & Johns Hopkins University, 2020; Global Dietary Database, 2018.

Figure 10 shows the relationship between the proportion of the Indigenous population and the estimated consumption of vegetables (g/day) by country in Latin America. Since there is no disaggregated data by ethnic or age group on vegetable intake, the proportion of the Indigenous population relative to the national total was used as a proxy, together with the average vegetable consumption per country, to indirectly estimate possible patterns in this population. For every 1% increase in the Indigenous population, vegetable consumption (according to GDD data) increases by approximately 0.52 gram per day.

Guatemala, Bolivia, and Peru have high percentages of Indigenous populations with vegetable consumption above the regional average. However, despite their ancestral knowledge of ecosystems and biodiversity, Indigenous peoples face multiple structural barriers that affect their food security and nutrition (Kennedy et al., 2021). These barriers include loss of territory, lack of public policies that support their food sovereignty, and economic inequalities that hinder access to varied and nutritious foods, such as fruits and vegetables. In addition, people in this situation do not consider fruits and vegetables a top priority in their purchasing patterns, as their priority is to alleviate hunger.


Photo: Jeison Higuita / Unsplash

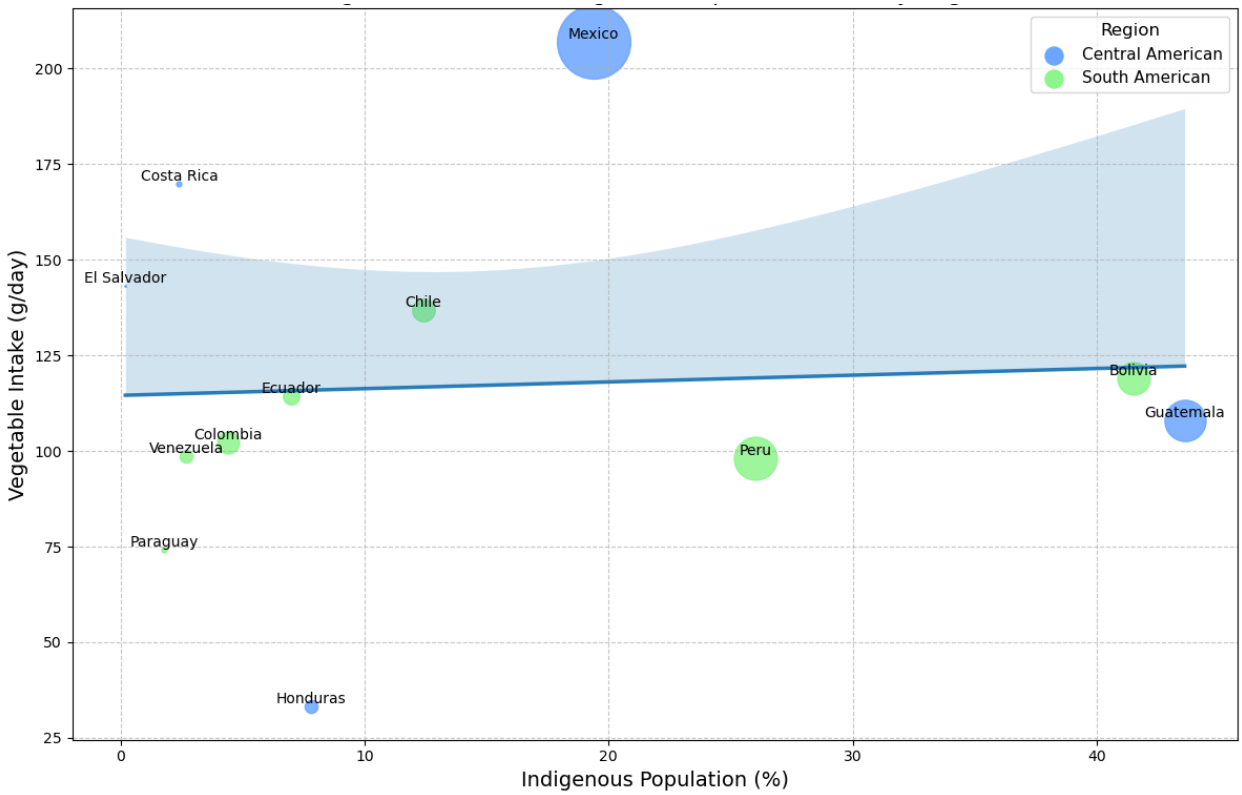


Figure 10. Percentage of dark green leafy vegetables consumption compared with the percentage of the Indigenous population
Source: Carla & Castro, 2023; World Bank Group, 2024

Legumes

The prevalence of legume consumption is high in Central America (67–87%) compared to South America and the Caribbean (21–54%), as shown in Table 7. According to data from the Global Nutrition Report 2018, legume consumption among adults aged 25 and older in Latin America and the Caribbean falls significantly short of recommended intake levels (100 g/day/person, as recommended by EAT-Lancet, 63 grams/day/person as per the Pan American Health Organization (PAHO) report from the Caribbean) (PAHO, 2020). Low legume intake is one of three significant risk factors for cardiovascular disease mortality (Zhang et al., 2023). Globally, the LAC region is the second-largest consumer of beans, after the Asia-Pacific region (Hughes et al., 2022).

The percentage of populations meeting the recommended legume intake varies considerably within the LAC region, with Central American countries showing a moderate alignment with recommendations, ranging from 28% (assuming a recommended level of 100 grams per person per day) in Costa Rica to 46% in Guatemala. An estimated 46% of the population met the recommended intakes in the Dominican Republic. South American countries demonstrated the lowest alignment to legume intake recommendations, with Bolivia showing the poorest performance at just 11% of the population meeting guidelines, followed by Chile at 13% and Ecuador at 15%. Paraguay (16%), Colombia (26%), and Peru (34%) showed slightly better but still critically low rates. At the same time, Venezuela had the highest percentage of its population meeting the recommended intakes in South America, at 40%. Comparison of GDD estimates with 24-hour recall data from the ELANS study shows markedly different intake levels. Costa Rica, for example, is the only country with an average daily intake of over 100 grams per person. **These findings highlight widespread subpar intakes of legumes across the region, with almost no country achieving even above 50% of its adult population meeting the recommended daily legume intake**, suggesting an urgent need for targeted dietary interventions and public health strategies to improve legume consumption throughout Latin America and the Caribbean. Overall, findings of reduced legume consumption in LAC countries are in line with broader food system trends: as countries' incomes increase, their intake and availability of legumes decrease, often being replaced by animal-source foods (Ambikapathi et al., 2022).

Table 7. Legume consumption intakes in LAC.

Region	Country	%Consumption from GDQP (2024)	GDD intake 2018 (g/day/person)	Beans and legumes (g/day/person) (ELANS, 2015)
Central American	Costa Rica	67.3%	28.4	103.6
	El Salvador	NA	36.8	*
	Guatemala	69.2%	48.1	*
	Honduras	69.7%	42.4	*
	Mexico	66.3%	41.4	*
Caribbean American	Dominican Republic	51.9%	46.8	*
South American	Bolivia	54.3%	11.7	*
	Chile	33.1%	13.1	21.8
	Colombia	40.5%	26.1	41.6
	Ecuador	51.2%	15.8	47.9
	Paraguay	21.4%	16.7	*
	Peru	45.1%	34.4	23.5
	Venezuela	41.5%	40.4	24.8

Flesh foods

Flesh food refers to the various types of animal-source meat intake, including seafood, processed and unprocessed red meat, and poultry. Poultry is the most commonly consumed meat across LAC countries, with consumption rates ranging from 35% to 67% in Peru (Table 8). Fish and seafood consumption exhibit high geographic variation, likely due to differences in coastal access and the development of the fish industry and value chain. Ecuador leads with a 36.0% prevalence, followed by Costa Rica (29.7%) and Peru (28.8%), while landlocked Paraguay shows the lowest prevalence at 9.0%. Processed meat includes cured and tinned meats such as sausages, jerky, and hot dogs. Nearly half the population in the Dominican Republic, Chile, and Costa Rica consumed processed meat. Animal-source foods and products (dairy, cheese, yogurt) contribute to 57-70% of protein intakes in LAC, where Ecuador and Argentina have the highest protein intake from the ELANS country cohort (Herrera-Cuenca et al., 2023).

Table *8*. Prevalence of animal-source flesh consumption by LAC region and country (GDQP- 2024).

Region	Country	Fish and Seafood	Poultry	Processed meat	Unprocessed red meat
Central American	Costa Rica	29.7	40.5	45.0	28.3
	El Salvador				
	Guatemala	12.0	35.8	29.5	28.6
	Honduras	16.8	47.8	40.5	25.9
	Mexico	17.0	47.8	41.0	31.8
Caribbean American	Dominican Republic	14.3	46.7	53.5	15.1
South American	Bolivia	14.8	48.8	26.3	51.7
	Chile	23.3	45.9	44.9	41.7
	Colombia	17.9	43.4	33.1	40.3
	Ecuador	36.0	56.8	24.1	34.5
	Paraguay	9.0	38.4	31.0	65.3
	Peru	28.8	67.8	21.1	24.8
	Venezuela	18.6	44.8	33.7	35.4

Meanwhile, the consumption of unprocessed red meat varies considerably across LAC countries, with Paraguay showing the highest consumption rate at 71%. In comparison, the Dominican Republic has the lowest at 27%. A consistent gender gap (Table 9) emerges across all countries, with men consuming unprocessed red meat at much higher rates than women, with a higher than 10% percentage point gap in Mexico, Dominican Republic, and Colombia. In Honduras, Guatemala, we observe a substantial difference of over 10% in the prevalence of consumption, driven by male migration and the higher purchasing power associated with urban areas (Rastandeh & Jarchow, 2021).

Table *9*. Consumption of unprocessed red meat by location and sex according to the Global Diet Quality Project (GDQP-2024).

