Food and Agriculture Organization of the United Nations

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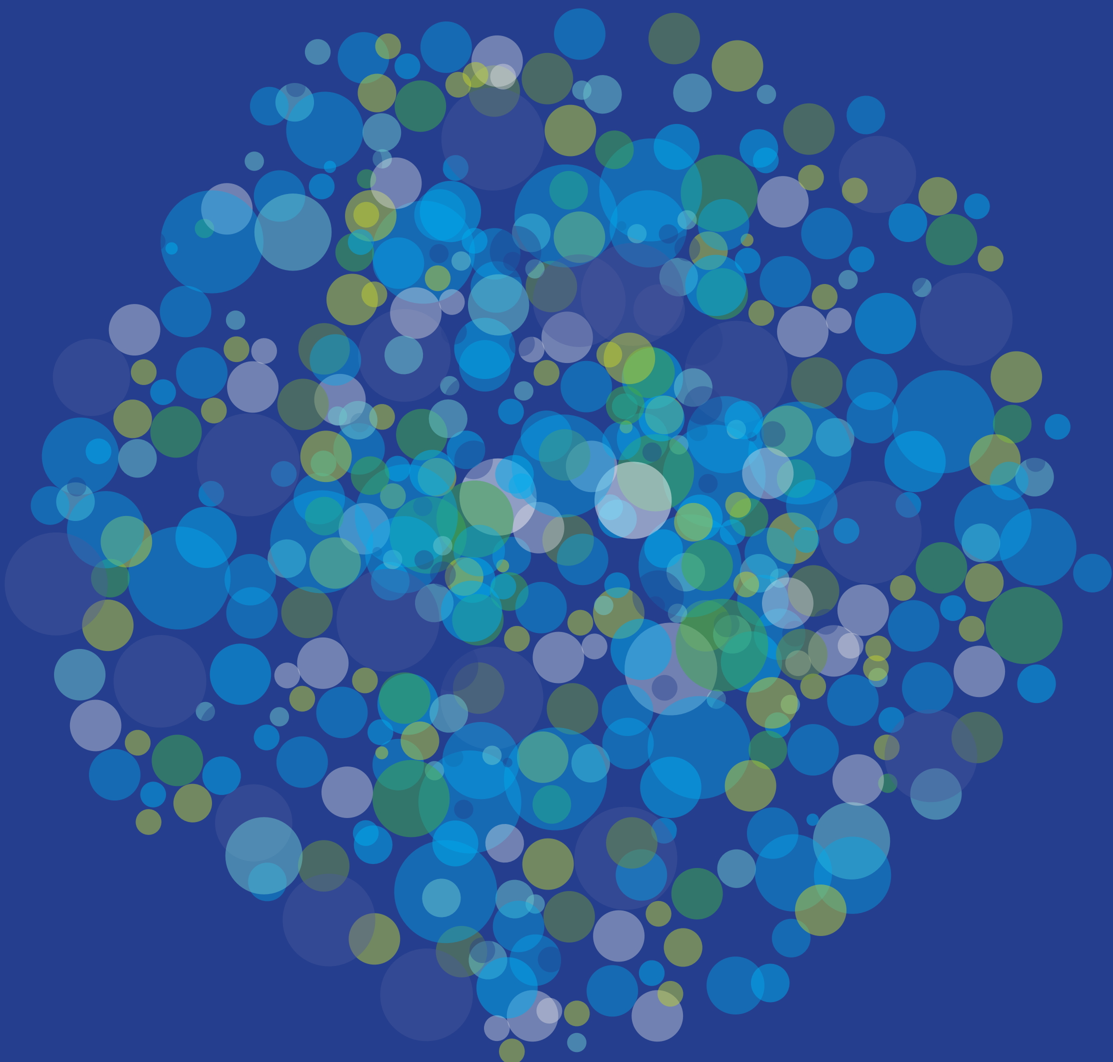
CENTER FOR DIETARY ASSESSMENT

Global report on the state of dietary data



Global report on the state of dietary data

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Megan Deitchler (Intake) proposed the concept for the report and managed the production of the report.

Victoria Padula de Quadros (FAO) led the analysis and write-up of Section 1.

The country stories in Section 2 were authored by the individuals named in the byline for each story. We thank all these contributors for their collaboration and for their willingness to share country successes related to dietary data collection and use: Eduardo Nilson and Gisele Bortolini (Brazil); Abdelaziz Ouedraogo, Ella Boudane Toe, Ousmane Ouedraogo, Ella W.R. Compaore, Jerome W. Some, Augustin N. Zeba, Estelle Bambara, Agnès T. Ouedraogo, Josias Compaore, Jean Hubert K. Zongo and Ouo Coulibaly Ouattara (Burkina Faso); Alex Marco Ndjebayi (Cameroon); Zhihong Wang, Weiyi Li, Huijun Wang, Bing Zhang and Gangqiang Ding (China); Endale Amare, Aregash Samuel and Masresha Tessema (Ethiopia); Amjad Abdel-Rahman Rashaideh and "Eva Inam" Kayed Al Zein (Jordan); Zipporah Bukania (Kenya); Tania C. Aburto, Teresa Shamah-Levy and Juan A. Rivera-Dommarco (Mexico); Mahamane Issiak Balarabé, Almoustapha T. Yatta and Gervais Ntandou Bouzitou (Niger); Adeyinka Onabolu and Busie Maziya-Dixon (Nigeria); Imelda Angeles-Agdeppa and Mario V. Capanzana (Philippines); Tuyen Danh Le, Phuong Thi Mai Tuan, Nga Tran Thuy, Tran Khanh Van and Son Duy Nguyen (Viet Nam); and Musonda Mofu and Raider Mugode (Zambia).

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Abbreviations and acronyms

10AROO	Ten Accra Recommendations to address Overweight and Obesity through food systems
2FAS	Food Fortification Advisory Services
BMI	Body mass index
CAADP	Comprehensive Africa Agriculture Development Programme
CCDC	Chinese Center for Disease Control and Prevention
CDC	United States Centers for Disease Control and Prevention
CEHA	Regional Centre for Environmental Health Action
CHNS	China Health and Nutrition Survey
DFE	Dietary folate equivalent
DOST	Department of Science and Technology
DRI	Dietary reference intake
DTAN	Directorate of Processing, Food, Promotion of Standards and Nutritional Quality of Agricultural Products
EAR	Estimated average requirement
ECOWAS	Economic Community of West African States
EMRO	Regional Office for the Eastern Mediterranean (WHO)
eNNS	Expanded National Nutrition Survey (Philippines)
ENSANUT	National Health and Nutrition Survey (Mexico)
EPHI	Ethiopian Public Health Institute
FAO	Food and Agriculture Organization of the United Nations
FCS	Food consumption survey
FCT	Food composition table
FIRST	Food and Nutrition Security Impact, Resilience, Sustainability and Transformation (FAO–EU)
FMoH	Federal Ministry of Health (Ethiopia)
FNP	Food and Nutrition Policy
FNRI	Food and Nutrition Research Institute
FNS	Food and Nutrition Strategy
FOPL	Front-of-pack labelling
FRAT	Food Fortification Rapid Assessment
GAIN	Global Alliance for Improved Nutrition
GIFT	Global Individual Food consumption data Tool (FAO/WHO)
GNS	General Nutrition Survey
GRET	Groupe de Recherche et d'Echange Technologique
HBS	Household budget survey
HC3N	High Commission for the 3N Initiative
HKI	Helen Keller International
HUC	Highly urbanized city
IBGE	Brazilian Institute of Geography and Statistics
INDDEX	International Dietary Data Expansion Project
INSP	National Institute of Public Health of Mexico
IOM	Institute of Medicine
I-to-I	Integration to effective implementation
JFDA	Jordan Food and Drug Administration
KNAP	Kenya Nutrition Action Plan
LMICs	Low- and middle-income countries
NASEM	National Academies of Sciences, Engineering, and Medicine (United States of America)
NCD	Non-communicable disease
NCI	National Cancer Institute (United States of America)
NDCD	Non-disaggregated composite dishes
NDRs	National dietary recommendations
NFCS	National Food Consumption Survey (Ethiopia)
NFFA	National Food Fortification Alliance (Cameroon)
NGO	Non-governmental organization
NIN	National Institute of Nutrition (Viet Nam)
NIPN	National Information Platform for Nutrition (Niger)

NNP	National Nutrition Program (Ethiopia)
NNS	National Nutrition Strategy (Ethiopia)
NNS	National Nutrition Survey (Philippines)
NPNL	Non-pregnant, non-lactating
PNSN	National Nutrition Security Policy (Niger)
POF	Pesquisa de Orçamentos Familiares
PUF	Public use file
RAE	Retinol activity equivalent
REACH	Renewed Efforts Against Child Hunger and undernutrition
SAS	Statistical Analysis System
SCI	Science Citation Index
SD	Standard deviation
SDG	Sustainable Development Goal
SFTP	Science for the people
SPS	Sanitary and phytosanitary
SSB	Sugar-sweetened beverage
SUN	Scaling Up Nutrition
TAC	Technical Advisory Committee
TDS	Total dietary study
UNICEF	United Nations Children's Fund
UPS	Updating Surveys
WFP	World Food Programme
WHO	World Health Organization

Executive summary

Diet and nutrition are critical to health, well-being and longevity. The economic and health burdens associated with poor quality diets are a worldwide concern, but for low- and middle-income countries (LMICs), the long-term impact of these burdens has the potential to be especially devastating. Many of these LMICs are currently grappling with the deepening multiple burdens of malnutrition, with undernutrition, nutrient inadequacies, and overweight and obesity often presenting simultaneously in communities, households and even in single individuals.

Time-relevant data is a necessary and critical component of any process or initiative that aims to ensure healthy diets. Robust data on what people eat in a country enables an understanding of current food consumption practices, and provides an evidence-based foundation for the design and implementation of targeted and well-informed actions, policies and messaging to address the key issues related to healthy eating.

The purpose of this report is to take stock and celebrate the collection and use of dietary data in LMICs, and generate further momentum for investment in government-led dietary surveys in LMICs.

Section 1 provides a global overview of dietary surveys carried out in LMICs from 1980 through 2019, analysing key characteristics and trends over time. By taking stock of and examining trends across the various national and subnational dietary surveys conducted in LMICs over the last 40 years, this section seeks to describe progress in dietary data collection to date, while also identifying the data gaps that still exist. The section concludes with an overview of large-scale, government-led dietary surveys that are underway in LMICs, highlighting their important role in filling data gaps from previous decades.

Section 2 celebrates the increased investment in dietary surveys in LMICs by highlighting country stories related to dietary survey initiation, implementation and data use.

In **Section 2.1**, experts from Kenya, Zambia, Burkina Faso, Niger and Jordan describe the motivation and need for dietary data in their respective countries, as well as the process to generate political will for undertaking a first national (or large-scale) dietary survey in the country. Experts from Ethiopia and Nigeria describe the motivation and process of generating political will for carrying out a second national dietary survey, and experts from Mexico recount how dietary surveys came to be institutionalized within the country's budget planning process, thereby ensuring routine dietary data collection for the population, in order to support time-relevant, evidence-based health and nutrition programmes and policies that are responsive to the evolving public health and nutrition needs of the country.

Section 2.2 provides a compilation of country stories related to dietary survey implementation in LMICs, written by experts from Brazil, Viet Nam, the Philippines and China. The stories in this section highlight the importance of collecting individual-level dietary data in the context of a country where dietary patterns are changing among different population groups and where multiple burdens of malnutrition are prevalent. They also describe the type of analyses that countries have been able to carry out as part of the larger, multimodule survey designs that have been implemented, and the broad range of uses (for the dietary data collected) that have been made possible from both a research/scientific and policy perspective, given the design used for collecting the data.

The country stories in **Section 2.3** explore the use of dietary data for evidence-based policy and programme design, and help to illustrate the rich potential of dietary data for practical use in public health, to strategically and cost-effectively address the multiple burdens of malnutrition in LMICs. The stories are from Brazil, Mexico and Cameroon, countries where dietary data have been used in a variety of ways to help address poor nutrition, including for example in terms of food insecurity and nutrient inadequacy, overweight and obesity, and the risk of non-communicable diseases.

Section 3 is aimed at generating further momentum for investment in government-led dietary surveys in LMICs by illustrating, through data visualizations, the type of information dietary data can provide for policy makers. Data visualizations are key to presenting such data in summary views that allow for easy interpretation of results, and can therefore serve as a critical communication tool. This section provides some examples of data visualizations that data analysts and policy makers may find useful for meaningful presentation of dietary data, including for those with little or no background in nutrition. The visualizations are based on data from the Mexican National Health and Nutrition Survey (ENSANUT) 2012, but are easily adapted and applied to any population-level dietary dataset. While further in-depth analyses of quantitative dietary data may be necessary for decision making, these visualizations can serve as a valuable first step in capturing the attention of the target audiences and stakeholders who can demand impactful changes.

About FAO and Intake

The Food and Nutrition Division of the Food and Agriculture Organization of the United Nations (FAO) works to protect, promote and improve sustainable food systems for healthy diets and improved nutrition. Together with the World Health Organization (WHO), FAO has been developing the FAO/WHO Global Individual Food consumption data Tool (FAO/WHO GIFT),[1] an open access platform for sharing dietary data. The platform provides access to microdata, as well as food-based summary statistics in the form of infographics and simple indicators to facilitate the use of these data by policy makers.

FAO/WHO GIFT is a growing repository that aims to fill a major gap in understanding what people are consuming around the world, and to promote the use of these data to better inform evidence-based policies and guidelines on healthy diets.

Intake[2] is a Center for Dietary Assessment at FHI Solutions, established in 2016 with funding from the Bill & Melinda Gates Foundation. Intake aims to strengthen policies and programmes to improve nutritional status in low- and middle-income countries (LMICs) by increasing the availability, quality, reliability, comparability and use of dietary data and metrics. Intake provides flexible, on-demand technical assistance to governments for collecting, analysing and using dietary intake data for evidence-based decision making in LMICs, and supports research to advance dietary assessment methods and the development of validated metrics of diet quality.

FAO and Intake's work connects at various points across the survey cycle. Together, FAO and Intake work synergistically to increase the availability and use of high-quality dietary data, particularly in LMICs, where there is currently a dearth of such data.

1 See http://www.fao.org/gift-individual-food-consumption.

2 See https://www.intake.org.

Introduction

The importance of a healthy diet for good nutrition and overall well-being is undeniable. Poor quality diets are associated with malnutrition, micronutrient deficiencies, and a range of adverse cardiometabolic and non-communicable disease outcomes, including hypertension, heart disease and diabetes. Indeed, poor quality diets have been identified as a top risk factor for disease globally, with recent analyses by the Global Burden of Disease Project estimating that 10 percent of the world's attributable disease burden is associated with dietary risks (GBD 2016 Risk Factors Collaborators, 2017).

The economic and health burdens associated with poor quality diets are a worldwide concern, but for low- and middle-income countries (LMICs), where health systems are generally less accessible and less equipped to respond to complex health outcomes, the long-term impact of these burdens has the potential to be especially devastating. Many of these LMICs are currently grappling with the deepening multiple burdens of malnutrition.

While the higher prevalence of undernutrition, nutrient inadequacy and micronutrient deficiencies in LMICs has long been acknowledged, recent data demonstrate that these countries also have a higher burden of adverse diet-related health outcomes associated with overweight and obesity. For example, it is now estimated that four out of every five individuals in the world who have diabetes reside in LMICs (IDF, 2017), and that cardiovascular disease accounts for a greater proportion of deaths in LMICs than it does in high-income countries (WHO, 2017).

The increase in adverse diet-related health outcomes in LMICs is at least in part a result of changing dietary patterns that stem from a range of factors. These include dynamic and changing food systems, increased urbanization and migration to urban or peri-urban centres, reduced physical activity, and greater availability and consumption of highly processed, packaged "convenience" foods that are generally low in nutrient density, but high in energy density, as well as in fat, sodium and sugar. Most LMICs are now profoundly immersed in what is often referred to as the "nutrition transition", with the increased prevalence of poor diet-related health outcomes serving as a trailing indicator of a growing problem.

Time-relevant data is a necessary and critical component of any process or initiative that aims to ensure healthy diets for a given population. Robust data on what people eat in a country enables an understanding of current food consumption practices, and provides an evidence-based foundation for the design and implementation of targeted and well-informed actions, policies and messaging to address the key issues related to healthy eating.

To obtain large-scale population-based data on what people eat in LMICs, the most commonly used method is that of collecting quantitative 24-hour dietary recall data via a population-based survey.[3] When repeat quantitative 24-hour dietary recall data are collected for a sufficient subsample of respondents in the survey, these data can be analysed to estimate the usual intake distributions of nutrients, foods and food groups consumed by the population. When these data are collected at a large scale across a country, they serve as an essential tool for:

- assessing problems related to dietary intake;
- providing evidence in order to tailor solutions for improved diet quality;
- developing informed strategies for the appropriate and efficient targeting of nutrition-related interventions;
- evaluating nutrition programmes and policies, and monitoring trends in dietary intake; and
- assessing the dietary exposure of humans to chemicals present in food (including food additives, contaminants, pesticide residues and veterinary drug residues).[4]

More specifically, the data can be used for:

- describing usual dietary practices and patterns among the population;
- developing food-based dietary guidelines and consumer education materials;
- identifying problem nutrients by demographic group and estimating the extent of gaps in adequacy for problem nutrients;
- identifying the contribution of nutrient-rich (or "healthy") and nutrient-poor (or "unhealthy") foods to the diet;

[3] In this report, the term "dietary survey" refers to a quantitative 24-hour dietary recall survey. (These surveys are also commonly referred to as "individual food consumption surveys".)

[4] To perform dietary exposure assessments, dietary data are combined with chemical occurrence data. Chemical occurrence data for contaminants, pesticides, food additives and veterinary drugs are available in different databases, including FOSCOLLAB: the Global FAO/WHO platform for food safety data and information.

- identifying potential "healthy" foods to promote for agricultural investment;
- identifying potential foods to serve as appropriate vehicles for food fortification and providing evidence-based guidance for the setting of suitable levels of fortification that address both nutritional and safety concerns; and
- improving the consistency and reliability of dietary exposure assessments, as an essential element of the four-step risk assessment process for chemicals in food (FAO and WHO, 2020).

To date, the number of LMICs that have carried out large-scale, nationally representative dietary surveys has remained relatively low. There has been a recent uptick in the number of surveys carried out however, reflecting an increase both in country-driven dietary surveys and in the use of such data by governments, to effectively inform nutrition and agriculture policy and programme design. These countries are leading the way in dietary data collection and use. In doing so, they have gained valuable insight into what has worked for ensuring the successful initiation and implementation of dietary surveys, and the effective use of the data obtained for evidence-based nutrition and agriculture policy and programme design in LMICs.

It is this backdrop — the changing nutrition situation in LMICs, juxtaposed against their success in responding to this situation through the collection and use of dietary data — that served as the guiding motivation for this publication, *Global Report on the State of Dietary Data*.

The report was prepared as a joint collaboration between the Food and Nutrition Division of the Food and Agriculture Organization of the United Nations (FAO) and the Intake Center for Dietary Assessment at FHI Solutions. The overall purpose of the report is to:

1) take stock of the dietary survey data collected in LMICs and analyse trends over time (**Section 1**);
2) celebrate the increased investment in dietary surveys in LMICs by highlighting country stories related to dietary survey initiation and implementation as well as data use (**Section 2**); and
3) generate further momentum for investment in government-led dietary surveys in LMICs by illustrating, through data visualizations, the type of information that dietary data can provide for policy makers (**Section 3**).

Section 1.

Global overview of dietary surveys in low- and middle-income countries

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Section 1. Global overview of dietary surveys in low- and middle-income countries

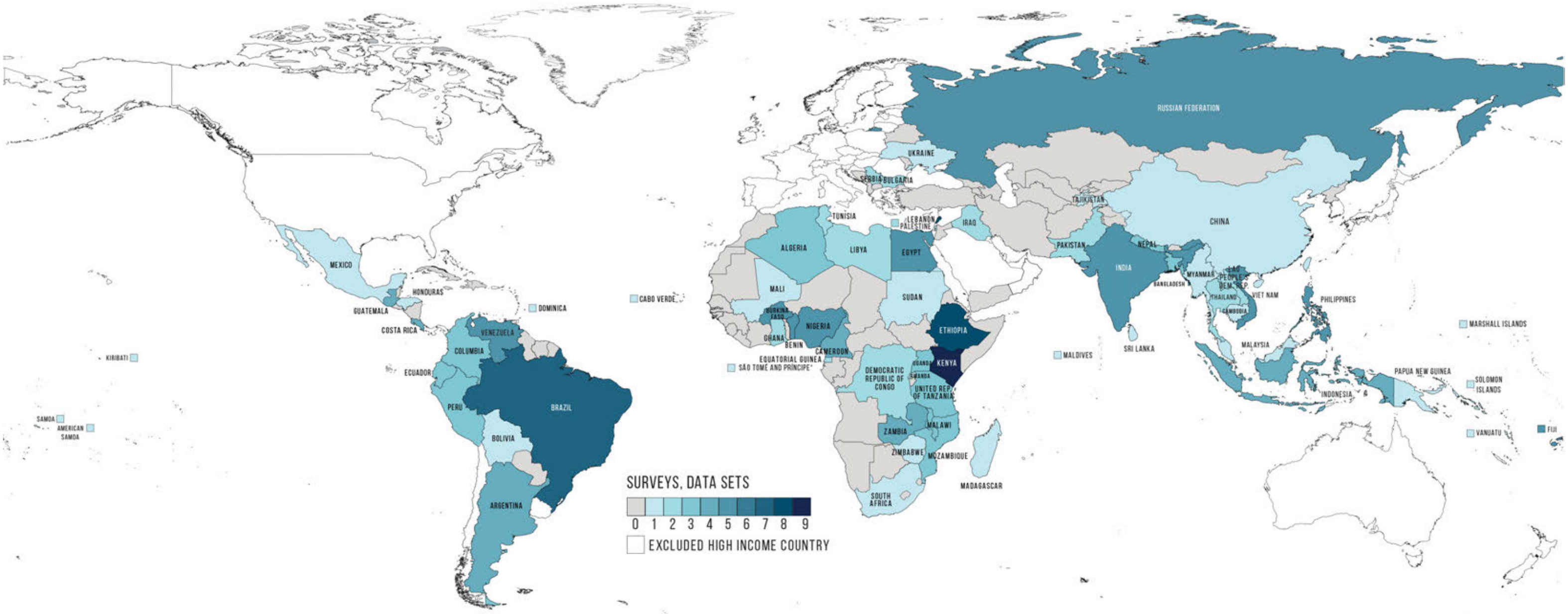
We begin the report by providing a global overview of dietary surveys carried out in low- and middle-income countries (LMICs) from 1980 through 2019, analysing key characteristics of these surveys and trends over time. In addition, we present an overview of upcoming large-scale, government-led dietary surveys in LMICs, including countries with institutionalized survey programmes. The analysis in this section centres on dietary surveys conducted in LMICs only — that is, low-income countries, lower-middle-income countries and upper-middle-income countries[5] — and does not take into consideration surveys conducted in high-income countries.

By taking stock of and examining trends across the various national and subnational dietary surveys conducted in LMICs over the last 40 years, this section seeks to describe progress in dietary data collection to date, while also identifying the data gaps that still exist. The section concludes with an overview of large-scale, government-led dietary surveys that are currently planned or underway in LMICs, highlighting their important role in filling data gaps from previous decades.

Figures 1–3 are based on information gathered by FAO for the FAO/WHO Global Individual Food consumption data Tool (FAO/WHO GIFT).[6] Built in collaboration with international partners, FAO/WHO GIFT's inventory consists of dietary surveys from around the world, and is based on published survey results, literature reviews, internet searches, and direct contact with data owners and other key informants. As such, the information presented may not be complete, but nevertheless it offers a substantive basis for analysis. The inventory is regularly updated — not only to cover new surveys but also to complement existing information — with the aim of becoming more complete with time. The full list of surveys used to compile Figures 1–3 is provided in **Annex 1**.

Figure 1 presents an overview of dietary surveys carried out in LMICs from 1980 through 2019, based on information gathered by FAO. Overall, at least 191 national and subnational dietary surveys were completed[7] in 69 LMICs across all regions[8] —

Figure 1. Map of dietary surveys carried out in low- and middle-income countries from 1980 to 2019



Source: Adapted from Map No. 4186 Rev.3 UNITED NATIONS, February 2005. Department of Peacekeeping Operations, Cartographic section.

NOTES: The data shown reflect information known/collected as of May 2021.

Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Sudan and South Sudan has not yet been determined.

[5] Country income groups reflect the World Bank classification for 2020 (World Bank, 2020).

[6] See http://www.fao.org/gift-individual-food-consumption/inventory-of-surveys.

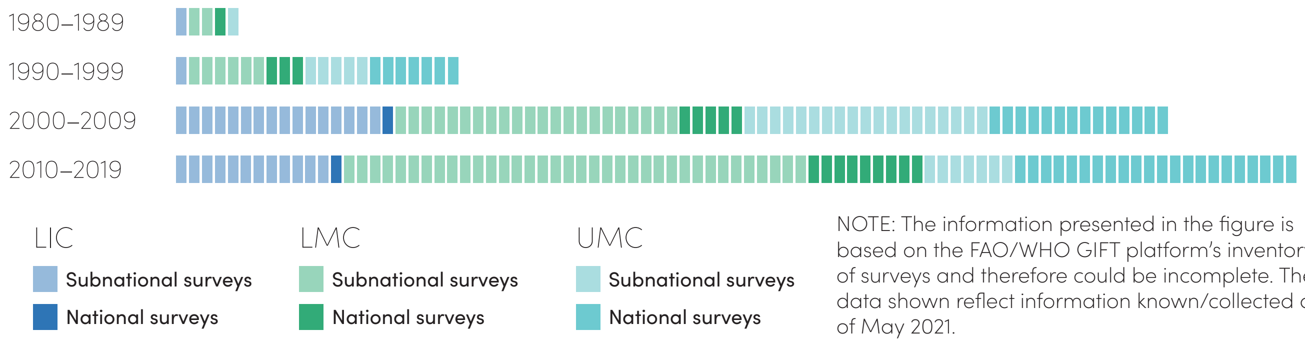
[7] For the purpose of the analysis, a survey was considered as completed when at least one publication of survey results had been finalized.

[8] Geographic regions were defined according to the FAO operational classification: Africa, Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, and the Near East and North Africa.

corresponding to approximately 50 percent of all LMICs. At least one dietary survey was completed in 28 countries over this period, the majority being in Africa (8 countries) and in Asia and the Pacific (13 countries). Several countries had more than one dietary survey completed, and five countries had more than six dietary surveys completed across the four decades (Brazil in Latin America and the Caribbean, Ethiopia and Kenya in Africa, India in Asia and the Pacific, and Lebanon in the Near East and North Africa).

Figure 2 presents the number of national and subnational dietary surveys carried out by decade and by country income level. Important trends emerge when examining the characteristics of the completed surveys. Firstly, the overall number of dietary surveys conducted in LMICs clearly increased across the decades, especially since 2000. In the decades of 2000–2009 and 2010–2019, the absolute number of surveys completed in lower-middle-income countries and upper-middle-income countries was significantly higher as compared to 1980–1999, with a 5-fold increase and close to a 4-fold increase respectively. The greatest increase in terms of percentage was in low-income countries, with a near 15-fold increase in the number of completed surveys in 2000–2019 as compared to 1980–1999. The number of large-scale, national surveys also increased across the decades for all country income levels, indicating the increased efforts and investments made by countries to collect dietary survey data.

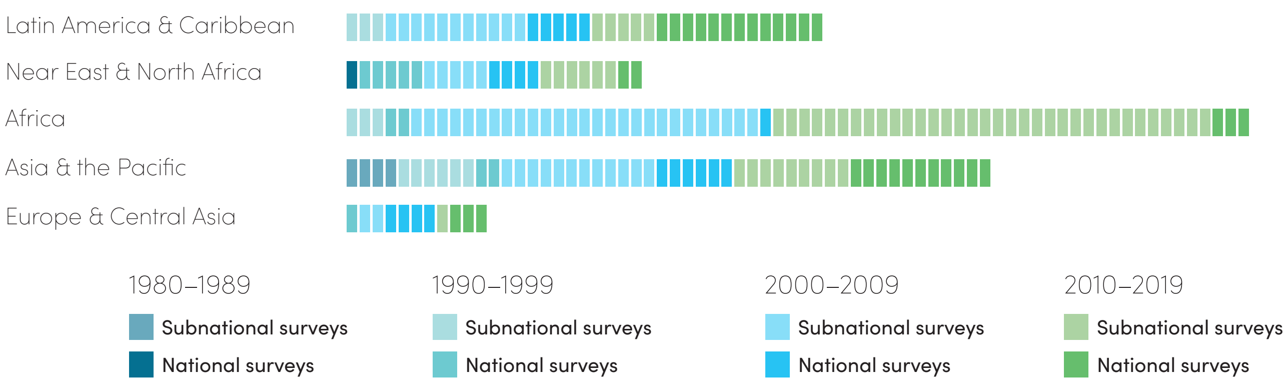
Figure 2. National and subnational dietary surveys carried out in low- and middle-income countries from 1980 to 2019, by decade



NOTE: The information presented in the figure is based on the FAO/WHO GIFT platform's inventory of surveys and therefore could be incomplete. The data shown reflect information known/collected as of May 2021.

The number of dietary surveys carried out in LMICs from 1980 through 2019 was also different across regions, as illustrated in Figure 3. The increased implementation of dietary surveys since 2000 took place mostly in Africa (65 surveys), Asia and the Pacific (38 surveys), and Latin America and the Caribbean (34 surveys). Between the decades of 2000–2009 and 2010–2019, these same regions saw an increase in the number of national dietary surveys conducted, especially in Asia and the Pacific (11 national surveys in 2010–2019, compared to 6 in 2000–2009), and in Latin America and the Caribbean (13 national surveys in 2010–2019, compared to 5 in 2000–2009). For Africa in particular, the increase in the number of national surveys in 2010–2019 (3 national surveys in 2010–2019, compared to 1 in 2000–2009) indicates a trend toward increased investment in large-scale dietary surveys in the region.

Figure 3. National and subnational dietary surveys carried out in low- and middle-income countries from 1980 to 2019, by decade and region

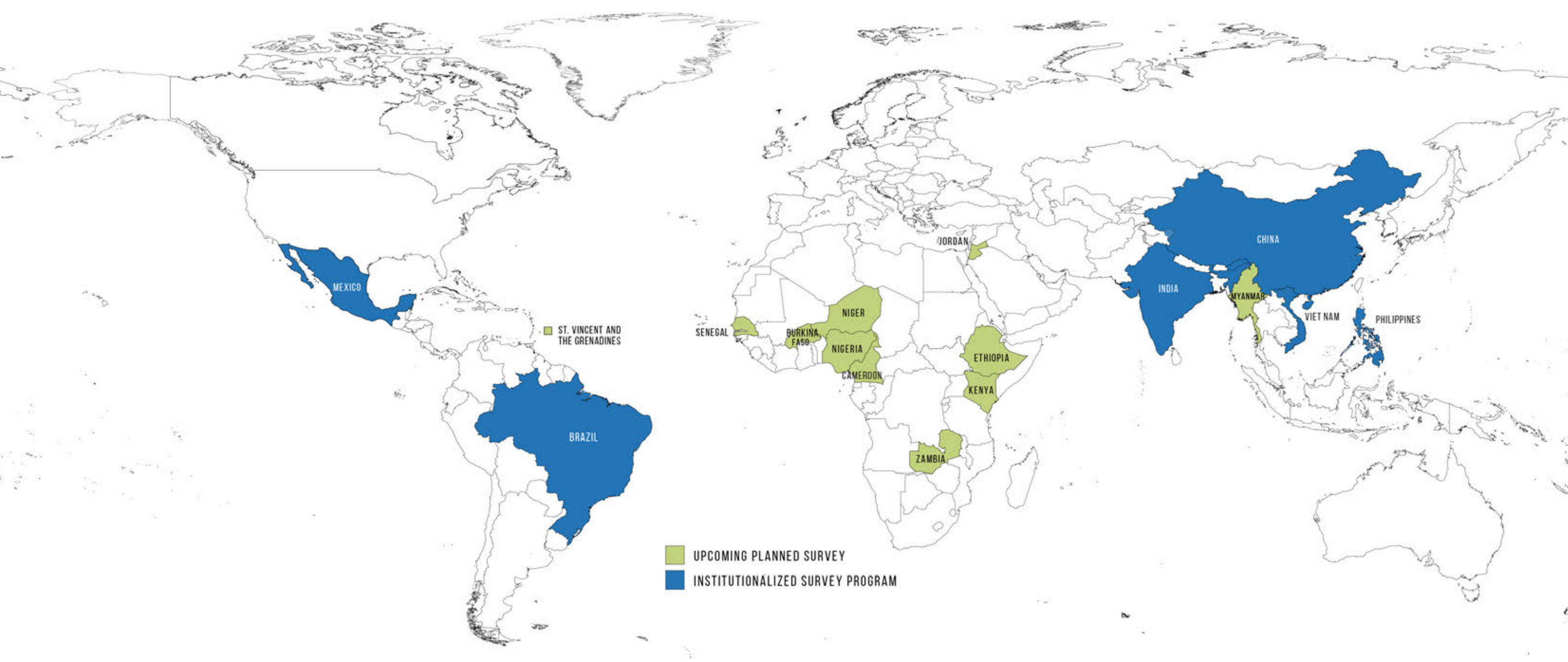


NOTES: Geographic regions are defined according to FAO's operational classification (Africa, Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, and the Near East and North Africa). The information presented in the figure is based on FAO/WHO GIFT's inventory of surveys and may therefore be incomplete. The data shown reflect information known/collected as of May 2021.

This trend in increased investment is confirmed by the number of upcoming large-scale, government-led dietary surveys in LMICs, as illustrated in Figure 4. According to the information gathered by FAO and Intake at the time of writing, at least 12 countries are in the process of planning and implementing such surveys, or of analysing the data from recently conducted surveys.[9] The majority of these upcoming surveys (8 out of 12) are planned in Africa, and will therefore help to fill the gap in nationally representative dietary data for the region.

Six LMICs (Brazil, China, India, Mexico, the Philippines and Viet Nam) have institutionalized the implementation of dietary surveys to ensure routine implementation in the country,[10] with some surveys using a rolling data collection design (in which data collection for a single survey is conducted across the country continuously over multiple years). Institutionalized dietary survey programmes and rolling survey designs are generally more common in high-income countries. The emergence of such programmes in LMICs indicates significant long-term engagement and investment from country governments to regularly undertake large-scale dietary surveys. It is hoped that this trend persists, and that LMICs continue to establish large-scale, national dietary surveys on a regular or rolling programme basis, with greater and more routine use of the resulting dietary data to support evidence-based government policy and programme planning, implementation, monitoring and evaluation for improved nutrition.

Figure 4. Map of upcoming large-scale, government-led dietary surveys in low- and middle-income countries



Source: Adapted from Map No. 4186 Rev.3 UNITED NATIONS, February 2005. Department of Peacekeeping Operations, Cartographic section.

NOTES: Upcoming surveys are defined as planned or ongoing surveys that have not yet finalized the publication of the survey results. The information presented in the map was collected via informal and non-systematic methods and may therefore be incomplete. The data shown reflect information known/collected as of May 2021.

Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Sudan and South Sudan has not yet been determined.

[9] Viet Nam has an institutionalized dietary survey program and is also included in the count of countries that have an upcoming national dietary survey.

[10] A dietary survey was considered to be institutionalized when carried out routinely and integrated into the budget planning process for a given country.

Section 2.

Country stories of dietary survey initiation, implementation, and data use

Section 2. Country stories of dietary survey initiation, implementation, and data use

This section presents a compilation of country stories related to dietary survey initiation, implementation and data use. These stories were among those shared during an international meeting convened in 2019 by Intake and FAO on "Dietary Data Collection, Analysis, and Use: Taking Stock of Country Experiences and Promising Practices in LMICs". A key objective of that meeting was to provide an open forum for exchanging experiences and sharing successes related to the initiation and implementation of dietary surveys, and the use of dietary data in low- and middle-income countries (LMICs). The meeting was attended by 30 technical experts from 19 LMICs working in areas related to nutrition and dietary data collection, analysis and use (FAO and Intake – Center for Dietary Assessment, 2020).

At the meeting, participants expressed a strong need for robust dietary data to inform nutrition actions in LMICs, and openly shared country experiences related to dietary data collection, analysis, and use for the benefit of cross-country learning and collective progress in nutrition worldwide (FAO and Intake – Center for Dietary Assessment, 2020). The country stories shared were stories of achievement, in which political will had successfully been generated within a country for the undertaking of a first dietary survey, or for institutionalizing the routine collection of dietary data in the country. The stories also showed how countries had strategically implemented dietary surveys to ensure the availability of a cost-feasible platform for data collection, and how countries had designed dietary surveys to fill specific, known data gaps, thereby helping to generate country commitment not only to invest in data collection, but also to ensure that the data collected would be used effectively. Meeting participants also shared experiences relating to a range of innovative uses of dietary data, including for strategic targeting of nutrition programmes, to offer cost-effective solutions for addressing gaps in micronutrient intakes, to develop country-specific food-based dietary guidelines, to inform the development of tax policies on unhealthy foods, to use geospatial analysis to identify populations at risk, and to guide policies on food reformulation and regulation.

It became clear that these stories deserved to be documented and shared with others. Not only in order to celebrate country successes as recounted by country experts, but perhaps more importantly to enable a wider set of countries to benefit from learning about the processes, systems and strategies that have worked in different country contexts for advancing dietary data collection and use. In follow-up to the meeting, FAO and Intake therefore invited participants to write up their country stories, for sharing in the present report.

The country stories we received in response to our invitation follow. Each story provides a snapshot of country success in working to address the multiple burdens of malnutrition through the use of a strong, evidence-based foundation involving dietary survey initiation, implementation, and data use. A total of 15 country stories are presented in this section, organized into three sections as follows:

- country stories focused on dietary survey initiation (**Section 2.1**);
- country stories focused on dietary survey implementation (**Section 2.2**); and
- country stories focused on dietary data use (**Section 2.3**).

Rather than presenting stories in alphabetical order of country name, the stories within each group are organized to highlight key areas of emphasis and importance for dietary survey initiation, implementation and data use. Some countries contributed more than one story at our request, to allow country experiences across multiple topic areas to be shared.

Section 2.1. Country stories on dietary survey initiation

The country stories in this section illustrate the ways in which political will was successfully generated for initiating dietary surveys in the given countries. Experts from Kenya, Zambia, Burkina Faso, Niger and Jordan describe the motivation and need for dietary data in their respective countries, as well as the process to generate political will for undertaking a first national (or large-scale) dietary survey in the country. Experts from Ethiopia and Nigeria describe the motivation and process of generating political will for carrying out a second national dietary survey, and experts from Mexico recount how dietary surveys came to be institutionalized within the country's budget planning process, thereby ensuring routine dietary data collection for the population, in order to support time-relevant, evidence-based health and nutrition programmes and policies that are responsive to the evolving public health and nutrition needs of the country.

Each of these surveys is currently in a different phase of work. The Burkina Faso, Jordan and Kenya surveys are currently in the planning stage, while data collection for the Niger, Nigeria and Zambia surveys is already complete, and work on data processing and statistical analysis is now beginning. Data collection for the Ethiopia survey is currently underway, and in Mexico, the most recent round of dietary survey data for the institutionalized survey programme was completed in 2016.

DIETARY SURVEY INITIATION

A multisectoral approach to designing a food consumption survey in Kenya

Author: Zipporah N. Bukania (1).

Affiliations: 1) Senior Research Scientist & Director, Centre for Public Health Research, Kenya Medical Research Institute, Kenya.

At the time of writing, Kenya is planning to undertake its first ever national individual food consumption survey, targeting different population groups within the country. Kenya's nutrition sector is guided by the Kenya Nutrition Action Plan (KNAP) 2018–2022. Malnutrition is a significant public health problem in Kenya, and KNAP 2018–2022 is a "triple duty" strategic action plan that aims to accelerate and scale up efforts towards the elimination of malnutrition throughout the country. Aligned with the Sustainable Development Goals (SDGs) and focusing on specific achievements by 2022, KNAP includes both individual food consumption and micronutrient surveys. Previously, the Kenya Government supported the development of a National Food and Nutrition Security Policy, to be implemented through the multisectoral National Food and Nutrition Security Policy Implementation Framework (2017–2022). This framework was jointly developed through a highly consultative process that involved the multidisciplinary participation of representatives from key ministries.

The recognition of nutrition as a multifaceted concern is instrumental for encouraging political will towards conduct of the first national food consumption survey. As part of this process, the planning of the survey involves and includes a wide range of different institutions right from inception. These include divisions from the Ministry of Health (including family health (nutrition, child health) and non-communicable disease), the State Departments (for Crops Development and Agriculture and Livestock) and the Kenya National Bureau of Statistics, as well as various partners including FAO, the United Nations Children's Fund (UNICEF), local universities, non-governmental organizations (NGOs) and individual consultants.

The success of using a multistakeholder consultative process for carrying out the initial pre-survey activities can be linked at least in part to the successful multisectoral process that was used for the design of KNAP. Indeed, multisector involvement was integral to the design of KNAP. During the design process for the KNAP, the need for engagement from multiple government sectors in support of nutrition surveys was heavily underscored, given that the findings from such surveys are crucial not only for informing and ensuring appropriate nutrition interventions, but also for providing evidence for broader policy frameworks across different sectors.

So far, the experience from Kenya has shown the importance of designing and planning the survey through multistakeholder consultation. This has created a sense of ownership, contributing in turn to a continuous consultative process throughout initial pre-survey activities. The process, initiated in 2018, provides the backdrop against which, as a country, Kenya is effectively planning for the individual food consumption survey. In addition, various bilateral organizations participated in the planning and implementation of the first phase of the pre-survey activities, and their technical and financial support must also be acknowledged. There was general consensus on the need for the survey implementation to be led by national institutions. The Kenya Medical Research Institute was given the mandate, through the Ministry of Health, to lead the survey process, with support and guidance on sampling processes from the Kenya National Bureau of Statistics.

DIETARY SURVEY INITIATION

Achieving the political will for initiating a national food consumption and micronutrient status survey in Zambia

Authors: Musonda Mofu (1) and Raider Mugode (2).

Affiliations: 1) Deputy Executive Director, National Food and Nutrition Commission, Zambia; and 2) Head of Public Health and Community Nutrition, National Food and Nutrition Commission, Zambia.

The Government of Zambia has placed a premium on nutrition as a basis for ensuring that its people are healthy and productive. This is well-articulated in the National Food and Nutrition Policy of 2006 and in Zambia's Vision 2030, which aims for a well-nourished and healthy population by 2030. To attain this vision, the Government has prioritized, among other measures, the prevention and control of specific macro- and micronutrient deficiencies and the promotion of appropriate diets and lifestyles throughout all stages of human life.

The framework for these policies was robust in targeting ideal nutrition outcomes in the short and long term for the country, but translation of the policy instruments into tangible actions faced two key difficulties — firstly, a lack of appreciation and understanding of the multidimensional nature of nutrition; and secondly, the inadequate allocation of resources to nutrition. Achieving Vision 2030 on nutrition was therefore set to be challenging, and it was clear that innovation and transformation at a systemic level would be required.

At a technical level, the country adopted a multisectoral framework for addressing nutrition challenges. This was a necessary step as — up until 2011 — nutrition was considered primarily a health sector issue. Achieving the goals and benefits that come with a multisectoral approach requires broad policy support that aligns with government provisioning of resources for nutrition. The National Food and Nutrition Commission of Zambia, an advisory body under the Ministry of Health, therefore approached the Government in 2011 to convene a National Nutrition Forum on the theme of "Accelerating Nutrition Actions in Zambia". During the Forum, which was held in February 2011, the President of Zambia called on the country to identify the critical actions necessary to achieve the goals of Vision 2030 and of the National Food and Nutrition Policy. This was crucial to breaking the ice around nutrition programme implementation.

After the Forum, a series of meetings were convened at national and district levels to demonstrate the need for a comprehensive and holistic approach toward nutrition improvement. As a result, the country adopted the "integration to effective implementation" (I-to-I) concept, as a means of attaining the goals set in Vision 2030. This meant that government institutions at policy level needed to appreciate the multidimensional nature at play.

In order to further break the ice around nutrition programme implementation, a meeting was held in October 2015 with the Minister of Agriculture, and focused on identifying the steps required to change Zambia's global ranking with regard to nutrition and set the country on a clear path toward attaining the goals of Vision 2030. The meeting proved to be pivotal, as questions were raised regarding a range of information needs: What foods were available in the country? How much of these foods were being consumed? Were dietary goals being met? What was the status for specific nutrients? And which foods were of national importance? Unfortunately, it was not possible to respond to these questions, as no relevant national survey data existed in Zambia at the time. The Minister therefore challenged the National Food and Nutrition Commission on the need for answers to such questions in order to understand the country's nutrition situation.

The matter was then presented to the Special Committee of Permanent Secretaries on Nutrition, with a request for the country to undertake a survey on questions of nutrient intake and nutrient status. The Committee approved the request and provided guidance on several additional aspects, including the need to assess the coverage of nutrition services and the spread of biofortified foods in the country, and the value of this information as a requirement for the work of the Scaling Up Nutrition (SUN) Movement. This decision was both life-saving and life-giving for the nutrition sector in Zambia, as data generation and use is the basis for target setting and for framing a theory of change for a national nutrition programme. A survey to measure national nutrient intake and nutrient status was proposed in January 2016.

The process to initiate the survey was not easy. It required broader thinking not only on nutrition, but also on how nutrition data could address other policy goals. It was essential to have the engagement of policy makers in Zambia in the survey initiation and planning process. This was important not only because of the resources required for the survey, but because the use of the data for policy formulation is key.

The data for the survey were collected in 2020. The survey provides provincial and nationally representative dietary and micronutrient biomarker data for children aged 6–59 months, adolescent girls aged 10–14 years and women of reproductive age. These data will be used to help the Government develop policy goals in agriculture, health, commerce, social protection, fisheries and livestock, and will provide a baseline for measuring progress toward improved nutrition throughout Zambia.

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DIETARY SURVEY INITIATION

The importance of conducting a quantitative dietary survey in Burkina Faso

Authors: Abdelaziz Ouedraogo (1), Ella Boudane Toe (1), Ousmane Ouedraogo (1), Ella W.R. Compaore (2), Jerome W. Some (3), Augustin N. Zeba (3), Estelle Bambara (4), Agnès T. Ouedraogo (1), Josias Compaore (1), Jean Hubert K. Zongo (1) and Ouo Coulibaly Ouattara (1).

Affiliations: 1) Ministry of Agriculture and Hydro-agricultural Development, General Directorate for the Promotion of Rural Economy, Directorate of Processing, Food, Promotion of Standards and Nutritional Quality of Agricultural Products, Burkina Faso; 2) Ministry of Health, Technical Secretariat for the Improvement of Food and Nutrition for Mothers and Children, Burkina Faso; 3) Ministry of Higher Education, Scientific Research and Innovation, Health Sciences Research Institute, Burkina Faso; and 4) Ministry of Health, Nutrition Department, Burkina Faso.

The idea of conducting a national quantitative 24-hour dietary recall survey stems from recommendations made by Burkina Faso's food and nutrition experts. Data on food composition and consumption are the basis of almost all aspects of nutrition. These data are used to determine nutritional adequacy, make dietary recommendations based on food choice and nutrient requirements, and determine relationships between nutrient intake and specific diseases. They are used in the health, food, agriculture and trade sectors to help improve the diet, food security and health of all populations, and to increase economic growth and development.

The need for a dietary survey in Burkina Faso was further intensified by other factors. For example, the Directorate of Processing, Food, Promotion of Standards and Nutritional Quality of Agricultural Products of Burkina Faso (DTAN), in trying to fulfil its mandate, was repeatedly confronted with a lack of national dietary recommendations with which to successfully carry out its activities. Indeed, in developing a context-appropriate strategy to promote the consumption of national dishes, it proved necessary to have data on food consumption for the population. In addition, when training or awareness-raising sessions are held for food and nutrition stakeholders in Burkina Faso, the dietary recommendations (including "food guides") of other countries must be used, since Burkina Faso does not have any of its own. As a result, when individuals or groups need to know the quantities in which different types of foods must be consumed for a balanced diet, they must depend on the dietary recommendations of other countries.

A significant initial challenge to carrying out a dietary survey in Burkina Faso lay in the need for capacity building in this area. But thanks to a supportive response from the National Institute of Nutrition and Technology of Tunisia and the Quadram Institute Bioscience (of Norwich Research Park) in the United Kingdom of Great Britain and Northern Ireland, it was possible to address these needs through participation in a training course on "Harmonized methods for the development and validation of food composition tables and databases". The course, which was funded by the Medical Research Council through the Quadram Institute, trained beneficiaries (from the Ministry of Agriculture and Hydro-agricultural Development and the Ministry of Health) on the harmonized methodology for the development and validation of food composition tables and databases.