Unprocessed red meat intakes							
Region	Country	All	Rural	Urban	Female	Male	Gap
Central American	Costa Rica	49%	50%	48%	45%	52%	7%
	Guatemala	38%	30%	41%	35%	41%	6%
	Honduras	38%	30%	42%	34%	43%	9%
	Mexico	46%	44%	49%	40%	52%	12%
Caribbean American	Dominican Republic	27%	33%	26%	21%	34%	13%
South American	Bolivia	57%	55%	59%	56%	59%	3%
	Colombia	54%	53%	56%	47%	62%	15%
	Chile	50%	54%	49%	46%	54%	8%

	Ecuador	45%	42%	51%	42%	49%	7%
	Paraguay	71%	72%	71%	67%	75%	8%
	Peru	33%	37%	31%	30%	35%	5%
	Venezuela	38%	-	37%	35%	42%	7%

Sex differences in meat consumption (both prevalence and quantity of intake) are mainly due to social norms of consuming meat being associated with perceptions of masculinity, power, and strength (Rothgerber, 2013; Sobal, 2005; Sumpter, 2015). Both the prevalence of meat consumption, as reported in GDQP data, and the available intake data, collected through 24-hour recall from the ELANS study, illustrate larger significant gender differences (Kovalskys et al., 2019). However, conflicting findings emerge from studies using less precise methodologies (see Table 10 for comparison of intake between ELANS and GDD). Studies that use estimated intake databases such as the Global Dietary Database find no sex differences in meat intake, which also corresponds to a lack of environmental impact (Caleffi et al., 2025; Miller et al., 2022). This discrepancy appears to stem from methodological limitations. Studies finding no sex differences rely primarily on dietary estimation methods based on demographic health surveys and, at best, food frequency questionnaires, with minimal use of the more accurate 24-hour recall methods. When high-quality 24-hour recall data, such as that from the National Health and Nutrition Examination Survey from the United States, is available, differences in meat intake and associated emissions across genders are observed (Bassi et al., 2022). Bassi and colleagues illustrate that different demographic profiles of men have the greatest impact, after adjusting for their energy intake, primarily driven by meat intake, despite socioeconomic status influences (Bassi et al., 2022). The diets of male Mexican Americans have the largest environmental impact, likely due to their cultural identity and social status (Bassi et al., 2022). This represents a critical area of inquiry with significant implications for targeted population-level interventions, particularly given the proliferating and often contradictory narratives surrounding the climate impact of dietary choices (Rockström et al., 2025).

Table 10. Intakes of animal-source foods in adults from ELANS study and GDD.

Region	**Country**	**Processed meat intake** (g/d) (ELANS, 2015)	**Red meat** (g/d) (ELANS, 2015)	**Fish and seafood** (g/d) (ELANS, 2015)	**GDD Processed meat** (g/d/p) (Miller et al., 2022)	**GDD unprocessed red meat** (g/d/p) (Miller et al., 2022)	**GDD Seafood** (g/d/p) (Miller et al., 2022)
Central American	Costa Rica	20.8	5.2	19	46	75	74
	El Salvador	NA	NA	NA	49	49	10
	Guatemala	NA	NA	NA	42	60	6
	Honduras	NA	NA	NA	58	32	12
	Mexico	NA	NA	NA	18	47	8
	Bolivia	NA	NA	NA	16	96	14
Caribbean American	Dominican Republic	NA	NA	NA	36	50	16
South American	Chile	24.8	45.7	12.4	54	19	17
	Colombia	18.2	69.4	15.1	77	98	40
	Ecuador	12.1	63.8	28.9	4	52	19
	Paraguay	NA	NA	NA	31	131	12
	Peru	6.2	26.0	28.5	33	108	12
	Venezuela	18.4	59.7	17.2	36	45	11

Balance

The balance principle refers to balancing energy intakes and macronutrient (fat, protein, carbohydrates) intakes with expenditures to maintain an acceptable range of macronutrient energy intake. **Energy intake** is defined as the total energy consumed by an individual, provided by the primary dietary sources (carbohydrates, protein, and fat). The acceptable macronutrient distribution (AMDR) for energy intake is 45-75% for carbohydrates, 15-30% for fat, and 15-20% for protein.

Data from the ELANS study (2015) were used to assess the balance principle in LAC (Fisberg et al., 2016; Kovalskys et al., 2019). **Overall, energy intake is balanced within the AMDR, assuming a physically active population.** Energy intakes across LAC countries averaged 1,959 kcal per day, with individual countries ranging from 1,781 kcal/day in Chile to 2,110 kcal/day in Ecuador (Table 11). The macronutrient distribution shows that carbohydrates accounted for the majority of energy intake and aligns with recommendations, averaging 54%. This varied by LAC countries, from Peru's high of 63% to Venezuela's low of 53%. Fat contributed approximately 30% of total energy intake across the region, with Peru showing notably lower fat consumption (22%) compared to other countries, which ranged from 28% to 31%. Protein intake was relatively consistent across countries, averaging 16% of total energy intake with a narrow range from 15-16% in most countries. **These macronutrient intake patterns suggest a relatively balanced energy composition across most LAC countries, with Peru as a notable exception, due to its higher carbohydrate and lower fat intake.**

Table *11*. Energy and macronutrient intake from the ELANS study.

	Energy intakes (Kcal/d) (ELANS, 2015)			**Carbohydrates** (% Energy intakes) (ELANS, 2015)			**Fat** (% Energy intakes) (ELANS, 2015)			**Protein** (% of energy intake) (ELANS, 2015)		
Countries	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**
Costa Rica	1892	2142	1641	57	57	57	28	28	29	14	15	14
Chile	1781	2005	1566	54	55	54	30	30	30	16	15	15
Colombia	2036	2233	1847	54	54	54	31	31	30	15	15	15
Ecuador	2110	2313	1894	54	54	54	30	30	30	16	16	16
Peru	2031	2254	1818	63	64	62	22	21	23	15	15	15
Venezuela	1887	2060	1728	53	53	53	31	31	30	16	16	16
ELANS	1959	2179	1754	54	55	54	30	29	30	16	16	16

Source: Adapted from Kovalskys et al., 2018

However, this population does not appear to be energy balanced when taking into account energy expenditure via physical activity levels, i.e., overall energy balance in addition to healthy diets (Luis de Moraes Ferrari et al., 2019; WHO, 2022). Women consistently show higher physical inactivity levels than men in most LAC countries. According to Table 12, Bolivia exhibits the highest rates of physical inactivity in the region, with 82% of men and 89% of women classified as physically inactive. In contrast, Chile demonstrates the lowest inactivity rates at 24% for men and 29% for women. The gender gap in physical inactivity is most pronounced in Costa Rica (16 percentage-point difference in favor of females) and Colombia (11 percentage-point difference), while Paraguay and Guatemala show minimal gender differences. Across all countries except Paraguay and Guatemala, women demonstrate higher rates of physical inactivity than men. The overall pattern suggests that physical inactivity is common in more than one-quarter of adults in the LAC region, and in some countries, the majority of the population is physically inactive. It is not surprising that obesity among women (36%) is higher than among men (31%), reflecting an energy imbalance. Overall, in the LAC region, 67% of adults are overweight and obese, and 37% of children aged 5-19 years are overweight and obese (Luciani et al., 2023).

Table *12*. Physical activity levels across LAC countries

Region	**Country**	**% Physical inactivity, adults aged 18+ (%) (WHO, 2022)**		**Leisure physical activity (min/week) (ELANS, 2015)**		**Sitting time (min/day) (ELANS, 2015)**	
		Male	**Female**	**Male**	**Female**	**Male**	**Female**
Central American	Costa Rica	38	54	330.4	249.6	486.9	418.1
	Guatemala	37	37	*	*	*	*
	Mexico	26	32	*	*	*	*
Caribbean American	Dominican Republic	34	43	*	*	*	*
South American	Bolivia	82	89	*	*	*	*
	Chile	24	29	360.5	322.3	497.5	474.6
	Colombia	43	54	312.4	263.5	507.3	457.5
	Ecuador	25	30	358.9	447.6	486.8	321.5
	Paraguay	38	37	*	*	*	*
	Peru	*	*	293.9	246.4	548.4	506.1
	Venezuela	30	33	393.6	244.7	389.4	377.4

*Data not available

Source: Luis de Moraes Ferrari et al., 2019; WHO, 2022.

Box 4. Food environments in Central America: A call to action for the implementation of cost-effective policies for the prevention of diet-related non-communicable diseases

By Fernanda Kroker, Institute of Nutrition of Central America and Panama (INCAP)

Food environments are defined as the physical, economic, social and sociocultural settings, opportunities, and conditions that influence people's food and beverage choices, and therefore their nutritional status (Swinburn et al., 2011). When these environments are unhealthy, they lead to unhealthy diets, characterized by excessive consumption of nutrients of public health concern such as sodium, sugar, total fats, saturated fats, and trans fats, which have consequences for the onset of diet-related chronic noncommunicable diseases (Dr-NCDs) such as obesity, type II diabetes mellitus, hypertension, and other cardiometabolic diseases (Lane et al., 2024; Perez-Ferrer et al., 2019).

What are some characteristics of an unhealthy food environment?

- High availability and supply of unhealthy (ultra-processed) foods at more affordable prices.
- Aggressive and misleading advertising of unhealthy foods and beverages targeting children, adolescents, and the public.
- Unclear labeling on food and beverage packaging.
- Lack of policies to create healthier food environments.

The Nutrition Institute of Central America and Panama conducted a series of collaborative studies to monitor the labeling, composition, and advertising of packaged foods in Guatemala and Costa Rica. These studies used standardized methodologies from the International Network for Research, Monitoring, and Action on Food, Obesity, and Noncommunicable Diseases (Swinburn et al., 2013).

To monitor food composition and labeling, the levels of nutrients of concern to public health were analyzed in pre-packaged products. In the case of advertising, different marketing techniques were analyzed, both on packaging and in television advertising, such as health claims, nutrition claims, offers, promotions, use of characters, and gifts, among others.