A meeting of experts was then convened in Accra, Ghana in March of 2019, with the objective of improving food security and nutrition governance, in particular through improved coordination mechanisms for mutual accountability within regional multistakeholder nutrition working groups that focus on the emerging challenge of urban obesity.[11] Five representatives from the ministries of agriculture and health in Burkina Faso participated in this consultative dialogue on "Addressing the emerging overweight and obesity public health challenges in West Africa". The ten recommendations that emerged from the meeting are summarized below. Among these, the second most important point stressed the need to develop dietary recommendations for each country, along with the need to conduct a quantitative dietary survey for doing so.

In follow-up to the Accra meeting, DTAN began preparing a protocol to conduct a dietary survey in Burkina Faso. This preliminary protocol was finalized by a national development committee, with funding from Intake and the Tufts University Friedman School's International Dietary Data Expansion (INDDEX) Project. A national workshop, also funded by Intake and the Tufts INDDEX Project, then brought together several actors from various ministerial departments and NGOs, to validate the protocol. As a result, the protocol for a national quantitative 24-hour dietary recall survey for Burkina Faso is ready, and the process of mobilizing its financing is underway.

Ten Accra Recommendations to address Overweight and Obesity through food systems (10AROO)

1. **Empower smallholder farmers through capacity building exercises**: train them on nutrition, forming cooperatives around nutritious food value chains and linking them to urban markets. This will increase availability of locally produced nutritious foods in urban markets while also increasing farmers' income.
2. **Update food composition tables and food-based dietary guidelines** and integrate local food products and recipes. These tools will be used as lobby materials to promote healthy food choices for consumers and increase demand for healthy diets.
3. **Engage the private sector in the drive to promote healthy urban food choices and lifestyles.** There is a need to come up with clear rules of engagement and what is expected of the private sector.
4. **Strengthen efforts to work with media and communication** for advocating for healthy diets and physical activity, and to limit advertisement of unhealthy food commodities, especially targeting children.
5. **Build strong linkages with healthcare facilities**, strengthen screening for dietary ailments, and promote efforts to fight them from the food systems perspective.
6. **Strengthen regulations of urban food systems through introduction of taxes for unhealthy food commodities and subsidizing healthy options**. This also includes coming up with nutrition-sensitive trade policies and regulations, and strengthening testing and research for nutritional value of marketed food commodities in urban areas.
7. **Build strong partnerships with universities and research institutions** to reinforce food research for nutrition and disseminating such findings in a user-friendly manner with clearly defined target audiences such as consumer associations.
8. **Promote value addition of local indigenous foods**, including supporting their access to markets through strong sanitary and phytosanitary (SPS) measures, packaging, labelling and branding.
9. **Establish strong monitoring and evaluation networks for food commodities** and their intake and market penetration trends for informed decisions.
10. **Identify nutrition champions and build strong consumer associations** and multisectoral platforms to promote healthy food diets and lifestyles in urban areas.

SOURCE: FAO. 2019. Summary: Multi-stakeholder nutrition working groups coordination and mutual accountability consultative dialogue in the ECOWAS Region: Addressing the emerging overweight and obesity public health challenges in West Africa. 20–22 March 2019. Accra.

[11] These working groups include SUN, Renewed Efforts Against Child Hunger and undernutrition (REACH), African Leaders for Nutrition, and the Comprehensive Africa Agriculture Development Programme (CAADP) Nutrition Working Group.

DIETARY SURVEY INITIATION

Why conduct a dietary survey and identify food vehicles for fortification in the Niger?

Authors: Mahamane Issiak Balarabé (1), Almoustapha T. Yatta (2) and Gervais Ntandou Bouzitou (3).

Affiliations: 1) Coordinator, National Information Platform for Nutrition, National Institute of Statistics, the Niger; 2) Principal Analyst, National Information Platform for Nutrition, National Institute of Statistics, the Niger; and 3) Policy Officer, FAO Niger and Technical Assistant for Nutrition, Office of the High Commissioner for the 3N Initiative within the framework of the FIRST partnership.

The Niger faces an unenviable nutrition situation, with stagnation across various nutritional indicators at national and subnational levels over the last ten years. The different types of malnutrition that are most frequently observed include stunting, acute malnutrition, low birth weight and micronutrient deficiencies. This situation predisposes the country to a reduction in the productivity of its working population, to diseases and to the additional burden of managing the effects of malnutrition.

It is in light of this alarming situation that the Government of the Niger and its various partners have for the past few years placed the issue of food and nutrition security at the centre of their concerns, and have endorsed multiple international and regional initiatives to improve the nutritional status of its population. In addition to the development of several sectoral strategies related to nutritional and food security, the Government adopted a National Nutrition Security Policy (PNSN) in 2018, along with its corresponding Multisectoral Action Plan, which together form the unifying framework for all nutrition interventions in the country.

The PNSN's Multisectoral Action Plan (2017–2020) has provided, among other things, for the development and implementation of strategies to combat specific micronutrient deficiencies, as one of the components for improving the nutritional situation in the Niger. These strategies include mass food fortification (through the promotion of small production units of fortified foods) and the consumption of diversified local foods.

Several fortification projects were funded by the European Commission, to increase its support for continued development and scaling up of food fortification in several underdeveloped countries. Thus in 2017, two food fortification projects, for a total amount of nearly EUR 10 million, were implemented by the World Food Programme (WFP) and the Research and Technological Exchange Group (GRET),[12] with the aim of improving the nutritional status of vulnerable populations and contributing to the prevention of malnutrition in the Niger.[13] The implementation, monitoring and evaluation of these projects require, among other things, estimating the food consumption of the target groups under consideration. This information is crucially required before the start of the projects, to determine the usual nutritional intake of vulnerable groups and to identify the nutrients most critically lacking in diets. It is also essential for determining the best food vehicles for fortification.

In April 2017, a mission conducted by the Food Fortification Advisory Services (2FAS) team facilitated

[12] Groupe de Recherche et d'Echange Technologique.

[13] See https://www.gret.org/2017/10/niger-lancement-officiel-de-deux-projets-de-fortification-alimentaire.

dialogue between stakeholders from various sectors on topics related to food fortification in the Niger. A key recommendation that followed from these consultations stressed the need to find alternatives to wheat flour, which does not meet the criteria of a good carrier for fortification at the national level. This is because wheat flour is consumed by only 38.1 percent of women and 39.2 percent of children — except in Niamey, the capital of the country, where it is consumed by 90 percent of women and children. However, at the time, there were no recent food consumption data in the Niger to provide an evidence base for identifying appropriate alternative food vehicles for fortification.

During the technical mission of the 2FAS team, it was therefore suggested that national partners conduct a national Food Fortification Rapid Assessment (FRAT) survey in the country, after a local one carried out by Helen Keller International in 2001, entitled "Determination of carrier foods for their enrichment in Vitamin A".[14] The national counterpart under the leadership of the High Commission for the 3N Initiative (HC3N)[15] recommended that the FRAT survey be coupled with a quantitative 24-hour dietary recall survey.

Following this mission, a roadmap was established and terms of reference were drafted by stakeholders, under the leadership of HC3N and with the support of the European Union Delegation in the Niger. The roadmap included the main steps and timelines for conducting a FRAT survey, together with a dietary survey, in order to have a large database of quantitative individual food intake data at the national level.

The FRAT survey was thus designed not only to be able to highlight the consumption patterns of foods preselected as potential carriers, but also to determine the most suitable carriers for fortification. As for the dietary survey, it was designed to allow for better understanding across multiple areas, including food consumption patterns, adequacy of micronutrient intakes for target groups of women and children, and micronutrient intake. In addition, the data collected through the survey will help identify foods rich in essential micronutrients, to be promoted for wider consumption.

A national multisectoral steering committee was set up to carry out the study,[16] and the National Institute of Statistics and the National Information Platform for Nutrition (NIPN) team received technical assistance as follows:

1) from 2FAS, through the recruitment of a consultant for the development of the survey protocol;

2) from the joint FAO–EU Food and Nutrition Security Impact, Resilience, Sustainability and Transformation (FIRST) programme, for the development of the protocol and the implementation of the survey; and

3) from the Intake Center for Dietary Assessment, for the improvement of the protocol, the implementation of the survey, and data processing.

Data collection for the FRAT, combined with the quantitative 24-hour dietary recall survey, concerned the five regions most affected by malnutrition (Dosso, Maradi, Tahoua, Tillabery and Zinder). It involved 3 080 households and 5 462 individuals (1 845 children aged 24–59 months, 1 951 adolescent girls aged 10–18 years and 1 666 adult women aged 19–45 years). It was carried out in 2019, in a post-harvest period of relative food abundance. The information collected from households and individuals can thus be used in other programmes or activities aimed at improving the nutrition of local communities — mainly adult women, adolescent girls and young children. The recipes collected and standardized during the preparatory phase of the survey can, for example, be optimized to strengthen ongoing work on national dietary recommendations (NDRs), with a view to developing a food guide for the Niger, as part of the FAO project "Creating an enabling environment for improving nutrition through agriculture and food systems".[17]

14 See https://pnin-niger.org/pnin-doc/web/uploads/documents/111/Doc-20191021-073821.pdf.

15 Haut-Commissariat à l'initiative "les Nigériens Nourrissent les Nigériens".

16 Decision N°00143/MP/DG/INS/DRH/DAARC of 13 September 2018.

17 See http://www.fao.org/niger/actualites/detail-events/fr/c/882846.

DIETARY SURVEY INITIATION

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Estimating dietary exposure to food chemicals in Jordan

Authors: Amjad Abdel-Rahman Rashaideh (1) and “Eva Inam” Kayed Al Zein (2).

Affiliations: 1) Food Director, Jordan Food and Drug Administration; and 2) Head of Food Safety Epidemiology Division, Jordan Food and Drug Administration.

In adherence to the “Regional Plan of Action for Food Safety for the Eastern Mediterranean 2017–2022” and the commitment of the national food safety authority in Jordan to protect public health by ensuring the safety and quality of foods in the Jordanian market, the Jordan Food and Drug Administration (JFDA) took the initiative in 2019 to plan and lead the implementation of a total dietary study (TDS), coupled with an individual food consumption survey (FCS) using the quantitative 24-hour dietary recall method, with the overall goal of understanding dietary intakes and assessing chemical hazards present in the Jordanian diet (WHO, 2016).

A preparatory national technical meeting was held in February 2020, with the support of the Jordan Country Office of the World Health Organization (WHO) and the Regional Centre for Environmental Health Action (CEHA) of WHO’s Regional Office for the Eastern Mediterranean (EMRO), to discuss conducting a TDS in Jordan. Representatives from multiple stakeholder organizations participated in the meeting and shared their experiences and available data. These included the Ministry of Health, Ministry of Agriculture, Department of Statistics, Ministry of Planning and International Cooperation, JFDA, WFP, WHO and academia.

While the estimation of actual dietary exposure to harmful and beneficial chemical substances is a prerequisite for risk assessment, combining the obtained levels of chemicals (pesticide residues, mycotoxins and heavy metals) in food with data from the FCS will provide valuable information for actions supporting improved food safety protection and consumer health in Jordan.

The data derived from the FCS will be used to estimate the amounts of different foods consumed by individuals, assess the nutritional content and quality of diets among consumers and develop quantitative food-based dietary guidelines. It will also provide evidence-based guidance for policy makers to plan and design public health interventions aimed at reducing the risks of nutrition-related diseases. The evidence generated by the survey will not only serve government institutions, but will also provide opportunities for researchers and academics across the country to use national data for research purposes.

With the TDS, the aim is to provide realistic data on chemical food contamination, and limit uncertainties in exposure assessment with refined sampling methods and chemical analysis of foods “as consumed” by the Jordanian population. Given the importance of the data, its use is also envisioned in standards development, trade and environmental management.

Finally, the project will provide an opportunity for stakeholders in food safety, nutrition and academia in Jordan to strengthen intersectoral coordination.


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DIETARY SURVEY INITIATION

How national nutrition surveys in Ethiopia contribute to food and nutrition policies, programmes and strategies

Authors: Endale Amare (1), Aregash Samuel (1) and Masresha Tessema (1).

Affiliations: 1) Food Science and Nutrition Research Directorate, Ethiopian Public Health Institute.

The high prevalence of undernutrition in Ethiopia (including stunting, wasting and micronutrient deficiencies) prompted the Ethiopian Government to approve the country's first-ever National Nutrition Strategy (NNS) in 2008 (Government of Ethiopia, 2008). Following this endorsement, the Federal Ministry of Health (FMoH), in collaboration with development partners and other line ministries, developed the National Nutrition Program (NNP), to be completed in two phases (NNP I and NNP II). The NNP embraces five major strategic objectives, each of which includes core targets, initiatives and expected results which directly and indirectly contribute to the reduction of malnutrition and to ending hunger (Government of Ethiopia, 2016a). NNP I was implemented with the aim of reducing the magnitude of malnutrition in Ethiopia, especially among children under five, and among pregnant and lactating women (Government of Ethiopia, 2016a; Government of Ethiopia, 2013). The second phase (NNP II) was initiated in 2016, and provides a framework for coordinated implementation of nutrition interventions to end hunger by 2030.

One of the components of the NNP is the Seqota Declaration, a commitment made in 2015 by the Ethiopian Government, and led by FMoH, to "end stunting among children in Ethiopia by 2030" (Government of Ethiopia, 2016a; Government of Ethiopia, 2016b). The initiative is in line with the SDGs (UN General Assembly, 2015), and aims to transform the lives of Ethiopian children through integrated community development in agriculture, health, nutrition, education, water, sanitation and hygiene, as well as social protection. The Government has demonstrated significant commitment and effort to implement this integrated project. Such efforts demonstrate the understanding of and willingness to tackle major nutritional challenges for health and economic development.

More recently, the Government developed the country's first Food and Nutrition Policy (FNP) (Government of Ethiopia, 2018), which was endorsed by the Council of Ministers in November 2018. This policy was designed with the engagement of multiple government sectors and diverse development partners. The major goal of the policy is to attain for all stages of life an optimal level of nutritional status that is consistent with high quality of life, productivity and longevity (Government of Ethiopia, 2018). In follow-up to the policy, the Government has launched the Food and Nutrition Strategy (FNS), which will operationalize the FNP (Government of Ethiopia, 2021).

The lack of national and regional information on individual food and nutrient intake impeded the design and implementation of various interventions (such as national food fortification and supplementation) that were aimed at alleviating major micronutrient deficiencies in the country. To address this, the country's first National Food Consumption Survey (NFCS) was conducted in 2011 (EPHI, 2013). The survey, which was both nationally and regionally representative, was made possible by the concerted effort of the Government, with financial and technical support from the World Bank, Nutrition International and the Global Alliance for Improved Nutrition (GAIN). Individual-level dietary data were collected using a single quantitative 24-hour dietary recall method. Data were collected among women and young children, as well as 10 percent of urban men in sampled households (EPHI, 2013).

A technical report of the survey results was produced and submitted to FMoH and stakeholders. The dietary data collected were used to guide the design of appropriate nutrition interventions and make evidence-based decisions for the aforementioned national nutrition plans and other agriculture and health policies. The Government also used the evidence to inform voluntary food fortification and supplementation programmes. Several presentations were made at national and international levels, and more than five papers were published in peer-reviewed journals (Samuel *et al.*, 2019; Ayana *et al.*, 2018; Tesfaye *et al.*, 2019; Mengistu *et al.*, 2017). Moreover, the NFCS data were used to estimate the dietary intake of different nutrients such as zinc, assess inadequate and excess intake of nutrients among different target and population groups (to then model different intervention approaches for improved nutritional status), and determine the association between dietary diversity and stunting.

As a country, Ethiopia is undergoing a process of economic growth, and with this growth, consumer behaviour is changing. This is due in part to increased exposure to modern and processed foods, which present risks for chronic disease. In addition, environmental factors are impacting the seasonal availability of certain foods, which in turn is also influencing the dietary patterns and nutritional status of the population. Timely data are therefore crucial for designing appropriate interventions, as are targeted strategies for different segments of the population.

To respond to this situation, the Government is now planning a second national food consumption survey to be implemented by the Ethiopian Public Health Institute (EPHI). This survey will be integrated into a larger national nutrition survey to be carried out in the country. The updated individual food consumption data are needed because dietary patterns in Ethiopia have changed over the last decade, due to population growth, urbanization, and a range of socio-economic and environmental factors. The planned survey will provide an understanding of trends in dietary consumption (i.e. to assess how food consumption patterns have changed in the population over time), which will then enable and inform the required policy interventions in all sectors. It will also enable the Government to evaluate the achievement of the National Nutrition Program (NNP II).

The dietary component of the integrated survey will use the quantitative 24-hour dietary recall method, with repeat recalls collected for a subsample of respondents. The survey also includes a micronutrient component and a nutrition impact component (NNP II end line), and will serve as a baseline for the National Food and Nutrition Strategy. These data are needed to provide essential information on the nutritional status of the country's population, thereby enabling decision makers in Government and other relevant stakeholders to develop appropriate and evidence-based food and nutrition policies, strategies and interventions to reduce undernutrition, micronutrient deficiency and diet-related non-communicable diseases.

The combined survey serves the logistic purpose of meeting data needs while also reducing data collection costs (as compared to the carrying out of three separate surveys to collect nutrition-related data). In addition, the combined approach will allow for better utilization of the data, including the option to triangulate different types of data – for example, micronutrient biomarker and dietary intake data – which will help to better interpret and translate the evidence.

DIETARY SURVEY INITIATION

A dietary intake survey in Nigeria: twenty years after the first

Authors: Adeyinka Onabolu (1) and Busie Maziya-Dixon (2).

Affiliations: 1) Senior Advisor on Food Security and Nutrition to the Honourable Minister of Agriculture, Nigeria; and 2) Senior Food and Nutrition Scientist, International Institute of Tropical Agriculture, Nigeria.

A commissioned assessment of the data and accountability landscape for nutrition in Nigeria identified several data gaps, two of which were considered particularly urgent:
1) Nigeria does not have information about what people eat, and is therefore unable to design programmes to address the challenges in the food system — for example, what foods to promote, what food transformation processes to modify, etc.; and
2) there are gaps in the definition and measurement of indicators for reporting on progress in meeting national and global nutrition targets. The decision to conduct a National Food Consumption and Micronutrient Survey was consequently taken during a nutrition data stakeholders' workshop held in July 2017, which reviewed and validated the findings from the gap assessment.

The planning of the National Food Consumption and Micronutrient Survey in Nigeria was jointly led by the Ministry of Finance, Budget and National Planning, the Federal Ministry of Health, and the Federal Ministry of Agriculture and Rural Development. A first meeting was held in January 2018, to discuss and agree on the scope and time frame for the survey; the resources and skills required; funding options and how to explore them; institutional arrangements, roles, responsibilities and lead agency; and modalities and locations for the analysis of biological samples and data.

The need to establish a strong governance structure for decision making was well-recognized during this first meeting, and as a result, a Technical Advisory Committee (TAC) and a Steering Committee were established. The role of the TAC is to ensure a sound technical approach to the survey, to review the progress of activities and milestones and to recommend proposed actions to the Steering Committee for approval. The Steering Committee on the other hand provides direction for the successful achievement of the survey objectives/results, and leadership for the effective functioning of the TAC and partners; it also ensures good data quality throughout the survey process. In addition, the Steering Committee makes final decisions on all issues based on the recommendations of the TAC, including the approval of work plans and timelines.

Intake and INDDEX are the major international technical partners for the dietary intake component of the survey. Local partners include the National Bureau of Statistics, National Population Commission, Universities of Ibadan, Calabar, and Uyo, Ahmadu Bello University Zaria, University of Agriculture Abeokuta, and the University of Nigeria, Nssuka.

The buy-in of the Nigerian Government was demonstrated when the Ministry of Finance, Budget and National Planning, the Federal Ministry of Health, and the Federal Ministry of Agriculture and Rural Development held an interactive session with development partners in July 2018, to express their support for the survey. It was at this session that the suggestion was made to participating ministries to create new budget lines for subsequent surveys and to make budgetary requests in collaboration with the National Bureau of Statistics two or three years before the next survey (foreseen for five years after the current survey). The Bill & Melinda Gates Foundation served as a champion for the survey, taking the lead in bringing partners together to secure funds and matching funds contributed by other agencies.

Data collection for the current survey began in 2021, with the hope that the budget request process established in 2018 will allow for additional dietary data to be collected routinely (every five years), to help meet the country's data needs for informing policy and programme design, and for monitoring progress toward achieving national and global nutrition targets.

DIETARY SURVEY INITIATION

Dietary survey initiation in Mexico

Authors: Tania C. Aburto (1), Teresa Shamah-Levy (2) and Juan A. Rivera-Dommarco (3)

Affiliations: 1) Nutrition and Health Research Center, National Institute of Public Health, Mexico; 2) Evaluation and Surveys Research Center, National Institute of Public Health, Mexico; and 3) National Institute of Public Health, Mexico.

The National Health Survey System in Mexico includes a series of probabilistic and nationally representative surveys on health and nutrition that include dietary data for different population groups. These surveys have given the country useful information with which to plan and evaluate the performance of the Mexican health system; estimate the magnitude, distribution and trends of the health and nutritional status of the population; assess dietary intake and its trends; and assess the coverage of programmes and services in order to quantify progress and identify health challenges in Mexico. They have been instrumental in prioritizing health and nutrition issues across the public agenda and for ensuring the design of appropriate and effective policy responses (Shamah-Levy *et al.*, 2019).

The political will to conduct nutrition and health surveys emerged during the last decades of the twentieth century, when policy makers and actors from the Ministry of Health became interested in the use of evidence for the design of programmes, particularly for poverty and undernutrition alleviation (Rivera Dommarco *et al.*, 2019). The National Nutrition Survey was carried out for the first time in 1988. As undernutrition was the main nutrition-related concern at the time, the survey focused on vulnerable age groups (children under five and women of reproductive age) (Rivera Dommarco, 1998). In 1999, the second National Nutrition Survey collected information from the same demographic groups, but added school-age children (5–11 years) (Resano-Pérez *et al.*, 2003). National Health Surveys were also conducted in 1986, 1994 and 2000 (Sepúlveda *et al.*, 2007), all financed by the Ministry of Health.

As of 2006, the nutrition and health surveys were combined to form the National Health and Nutrition Survey (ENSANUT), with the objective of quantifying the magnitude, distribution and trends of the health and nutrition status among the Mexican population and identifying the challenges faced by the country's health system (Palma-Coca *et al.*, 2007). The survey has been conducted in 2006, 2012, 2016 (mid-stage) and 2018. It has included all age groups and has maintained a lifeline scheme that has allowed for the comparison of results over time. The latter has been fundamental for gathering timely information on the magnitude of changes in the population's health, nutrition and dietary intake (Romero-Martínez *et al.*, 2013, Romero-Martínez *et al.*, 2017). Dietary data collection started with the second National Nutrition Survey of 1999, using a single quantitative 24-hour dietary recall for a subsample of 18 percent of survey participants. For the 2012 and 2016 surveys, dietary intake was collected using both quantitative 24-hour dietary recalls and food frequency questionnaires for different subsamples, ranging from 10 to 46 percent of survey participants. The 24-hour recalls in these two surveys used an automated five-step multiple-pass method, and collected a non-consecutive, second 24-hour recall to account for intra-individual variability. The other surveys (2006 and 2018) collected dietary data using only food frequency questionnaires. The ENSANUT has been conducted by the National Institute of Public Health, with support from other national agencies, and has been financed mainly by the Ministry of Health.

Notably, the National Institute of Public Health has played an important role not only in designing the survey and collecting the data, but also in analysing the information and identifying health and nutrition problems and challenges in the Mexican health system, along with potential solutions.

Section 2.2. Country stories on dietary survey implementation

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This section presents a compilation of country stories related to dietary survey implementation in LMICs, and are written by experts from Brazil, Viet Nam, the Philippines and China. A range of different survey designs has been used to collect dietary data in these countries. Each design has been tailored to reflect and respond not only to country context but also to country needs with regard to data use. In some cases, the survey design is also customized to help ensure the availability of a robust national survey platform for the collection of the data and for cost feasibility in collecting dietary data.