Findings:

1. Only 1% of packaged products with information (complete nutrition declaration) meet adequate nutrient levels for human consumption (sodium, energy, fats, sugars) according to the PAHO nutrient profile (Alarcon-Calderon et al., 2020).
2. Of the total products evaluated (with and without complete nutritional information), 50% of the food supply contains excessive amounts of at least one nutrient related to Dr-NCDs (Alarcon-Calderon et al., 2020).
3. Products with excessive amounts of nutrients of concern to public health (especially ultra-processed foods) use nutrition and health claims, persuasive marketing techniques, and poor labeling practices. This confuses consumers about the true nutritional content of these products (Cosenza-Quintana et al., 2020; Zamora-Corrales et al., 2019, 2019).
4. In addition, monitoring of food and beverage advertising revealed that television promotion of unhealthy products (according to the WHO nutrient profile) is higher than that of foods with a healthier nutrient profile. Products with excessive amounts of nutrients related to Dr-NCDs are the most heavily advertised and contain more persuasive strategies (offers, promotions, gifts, etc.), especially those aimed at children (Cosenza-Quintana et al., 2020; Zamora-Corrales et al., 2019, 2019).

In summary, these studies demonstrate an unhealthy food environment, which is one of the determinants of unhealthy diets and the onset of diet-related noncommunicable diseases (diet-related NCDs). Therefore, the development of evidence-based and cost-effective population-based preventive measures is key to promoting healthier environments and preventing diet-related NCDs. Population-based measures to create healthier food environments and diets, such as front-of-package nutrition warning labels, fiscal measures (e.g., taxes on sugary drinks), regulation of food and beverage advertising aimed at minors, product reformulation (e.g., reduction of sodium, sugars, etc.), and mass communication campaigns, are the most cost-effective for the prevention of diet-related NCDs (Cecchini et al., 2010; WHO, 2024).

Moderation

The moderation principle refers to moderating the intake of foods that are detrimental to health. This primarily includes ultra-processed foods and salty and sugary beverages. Based on the data from the Diet Quality Questionnaire (2024) from the Global Diet Quality Project, and including ELANS (2015) data, ultra-processed food consumption patterns vary significantly across Latin American countries. Central American nations show particularly high consumption rates, with Honduras leading in soft drink intake (57.5%) and Guatemala showing the highest consumption of packaged ultra-processed salty snacks (35.1%). Sweet beverage consumption is remarkably high across all countries, ranging from 74.1% in Colombia to 92.5% in Honduras, indicating widespread adoption of sugary drinks throughout the region. From the ELANS study, we include sugar intake in grams. The recommended daily intake is 45 grams per person (PAHO, 2020). Colombia shows the highest total daily sugar consumption at 109.8 grams, followed by Peru at 106.4 grams and Ecuador at 102.4 grams, all of which substantially exceed the WHO recommendations (Table 13).

Table *13***.** Intakes of salty snacks, sweet and sugary beverages, and ultra-processed foods.

Region	Country	% Soft drinks (soda, energy drinks, sports drinks) per day or week preview (GDQP, 2024)	% Packaged ultra-processed salty snacks (GDQP, 2024)	% Salty or fried snacks (GDQP, 2024)	% Salty packaged snacks, instant noodles, or fast food (GDQP, 2024)	% Sweet beverages (GDQP, 2024)	% Sweet foods (GDQP, 2024)	Total sugar intakes (g/Day) ELANS, 2015
Central American	Costa Rica	37.8	27.0	49.8	36.9	86.5	64.3	
	Guatemala	49.5	35.1	54.1	48.9	90.2	66.7	Not available
	Honduras	57.5	38.9	50.2	45.5	92.5	66.4	Not available
	Mexico	37.8	19.1	26.9	24.9	87.8	62.9	Not available
Caribbean American	Dominican Republic	41.4	17.0	46.4	28.1	85.7	48.2	
South American	Bolivia	38.1	13.0	37.4	19.2	88.9	48.5	Not available
	Chile	46.2	20.8	37.8	29.7	92.3	59.0	84.9
	Colombia	28.4	15.6	35.0	23.3	74.1	49.0	109.8
	Ecuador	29.2	13.6	30.7	19.5	86.1	38.1	102.4
	Paraguay	42.4	11.4	49.5	24.2	81.4	55.9	Not available
	Peru	30.4	10.7	35.2	22.4	83.1	46.1	106.4
	Venezuela	32.8	12.5	33.0	19.4	87.1	58.9	98.8

Source: Diet Quality Project, 2024; Global Nutrition Report, 2024.

We find significant gender differences in the prevalence of consuming unhealthy food groups, including deep-fried foods, soft drinks (such as soda, energy drinks, sports drinks), and fruit juices. Gender differences in consumption reveal that males consistently consume more sugary foods and beverages than females across all countries surveyed (Table 14). The gender gap reaches 18% in Ecuador, with males showing the highest consumption rate at 73% compared to females at 55%. The Dominican Republic (14% gap) and Colombia (15% gap) also demonstrate substantial gender differences, while countries such as Guatemala and Peru exhibit more modest disparities of 4–6%. For context (see Figure 11), the LAC regional food production profile reveals a striking mismatch with nutritional needs, directly undermining public health guidelines (Clifford Astbury et al., 2021). LAC produces a staggering 12 times the recommended levels of sugar. While the region aligns reasonably well with recommended intake levels for red and processed meat supply (after accounting for exports), it falls dramatically short in producing adequate quantities of fruits and vegetables relative to per capita recommended consumption levels (Clifford Astbury et al., 2021).

Table *14*. Differences in the prevalence of consumption of sugary foods or beverages.

More than one				
Region	**Country**	**Female**	**Male**	**GAP**
Central American	Honduras	79%	87%	8%
	Guatemala	79%	85%	6%
	Mexico	71%	80%	9%
Caribbean American	Dominican Republic	63%	77%	14%
South American	Bolivia	62%	74%	12%
	Colombia	52%	67%	15%
	Chile	73%	82%	9%
	Ecuador	55%	73%	18%
	Paraguay	66%	72%	6%
	Peru	58%	64%	6%
	Venezuela	68%	75%	7%

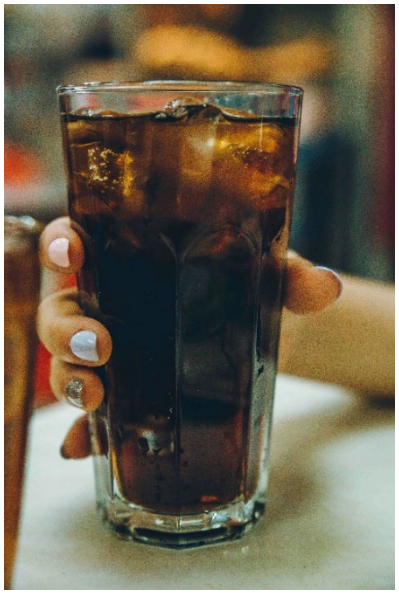


Photo: Khanh Nguyen/ Unsplash

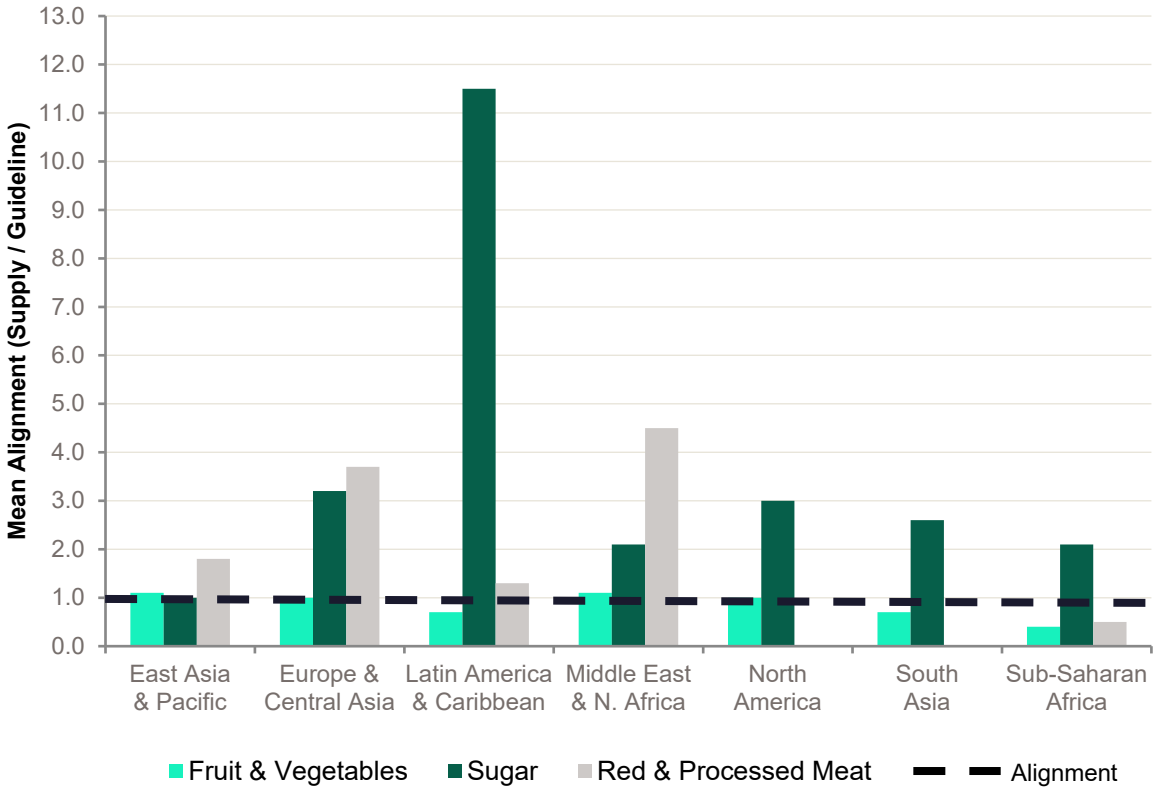


Figure 11. Sugar, Fruits and vegetables, and red and processed meat supply compared to the recommended dietary guidelines.
Source: Adapted from Clifford Astbury et al., 2021.
Note: Values = supply ÷ guideline. 1.0 = perfect alignment (dashed line). >1 excess; <1 deficit. North America & South Asia meat: no FBDG available (shown as 0).

Box 5: Reformulation of Ultra-Processed Products in Colombia After the Introduction of Public-Health Regulations

By Elisa M. Cadena, Irieleth Gallo & Victoria E. Soto, Center for the Study of Social Protection and Health Economics, Universidad ICESI

Colombia has implemented a coordinated regulatory package to improve its food environment, including maximum sodium targets, front-of-package warning labeling (FOPL), and taxes on sugar-sweetened beverages and ultra-processed foods (UPFs) containing excess sodium, sugars, or saturated fat (Figure 12). These measures aim to reduce non-communicable diseases by driving industry reformulation toward healthier products.

Cadena and colleagues (Cadena et al., 2025) compared energy and nutrient profiles of 200 matched UPFs drawn from the 2015 National Nutrition Survey (ENSIN) and a 2024 in-store survey in Bogotá. The study revealed clear nutritional improvements after the new regulations took effect (Figure 13):

- Sugars in beverages declined from 8.9 to 4.8 g per 100 ml (-46 %).
- Sodium in foods decreased from 400 to 296 mg per 100 g (-26 %).
- Energy content fell notably in beverages and processed meats, while saturated fat showed minimal change.
- Calcium increased in baked goods, with no consistent pattern for other micronutrients.
- Overall, 85% of products met sodium label requirements and 87% complied with sugar labeling.

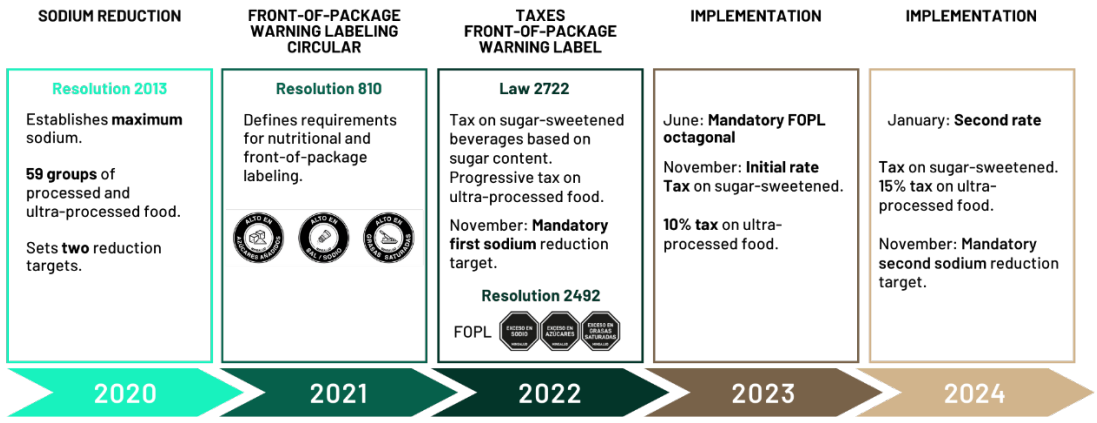


Figure 12. Public policies to reduce consumption of ultra-processed foods in Colombia.

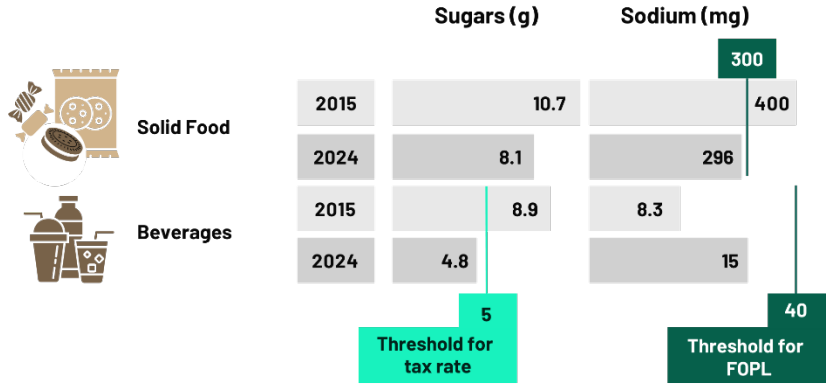


Figure 13. Reductions in Sugars and Sodium, 2020–2024.

Key message: The combination of labeling, fiscal, and compositional regulations has successfully incentivized reformulation of UPFs in Colombia, lowering sugar and sodium levels and setting a precedent for integrated food-policy design in Latin America. Continued monitoring should assess ingredient substitutions (e.g., sweeteners) and the broader dietary and health impacts of these product changes.

Discussion

This report summarizes the current state of food security and healthy diets in Latin America and the Caribbean (LAC), specifically focusing on gender and location differences, where data were available. Public databases (FAO, IPC, HLPE), studies on harmonized quantitative dietary intake, and systematic reviews were used. Overall, in LAC, food insecurity mainly affects the urban population and women. Around 75% of people experiencing food insecurity (162 million) live in urban and peri-urban areas. Furthermore, this region has the largest gender gap in food insecurity worldwide, surpassing regions such as sub-Saharan Africa and South Asia, a disparity that was already high before the COVID-19 pandemic. According to the IPC classification, the five countries with sizable populations in Phase 3 (Crisis level and above) or higher are the Dominican Republic, Ecuador, Haiti, Honduras, and Guatemala. Based on this data, we have three main recommendations for studies in LAC region: (1) Invest, identify and address factors associated with urban and peri-urban FIS, specifically focusing on gender gap; (2) Measure food security by gender and other social positions; and (3) focus on regional network and developing co-learning networks for programs and policies targeting gendered and urban/peri-urban food insecurity issues.

Another important finding, or rather framing, of this report is the assessment of healthy diets in Latin America and the Caribbean. Overall, LAC countries fail to meet three out of four healthy diet principles (FAO & WHO, 2024) (see figure 14). While the region achieves dietary diversity with an average of six out of 10 food groups consumed, it falls short on three critical principles of a healthy diet: adequacy (especially for vitamin E), balance, and moderation. Gender differences were noted across diversity, moderation, and balance principles.

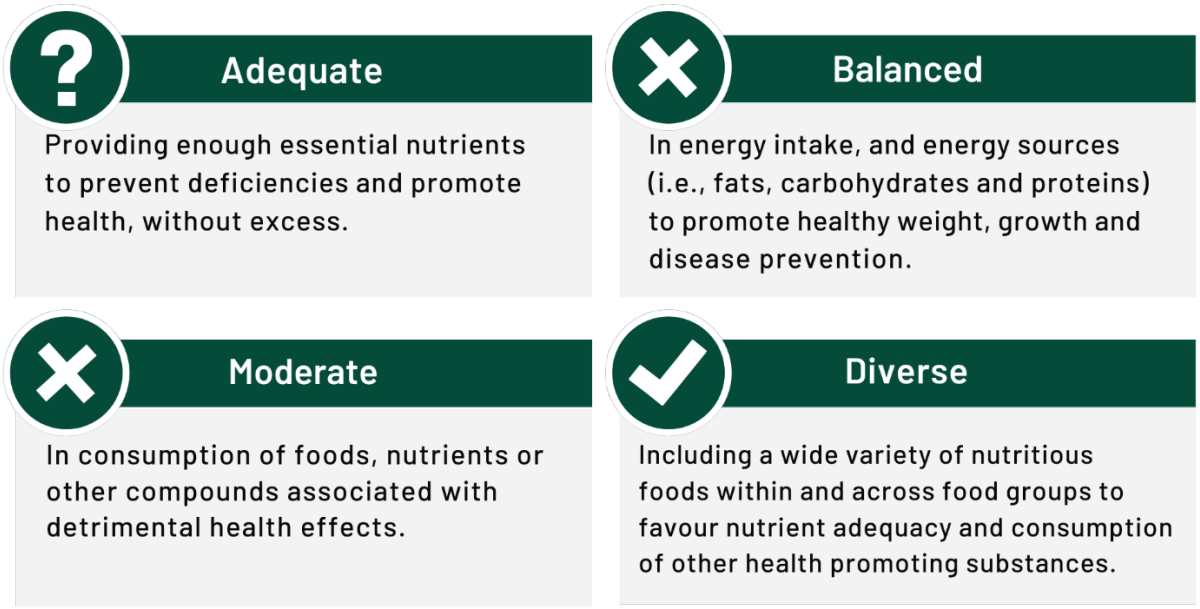


Figure 14. The authors' assessment of healthy diets in the LAC region.
Source: Adapted from FAO & WHO, 2024.

Although the Minimum Dietary Diversity for Women (MDD-W) is reasonably high in this population (60-80% achieving MDD-W), the type of diversity is not aligned with the prevention of non-communicable diseases, as noted by the Essential All-5 diversity index (20–55%). This index includes vegetables, fruits, legumes/nuts, animal source foods and starches. In LAC, the most-commonly consumed food groups were staples, meat, other vegetables, dairy, and fruits.