The stories in this section highlight the importance of collecting individual-level dietary data in the context of a country where dietary patterns are changing among different population groups and where multiple burdens of malnutrition are prevalent. They also describe the type of analyses that countries have been able to carry out as part of the larger, multimodule survey designs that have been implemented, and the broad range of uses (for the dietary data collected) that have been made possible from both a research and policy perspective, given the design used for collecting the data. Notably, all of these countries have successfully institutionalized a dietary survey programme within the government budget and planning process.

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Dietary data in household budget and health surveys in Brazil

Authors: Eduardo Nilson (1) and Gisele Bortolini (1).

Affiliations: 1) Ministry of Health, Brazil.

Brazil has a long history of dietary studies and surveys, starting in the 1880s, although nationally representative surveys only started in the 1970s. These first national dietary surveys were independently planned and funded, which resulted in costly and time-consuming processes, as well as in the irregularity of data collection and in different objectives and methodologies, which limited the comparability of results over time.

Household budget surveys (HBSs) were initiated in the 1970s, and at the end of the 1980s the country's main HBS, known as the *Pesquisa de Orçamentos Familiares* (POF), was created as a study of the metropolitan areas of state capitals. The POF, which became nationally representative in the early 2000s, is coordinated and implemented by the Brazilian Institute of Geography and Statistics (IBGE), and is mostly funded by the Ministry of Economy. The national POF is now programmed as quinquennial and is both nationally and regionally representative. It covers urban and rural populations, with visits to over 60 thousand households around the country conducted over the course of a full year of data collection, in order to account for the seasonality of variables.

The primary aim of the POF is to provide economic data, especially regarding household purchases and the prices of all household expenses including foods. Data from the POF have also been used in nutrition research, for example for indirect analyses of food consumption. The use of food composition tables together with POF data allowed for the analysis of dietary diversity, macronutrients and sodium in diets. As a result, the IBGE became interested in the use of POF data for nutritional studies, which prompted discussions between the Ministry of Health, IBGE and national research teams. These discussions resulted in the official incorporation of the analysis of food availability in the household (based on per capita food consumption) and the publication of a specific report on POF. Later, in 2008, after more negotiations and additional funding by the Ministry of Health, the inclusion of quantitative 24-hour dietary recall data collection in the POF surveys represented another milestone in the availability of dietary data for Brazil. This allowed for individual dietary analyses for a subsample of individuals over ten years of age, and became a specific module of the survey.

The change from conducting independent dietary surveys to including dietary modules within the national POF has resulted in a trade-off that is mostly positive, as the integration of the dietary modules within the POF allows for the dietary analysis to be linked to other household purchases (including the costs of foods and variations in these costs), and to the socio-economic and demographic characteristics of the families and individuals. There is also a significant reduction in operational costs when integrating the dietary survey into an existing regular survey. Additionally, the work of the IBGE is universally accepted by the population, thereby reducing sample losses as compared to other surveys. And the use of a common master sample for all surveys strengthens the study of historical trends as well as the comparability of data between different national surveys. Nevertheless, by working with a pre-existing survey, there is less flexibility for customized reports and modules, and the continuity of additional modules (such as the 24-hour dietary recalls, anthropometry, and food and nutrition insecurity), requires ongoing negotiation. There is also the constant risk that funding from IBGE and its partners may be transferred to other surveys. Moreover, the POF was not capable of incorporating data collection on the diets of younger children (including breastfeeding and complementary feeding), or of incorporating the study of diet-related health outcomes, which continue to require specific national surveys.

In Brazil, both household food availability and quantitative 24-hour dietary recall data have proven to be compatible with the national POF, and extremely useful in the analysis of food consumption trends over time, as well as in informing, monitoring and evaluating food and nutrition policies. Moreover, open data policies implemented over the last decade in Brazil have promoted public access to the anonymized microdata, and have consequently expanded the use of the national data by researchers and policy makers.


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DIETARY SURVEY IMPLEMENTATION

The National Nutrition Survey in Viet Nam: the shift to individual dietary data collection

Authors: Tuyen Danh Le (1), Phuong Thi Mai Tuan (1), Nga Tran Thuy (1), Tran Khanh Van (1) and Son Duy Nguyen (1).

Affiliations: 1) National Institute of Nutrition, Viet Nam.

With technical support from the United States Centers for Disease Control and Prevention (CDC) and Intake, the Viet Nam General Nutrition Survey (GNS) in 2020 was designed as a cross-sectional population-based survey, to provide nationally representative estimates of micronutrient status, anthropometric status and dietary intake for selected target population groups. Dietary assessment was done across four population groups: pregnant women; lactating women; non-pregnant, non-lactating women of child-bearing age; and men aged 15–49 years. The sample design included stratification by six grouped ecological regions, and allows for the estimation of results at the following levels: national, urban vs rural (at the national level), and regional (for each of the six ecological regions).

Dietary assessment was one of the key components of the GNS. In the past, the Viet Nam National Institute of Nutrition (NIN) collected household food consumption data, but in this survey, NIN shifted from collecting household-level to individual-level dietary data. The latter provides information on the quantity of food consumption and meal patterns at the individual level for specific target population groups, while the former does not provide information on individual meal patterns or on how food is distributed, allocated and consumed among household members. Moreover, quantitative 24-hour dietary recall data collection at the individual level provides more accurate information on nutrient intake, which is crucial for evaluating nutritional status, micronutrient deficiencies and other health conditions among different target population groups.

Viet Nam is currently facing a triple burden of malnutrition, in which undernourishment and micronutrient deficiencies continue to persist among the population, while new nutrition-related health conditions associated with overnutrition (including obesity and non-communicable diseases [NCDs]) are also on the rise. The situation has emerged following a period of economic transition for the country, and a shift in dietary patterns and physical activity levels among the population.

According to results from a micronutrient survey conducted by NIN in 2019, the prevalence of anaemia among women of reproductive age was 25.5 percent, and was classified as a public health problem of moderate significance. Of anaemic women, 37.7 percent had iron deficiency anaemia, and approximately one in four women (23.3 percent) had depleted iron stores. Meanwhile, the prevalence of serum zinc deficiency in women of reproductive age was 63.6 percent, and was classified as a public health problem of severe significance (Nga *et al.*, 2020). For children aged 6–59 months, 69.3 percent were zinc deficient and 24.8 percent were iron deficient (ferritin under 12 µg/litre) (Nga *et al.*, 2016). At the same time, Viet Nam has experienced a rapid increase in overweight and obesity among both adults and children, and a growing number of people with NCDs, which accounted for 73 percent of the country's death toll in 2012 (WHO, 2014).

To address these health burdens, it is essential to have sufficient data on dietary intake for each target population group at the country level, in order to understand how food consumption has changed due to the country's economic transition. Sweet foods, processed foods, and foods that are high in fat and in energy density have become increasingly popular in Viet Nam. The number of people eating out has also increased rapidly in recent years. But to date, there is a lack of national data on dietary intakes at the individual level in Viet Nam; almost all of the dietary data collected has been at the small scale. These issues underscore the importance of shifting the collection of food consumption data to the individual level for the 2020 GNS.

In 2021, NIN developed the National Nutrition Strategy for the 2021-2030 period, with a vision toward 2040. The data collected in the Viet Nam 2020 GNS will be submitted to leaders and policy makers of all related health sectors and agencies, including the Ministry of Health, the Ministry of Agriculture and Rural Development and the Government Cabinet, and will also be shared with food industries. The goal is to provide strong, evidence-based information to support NIN and the Ministry of Health in developing food-based interventions and dietary guidelines to improve the nutrition of the country's population.

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DIETARY SURVEY IMPLEMENTATION

Dietary assessment as a component of the National Nutrition Survey: the Philippine experience

Authors: Imelda Angeles-Agdeppa (1) and Mario V. Capanzana (2).

Affiliations: 1) Director IV & Scientist II, Food and Nutrition Research Institute, Department of Science and Technology, Philippines; and 2) Director IV (retd.), Food and Nutrition Research Institute, Department of Science and Technology, Philippines.

The Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology (DOST) of the Philippines is the premier research agency of the Government, and is tasked with carrying out three mandates by virtue of Executive Order No. 128, as signed by the President of the Philippines: 1) to undertake research that defines the citizenry's nutritional status with reference to the malnutrition problem, its causes and effects; 2) to develop and recommend policy options, strategies, programmes and projects that address the malnutrition problem; and 3) to diffuse knowledge and technologies in food and nutrition and provide science and technology services to stakeholders. Moreover, Executive Order No. 352 stipulates that the National Nutrition Survey (NNS) is a designated activity that will generate critical data for decision making in the government and private sector.

As a result of these mandates, DOST-FNRI has conducted the NNS, starting in 1978 and every five years thereafter. In order to update country data on nutritional status, interim Updating Surveys (UPS) were also conducted every two and a half years (between one NNS and the next) until 2015. In the surveys dating from 1978 to 1987, representation was limited to national and selected regional data estimates, for selected age groups. It was only from 1993 onwards that data estimates were presented for all age groups and regions, along with representation at the national level. In 2018 however, the FNRI changed the design of the survey in response to a resolution issued by the Philippine Statistics Agency. The resolution mandated the FNRI to conduct the NNS every year for three years as a rolling survey, and it is now known as the Expanded National Nutrition Survey (eNNS).

The eNNS started in 2018 and ran until 2020, covering all 117 provinces in the Philippines, as well as all highly urbanized cities (HUCs). The three-year rolling eNNS addresses a crucial need for disaggregated data at the provincial level. This need cannot be adequately met by national and regional estimates, as nutritional status can vary significantly among provinces and HUCs comprising a region. Disaggregated data that reflects all forms of malnutrition across all provinces and HUCs is therefore critical to achieving the SDGs in the Philippines, and to ensuring that marginalized and vulnerable populations are not left behind. This change in the survey's design corresponds to a tremendous increase in sample size – from 2 800 households and 17 667 individuals in 1978, to 56 500 households and 165 586 individuals in each of the survey periods, covering all age groups from 0 to 60 years and over.

As in previous surveys, the eNNS provides data and information for different nutritional assessments across nine components:
1) anthropometry; 2) biochemical; 3) clinical; 4) quantitative 24-hour dietary recall; 5) socio-economic and demographic characteristics of respondents; 6) food security; 7) government programmes; 8) infant and young child feeding; and 9) maternal health.

The carrying out of surveys is institutionalized and therefore funded by the Government. The FNRI submits three-year forward budget estimates to the Department of Budget and Management, updated on a yearly basis. To supplement the budget during survey periods, the DOST-FNRI holds a meeting with stakeholders about 3–6 months prior to the survey, to begin a process of collaborative research among government institutions, NGOs, international funding organizations and/or the industrial and private sector.

To sustain government engagement and interest in the survey, DOST-FNRI disseminates the data and provides policy recommendations to partner government agencies at both local and national level, as well as to legislators during special congressional and senatorial meetings. The FNRI also produces monographs on survey results by province, and a handbook of "Facts and Figures" for print and digital distribution to different stakeholders involved in the planning and implementation of programmes to address malnutrition in the country. In addition, the FNRI makes the data from the different survey periods available as public use files (PUFs), in order to maximize data use and attract and invite additional research collaborators from academia, NGOs, international organizations and the private sector. The dietary survey data is also used for risk assessments of nutrients, contaminants and other food safety parameters, and for the development of national tools and standards — many laws have been implemented to date using the survey results. DOST-FNRI has also received significant recognition with regard to the generation of new technologies for the production of nutritious products, and for prioritizing the importance of science for the people (SFTP).

Dietary survey implementation and its valuable application in China

Authors: Zhihong Wang (1), Weiyi Li (2), Huijun Wang (3), Bing Zhang (4) and Gangqiang Ding (5).

Affiliations: 1) Researcher, National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention; 2) Research Assistant, National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention; 3) Researcher, National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention; 4) Vice Director & Professor, National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention; and 5) Director & Chief Physician, National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention.Simusquit.

Established in 1989, the China Health and Nutrition Survey (CHNS) is a multipurpose longitudinal survey, led by the Chinese Center for Disease Control and Prevention (CCDC) National Institute for Nutrition and Health, in collaboration with the Carolina Population Center at the University of North Carolina at Chapel Hill. The project aims to study secular trends in dietary intake and nutritional status among the Chinese population, in order to examine how the social and economic transformation of Chinese society is affecting the health and nutritional status of its population. The impact of nutrition and health behaviours on outcomes is gauged by changes in community organizations and programmes, as well as by changes in sets of household and individual economic, demographic and social factors (Zhang, Wang and Du, 2011; Popkin *et al.*, 2010).

The most important feature of the CHNS is that it not only provides longitudinal tracking data for researchers to analyse long-term changes, but it also provides cohort study data for etiologic research of undernutrition and nutrition-related non-communicable diseases. To date, 11 rounds of surveys of the same population have been conducted in nine provinces in 1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009, 2011, 2015 and 2018. New cohorts were established in Beijing, Shanghai and Chongqing municipalities since 2011 and in Xi'an, Yunnan and Zhejiang provinces since 2015. By 2015, the CHNS had developed into a cohort covering 20 000 subjects from 15 provinces.

This in-depth survey collects data at three levels — individual, household and community — on a range of topics including: occupations; incomes and benefits of working-age household members; time use; diet and nutritional status; activities of daily living, health status and use of health services; marriages, fertility preferences and pregnancies of reproductive-age women; mass media exposure and body image perception; household size and composition; living arrangements; care of children and elders; housing conditions; land ownership; and limited data on household asset ownership. Individual health-related data are highly detailed and include carefully collected/measured data on dietary intake,[18] physical activity, smoking and alcohol use, anthropometrics, blood pressure and limited clinical data from all respondents. Fasting blood, faeces, urine and toenail samples were collected in the CHNS in 2009, 2015 and 2018.

The CHNS provides the only longitudinal tracking data on two generations in China. In 2015, there were data for at least 3 212 couples and their children, and there are three

[18] A consecutive, three-day, quantitative 24-hour dietary recall method has been used in combination with household weighing for seasonings. A one-year food frequency questionnaire has also been used since 2009.

generations of tracking data for 965 subjects. This provides an opportunity to study the nutrition and health status of two generations in different living environments.

The major strength of the CHNS is the ability to capture enormous heterogeneity and change both spatially and temporally, in one of the most rapidly changing environments in the world. Because of its long duration and wide geographic coverage, the CHNS can document the dramatic changes in economic, social, behavioural and health status that have characterized China in the past several decades.

Use of the 30-year longitudinal data from the CHNS has allowed for in-depth analysis of the Chinese population with regard to the long-term dynamics of dietary structure, nutritional status, eating behaviour and lifestyle, as well as their relationships with cardiometabolic risks factors and chronic diseases. An array of research across dozens of disciplines has been conducted in past decades, the results of which have been communicated in peer-reviewed journals. More than 1 500 research papers and more than 1 200 English papers have been published in China's core and Science Citation Index (SCI) journals respectively, covering many research fields including nutrition and health, economics, agriculture and social sciences. For example, a few studies using CHNS data found that the relationship between body mass index (BMI) and hypertension among people in China is much steeper than in the United States of America, and that shifting dietary and activity patterns are linked to increased obesity among the poor in China (Ouyang *et al.*, 2014; Su *et al.*, 2010; Ma *et al.*, 2013). Important results relating to observed trends in food and nutrient intake and the dietary patterns of the population have contributed to the formulation and updating of the country's dietary reference intakes (DRIs) and dietary guidelines. Moreover, research with CHNS data is also being used to form the basis for many national and provincial programmes addressing unhealthy diets, low levels of activity and increased obesity. Most importantly, relevant findings from the CHNS provide scientific evidence for developing key nutrition policies and standards, such as the Healthy China 2030 blueprint, Healthy China Initiatives 2019–2030, the National Nutrition Plan, the China Food and Nutrition Development blueprint and fortification-related policies, and others. Internationally, the successful experience in fortification of soy sauce and flour with iron and other micronutrients has been used as the basis for World Bank poverty reduction programmes in a number of poor countries.

Section 2.3. Country stories on dietary data use

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The country stories in this section focus on the use of dietary data for evidence-based policy and programme design, and help to illustrate the rich potential of dietary data for practical use in public health, to strategically and cost-effectively address the multiple burdens of malnutrition in LMICs. The stories are from Brazil, Mexico and Cameroon, all of which are countries where dietary data have been used in a variety of ways to help address poor quality diets as related to undernutrition (for example, in terms of food insecurity and nutrient inadequacy), overweight and obesity, and the risk for non-communicable diseases.

Brazil and Mexico have both institutionalized dietary data collection as part of the government budget planning process, and Cameroon is currently planning for the implementation of its second national dietary survey.

DIETARY DATA USE

Policy and regulatory uses of dietary surveys in Brazil

Authors: Eduardo Nilson (1) and Gisele Bortolini (1).

Affiliations: 1) Ministry of Health, Brazil.

In Brazil, dietary factors — including the excessive consumption of salt, sugars and fats, as well as insufficient intake of fibre, whole grains, fruits and vegetables — are among the major risks for NCDs, and are observed across all age groups and geographic regions of the country. In parallel, food and nutrition insecurity are prevalent among vulnerable populations, resulting in a double burden of malnutrition.

Food and nutrition policies in Brazil have historically been evidence-based, and the use of nationally representative dietary data — from the country's main HBS, known as the *Pesquisa de Orçamentos Familiares* (POF) and from other specific dietary surveys — are key inputs for policy formulation, monitoring and evaluation. For example, the revision of the national dietary guidelines was based on the identification of healthy food patterns related to the degree of food processing, as reported in the quantitative 24-hour dietary recall information collected in the national POF (Costa Louzada *et al.*, 2015). This allowed for the development of realistic and achievable dietary recommendations, based on actual consumption. According to the POF, approximately 20 percent of the Brazilian population already had a healthier diet compared to the rest of the population (i.e. a diet based on freshly prepared dishes and fewer industrialized or ultraprocessed foods). The analysis also found that diets with a larger share of ultraprocessed foods are associated with overall loss of diet quality (considering both macronutrients and micronutrients), and increased risk of overweight and obesity (Louzada *et al.*, 2015). This led to the golden rule of the dietary guidelines: to always prefer natural or minimally processed foods and freshly made dishes.

The POF data can be disaggregated to the census sectors in Brazil, and linked to other surveys based on these territories. This can generate interesting and useful analyses of food environments, for example to indicate household access to healthy and unhealthy foods. It can then allow for the plotting of these results against maps of fresh produce markets, food deserts and food swamps.

The nutritional analysis of POF data has also been used to inform several food regulation and food reformulation policies in Brazil. Sodium and sugar reduction initiatives (based on the reformulation of processed and ultraprocessed foods) have used POF data to determine the priority food categories for reformulation according to their contribution to nutrient intake. More recently, modelling studies have been undertaken to estimate the impact of these reductions and compare different policy options for influencing food and nutrient intake (Nilson *et al.*, 2020).

In the regulatory field related to NCD prevention, several policies have benefited from POF data for modelling the impact of different policy scenarios as part of their Regulatory Impact Analysis reports. Examples include the national discussion on front-of-pack nutrition labelling (FOPL), the comparison of estimated changes in food consumption and intake of critical nutrients, and the health and economic impact of different FOPL models (including traffic lights and warnings). Other food regulatory processes have used POF data to inform and adjust rules to the context of the population. For example, the revision of the regulation on mandatory flour fortification used POF data to justify the selection of appropriate food vehicles (maize and wheat flour) for fortification, as well as for setting safe lower and upper limits for iron and folic acid fortification levels, considering overall micronutrient intake by sex and age group (Dos Santos *et al.*, 2015).

As these examples have demonstrated, dietary data in Brazil have been used to design, implement, monitor and evaluate a range of interventions and policies tailored both to the general population and to specific population groups. Increasing the use of HBS data will be extremely helpful for improved decision making and greater cost-effectiveness in the promotion of healthier diets, and in the prevention of negative diet-related outcomes such as NCDs and micronutrient deficiencies.

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DIETARY DATA USE

Dietary data use in Mexico

Authors: Tania C. Aburto (1), Teresa Shamah-Levy (2) and Juan A. Rivera-Dommarco (3).

Affiliations: 1) Nutrition and Health Research Center, National Institute of Public Health, Mexico; 2) Evaluation and Surveys Research Center, National Institute of Public Health, Mexico; and 3) National Institute of Public Health, Mexico.

The prevalence of overweight and obesity in Mexico is one of the highest in the world. From 1988 to 2018, the prevalence of obesity in Mexican women increased dramatically from 9.5 to 40.2 percent. According to the most recent National Health and Nutrition Survey of 2018, 76.8 percent of women and 73 percent of men over the age of 20 years present excess body weight (INEGI and INSP, 2018). Similarly, an upward trend in excess body weight has been observed in school-age children and adolescents (Hernández-Cordero *et al*., 2017). Meanwhile, the country still faces persistent undernutrition, with stunting and micronutrient deficiencies in low-income children and iron deficiency anaemia in women (Rivera-Dommarco *et al*., 2013; Villalpando *et al*., 2015).

A comprehensive analysis using quantitative 24-hour dietary recall data from the National Health and Nutrition Survey of 2012 explored the food and nutrient intake of the Mexican population (Rivera *et al*., 2016). Among the main findings, it was noted that sugar-sweetened beverages (SSBs) and non-essential, energy-dense foods accounted for 26 percent of total daily energy intake (13 percentage points above the advisable intake), while the intake of healthy foods such as fruits, vegetables and legumes was substantially below the recommended intake (Aburto *et al*., 2016). Correspondingly, only 1–12 percent of the population met consumption recommendations for legumes, fruits and vegetables, whereas 58–90 percent of the population exceeded the consumption recommendation for SSBs and non-essential energy-dense foods (Batis *et al*., 2016). Moreover, added sugars accounted for 12.5 percent of total energy intake (well above the 5 percent suggested by WHO), with SSBs being the main source of added sugars (Sanchez-Pimienta *et al*., 2016).

Consequently, Mexican authorities have implemented several policy measures that recognize the enormous challenges that obesity and non-communicable diseases represent for the country's welfare (Government of Mexico, 2013). Among these, the National Institute of Public Health led the effort to develop the Mexican Dietary and Physical Activity Guidelines in the Context of Overweight and Obesity (Bonvecchio-Arenas *et al*., 2015). In 2014, a strong partnership between advocacy organizations, academia and the legislative branch of the Government enabled a tax implementation of one Mexican peso per litre (a price increase of almost 10 percent) on manufactured non-dairy and non-alcoholic beverages with added sugar, and an 8 percent tax on non-basic, energy-dense foods. Analyses of the impact of these taxes showed a decrease in purchases of taxed products, especially among low-income households (Colchero *et al*., 2016; Colchero, Molina and Guerrero-Lopez, 2017; Taillie *et al*., 2017).

More recently, the legislative chambers approved front-of-pack nutrition labelling to be implemented during the last months of 2020. This will consist of black, octagonal warning labels listing excess energy, sugar, sodium, saturated fat, trans fat and two warnings for caffeine and non-caloric sweeteners, indicating they are not recommended for children. This regulation will also forbid the use of characters, cartoons and other role models, as well as health claims or endorsements by sports leagues in products with one or more warning labels. Ideally, this will lead consumers to make healthier food choices while also encouraging manufacturers toward product reformulation.

Dietary data collection and use in Cameroon

Authors: Alex Marco Ndjebayi (1).

Affiliations: 1) Programme Advisor, Helen Keller International, Cameroon.

Discussions on a dietary survey in Cameroon occurred in the context of broader consultations on addressing hidden hunger and micronutrient deficiencies. The idea for a possible food fortification programme came from Helen Keller International (HKI), based on their experience implementing similar programmes in West Africa. Following the West African experience, HKI conducted advocacy in 2008 to create a national food fortification programme in Cameroon, to contribute to the reduction of micronutrient deficiencies among women of reproductive age and children. In 2009, the National Food Fortification Alliance (NFFA) was launched, bringing together key government stakeholders.

The Ministry of Public Health, with the support of HKI, UNICEF, the Michael and Susan Dell Foundation, and the University of California, Davis, conducted the first activity of the fortification programme, which involved a national survey of micronutrient status and dietary intake (using the quantitative 24-hour dietary recall method) among women and young children.

The results of the dietary intake survey were used in several ways:

- Selection of fortification vehicles: Wheat flour was determined to be an appropriate food fortification vehicle for a mixture of micronutrients missing in the diet (including folic acid, iron, vitamin B12 and zinc). Vegetable oil was selected as a vehicle for vitamin A.
- Definition of standards: Based on dietary intake data and WHO recommendations for fortification levels (WHO, 2009), fortificants were selected and fortification levels set.
- Simulations to estimate the impact and cost-effectiveness of interventions: Dietary intake data from the fortification baseline survey suggested that fortification of wheat flour at the target level is likely to reduce, but not eliminate, inadequate zinc intake. In addition, modelling tools such as those developed by the MINIMOD project[19] were applied to examine the potential effectiveness and cost-effectiveness of alternative and complementary activities for improving micronutrient status in Cameroon.