Despite the cultural significance and acceptability of legumes, consumption remains very low in South American and Caribbean countries, with prevalence at only 20–50%. This aligns with the widely observed trend that legumes slowly disappear from diets as access to animal-source foods increases, a pattern often seen as countries transition to middle-income status (Ambikapathi et al., 2022). It is also worth noting that while the 29 LAC countries include recommendations on consuming legumes in their Food-Based Dietary guidelines, only five out of 29 provide specific guidance on serving frequency, and only two specify serving size (Hughes et al., 2022). The five countries that include recommendations on serving frequency are Belize, Chile, Colombia, Jamaica, and Paraguay. The recommendations include two servings a week to 2–3 servings/day (Hughes et al., 2022). The two countries that include servings sizes are Belize with a suggestion of "1/4 cup of red beans" and Jamaica with a suggestion of "¼ cup cooked peas, beans, baked beans, stewed peas, and chickpeas (1 Tbspn), ½ cup canned green peas and lentils" (Hughes et al., 2022). This gap illustrates that considerable work is needed to operationalize LAC food-based dietary guidelines with specific, actionable recommendations on both serving

frequency and portion size. Additionally, the cost of legumes does appear to be high in Mexico (relative price of 0.86 compared to the cost of the least expensive starchy staples) and South America (2.1 in Paraguay) (Bai et al., 2021).

Energy balance remains poor due to very low physical activity levels and excessive consumption of unhealthy foods. The assessment of the balance principle for macronutrients by quantitative dietary recall shows that LAC adult diets largely fall within the acceptable ranges of macronutrient intake. However, examining physical activity levels and body mass index reveals a different picture, illustrating that balance is not being met. This has important implications for how we measure the balance principle. A suite of indicators might paint a more complete picture of dietary balance. It's worth noting that there were high levels of physical inactivity and gender differences, warranting a closer look at how the current built environment in LAC enables these dietary patterns and overall energy balance, including physical activity. Recent ecological analyses of the built environment in 200 LAC cities on obesity, diabetes, and BMI showed findings that differ substantially from those in high-income countries (Anza-Ramirez et al., 2022). For example, higher intersection density was associated with higher obesity and BMI levels (adjusted for age, sex, education, and other sub-city-level variables), despite the previous literature showing that higher intersections increase walkability and connectivity, leading to lower obesity and BMI (Anza-Ramirez et al., 2022). City fragmentation, connectivity, and development were negatively associated with BMI and obesity. Only greenery was positively related to optimal nutrition outcomes, in line with previous literature (Anza-Ramirez et al., 2022). This warrants a deeper understanding of the historical development and urbanization patterns specific to LAC that shape the current and future built environment, as they fundamentally affect health and food access.

One of the more prominent findings is the sweetened diets of the LAC population. The ELANS study showed a mean intake of 99 grams of total sugar, accounting for at least 20% of total energy (Fisberg et al., 2018). Consumption of sweet beverages is estimated at 80-90% in LAC countries based on 2024 Diet Quality Questionnaires. Stratification of sugar intake in the ELANS study reveals significant gender and socioeconomic status **(**SES) patterns: men consume more than women, higher-SES groups consume more than lower-SES groups, and younger people consume more than older people (Fisberg et al., 2018). This report corroborates the overall findings that **men consume more unhealthy foods than women**, with men consistently showing higher consumption of sugary foods, beverages, and processed foods compared to women.

Overall, these dietary patterns in the region reflect the region's export-focused agricultural systems, which prioritize commodity production over ensuring an adequate domestic supply of nutritious food for local consumption, a misalignment that's been well documented (Astbury et al., 2021). The domestic supply of sugar in LAC is 12 times the recommended intake level, which is about 25-50 grams of sugar (Astbury et al., 2021). The policy space in LAC has been active, with front-of-the-package labeling and beverage tax initiatives undertaken in many LAC countries to moderate sugar intake. The impact evaluation of these foods extends beyond diets and nutrition to other distal factors, such as reductions in dental cavities among children (Crosbie et al., 2023; Redondo et al., 2018). What is not clear is the impact of these policies on different social groups, especially men, who consume a larger quantity of the total sugar. Studies from high-income countries illustrate that nutrition labels may not have the same impact on men (Levi et al., 2006; Stran & Knol, 2013).

While globally the most commonly lacking micronutrients are vitamin A, iron, and zinc, the ELANS study showed relatively high mean adequacy ratios of 97% for iron and zinc and 87% for vitamin A in LAC. However, the lack of disaggregation by residence and socio-economic status in this analysis could mask significant existing disparities within the region. These dietary inadequacies, combined with food insecurity, compound to create substantial health inequities across the population. There has been a rich literature on the current state of food environments, nutritional status, obesity, policies, and programs in the LAC region (Corvalán et al., 2017; Hawkes et al., 2013; Palacios et al., 2021; Popkin & Reardon, 2018; Taillie et al., 2020). However, harmonized dietary data collection has been sparse in LAC compared to renewed efforts observed in Africa and Southeast Asia. Studies such as ELANS and Salurbral (Urban Health in Latin America) projects fill this critical evidence gap on diets and consumption patterns, and physical activity, especially across multiple sites and within sub-national spaces where inequities are masked (Kovalskys et al., 2019; Moore et al., 2024).

This report has several significant limitations that warrant consideration. First, the availability of harmonized datasets for regional comparison remains limited, constraining our ability to draw consistent comparisons across all LAC countries. Second, reliance on national averages especially Carribean nations, necessarily masks significant within-country disparities by geography, socioeconomic status, and other demographic characteristics. While we attempted to examine disaggregated data where available, systematic disaggregation was not possible across all countries and indicators. Third, we did not specifically investigate the diets of the most vulnerable populations (children, women of different physiological needs), where inadequate intakes and micronutrient deficiencies are likely to paint a different picture than the regional averages presented here. Fourth, this analysis does not deeply explore dietary patterns or food cultures that would contextualize the principles of healthy diets within the lived experiences and food environments of LAC populations. For example, analyses in Colombia have identified four distinct dietary patterns: traditional, industrial, conservative, and grilled-food and processed-drink patterns, each shaped by complex social, economic, and cultural factors (Meneses Urrea et al., 2022). Understanding the daily lives, time-use constraints, mobility patterns, and structural conditions that give rise to these dietary patterns requires ethnographic and mixed-methods approaches beyond the scope of this

assessment. Future research should integrate quantitative dietary data with qualitative insights into how people navigate their food environments to more fully understand and effectively address nutrition security challenges in the region.

Addressing nutrition security in LAC requires recognizing profound gender and social disparities in both food access and health outcomes. While women disproportionately experience food insecurity, access to unhealthy food appears to be high among men, who also face significantly elevated mortality from diet-related non-communicable diseases across the region. Males experience 51% higher cardiovascular disease mortality (178.8 vs. 118.3 per 100,000), 25% higher diabetes mortality (33.3 vs. 26.7 per 100,000), and 40% higher chronic respiratory disease mortality (33.7 vs. 24.1 per 100,000) compared to females (Herrera-Cuenca et al., 2023). **LAC countries exhibit inadequate consumption of protective foods (low intakes of vegetables, fruits, and legumes) while over-consuming sugary foods, especially among men.** These patterns suggest that gender and other social positions shape not only access to adequate diets but also behavioral risk factors (social norms, healthcare utilization) and biological vulnerability to diet-related diseases. Gender-responsive nutrition policies must therefore address both the feminization of food insecurity, poor access to healthy foods, and the elevated disease burden among men to achieve health equity in the region. More importantly, policy evaluation in LAC needs to be conducted through a social equity lens.


Photo: Alex Reep / UC Berkeley

References

Alarcon-Calderon, A., Vandevijvere, S., Ramírez-Zea, M., & Kroker-Lobos, M. F. (2020). Lack of nutrient declarations and low nutritional quality of pre-packaged foods sold in Guatemalan supermarkets. *Public Health Nutrition*, *23*(13), 2280–2289. https://doi.org/10.1017/S1368980020000336

Ambikapathi, R., Schneider, K. R., Davis, B., Herrero, M., Winters, P., & Fanzo, J. C. (2022). Global food systems transitions have enabled affordable diets but had less favourable outcomes for nutrition, environmental health, inclusion and equity. *Nature Food*, *3*(9), 764–779. https://doi.org/10.1038/s43016-022-00588-7

Amoussa Hounkpatin, W., Koukou, E., Termote, C., Ntandou, G., Mitchodigni, I., Bodjrenou, S., & Alaofe, H. (2023). *Dietary diversity predicts the adequacy of micronutrient intake in 6- to 23-month-old children regardless of the season in rural Southern Benin*. https://doi.org/10.1177/03795721231164085

Anza-Ramirez, C., Lazo, M., Zafra-Tanaka, J. H., Avila-Palencia, I., Bilal, U., Hernández-Vásquez, A., Knoll, C., Lopez-Olmedo, N., Mazariegos, M., Moore, K., Rodriguez, D. A., Sarmiento, O. L., Stern, D., Tumas, N., & Miranda, J. J. (2022). The urban built environment and adult BMI, obesity, and diabetes in Latin American cities. *Nature Communications*, *13*(1), 7977. https://doi.org/10.1038/s41467-022-35648-w

Ardila, F. (2016). *Narrativas y Redes en la Formulación del Plan Alimentario y Nutricional Indígena y Afro del municipio de Tumaco (PANIAT)*. https://bffrepositorio.unal.edu.co/server/api/core/bitstreams/a8aa20dd-105c-448c-87d8-5ec901bc3400/content

Astbury, C., Aguirre, E., Cullerton, K., Monsivais, P., & Penney, T. L. (2021). How supportive is the global food supply of food-based dietary guidelines? A descriptive time series analysis of food supply alignment from 1961 to 2013. *SSM - Population Health*, *15*, 100866. https://doi.org/10.1016/j.ssmph.2021.100866

Bai, Y., Alemu, R., Block, S. A., Headey, D., & Masters, W. A. (2021). Cost and affordability of nutritious diets at retail prices: Evidence from 177 countries. *Food Policy*, *99*, 101983. https://doi.org/10.1016/j.foodpol.2020.101983

Bassi, C., Maysels, R., & Anex, R. (2022). Declining greenhouse gas emissions in the US diet (2003–2018): Drivers and demographic trends. *Journal of Cleaner Production*, *351*, 131465. https://doi.org/10.1016/j.jclepro.2022.131465

Basurko, C., Savy, M., Galindo, M. S., Gatti, C., Osei, L., Nacher, M., & Dramé, M. (2025). Prevalence of Food Insecurity during Pregnancy in Latin American and the Caribbean Countries: A Systematic Review. *The Journal of Nutrition*, *155*(1), 250–259. https://doi.org/10.1016/j.tjnut.2024.09.005

Brito, A., Cori, H., Olivares, M., Mujica, M. F., Cediel, G., & De Romaña, D. L. (2013). Less than Adequate Vitamin D Status and Intake in Latin America and the Caribbean: A Problem of Unknown Magnitude. *Food and Nutrition Bulletin*, *34*(1), 52–64. https://doi.org/10.1177/156482651303400107

Busso, D., David, A., Penailillo, R., Echeverría, G., Rigotti, A., Kovalskys, I., Gómez, G., Cortés Sanabria, L. Y., Yépez García, M. C., Pareja, R. G., Herrera-Cuenca, M., Fisberg, M., & on behalf of the ELANS Study Group. (2021). Intake of Vitamin E and C in Women of Reproductive Age: Results from the Latin American Study of Nutrition and Health (ELANS). *Nutrients*, *13*(6), Article 6. https://doi.org/10.3390/nu13061954

Cadena, E. M., Gallo, I., & Soto, V. E. (2025). Reformulation of ultra-processed products in Colombia after the introduction of public health regulations. *BMC Medicine*, *23*(1), 446. https://doi.org/10.1186/s12916-025-04215-7

Caleffi, S., Micha, R., Mozaffarian, D., & Springmann, M. (2025). *The socio-demographic characteristics of food-related environmental impacts*. Research Square. https://doi.org/10.21203/rs.3.rs-5434310/v1

Carla, Y., & Castro, D. (2023). *Indigenous Peoples in Latin America:Statistical Information*. https://sgp.fas.org/crs/row/R46225.pdf#page=6.29

Cecchini, M., Sassi, F., Lauer, J. A., Lee, Y. Y., Guajardo-Barron, V., & Chisholm, D. (2010). Tackling of unhealthy diets, physical inactivity, and obesity: Health effects and cost-effectiveness. *The Lancet*, *376*(9754), 1775–1784. https://doi.org/10.1016/S0140-6736(10)61514-0

Clapp, J., Moseley, W. G., Burlingame, B., & Termine, P. (2022). Viewpoint: The case for a six-dimensional food security framework. *Food Policy*, *106*, 102164. https://doi.org/10.1016/j.foodpol.2021.102164

Clifford Astbury, C., Aguirre, E., Cullerton, K., Monsivais, P., & Penney, T. L. (2021). How supportive is the global food supply of food-based dietary guidelines? A descriptive time series analysis of food supply alignment from 1961 to 2013. *SSM - Population Health*, *15*, 100866. https://doi.org/10.1016/j.ssmph.2021.100866

Corvalán, C., Garmendia, M. L., Jones-Smith, J., Lutter, C. K., Miranda, J. J., Pedraza, L. S., Popkin, B. M., Ramirez-Zea, M., Salvo, D., & Stein, A. D. (2017). Nutrition status of children in Latin America. *Obesity Reviews*, *18*(S2), 7–18. https://doi.org/10/gnbwwj

Cosenza-Quintana, E. L., Morales-Juárez, A., Ramirez-Zea, M., Vandevijvere, S., & Kroker-Lobos, M. F. (2020). Overabundance of unhealthy food advertising targeted to children on Guatemalan television. *Health Promotion International*, *35*(6), 1331–1340. https://doi.org/10.1093/heapro/daaa002

Crosbie, E., Gomes, F. S., Olvera, J., Patiño, S. R.-G., Hoeper, S., & Carriedo, A. (2023). A policy study on front–of–pack nutrition labeling in the Americas: Emerging developments and outcomes. *The Lancet Regional Health – Americas*, *18*. https://doi.org/10.1016/j.lana.2022.100400

Dabone, C., Mbagwu, I., Muray, M., Ubangha, L., Kohoun, B., Etowa, E., Nare, H., Kiros, G., & Etowa, J. (2022). Global Food Insecurity and African, Caribbean, and Black (ACB) Populations During the COVID-19 Pandemic: A Rapid Review. *Journal of Racial and Ethnic Health Disparities*, *9*(2), 420–435. https://doi.org/10.1007/s40615-021-00973-1

De Quadros, V. P., Balcerzak, A., Allemand, P., De Sousa, R. F., Bevere, T., Arsenault, J., Deitchler, M., & Holmes, B. A. (2022). Global Trends in the Availability of Dietary Data in Low and Middle-Income Countries. *Nutrients*, *14*(14), 2987. https://doi.org/10.3390/nu14142987

Del Pilar Zea León, M., Yoshioka, A. M., González, D. E., Girón, L. E., Barona, S. A., & Valencia, H. (2023). O104 Estimación del costo mínimo y asequibilidad a una dieta suficiente en energía, adecuada en nutrientes y una dieta saludable para la población urbana de cali, colombia 2022. Archivos Latinoamericanos de Nutricion, 73, 112.

Diet Quality Project, D. (2024). *DQQ Microdata 2021-2024* (Version 2.1, pp. 71449081, 27421708, 18586, 47570, 50159, 27954929) [Text/tab-separated-values,text/tab-separated-values,text/comma-separated-values,application/vnd.openxmlformats-officedocument.spreadsheetml.sheet,application/vnd.openxmlformats-officedocument.spreadsheetml.sheet,application/x-spss-sav]. Harvard Dataverse. https://doi.org/10.7910/DVN/PWWJSA

DQQ. (2024). *DQQ Results Dataset 2021-2024* (Version 2.1, pp. 3159784, 4197523) [Text/tab-separated-values,text/tab-separated-values]. Harvard Dataverse. https://doi.org/10.7910/DVN/KY3W8A

Ebanks, G. E. (1993). [The urbanized societies of Latin America and the Caribbean: Some dimensions and observations]. *Notas De Poblacion*, *21*(57), 125–160.

Espinosa-Cristia, J. F., Feregrino, J., & Isla, P. (2019). Emerging, and old, dilemmas for food security in Latin America. *Journal of Public Affairs*, *19*(3), e1999. https://doi.org/10.1002/pa.1999

FAO. (2021). *Minimum dietary diversity for women*. FAO. https://doi.org/10.4060/cb3434en

FAO. (2022). *FAOSTAT*. https://www.fao.org/faostat/en/#data/FDIQ

FAO. (2023a). *The State of Food and Agriculture 2023*. FAO. https://doi.org/10.4060/cc7724en

FAO. (2023b). *The status of women in agrifood systems – Overview*. Rome. https://doi.org/10.4060/cc5060en

FAO, IFAD, UNICEF, WFP, & WHO. (2023). *The State of Food Security and Nutrition in the World 2023*. FAO; IFAD; UNICEF; WFP; WHO; https://doi.org/10.4060/cc3017en

FAO, IFAD, UNICEF, WFP, & WHO. (2024). *The State of Food Security and Nutrition in the World 2024 – Financing to end hunger, food insecurity and malnutrition in all its forms*. FAO; IFAD; UNICEF; WFP; WHO; https://doi.org/10.4060/cd1254en

FAO, IFAD, UNICEF, WFP, & WHO. (2025). *The State of Food Security and Nutrition in the World 2025* (Addressing High Food Price Inflation for Food Security and Nutrition). https://doi.org/10.4060/cd1254en

FAO, & WHO. (2024). *What are healthy diets? Joint statement by the Food and Agriculture Organization of the United Nations and the World Health Organization*. WHO; FAO; https://doi.org/10.4060/cd2223en

Fisberg, M., Kovalskys, I., Gómez, G., Rigotti, A., Cortés, L. Y., Herrera-Cuenca, M., Yépez, M. C., Pareja, R. G., Guajardo, V., Zimberg, I. Z., Chiavegatto Filho, A. D. P., Pratt, M., Koletzko, B., Tucker, K. L., & the

ELANS Study Group. (2016). Latin American Study of Nutrition and Health (ELANS): Rationale and study design. *BMC Public Health*, *16*(1), 93. https://doi.org/10.1186/s12889-016-2765-y

Fisberg, M., Kovalskys, I., Gómez, G., Rigotti, A., Sanabria, L. Y. C., García, M. C. Y., Torres, R. G. P., Herrera-Cuenca, M., Zimberg, I. Z., Koletzko, B., Pratt, M., Aznar, L. A. M., Guajardo, V., Fisberg, R. M., Sales, C. H., Previdelli, Á. N., & On behalf of the ELANS Study Group. (2018). Total and Added Sugar Intake: Assessment in Eight Latin American Countries. *Nutrients*, *10*(4), 389. https://doi.org/10.3390/nu10040389

Food Systems Dashboard. (2025). https://www.foodsystemsdashboard.org/

Global Alliance for Improved Nutrition (GAIN) & Johns Hopkins University. (2020). *The Food Systems Dashboard*. Global Alliance for Improved Nutrition (GAIN) and Johns Hopkins University. https://doi.org/10.36072/db

Global Diet Quality Project. (2022). *Measuring what the world eats: Insights from a new approach*. Global Alliance for Improved Nutrition and Harvard T.H. Chan School of Public Health, Department of Global Health and Population. https://doi.org/10.36072/dqq2022

Global Dietary Database. (2018). *Download Data | Global Dietary Database*. https://globaldietarydatabase.org/data-download

Global Nutrition Report. (2024). *Global Nutrition Report | Country Nutrition Profiles—Global Nutrition Report*. https://globalnutritionreport.org/resources/nutrition-profiles/latin-america-and-caribbean/