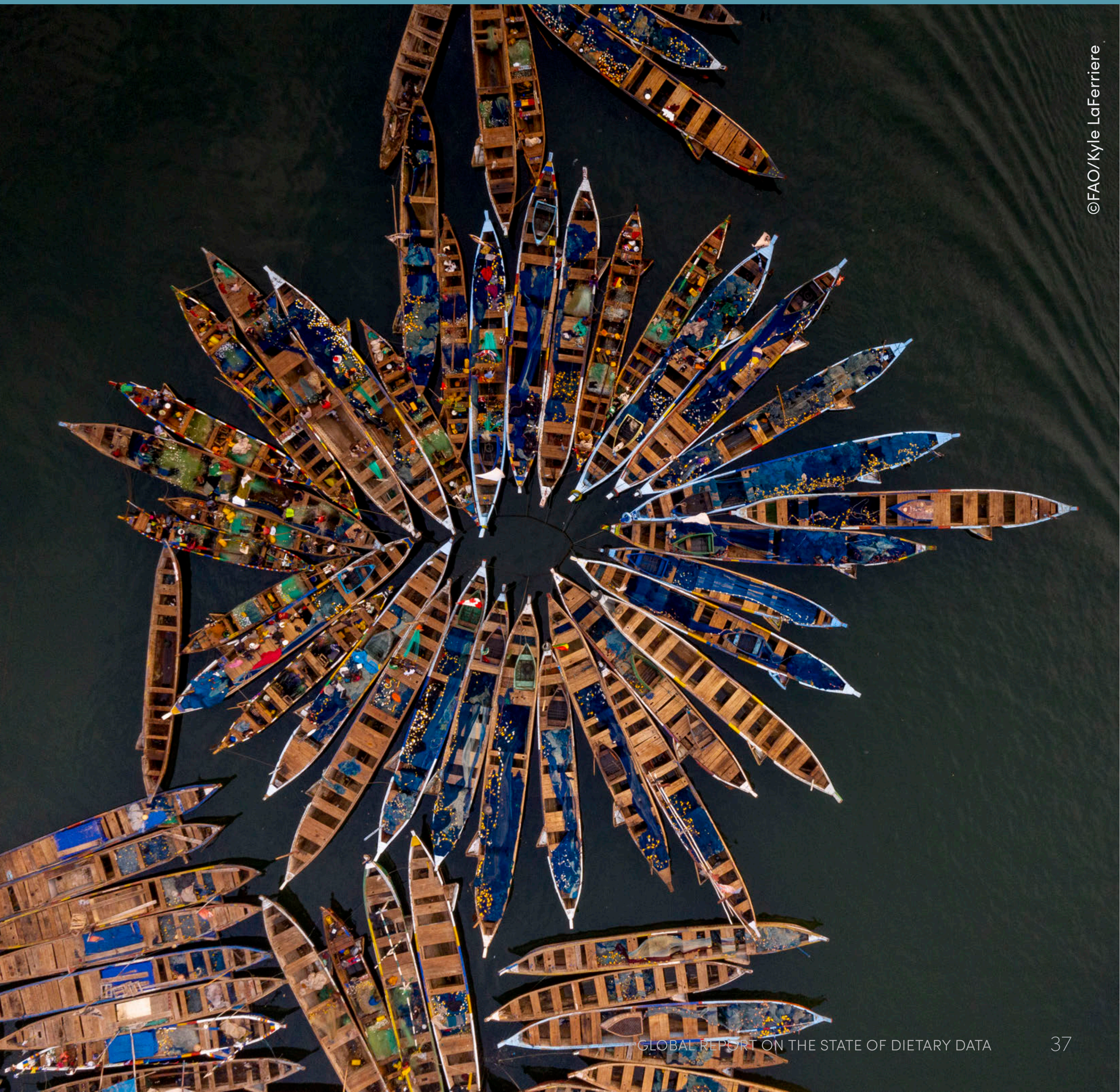
More than ten years after the first national survey on individual food consumption, it is imperative to organize a new survey to update this information. Since 2009, several programmes aiming at improving the nutritional status of the population have been implemented. These programmes have potentially influenced the micronutrient intake of the population; eating habits may also have shifted over time. It is important to reassess the situation to inform future nutrition programming.

[19] MINIMOD is a tool developed by the University of California, Davis to provide input for the planning and management of micronutrient intervention programmes in LMICs. MINIMOD uses a set of three interconnected models (a nutrition benefits model that links to the "Lives Saved Tool", a cost model and an economic optimization model) to identify the most cost-effective set of micronutrient intervention programmes in a particular country, across space and time. For more information about MINIMOD, see https://minimod.ucdavis.edu/models/.

The results from this second national dietary survey will be used to:

- Calculate the potential impact on dietary intake of different interventions (including fortification, supplementation and biofortification) for different groups (such as women and children) and for different parts of the country (because food habits differ geographically).
- Evaluate the prevalence and distribution of food health indicators (including deficiencies, macro- and micronutrient excess, and obesity) and identify social inequalities in terms of nutritional quality, in order to get a detailed and timely picture of the needs of the Cameroonian population.
- Update the design of the food fortification programme (including selected food vehicles and levels of micronutrients for fortification, norms and standards).
- Predict the impact and cost-effectiveness of additional investments in existing intervention programmes and in the design/ implementation of new intervention programmes.

Section 3. Visualizing dietary data



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Section 3. Visualizing dietary data

Dietary data offer a wealth of information that can be used across a variety of sectors for programme and policy design, and for monitoring and evaluation. Data visualizations are key to presenting such data in summary views that allow for easy interpretation of results, and can therefore serve as a critical communication tool. This section provides some examples of data visualizations that data analysts and policy makers may find useful for meaningful presentation of dietary data. Using a sample dataset, it features a series of figures that report on different indicators related to diet quality. Each of these visualizations serves to illustrate the data for easy interpretation, including by those with little or no background in nutrition.

A total of seven different types of figures or visualizations are presented, addressing three thematic areas: 1) overall diet (contributions of food groups to energy intake); 2) micronutrient intake adequacy (and the contributions of food groups and foods to micronutrient intake); and 3) dietary intakes related to non-communicable disease (NCD) risk. Together, these visualizations can help to identify key characteristics in the dietary patterns of a population, along with key gaps in dietary intakes, including for example inadequate intakes of micronutrients and excessive consumption of less healthy foods. This is useful for assessment, for informing the design of programmes and policies aimed at improving diet quality, and for establishing the targets that such programmes and policies should aim to achieve. For countries with existing programmes and policies aimed at improving diet quality, the information can also be used for monitoring and evaluation.

Section 3.1 presents one example for each of the seven types of data visualization, based on data for one specific demographic group. Each of these sample visualizations is discussed and explained individually, in order to provide guidance on the type of data visualization it represents, how to interpret the data and how the data may be used. The full set of data visualizations for all demographic groups is provided in **Section 3.2**.

The visualizations in Section 3 are based on data from the Mexican National Health and Nutrition Survey (ENSANUT) 2012 (Romero-Martínez et al., 2013). The analytic methods used to generate the results are described in **Annex 2**. The results themselves are provided in detail as a series of tables in **Annex 3**.

Section 3.1. Understanding the different types of data visualizations

As noted in the introduction to this section, the figures discussed and explained below reflect *one* example for each of the seven types of data visualization covered in this report, so as to illustrate its potential use and application (i.e. the data it illustrates, its interpretation, and use). In each case, the example is based on the results of analyses conducted for *one* specific demographic group; i.e. that of rural adolescent girls.

The full set of visualizations — for all demographic groups and indicators — is provided in Section 3.2. As there are seven types of data visualization covered, this full set includes seven sets of figures labelled from A to G. For each type of data visualization, the individual figures are further labelled by number; for example B1–B6. This labelling system is similarly reflected here in Section 3.1.

The figures and the corresponding discussions are organized into three thematic areas, reflecting the overall diet (contributions of food groups to energy intake), micronutrient intake adequacy (and the contributions of food groups and foods to micronutrient intakes), and dietary intakes related to NCD risk.

Overall diet

Contribution to energy intake by food group

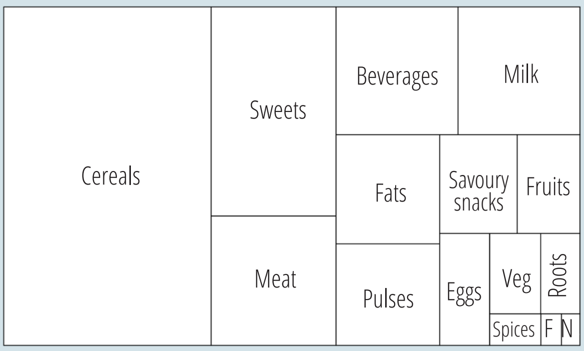
Figure A provides an overall picture of the diet by showing the contribution of different food groups to energy intake, using results for adolescent girls aged 10–13 years living in rural areas of Mexico. The food groups used for this analysis reflect those defined by FAO/WHO GIFT (FAO, 2021):

- cereals and their products (cereals);
- roots, tubers, plantains and their products (roots);
- pulses, seeds and nuts and their products (pulses);
- milk and milk products (milk);
- eggs and their products (eggs);
- fish, shellfish and their products (fish);
- meat and meat products (meat);
- vegetables and their products (veg);
- fruits and their products (fruits);
- fats and oils (fats);
- sweets and sugars (sweets);
- spices and condiments (spices);
- beverages;
- non-disaggregated composite dishes (NDCD); and
- savoury snacks.

The data visualization shows the proportional contribution of each of these food groups to overall energy intake. This is represented by the relative size of the box, with the highest to lowest proportion from top left to bottom right. As an example, Figure A therefore illustrates that among this demographic, cereals make the largest contribution to energy intake, followed by sweets and meat. The detailed results used to create this visualization (as presented in **Annex 3**) show that cereals contribute 37 percent to the energy intake of adolescent girls, while sweets and meat contribute 14 percent and 8 percent respectively.

In addition to providing descriptive information on the dietary patterns and consumption of food groups for the demographic group represented, this data visualization is useful for identifying the potential overconsumption of unhealthy food groups. For example, it is apparent from Figure A that the contribution of sweets and savoury snacks to overall energy intake is relatively high among adolescent girls of this age group in rural Mexico. High-level descriptive results of this kind can provide useful information for identifying potentially problematic dietary patterns, and indicate areas that may require programmatic and/or policy action.

Figure A
Contribution to energy intake by food group
Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: F = fish. N = non-disaggregated composite dishes. Data is for rural girls aged 10–13 years in Mexico in 2012.

Micronutrient intake adequacy

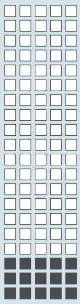
Sample visualizations relating to micronutrient adequacy are depicted in Figures B1–E1. The different letters symbolize different types of visualizations. The number refers to the nutrient, which in this sample visualization refers to calcium (number 1). All of the visualizations for all nutrients are found in Section 3.2. For example, Figures B1–B6 in Section 3.2 address one type of data visualization across six different micronutrients.

Prevalence of micronutrient intake adequacy

Figure B1 serves as a sample visualization for Figures B1–B6 in Section 3.2, each of which depicts the proportion of the population with intake of a given micronutrient at or above the average nutrient requirement for that demographic group. This type of visualization has 100 boxes. The number of filled boxes denotes the percentage of the population with adequate intakes (consuming at or above the average requirement for the given demographic group), while the number of clear boxes denotes the percentage with inadequate intakes (consuming below the average requirement). As such, we can see from Figure B1 that only 15 percent of adolescent girls in rural Mexico have adequate calcium intake.

Figure B1
Prevalence of micronutrient intake adequacy

Percentage with intakes at or above the average requirement.



NOTE: Data is for calcium intake of rural girls aged 10–13 years in Mexico in 2012.

These visualizations are useful to clearly identify nutrients of concern for particular demographic groups, and are therefore crucial to developing interventions that are relevant and tailored to those groups in most need. Moreover, when data are analysed by geographic region or rural/urban residence, different nutrient gaps may be revealed, providing additional information for more targeted interventions. When used over time, these visualizations can also show the impact of different interventions on micronutrient intake adequacy.

Extent of the micronutrient intake gap

Figure C1 serves as a sample visualization for Figures C1–C6 in Section 3.2, each of which depicts the micronutrient intake gap for a given micronutrient, or the difference between the actual median intake and the estimated target median intake needed to achieve a very high prevalence of adequacy. The visualization shows the actual median intake as a filled box and the gap as a clear box.

Figure C1
Extent of the micronutrient intake gap

Difference between the actual median micronutrient intake and the estimated target median intake needed to achieve a very high prevalence of adequacy

NOTE: Data is for calcium intake of rural girls aged 10–13 years in Mexico in 2012.

For adolescent girls in rural Mexico, Figure C1 therefore reflects an actual median intake of calcium of 773 mg, against an estimated target median intake of 1501 mg, for a gap of 728 mg. The figure gives a rough idea of the difference: the white box appears similar in size to the black box — meaning that the median calcium intake among rural adolescent girls would need to nearly double to ensure that almost all of them consume adequate calcium.

These visualizations can prove useful in designing interventions, as the information they provide can help programmers and policy makers to determine whether a gap may be filled by a food-based intervention, or if supplementation or fortification may be necessary.

Contribution to micronutrient intake by food group

Figure D1 serves as a sample visualization for Figures D1–D6 in Section 3.2, each of which depicts the mean proportional contribution of each different FAO/WHO GIFT food group to the total intake for a given micronutrient. The proportions are indicated visually by the relative size of the boxes, with the highest to lowest proportion shown from the top left to bottom right.

Figure D1 therefore shows that cereals and milk provide the highest proportions of calcium intake in the diets of adolescent girls in rural Mexico. These two food groups provide more than half of the total calcium intake.

These visualizations are useful in obtaining a quick picture of the food groups that contribute to the majority of micronutrient intake. Further investigation (for example, into which foods are consumed, their amounts and their nutrient content) may then be used to inform food-based interventions.

Contribution to micronutrient intake by individual food

Figure E1 serves as a sample visualization for Figures E1–E6 in Section 3.2, each of which illustrates the mean proportional contributions of individual foods to the total intake for a given micronutrient. These visualizations focus on the individual foods (as opposed to food groups, as addressed in Figures D1–D6) that provide the most micronutrients, and show the top eight foods by proportional contribution in each case. The proportions are indicated visually by the relative size of the circle for each food.

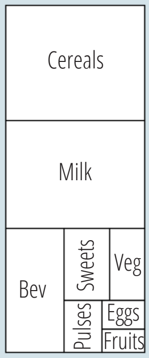
As such, Figure E1 shows that among individual foods, maize tortillas and milk provide the highest proportions of calcium to the diets of adolescent girls in rural Mexico. The detailed results used to create this visualization (as presented in **Annex 3**) show that maize tortillas and milk contribute 27 percent and 18 percent, respectively, to the total calcium intake of adolescent girls.

These visualizations are useful in identifying the foods or beverages that supply the greatest amounts of a given micronutrient, which can in turn inform food-based interventions. For example, milk may be a focus food for a programme to encourage adolescent girls to increase their intake of calcium (along with other micronutrients such as vitamins A and B12, as illustrated in Section 3.2). In addition, these visualizations may be used to monitor intake and interventions over time.

Figure D1

Contribution to micronutrient intake by food group

Mean proportion of total micronutrient intake by FAO/WHO GIFT food groups

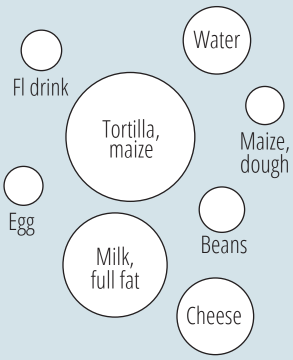


NOTES: Bev = beverages. Veg = vegetables. Data is for calcium intake of rural girls aged 10–13 years in Mexico in 2012.

Figure E1

Contribution to micronutrient intake by individual food

Mean proportion of total micronutrient intake by individual food

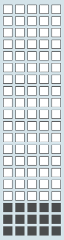


NOTES: Fl drink = water-based flavoured drink. Data is for calcium intake of rural girls aged 10–13 years in Mexico in 2012.

Figure F1

Percentage meeting the dietary recommendation

Percentage consuming no more than the recommended amount of sugar-sweetened beverages (3% of total energy intake)

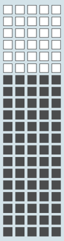


NOTE: Data is for rural girls aged 10–13 years in Mexico in 2012.

Figure F2

Percentage meeting the dietary recommendation

Percentage consuming no more than the recommended amount of saturated fat (10% of total energy intake)

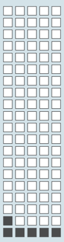


NOTE: Data is for rural girls aged 10–13 years in Mexico in 2012.

Figure F3

Percentage meeting the dietary recommendation

Percentage consuming at or above the recommended amount of fruits and vegetables (400 g for adults or 360 g for adolescents)



NOTE: Data is for rural girls aged 10–13 years in Mexico in 2012.

Dietary intakes related to non-communicable disease risk

There are two sets or types of visualizations (Figures F1–F3 and Figures G1–G3) that present information on dietary intakes that may indicate a potential population risk for NCD-related outcomes. Figures F1–F3 reflect the extent to which dietary intakes meet a given dietary recommendation for a food group or nutrient associated with NCD risk, and Figures G1–G3 reflect intake provided by individual foods. The two types of visualization are shown in parallel in Section 3.2 (i.e. Figure F1 is shown alongside Figure G1; Figure F2 is shown with Figure G2; and Figure F3 is shown with Figure G3), and are discussed in further detail below.

Percentage meeting dietary recommendations

Figures F1–F3 depict the proportion of the population with intakes that meet a given dietary recommendation for a food group or nutrient that is associated with NCD risk. As with Figures B1–B6, this type of visualization has 100 boxes. The number of filled boxes reflects the percentage of the population whose intakes meet the recommended level, while the number of clear boxes reflects the percentage whose intakes do not meet the dietary recommendation.

Figure F1 reflects the percentage of the population that meets the dietary recommendation for sugar-sweetened beverages (SSBs). The recommendation indicates that SSBs should provide no more than 3 percent of total energy intake, and applies to all age groups (AHA, 2014). As seen in the sample visualization (Figure F1), only 15 percent of adolescent girls in rural Mexico meet this recommendation. In other words, 85 percent of this demographic consumes SSBs at levels that exceed the recommended dietary threshold.

Figure F2 shows the percentage of the population that meets the dietary recommendation for saturated fat. This recommendation, as set by the World Health Organization (WHO), indicates that saturated fats should provide no more than 10 percent of total energy intake, as excess intake of saturated fat is associated with cardiovascular disease (WHO, 2020). As seen in the sample visualization (Figure F2), 70 percent of adolescent girls in rural Mexico meet this recommendation (i.e. get 10 percent or less of their total energy intake from saturated fat).

Figure F3 illustrates the percentage that meets the dietary recommendation for fruits and vegetables. For adults, the recommendation is to consume at least 400 g of fruits and vegetables per day for NCD risk reduction (WHO, 2020), but the threshold was adjusted to 360 g per day for adolescents, as they consume less food and energy on average than adults (see **Annex 2**). As seen in the visualization (Figure F3) only 6 percent of adolescent girls in rural Mexico meet this recommendation (i.e. consume 360 g or more of fruits and vegetables).

This set of visualizations allows for the clear identification of demographic groups that do not meet recommendations for foods and nutrients of concern for NCD risk. This information is valuable for targeting interventions to reduce consumption (of SSB or saturated fat) or encourage consumption (of fruits and vegetables). Visualizations of this kind can also be used to show the impact of interventions over time.

Contribution to intake by individual food

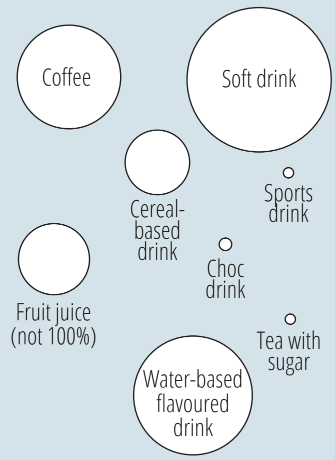
Figures G1–G3 show the mean proportion of total intake provided by individual food (or beverage). This visualization is provided for each dietary recommendation of focus in Figures F1–F3; i.e. to show the mean proportion of total SSB energy intake by individual beverage, the mean proportion of total saturated fat intake (in energy) by individual food or beverage, and the mean proportion of total fruit and vegetable intake (in grams) by individual fruit or vegetable. Each figure features eight circles, representing the top eight foods or beverages by contribution to intake. The relative size of each circle indicates the proportional contribution of the given food or beverage to the total intake of that food, beverage, or nutrient.

The sample visualization (**Figure G1**) reflects the contribution of individual beverages to total energy intake from SSBs among adolescent girls in rural Mexico. It shows that the SSBs providing the most energy to the diets of this demographic group are soft drinks and water-based flavoured drinks (with added sugar), at proportions of 40 percent and 27 percent (of total energy from SSBs) respectively.

These visualizations are useful in identifying the foods or beverages whose consumption should be discouraged (i.e. with regard to SSBs and saturated fat) or encouraged (i.e. with regard to fruits and vegetables) in the context of NCD risk. For example, the Mexican Government taxed non-essential energy-dense foods (including salty snacks, pastries, frozen desserts and SSBs) as a public health intervention in 2014, and evidence has shown its effect on reduced purchases (Batis *et al.*, 2016).

Figure G1
Contribution to intake by individual food

Mean proportion of total SSB intake by individual food or beverage



NOTES: Choc drink = chocolate flavoured drink. Data is for rural girls aged 10–13 years in Mexico in 2012.

Section 3.2. Full set of data visualizations

The data visualizations presented in this section provide an overview of dietary intake across the following four demographic groups of the Mexican population: girls aged 10–13 years, boys aged 10–13 years, non-pregnant and non-lactating (NPNL) women aged 19–50 years, and men aged 19–50 years. Results for each demographic group are also broken down by rural/urban residence. Reporting results by demographic group is important for meaningful interpretation of dietary data, as children and adults have different nutrient requirements and consume different amounts of food. Similarly, rural/urban residence is one of the key factors by which diets are likely to differ, due to differences in availability and access to foods, food preparation and eating behaviours. Data presented in aggregate can therefore obscure important findings.

Although the data illustrated in these visualizations are specific to Mexico, the visualizations themselves are easily adapted and applied to any population-level dietary dataset.[20] Programmers and policy makers can quickly ascertain which aspects of the diet are insufficient or in excess and by how much, and which foods or food groups contribute to the intakes.

For example, considering the indicators for rural adolescent girls, an intervention to encourage the intake of milk could potentially improve intakes of calcium, vitamin A and vitamin B_{12}. More specifically, reduced-fat milk may be indicated for some segments of the population, in order to reduce the intake of saturated fat. Examining visualizations for urban populations may determine that they require different interventions than those required for rural populations. While further in-depth analyses of quantitative dietary data may be necessary for decision making, these visualizations can serve as a valuable first step in capturing the attention of the target audiences and stakeholders who can demand impactful changes.[21]

[20] Additional visualizations based on quantitative dietary data can be found on the FAO/WHO GIFT platform.

[21] Although data visualizations related to agriculture, food safety, or environmental impact are not presented in this report, dietary data can be used to inform programmes and policies related to these sectors as well. Data visualizations could similarly be designed to summarize descriptive analyses and informative indicators for these sectors.

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DATA VISUALIZATIONS

Rural girls aged 10–13 years

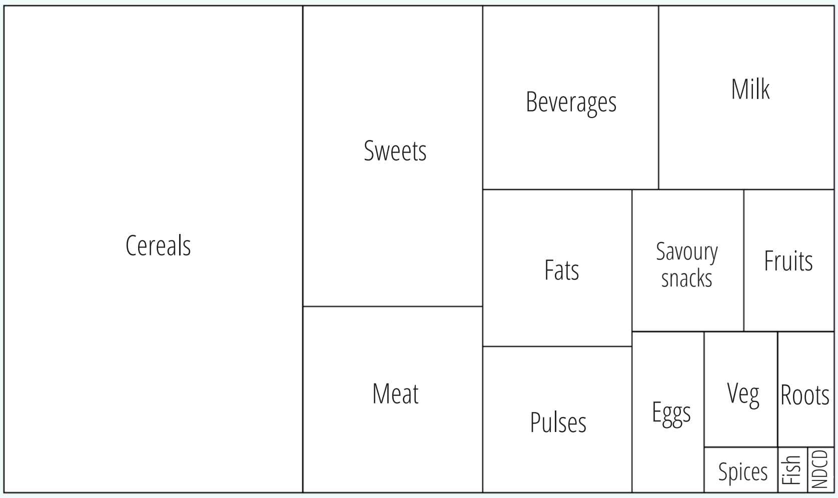
Mexico 2012

Overall diet

Figure A

Contribution to energy intake by food group

Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: NDCD = non-disaggregated composite dishes. Veg = vegetables.