Gómez, G., Fisberg, R. M., Nogueira Previdelli, Á., Hermes Sales, C., Kovalskys, I., Fisberg, M., Herrera-Cuenca, M., Cortés Sanabria, L. Y., García, M. C. Y., Pareja Torres, R. G., Rigotti, A., Guajardo, V., Zalcman Zimberg, I., Chinnock, A., Murillo, A. G., Brenes, J. C., & ELANS Study Group, O. B. of T. (2019). Diet Quality and Diet Diversity in Eight Latin American Countries: Results from the Latin American Study of Nutrition and Health (ELANS). *Nutrients*, *11*(7), Article 7. https://doi.org/10.3390/nu11071605

Gómez, G., Monge-Rojas, R., Vargas-Quesada, R., Previdelli, A. N., Quesada, D., Kovalskys, I., Herrera-Cuenca, M., Cortes, L. Y., García, M. C. Y., Liria-Domínguez, R., Rigotti, A., Fisberg, R. M., Ferrari, G., Fisberg, M., & Brenes, J. C. (2024). Exploring the FAO Minimum Dietary Diversity Indicator as a Suitable Proxy of Micronutrient Adequacy in Men and Women Across Reproductive and Non-reproductive Ages in 8 Latin American Countries. *Food and Nutrition Bulletin*, *45*(2_suppl), S55–S65. https://doi.org/10.1177/03795721241242920

Gómez, G., Nogueira Previdelli, Á., Fisberg, R. M., Kovalskys, I., Fisberg, M., Herrera-Cuenca, M., Cortés Sanabria, L. Y., Yépez García, M. C., Rigotti, A., Liria-Domínguez, M. R., Guajardo, V., Quesada, D., Murillo, A. G., & Brenes, J. C. (2020). Dietary Diversity and Micronutrients Adequacy in Women of Childbearing Age: Results from ELANS Study. *Nutrients*, *12*(7), Article 7. https://doi.org/10.3390/nu12071994

Hawkes, C., Jewell, J., & Allen, K. (2013). A food policy package for healthy diets and the prevention of obesity and diet-related non-communicable diseases: The NOURISHING framework. *Obesity Reviews*, *14*(S2), 159–168. https://doi.org/10.1111/obr.12098

Hernández-Moreno, A., Vásquez-Palma, O., Gutiérrez-Gutiérrez, F., Cordero-Ahiman, O., Celedón-Celis, N., & Hochstetter-Diez, J. (2024). Analysis of Food Security of Older Rural Indigenous People in Latin America and the Caribbean. *Foods*, *13*(11), 1772. https://doi.org/10.3390/foods13111772

Hernández-Vásquez, A., Visconti-Lopez, F. J., & Vargas-Fernández, R. (2022). Factors Associated with Food Insecurity in Latin America and the Caribbean Countries: A Cross-Sectional Analysis of 13 Countries. *Nutrients*, *14*(15), Article 15. https://doi.org/10.3390/nu14153190

Herrera-Cuenca, M., Yépez García, M. C., Cortés Sanabria, L. Y., Hernández, P., Sifontes, Y., Ramírez, G., Vásquez, M., Gómez, G., Liria-Domínguez, M. R., Rigotti, A., Fisberg, M., Kovaslkys, I., & Landaeta-Jiménez, M. (2023). Contribution of Proteins to the Latin American Diet: Results of the ELANS Study. *Nutrients*, *15*(3), 669. https://doi.org/10.3390/nu15030669

Hjertholm, K. G., Holmboe-Ottesen, G., Iversen, P. O., Mdala, I., Munthali, A., Maleta, K., Shi, Z., Ferguson, E., & Kamudoni, P. (2019). Seasonality in associations between dietary diversity scores and nutrient adequacy ratios among pregnant women in rural Malawi—A cross-sectional study. *Food Nutr Res*, *63*. (30837821). https://doi.org/10.29219/fnr.v63.2712

HLPE. (2024). *Strengthening urban and peri-urban food systems to achieve food security and nutrition, in the context of urbanization and rural transformation*. CFS HLPE-FSN. https://sfcs.fao.org/docs/devhlpelibraries/report-19/hlpe-19---main-report_en_cd1459en.pdf

Hughes, J., Pearson, E., & Grafenauer, S. (2022). Legumes—A Comprehensive Exploration of Global Food-Based Dietary Guidelines and Consumption. *Nutrients*, *14*(15), 3080. https://doi.org/10.3390/nu14153080

ICBF & FAO. (2019). *Componente 2: Desarrollo de procesos participativos con enfoque diferencial étnico para la adaptación territorial de las GABA.* https://www.icbf.gov.co/system/files/metodologia_adaptacion_territorial_gaba_1.pdf#page=129.39

ICBF-UdeA. (2025). *Guía de alimentación para la población colombiana basada en biodiversidad y alimentación real | Portal ICBF - Instituto Colombiano de Bienestar Familiar ICBF*. https://www.icbf.gov.co/guia-de-alimentacion-para-la-poblacion-colombiana-basada-en-biodiversidad-y-alimentacion-real

IPC Acute Food Insecurity Classification | IPC - Integrated Food Security Phase Classification. (2025). Retrieved in May 2025. https://www.ipcinfo.org/ipcinfo-website/ipc-overview-and-classification-system/ipc-acute-food-insecurity-classification/en/

Kalmpourtzidou, A., Eilander, A., & Talsma, E. F. (2020). Global Vegetable Intake and Supply Compared to Recommendations: A Systematic Review. *Nutrients*, *12*(6), 1558. https://doi.org/10.3390/nu12061558

Kennedy, G., Kanter, R., Chotiboriboon, S., Covic, N., Delormier, T., Longvah, T., Maundu, P., Omidvar, N., Vish, P., & Kuhnlein, H. (2021). Traditional and Indigenous Fruits and Vegetables for Food System Transformation. *Current Developments in Nutrition*, *5*(8), nzab092. https://doi.org/10.1093/cdn/nzab092

Kovalskys, I., Fisberg, M., Gómez, G., Pareja, R. G., Yépez García, M. C., Cortés Sanabria, L. Y., Herrera-Cuenca, M., Rigotti, A., Guajardo, V., Zalcman Zimberg, I., Nogueira Previdelli, A., Moreno, L. A., Koletzko, B., & the ELANS Study Group. (2018). Energy intake and food sources of eight Latin American countries: Results from the Latin American Study of Nutrition and Health (ELANS). *Public Health Nutrition*, *21*(14), 2535–2547. https://doi.org/10.1017/S1368980018001222

Kovalskys, I., Rigotti, A., Koletzko, B., Fisberg, M., Gómez, G., Herrera-Cuenca, M., Cortés Sanabria, L. Y., Yépez García, M. C., Pareja, R. G., Zimberg, I. Z., Del Arco, A., Zonis, L., Previdelli, A. N., Guajardo, V., Moreno, L. A., Fisberg, R., & the ELANS Study Group. (2019). Latin American consumption of major food groups: Results from the ELANS study. *PLOS ONE*, *14*(12), e0225101. https://doi.org/10.1371/journal.pone.0225101

Lane, M. M., Gamage, E., Du, S., Ashtree, D. N., McGuinness, A. J., Gauci, S., Baker, P., Lawrence, M., Rebholz, C. M., Srour, B., Touvier, M., Jacka, F. N., O'Neil, A., Segasby, T., & Marx, W. (2024). Ultra-processed food exposure and adverse health outcomes: Umbrella review of epidemiological meta-analyses. *BMJ*, *384*, e077310. https://doi.org/10.1136/bmj-2023-077310

Levi, A., Chan, K. K., & Pence, D. (2006). Real Men Do Not Read Labels: The Effects of Masculinity and Involvement on College Students' Food Decisions. *Journal of American College Health*, *55*(2), 91–98. https://doi.org/10.3200/JACH.55.2.91-98

Luciani, S., Nederveen, L., Martinez, R., Caixeta, R., Chavez, C., Sandoval, R. C., Severini, L., Cerón, D., Gomes, A. B., Malik, S., Gomez, F., Ordunez, P., Maza, M., Monteiro, M., & Hennis, A. (2023). Noncommunicable diseases in the Americas: A review of the Pan American Health Organization's 25-year program of work. *Revista Panamericana de Salud Pública*, *47*, e13. https://doi.org/10.26633/RPSP.2023.13

Luis de Moraes Ferrari, G., Kovalskys, I., Fisberg, M., Gómez, G., Rigotti, A., Sanabria, L. Y. C., García, M. C. Y., Torres, R. G. P., Herrera-Cuenca, M., Zimberg, I. Z., Guajardo, V., Pratt, M., King, A. C., Solé, D., Fisberg, M., Kovalskys, I., Gómez, G., Rigotti, A., Sanabria, L. Y. C., … on behalf of the ELANS Study Group. (2019). Socio-demographic patterning of self-reported physical activity and sitting time in Latin American countries: Findings from ELANS. *BMC Public Health*, *19*(1), 1723. https://doi.org/10.1186/s12889-019-8048-7

Mane, E., Giaquinto, A. M., Cafiero, C., Viviani, S., & Anríquez, G. (2025). Closing the gender gap in global food insecurity: Socioeconomic determinants and economic gains in the aftermath of COVID-19. *Global Food Security*, *45*, 100850. https://www.sciencedirect.com/science/article/pii/S2211912425000252

Mason-D'Croz, D., Bogard, J. R., Sulser, T. B., Cenacchi, N., Dunston, S., Herrero, M., & Wiebe, K. (2019). Gaps between fruit and vegetable production, demand, and recommended consumption at global and national levels: An integrated modelling study. *The Lancet Planetary Health*, *3*(7), e318–e329. https://doi.org/10.1016/S2542-5196(19)30095-6

Meneses Urrea, L. A., Vaquero Abellán, M., Benachi Sandoval, N., Villegas Arenas, D., Osorio Murillo, O., & Molina-Recio, G. (2022). Dietary Patterns in Colombia: An Exploratory and Confirmatory Factor Analysis. *Frontiers in Food Science and Technology*, *2*. https://doi.org/10.3389/frfst.2022.897877

Miller, V., Reedy, J., Cudhea, F., Zhang, J., Shi, P., Erndt-Marino, J., Coates, J., Micha, R., Webb, P., Mozaffarian, D., Abbott, P., Abdollahi, M., Abedi, P., Abumweis, S., Adair, L., Nsour, M. A., Al-Daghri, N., Al-Hamad, N., Al-Hooti, S., … Zohoori, F. V. (2022). Global, regional, and national consumption of animal-source foods between 1990 and 2018: Findings from the Global Dietary Database. *The Lancet Planetary Health*, *6*(3), e243–e256. https://doi.org/10.1016/S2542-5196(21)00352-1

Mohammadi, E., Singh, S. J., McCordic, C., & Pittman, J. (2022). Food Security Challenges and Options in the Caribbean: Insights from a Scoping Review. *Anthropocene Science*, *1*(1), 91–108. https://doi.org/10.1007/s44177-021-00008-8

Moore, K., Lazo, M., Ortigoza, A., Quistberg, D. A., Sanchez, B., Acharya, B., Alfaro, T., Kroker-Lobos, M. F., Menezes, M. C. D., Sarmiento, O. L., de Souza Andrade, A. C., Perez Ferrer, C., Hernandez Vasquez, A., Caiaffa, W. T., Diez Roux, A. V., & SALURBAL Group. (2024). Data Resource Profile: Harmonized health survey data for 240 cities across 11 countries in Latin America: the SALURBAL project. *International Journal of Epidemiology*, *54*(1), dyae171. https://doi.org/10.1093/ije/dyae171

PAHO. (2020). *Recommended Nutrient Intakes and Population Nutrient Intake Goals for the Caribbean—PAHO/WHO | Pan American Health Organization*. https://www.paho.org/en/documents/recommended-nutrient-intakes-and-population-nutrient-intake-goals-caribbean

Palacios, C., Magnus, M., Arrieta, A., Gallardo, H., Tapia, R., & Espinal, C. (2021). Obesity in Latin America, a scoping review of public health prevention strategies and an overview of their impact on obesity prevention. *Public Health Nutrition*, *24*(15), 5142–5155. https://doi.org/10.1017/S1368980021001403

Perez-Ferrer, C., Auchincloss, A. H., de Menezes, M. C., Kroker-Lobos, M. F., de Oliveira Cardoso, L., & Barrientos-Gutierrez, T. (2019). The food environment in Latin America: A systematic review with a focus on environments relevant to obesity and related chronic diseases. *Public Health Nutrition*, *22*(18), 3447–3464. https://www.cambridge.org/core/journals/public-health-nutrition/article/food-environment-in-latin-america-a-systematic-review-with-a-focus-on-environments-relevant-to-obesity-and-related-chronic-diseases/174014211E096276A58144FB9B670946

Pingali, P. L. (2016). The hunger metrics mirage: There's been less progress on hunger reduction than it appears. *Proceedings of the National Academy of Sciences*, *113*(18), 4880–4883. https://doi.org/10.1073/pnas.1603216113

Popkin, B. M., & Reardon, T. (2018). Obesity and the food system transformation in Latin America. *Obesity Reviews*, *19*(8), 1028–1064. https://doi.org/10.1111/obr.12694

Rastandeh, A., & Jarchow, M. (2021). Urbanization and biodiversity loss in the post-COVID-19 era: Complex challenges and possible solutions. *Cities & Health*, *5*(sup1), S37–S40. https://doi.org/10.1080/23748834.2020.1788322

Redondo, M., Hernández-Aguado, I., & Lumbreras, B. (2018). The impact of the tax on sweetened beverages: A systematic review. *The American Journal of Clinical Nutrition*, *108*(3), 548–563. https://doi.org/10.1093/ajcn/nqy135

Rockström, J., Thilsted, S. H., Willett, W. C., Gordon, L. J., Herrero, M., Hicks, C. C., Mason-D'Croz, D., Rao, N., Springmann, M., Wright, E. C., Agustina, R., Bajaj, S., Bunge, A. C., Carducci, B., Conti, C., Covic, N., Fanzo, J., Forouhi, N. G., Gibson, M. F., … DeClerck, F. (2025). The EAT–Lancet Commission on healthy, sustainable, and just food systems. *The Lancet*, *406*(10512), 1625–1700. https://doi.org/10.1016/S0140-6736(25)01201-2

Romero-Lankao, P., & Gnatz, D. M. (2013). Exploring urban transformations in Latin America. *Current Opinion in Environmental Sustainability*, *5*(3–4), 358–367. https://doi.org/10.1016/j.cosust.2013.07.008

Rothgerber, H. (2013). Real men don't eat (vegetable) quiche: Masculinity and the justification of meat consumption. *Psychology of Men & Masculinity*, *14*(4), 363–375. https://doi.org/10.1037/a0030379

Ruel, M. T. (2003). Operationalizing Dietary Diversity: A Review of Measurement Issues and Research Priorities. *The Journal of Nutrition*, *133*(11), 3911S-3926S. https://doi.org/10.1093/jn/133.11.3911S

Saurith López, V. (2018). Folleto_Guía Alimentaria Basada en Sistemas Alimentarios y Cocinas Tradicionales (Guapi, Cauca, Colombia). https://l1nq.com/0e4lo63

SINERGIAS. (2022). *Guía del buen comer basada en calendarios ecológicos, saberes y sabores locales, departamento del Vaupés. Rotafolio*. https://www.researchgate.net/publication/383749544_Guia_del_buen_comer_basada_en_calendarios_ecologicos_saberes_y_sabores_locales_departamento_del_Vaupes_Rotafolio

Sobal, J. (2005). Men, Meat, and Marriage: Models of Masculinity. *Food and Foodways*, *13*(1–2), 135–158. https://doi.org/10.1080/07409710590915409

Springmann, M., Kennard, H., Dalin, C., & Freund, F. (2023). International food trade contributes to dietary risks and mortality at global, regional and national levels. *Nature Food*, *4*(10), 886–893. https://doi.org/10.1038/s43016-023-00852-4

Stran, K. A., & Knol, L. L. (2013). Determinants of Food Label Use Differ by Sex. *Journal of the Academy of Nutrition and Dietetics*, *113*(5), 673–679. https://doi.org/10.1016/j.jand.2012.12.014

Sumpter, K. C. (2015). Masculinity and Meat Consumption: An Analysis Through the Theoretical Lens of Hegemonic Masculinity and Alternative Masculinity Theories. *Sociology Compass*, *9*(2), 104–114. https://doi.org/10.1111/soc4.12241

Swinburn, B. A., Sacks, G., Hall, K. D., McPherson, K., Finegood, D. T., Moodie, M. L., & Gortmaker, S. L. (2011). The global obesity pandemic: Shaped by global drivers and local environments. *Lancet (London, England)*, *378*(9793), 804–814. https://doi.org/10.1016/S0140-6736(11)60813-1

Swinburn, B., Sacks, G., Vandevijvere, S., Kumanyika, S., Lobstein, T., Neal, B., Barquera, S., Friel, S., Hawkes, C., Kelly, B., L'Abbé, M., Lee, A., Ma, J., Macmullan, J., Mohan, S., Monteiro, C., Rayner, M., Sanders, D., Snowdon, W., & Walker, C. (2013). INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): Overview and key principles. *Obesity Reviews*, *14*, 1–12. https://doi.org/10.1111/obr.12087

Taillie, L. S., Reyes, M., Colchero, M. A., Popkin, B., & Corvalán, C. (2020). An evaluation of Chile's Law of Food Labeling and Advertising on sugar-sweetened beverage purchases from 2015 to 2017: A before-and-after study. *PLOS Medicine*, *17*(2), e1003015. https://doi.org/10.1371/journal.pmed.1003015

The World Food Map. (2025, November 7). The World Food Map. https://www.worldfoodmap.org/

Thorndike, A. N., Gardner, C. D., Kendrick, K. B., Seligman, H. K., Yaroch, A. L., Gomes, A. V., Ivy, K. N., Scarmo, S., Cotwright, C. J., Schwartz, M. B., & null, null. (2022). Strengthening US Food Policies and Programs to Promote Equity in Nutrition Security: A Policy Statement From the American Heart Association. *Circulation*, *145*(24), e1077–e1093. https://doi.org/10.1161/CIR.0000000000001072

WHO. (2022). *Global status report on physical activity 2022*. https://www.who.int/publications-detail-redirect/9789240059153

World Bank Group. (2024). *World Bank Open Data*. World Bank Open Data. https://datos.bancomundial.org/indicator/SP.POP.TOTL?locations=ZJ&most_recent_year_desc=false

World Health Organization (WHO. (2024). *Tackling NCDs: Best buys and other recommended interventions for the prevention and control of noncommunicable diseases, 2nd ed.* https://www.who.int/publications/i/item/9789240091078

Yoshioka Vargas, A. M., Zea León, M. D. P., Girón Cruz, L. E., González Gómez, D. E., Barona Montoya, S. A., Rankin-Cortázar, S., & González Rodríguez, C. E. (2025). Cost and affordability of three levels of diet quality for urban households in Colombia. *Public Health Nutrition*, 1–34. https://doi.org/10.1017/S1368980025000564

Zamora-Corrales, I., Jensen, M. L., Vandevijvere, S., Ramírez-Zea, M., & Kroker-Lobos, M. F. (2019). Television food and beverage marketing to children in Costa Rica: Current state and policy implications. *Public Health Nutrition*, *22*(13), 2509–2520. https://doi.org/10.1017/S1368980019000776

Zhang, B., Pu, L., Zhao, T., Wang, L., Shu, C., Xu, S., Sun, J., Zhang, R., & Han, L. (2023). Global Burden of Cardiovascular Disease from 1990 to 2019 Attributable to Dietary Factors. *The Journal of Nutrition*, *153*(6), 1730–1741. https://doi.org/10.1016/j.tjnut.2023.03.031

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