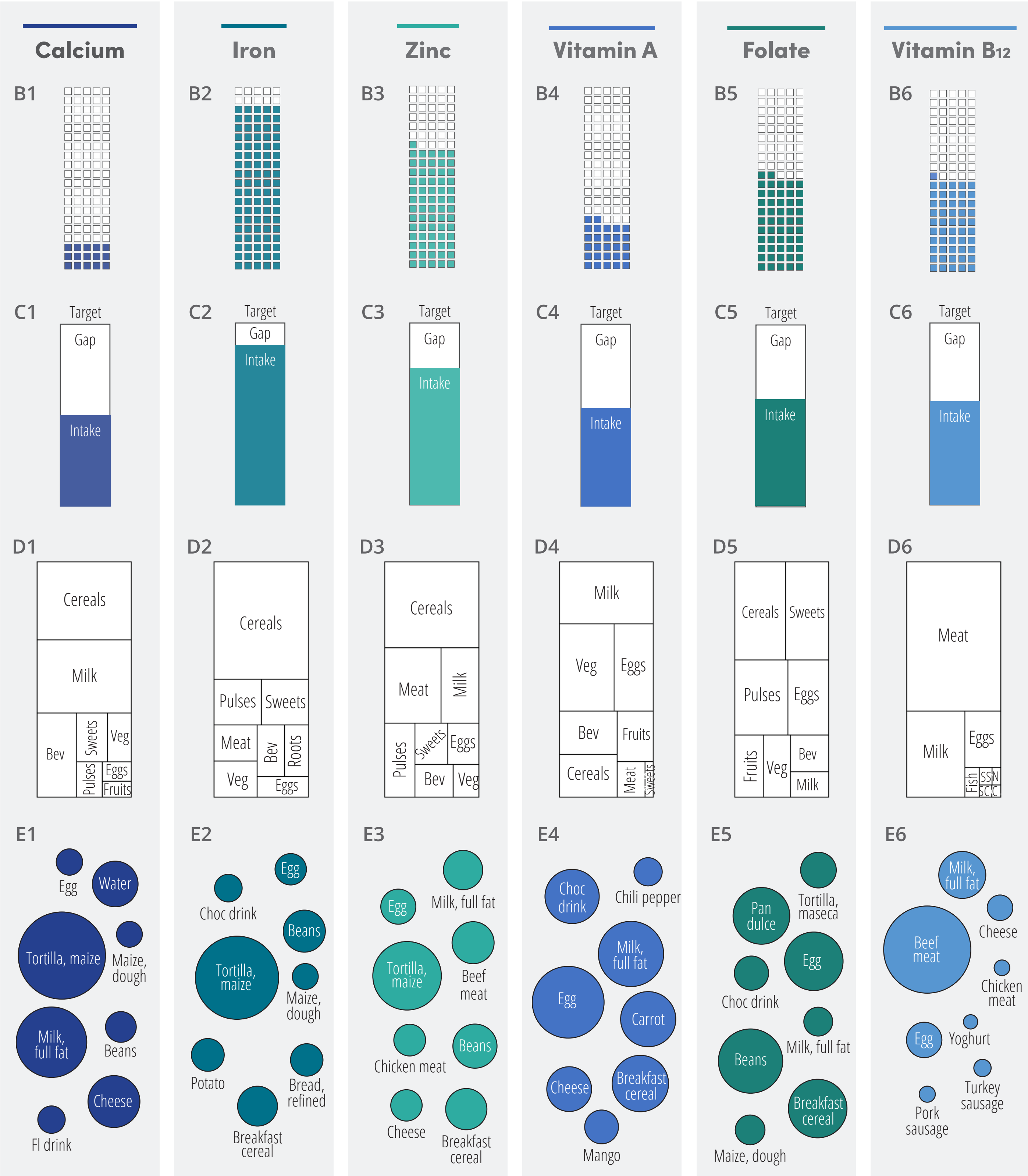
RURAL GIRLS AGED 10–13 YEARS

Micronutrient intake adequacy

Mexico 2012

Figures

B1–B6 Prevalence of micronutrient intake adequacy
C1–C6 Extent of the micronutrient intake gap
D1–D6 Contribution to micronutrient intake by food group
E1–E6 Contribution to micronutrient intake by individual food



NOTES: Bev = beverages. C = cereals. Choc drink = chocolate drink, fortified. Fl drink = water-based flavoured drink. N = non-disaggregated composite dishes. SC = spices and condiments. SS = savoury snacks. Veg = vegetables.

RURAL GIRLS AGED 10–13 YEARS

Dietary intakes related to non-communicable disease risk

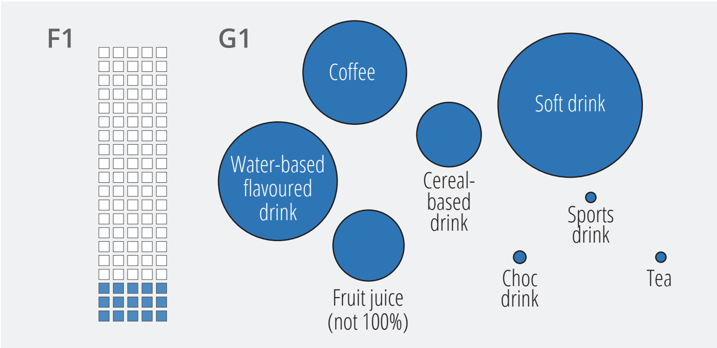
Mexico 2012

Figures

F1–F3 Percentage meeting the dietary recommendation
G1–G3 Contribution to intake by individual food

Sugar-sweetened beverages (SSBs)

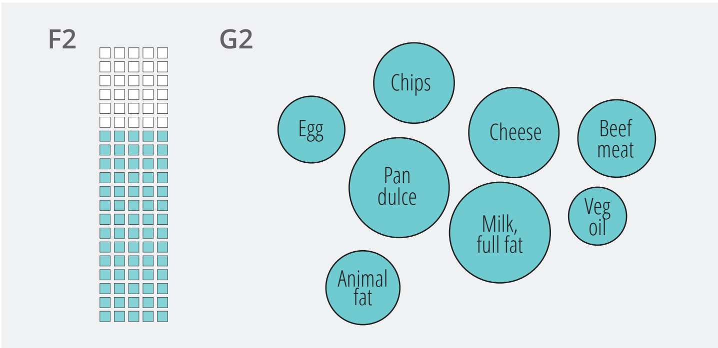
F1 Dietary recommendation: 3% or less of total energy intake from SSBs
G1 Contribution to total SSB energy intake by individual SSBs



NOTE: Choc drink = chocolate flavoured drink.

Saturated fat

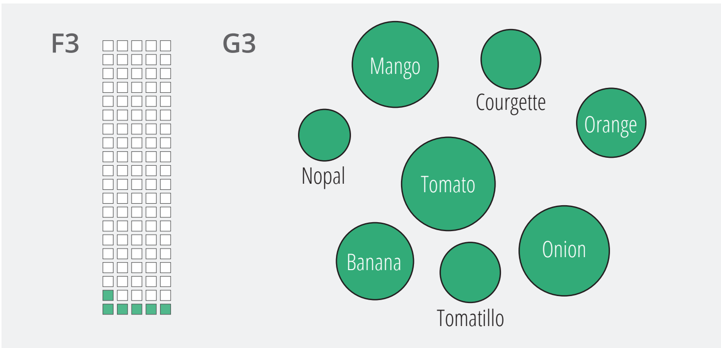
F2 Dietary recommendation: 10% or less of energy intake from saturated fat
G2 Contribution to total saturated fat intake by individual food or beverage



NOTE: Veg oil = vegetable oil.

Fruits and vegetables

F3 Dietary recommendation: 360 g or more of fruits and vegetables
G3 Contribution to total fruit and vegetable intake by indiviudal fruit and vegetable



DATA VISUALIZATIONS

Urban girls aged 10–13 years

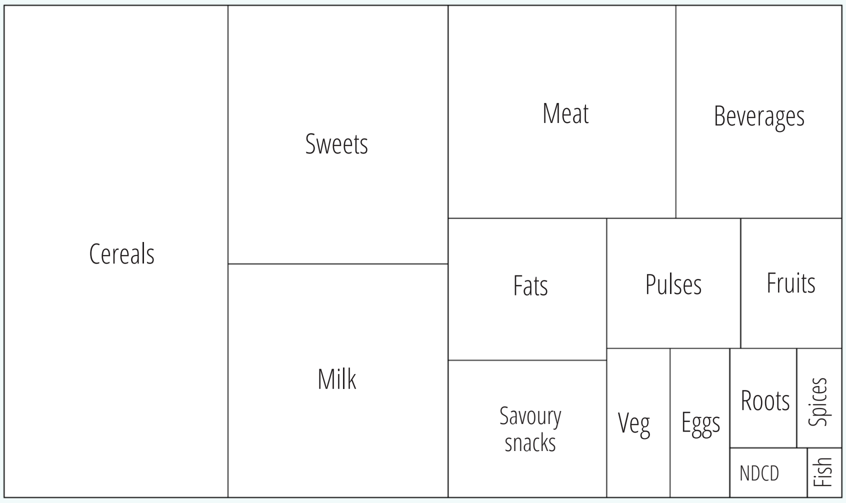
Mexico 2012

Overall diet

Figure A

Contribution to energy intake by food group

Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: NDCD = non-disaggregated composite dishes. Veg = vegetables.

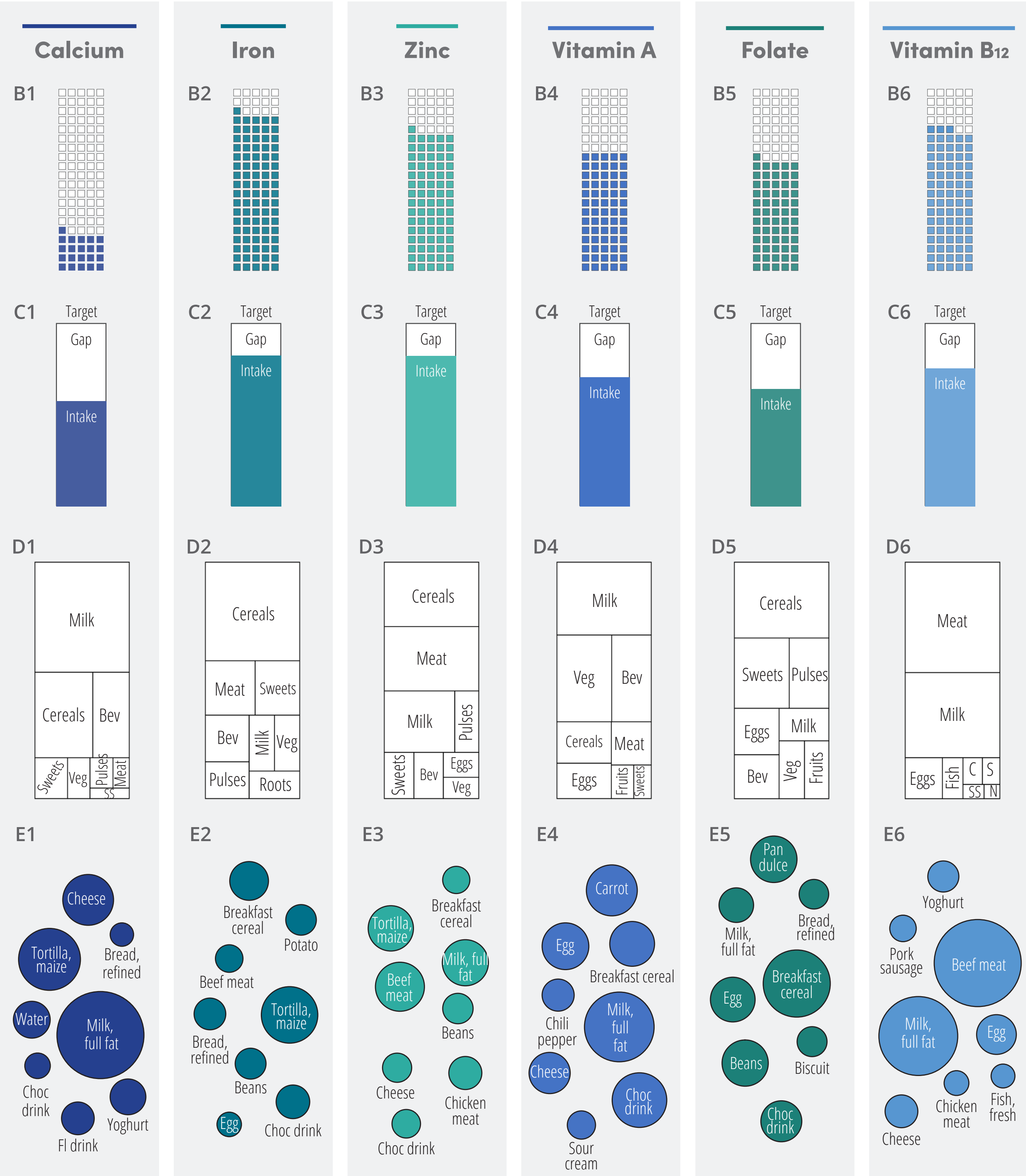
URBAN GIRLS AGED 10–13 YEARS

Micronutrient intake adequacy

Mexico 2012

Figures

B1–B6 Prevalence of micronutrient intake adequacy
C1–C6 Extent of the micronutrient intake gap
D1–D6 Contribution to micronutrient intake by food group
E1–E6 Contribution to micronutrient intake by individual food



NOTES: Bev = beverages. C = cereals. Choc drink = chocolate drink, fortified. Fl drink = water-based flavoured drink. N = non-disaggregated composite dishes. S = sweets. SS = savoury snacks. Veg = vegetables.

URBAN GIRLS AGED 10–13 YEARS

Dietary intakes related to non-communicable disease risk

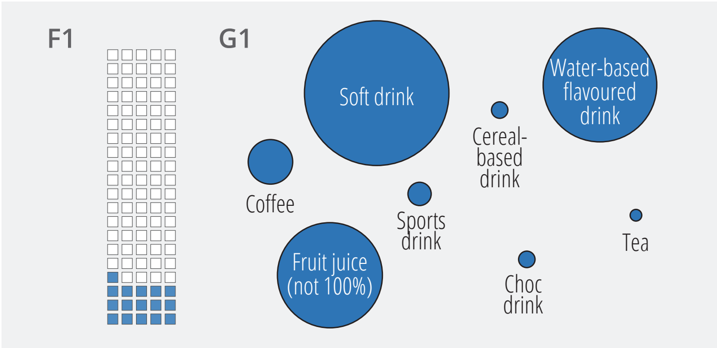
Mexico 2012

Figures

F1–F3 Percentage meeting the dietary recommendation
G1–G3 Contribution to intake by individual food

Sugar-sweetened beverages (SSBs)

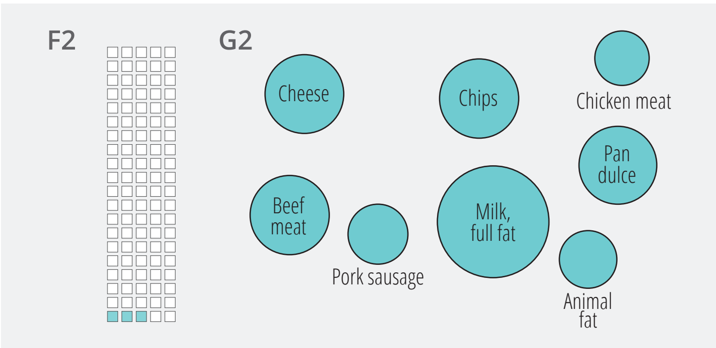
F1 Dietary recommendation: 3% or less of total energy intake from SSBs
G1 Contribution to total SSB energy intake by individual SSBs



NOTE: Choc drink = chocolate flavoured drink.

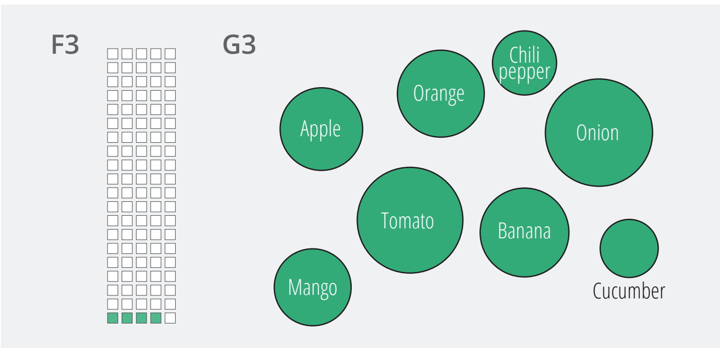
Saturated fat

F2 Dietary recommendation: 10% or less of energy intake from saturated fat
G2 Contribution to total saturated fat intake by individual food or beverage



Fruits and vegetables

F3 Dietary recommendation: 360 g or more of fruits and vegetables
G3 Contribution to total fruit and vegetable intake by indiviudal fruit and vegetable



DATA VISUALIZATIONS

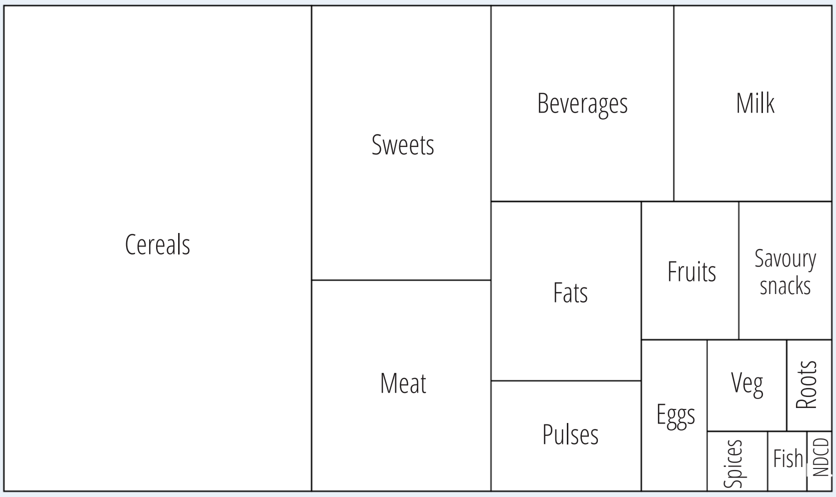
Rural boys aged 10–13 years

Mexico 2012

Overall diet

Figure A
Contribution to energy intake by food group

Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: NDCD = non-disaggregated composite dishes. Veg = vegetables.

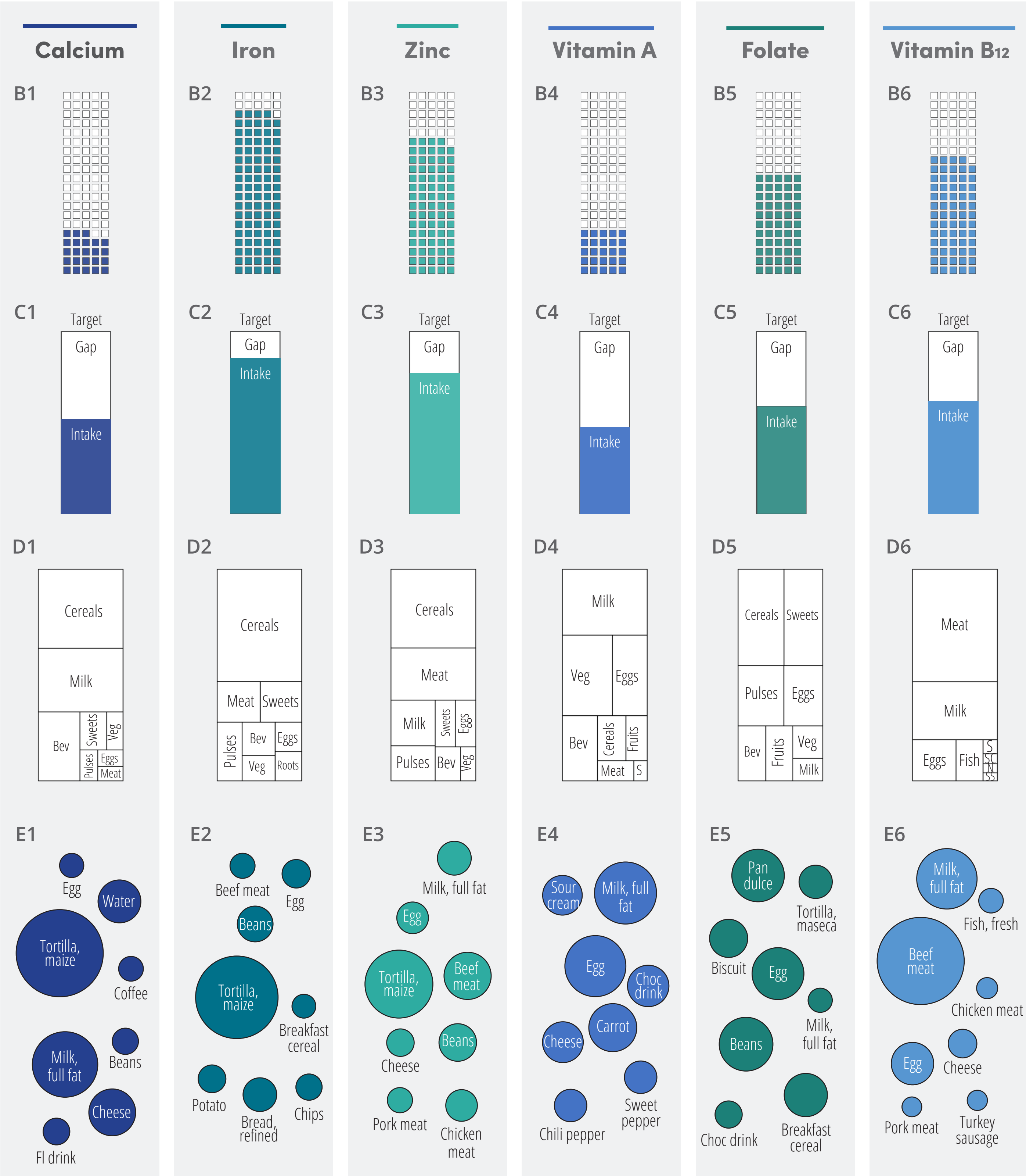
RURAL BOYS AGED 10–13 YEARS

Micronutrient intake adequacy

Mexico 2012

Figures

B1–B6 Prevalence of micronutrient intake adequacy
C1–C6 Extent of the micronutrient intake gap
D1–D6 Contribution to micronutrient intake by food group
E1–E6 Contribution to micronutrient intake by individual food



NOTES: Bev = beverages. Choc drink = chocolate drink, fortified. Fl drink = water-based flavoured drink. N = non-disaggregated composite dishes. S = sweets. SC = spices and condiments. SS = savoury snacks. Veg = vegetables.

RURAL BOYS AGED 10–13 YEARS

Dietary intakes related to non-communicable disease risk

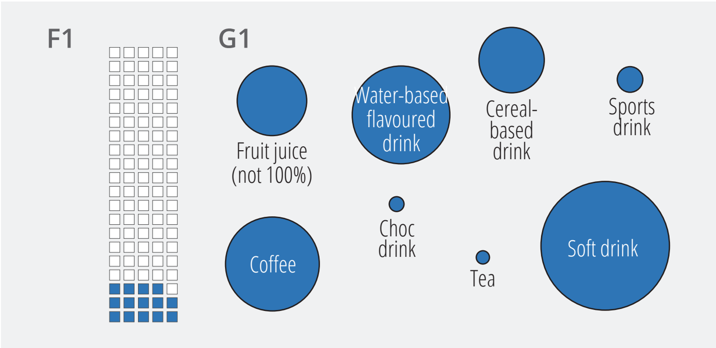
Mexico 2012

Figures

F1–F3 Percentage meeting the dietary recommendation
G1–G3 Contribution to intake by individual food

Sugar-sweetened beverages (SSBs)

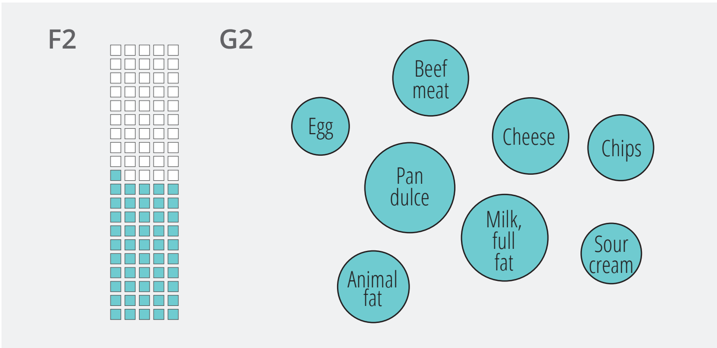
F1 Dietary recommendation: 3% or less of total energy intake from SSBs
G1 Contribution to total SSB energy intake by individual SSBs



NOTE: Choc drink = chocolate flavoured drink.

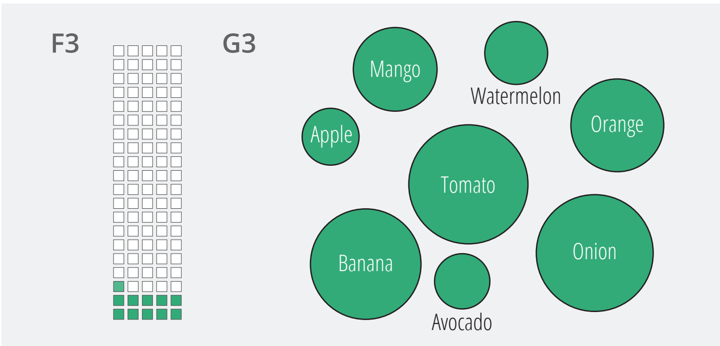
Saturated fat

F2 Dietary recommendation: 10% or less of energy intake from saturated fat
G2 Contribution to total saturated fat intake by individual food or beverage



Fruits and vegetables

F3 Dietary recommendation: 360 g or more of fruits and vegetables
G3 Contribution to total fruit and vegetable intake by individual fruit and vegetable



DATA VISUALIZATIONS

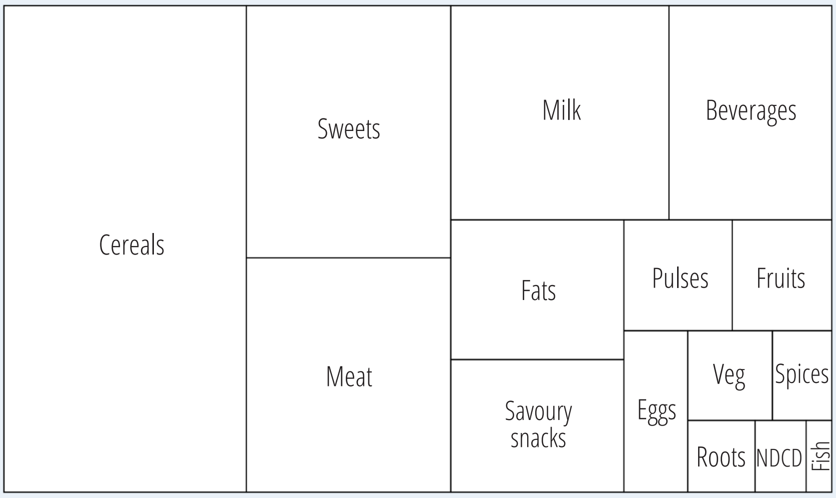
Urban boys aged 10–13 years

Mexico 2012

Overall diet

Figure A
Contribution to energy intake by food group

Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: NDCD = non-disaggregated composite dishes. Veg = vegetables.

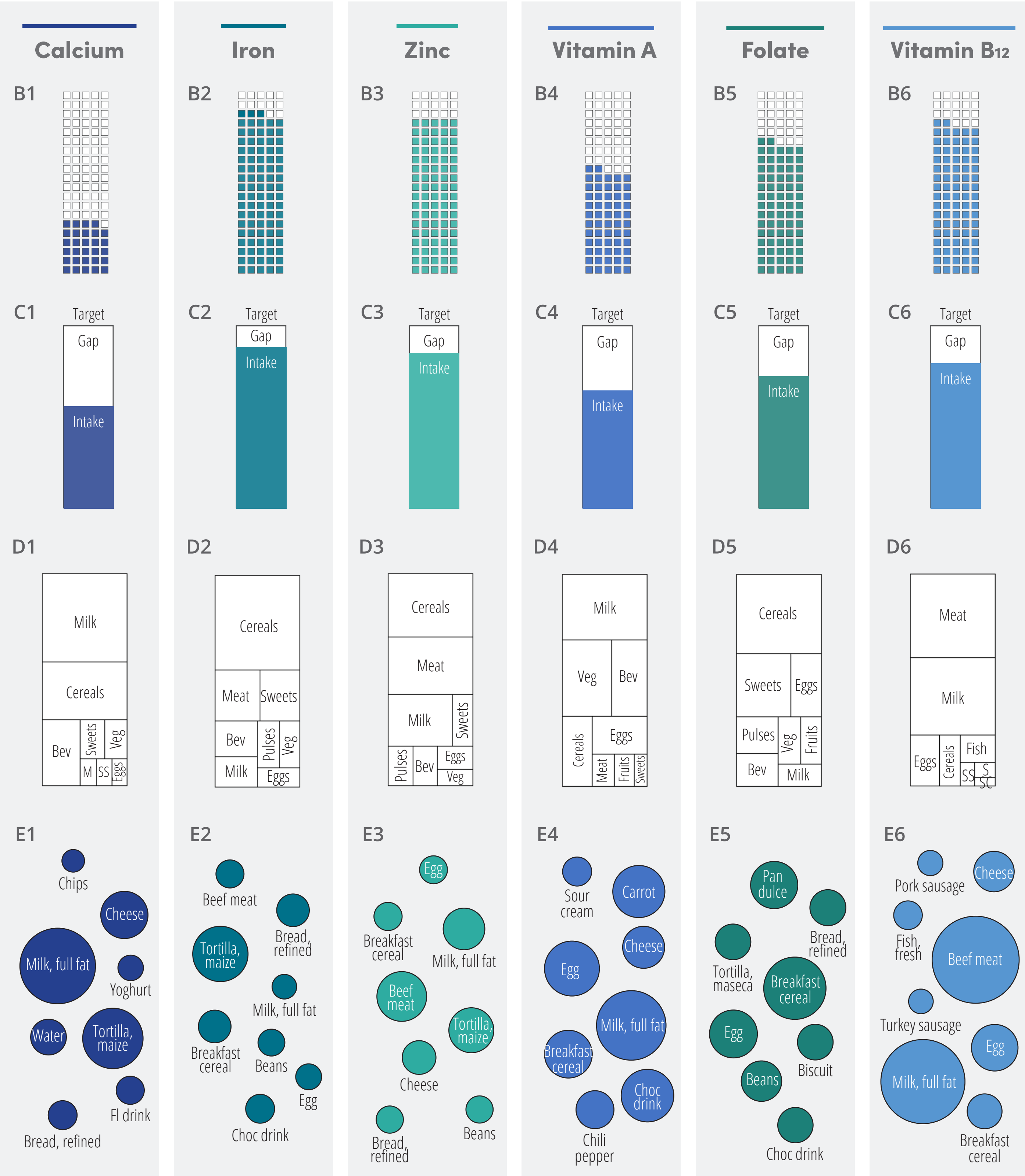
URBAN BOYS AGED 10–13 YEARS

Micronutrient intake adequacy

Mexico 2012

Figures

B1–B6 Prevalence of micronutrient intake adequacy
C1–C6 Extent of the micronutrient intake gap
D1–D6 Contribution to micronutrient intake by food group
E1–E6 Contribution to micronutrient intake by individual food



NOTES: Bev = beverages. Choc drink = chocolate drink, fortified. Fl drink = water-based flavoured drink. M = meat. N = non-disaggregated composite dishes. S = sweets. SC = spices and condiments. SS = savoury snacks. Veg = vegetables.

URBAN BOYS AGED 10–13 YEARS

Dietary intakes related to non-communicable disease risk

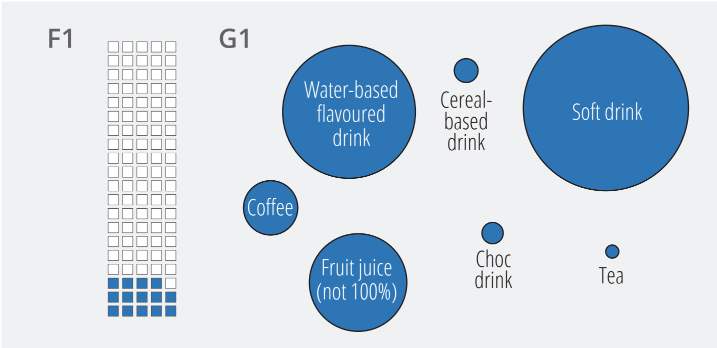
Mexico 2012

Figures

F1–F3 Percentage meeting the dietary recommendation
G1–G3 Contribution to intake by individual food

Sugar-sweetened beverages (SSBs)

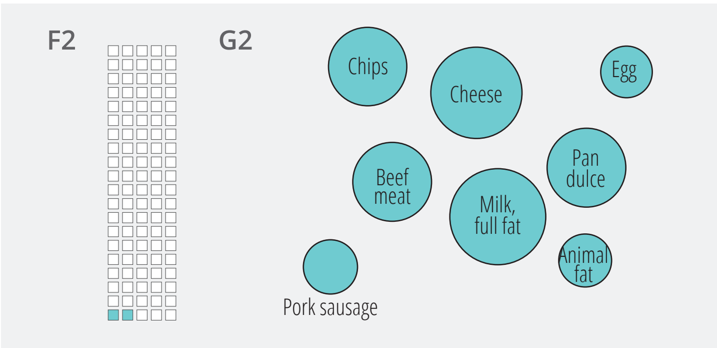
F1 Dietary recommendation: 3% or less of total energy intake from SSBs
G1 Contribution to total SSB energy intake by individual SSBs



NOTE: Choc drink = chocolate flavoured drink.

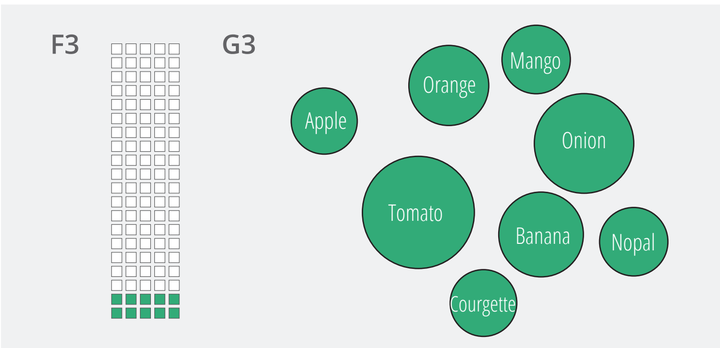
Saturated fat

F2 Dietary recommendation: 10% or less of energy intake from saturated fat
G2 Contribution to total saturated fat intake by individual food or beverage



Fruits and vegetables

F3 Dietary recommendation: 360 g or more of fruits and vegetables
G3 Contribution to total fruit and vegetable intake by individual fruit and vegetable



DATA VISUALIZATIONS

Rural non-pregnant, non-lactating women aged 19–50 years

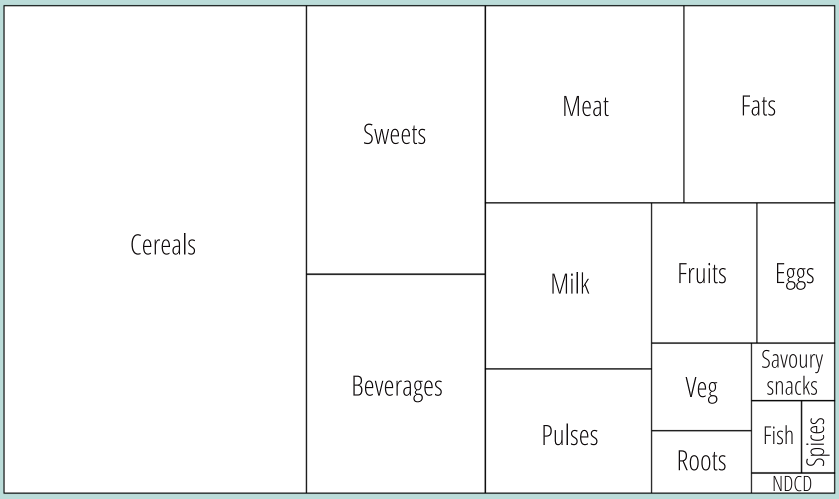
Mexico 2012

Overall diet

Figure A

Contribution to energy intake by food group

Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: NDCD = non-disaggregated composite dishes. Veg = vegetables.

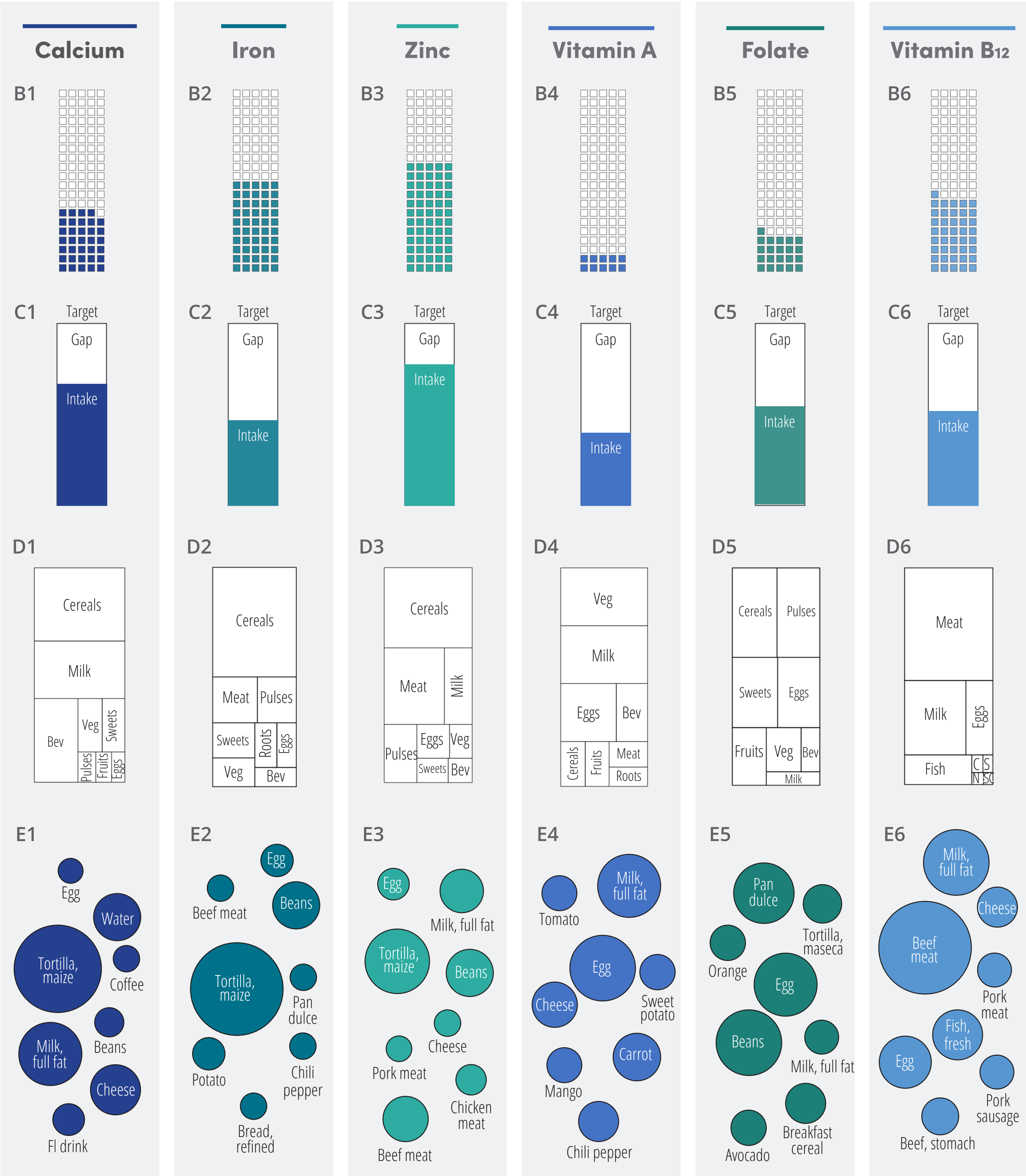
RURAL NON-PREGNANT, NON-LACTATING WOMEN
AGED 19–50 YEARS

Micronutrient intake adequacy

Mexico 2012

Figures

B1–B6 Prevalence of micronutrient intake adequacy
C1–C6 Extent of the micronutrient intake gap
D1–D6 Contribution to micronutrient intake by food group
E1–E6 Contribution to micronutrient intake by individual food



NOTES: Bev = beverages. C = cereals. Fl drink = water-based flavoured drink. N = non-disaggregated composite dishes. S = sweets. SC = spices and condiments. Veg = vegetables

RURAL NON-PREGNANT, NON-LACTATING WOMEN
AGED 19–50 YEARS

Dietary intakes related to non-communicable disease risk

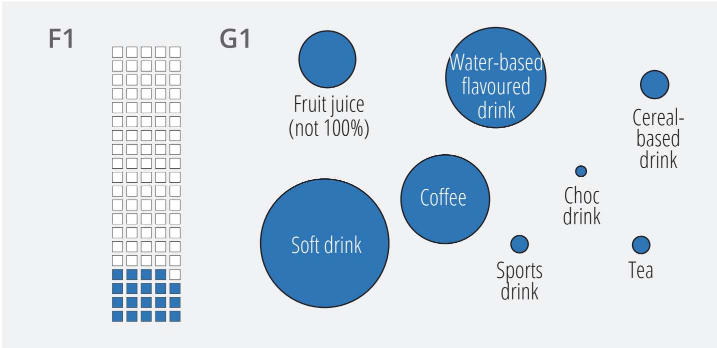
Mexico 2012

Figures

F1–F3 Percentage meeting the dietary recommendation
G1–G3 Contribution to intake by individual food

Sugar-sweetened beverages (SSBs)

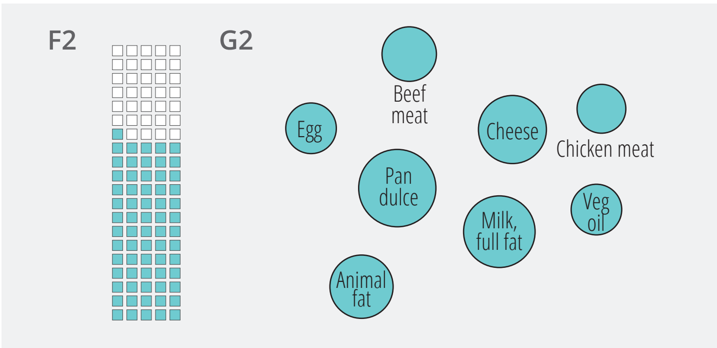
F1 Dietary recommendation: 3% or less of total energy intake from SSBs
G1 Contribution to total SSB energy intake by individual SSBs



NOTE: Choc drink = chocolate flavoured drink.

Saturated fat

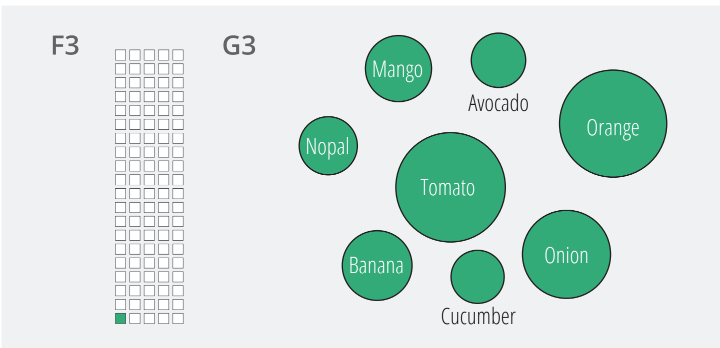
F2 Dietary recommendation: 10% or less of energy intake from saturated fat
G2 Contribution to total saturated fat intake by individual food or beverage



NOTE: Veg oil = vegetable oil.

Fruits and vegetables

F3 Dietary recommendation: 400 g or more of fruits and vegetables
G3 Contribution to total fruit and vegetable intake by individual fruit and vegetable



DATA VISUALIZATIONS

Urban non-pregnant, non-lactating women aged 19–50 years

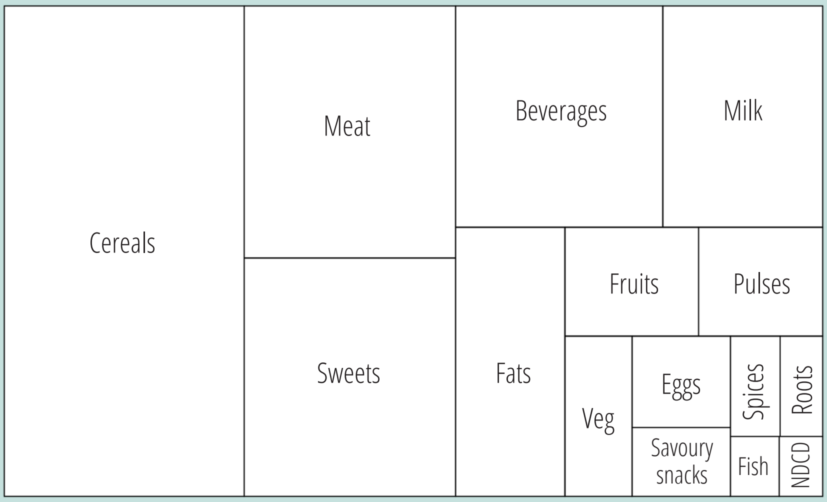
Mexico 2012

Overall diet

Figure A

Contribution to energy intake by food group

Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: NDCD = non-disaggregated composite dishes. Veg = vegetables.

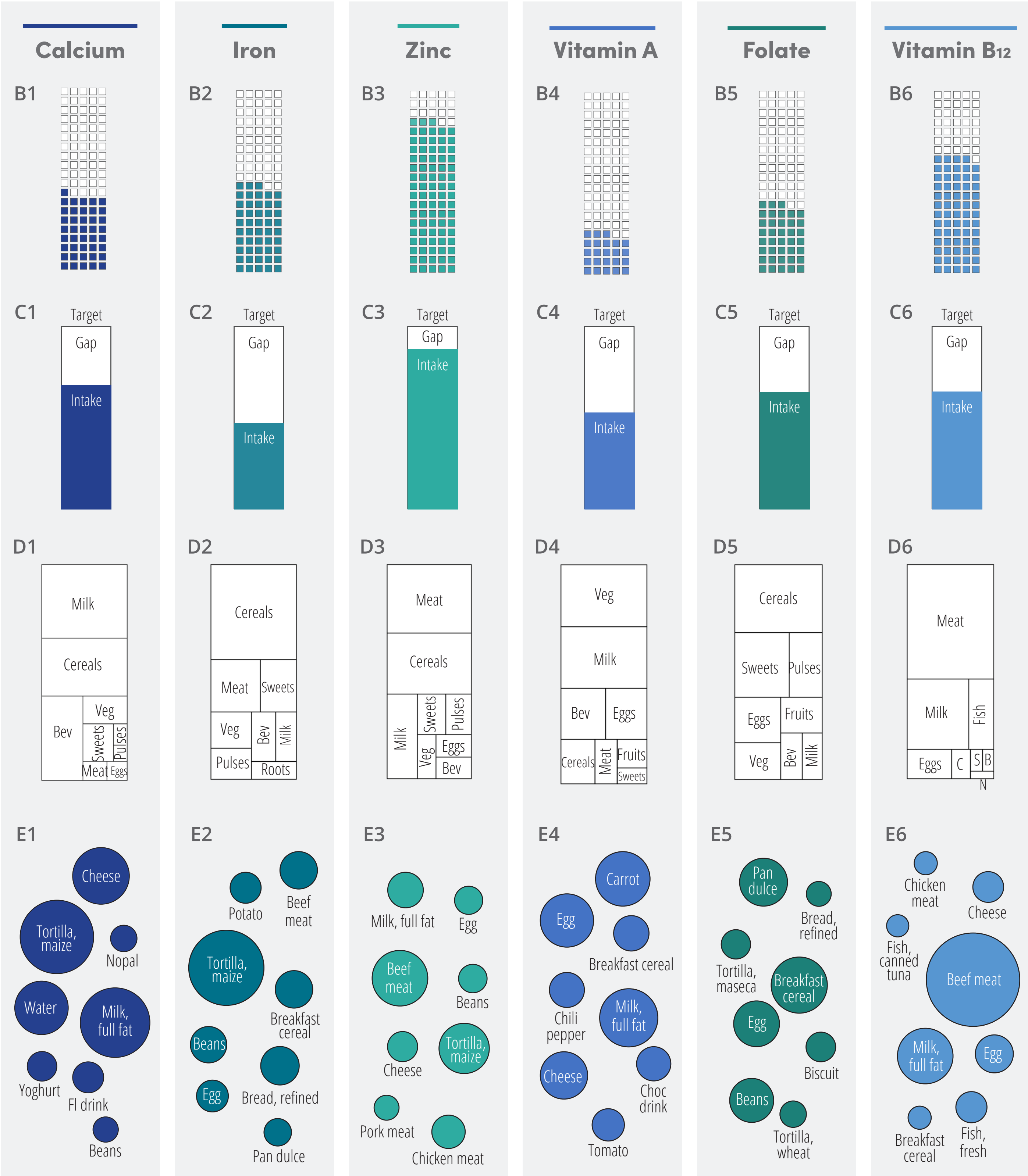
URBAN NON-PREGNANT, NON-LACTATING WOMEN
AGED 19–50 YEARS

Micronutrient intake adequacy

Mexico 2012

Figures

B1–B6 Prevalence of micronutrient intake adequacy
C1–C6 Extent of the micronutrient intake gap
D1–D6 Contribution to micronutrient intake by food group
E1–E6 Contribution to micronutrient intake by individual food



NOTES: B or Bev = beverages. C = cereals. Choc drink = chocolate drink, fortified. Fl drink = water-based flavoured drink. N = non-disaggregated composite dishes. S = sweets. Veg = vegetables.

Dietary intakes related to non-communicable disease risk

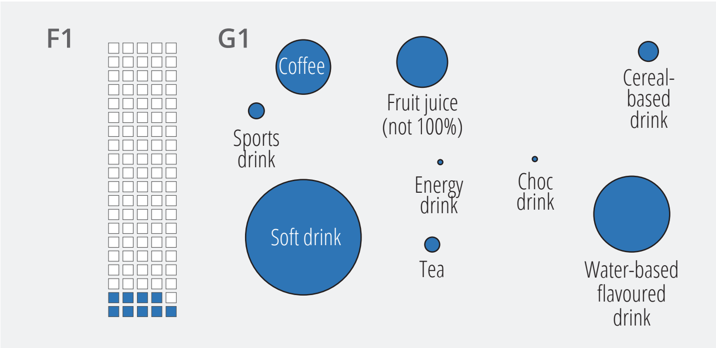
Mexico 2012

Figures

F1–F3 Percentage meeting the dietary recommendation
G1–G3 Contribution to intake by individual food

Sugar-sweetened beverages (SSBs)

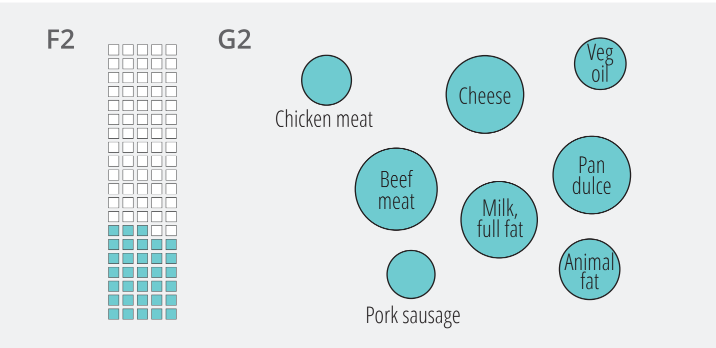
F1 Dietary recommendation: 3% or less of total energy intake from SSBs
G1 Contribution to total SSB energy intake by individual SSBs



NOTE: Choc drink = chocolate flavoured drink.

Saturated fat

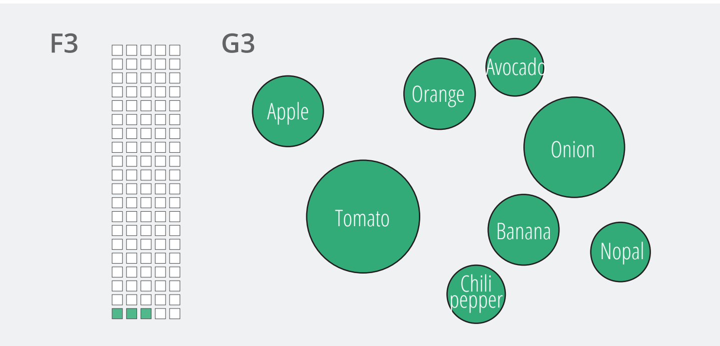
F2 Dietary recommendation: 10% or less of energy intake from saturated fat
G2 Contribution to total saturated fat intake by individual food or beverage



NOTE: Veg oil = vegetable oil.

Fruits and vegetables

F3 Dietary recommendation: 400 g or more of fruits and vegetables
G3 Contribution to total fruit and vegetable intake by individual fruit and vegetable



DATA VISUALIZATIONS

Rural men aged 19–50 years

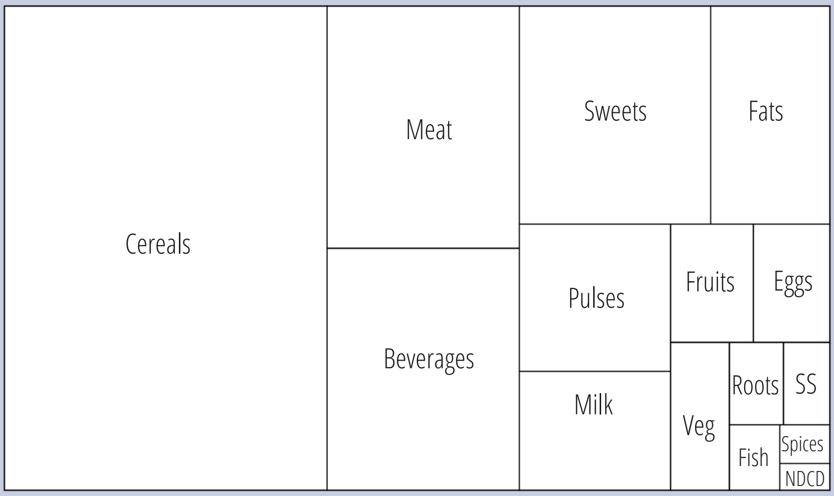
Mexico 2012

Overall diet

Figure A

Contribution to energy intake by food group

Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: NDCD = non-disaggregated composite dishes. SS = savoury snacks. Veg = vegetables.

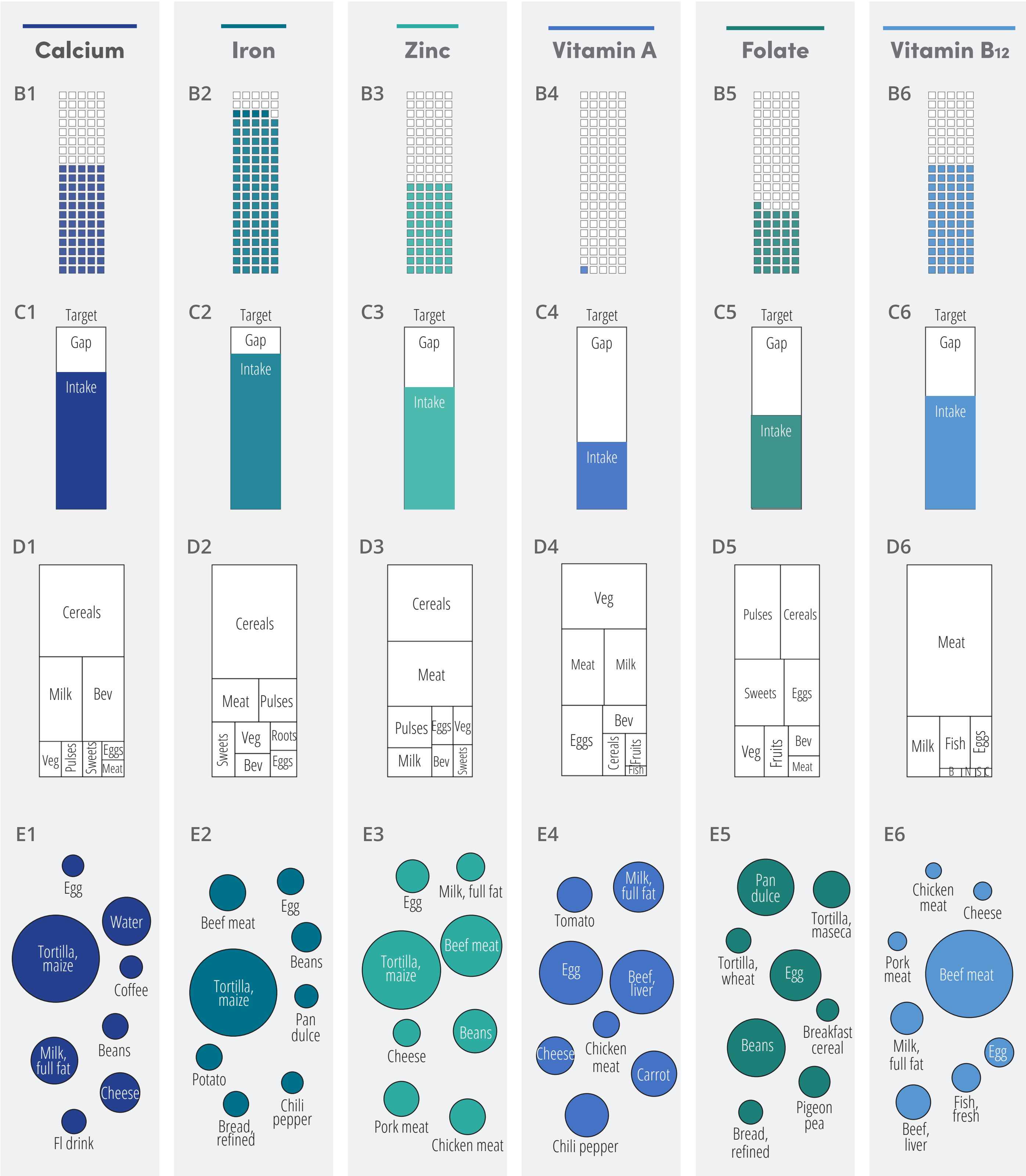
RURAL MEN AGED 19–50 YEARS

Micronutrient intake adequacy

Mexico 2012

Figures

B1–B6 Prevalence of micronutrient intake adequacy
C1–C6 Extent of the micronutrient intake gap
D1–D6 Contribution to micronutrient intake by food group
E1–E6 Contribution to micronutrient intake by individual food



NOTES: B or Bev = beverages. C = spices and condiments. Fl drink = water-based flavoured drink. N = non-disaggregated composite dishes. S = sweets. Veg = vegetables.

RURAL MEN AGED 19–50 YEARS

Dietary intakes related to non-communicable disease risk

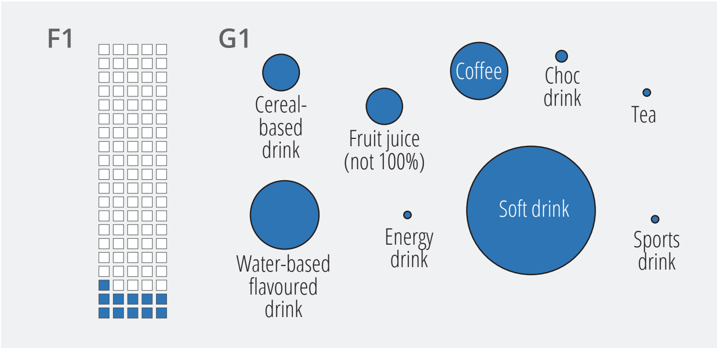
Mexico 2012

Figures

F1–F3 Percentage meeting the dietary recommendation
G1–G3 Contribution to intake by individual food

Sugar-sweetened beverages (SSBs)

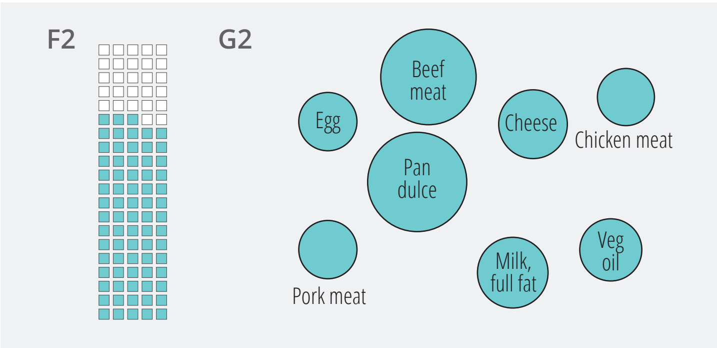
F1 Dietary recommendation: 3% or less of total energy intake from SSBs
G1 Contribution to total SSB energy intake by individual SSBs



NOTE: Choc drink = chocolate flavoured drink.

Saturated fat

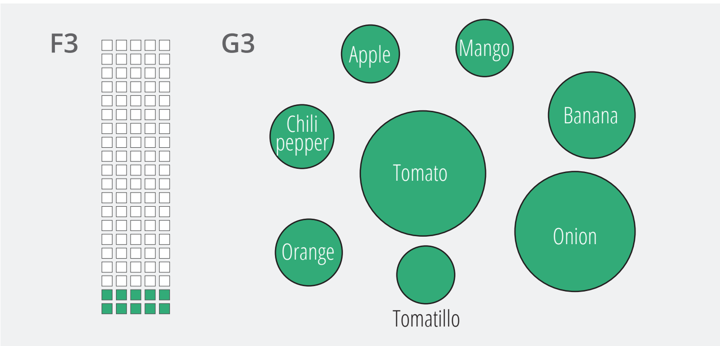
F2 Dietary recommendation: 10% or less of energy intake from saturated fat
G2 Contribution to total saturated fat intake by individual food or beverage



NOTE: Veg oil = vegetable oil.

Fruits and vegetables

F3 Dietary recommendation: 400 g or more of fruits and vegetables
G3 Contribution to total fruit and vegetable intake by individual fruit and vegetable



DATA VISUALIZATIONS

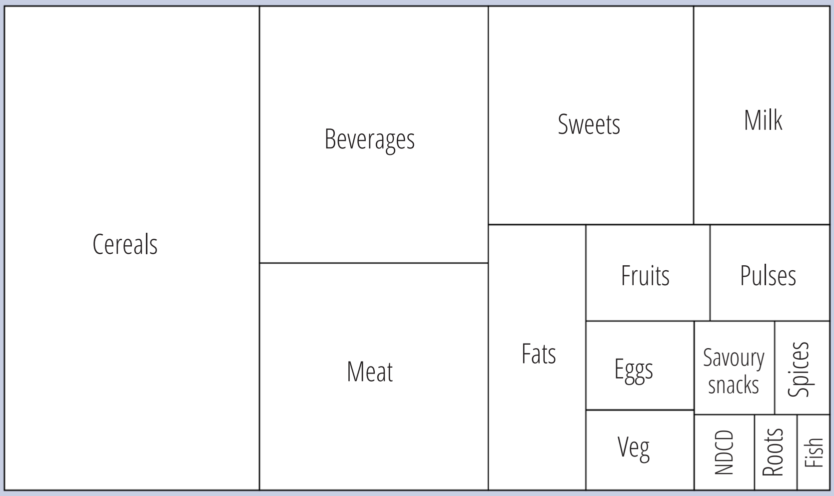
Urban men aged 19–50 years

Mexico 2012

Overall diet

Figure A
Contribution to energy intake by food group

Mean proportion of total energy intake by FAO/WHO GIFT food groups



NOTES: NDCD = non-disaggregated composite dishes. Veg = vegetables.

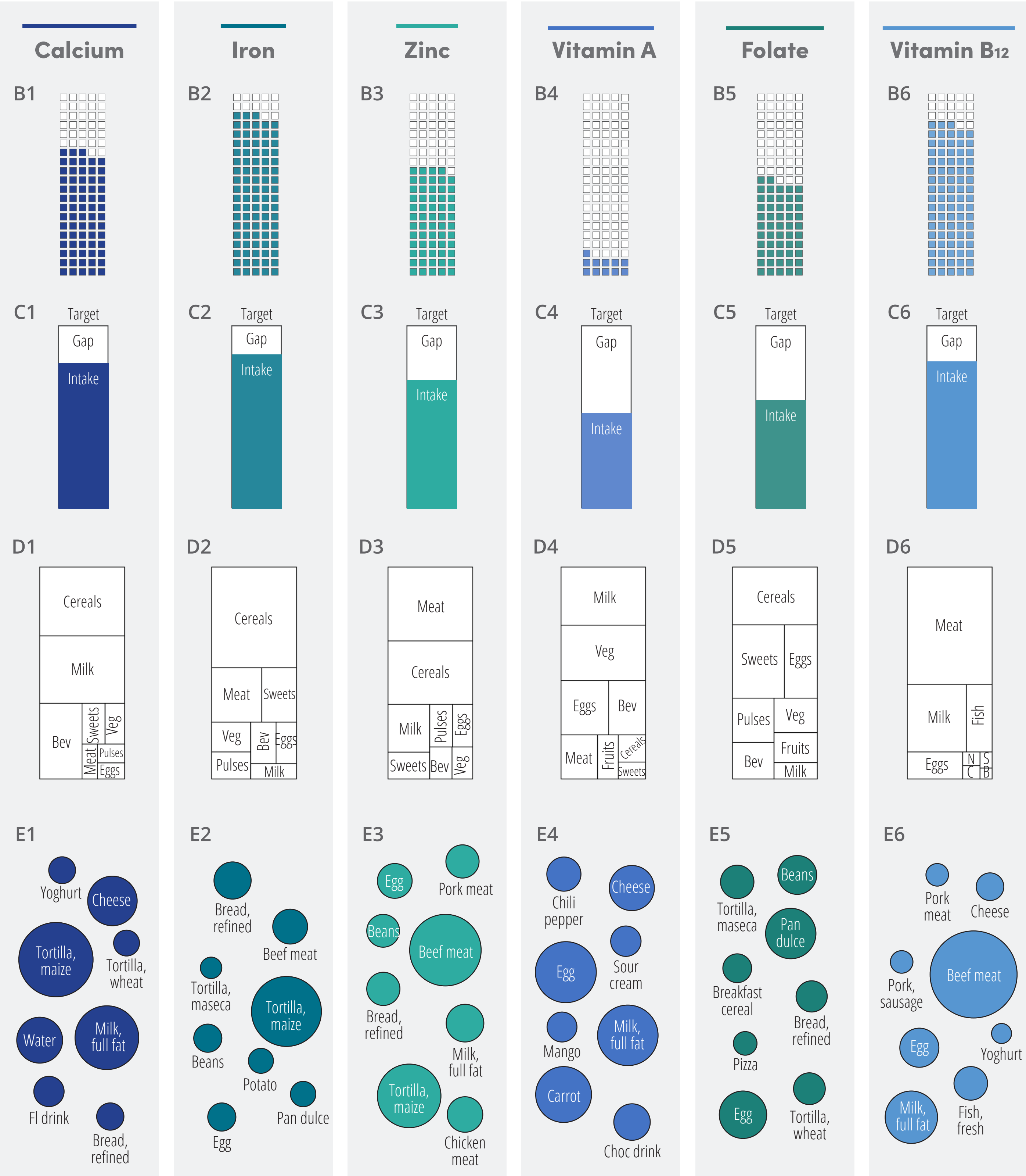
URBAN MEN AGED 19–50 YEARS

Micronutrient intake adequacy

Mexico 2012

Figures

B1–B6 Prevalence of micronutrient intake adequacy
C1–C6 Extent of the micronutrient intake gap
D1–D6 Contribution to micronutrient intake by food group
E1–E6 Contribution to micronutrient intake by individual food



NOTES: B or Bev = beverages. C = spices and condiments. Choc drink = chocolate drink, fortified. Fl drink = water-based flavoured drink. N = non-disaggregated composite dishes. S = sweets. Veg = vegetables.

URBAN MEN AGED 19–50 YEARS

Dietary intakes related to non-communicable disease risk

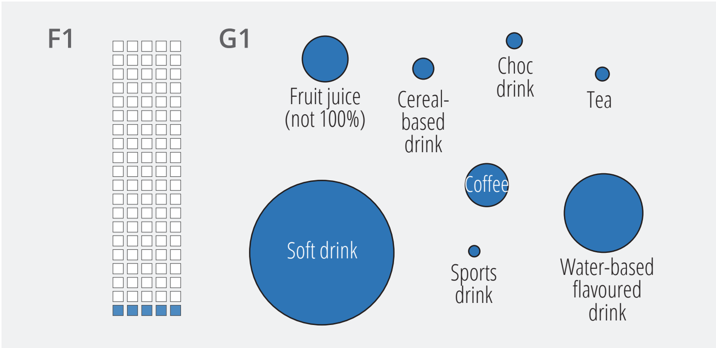
Mexico 2012

Figures

F1–F3 Percentage meeting the dietary recommendation
G1–G3 Contribution to intake by individual food

Sugar-sweetened beverages (SSBs)

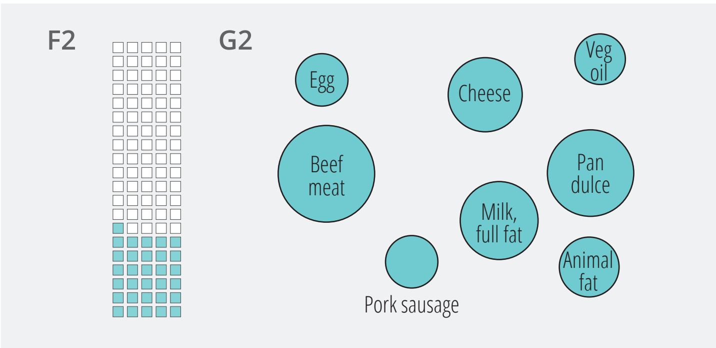
F1 Dietary recommendation: 3% or less of total energy intake from SSBs
G1 Contribution to total SSB energy intake by individual SSBs



NOTE: Choc drink = chocolate flavoured drink.

Saturated fat

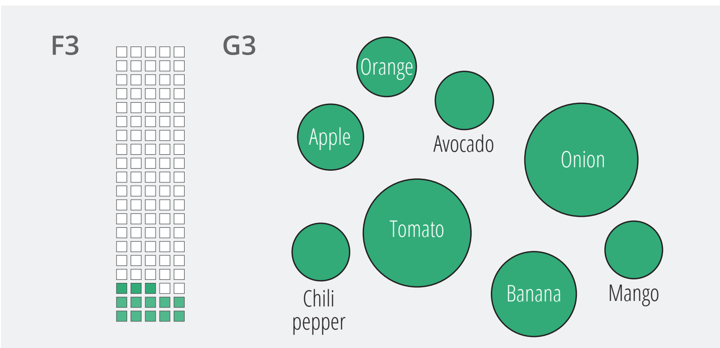
F2 Dietary recommendation: 10% or less of energy intake from saturated fat
G2 Contribution to total saturated fat intake by individual food or beverage



NOTE: Veg oil = vegetable oil.

Fruits and vegetables

F3 Dietary recommendation: 400 g or more of fruits and vegetables
G3 Contribution to total fruit and vegetable intake by individual fruit and vegetable



Annex 1.

Inventory of dietary surveys

Survey data

Survey name[A]	Country	Geographic region (FAO operational classification)	Income level[B]	Year of data collection	Year range[C]	Coverage
Algeria - 2008–2010 - University of Tlemcen	Algeria	Near East and North Africa	LMIC	2010	2010–2019	Subnational
Algeria - 2011–2012 - University of Tlemcen	Algeria	Near East and North Africa	LMIC	2012	2010–2019	Subnational
Algeria - 2010–2014 - University of Tlemcen	Algeria	Near East and North Africa	LMIC	2014	2010–2019	Subnational
American Samoa - 1990 - Hawaii Department of Health	American Samoa	Asia and the Pacific	UMIC	1990	1990–1999	National
Argentina - 2005 - Encuesta Nacional de Nutrición y Salud (ENNyS)	Argentina	Latin America and the Caribbean	UMIC	2005	2000–2009	National
Argentina - 2012–2013 - Primer estudio sobre el estado nutricional y los hábitos alimentarios de la población adulta de Rosario	Argentina	Latin America and the Caribbean	UMIC	2013	2010–2019	Subnational
Argentina - 2015 - Latin American Study of Nutrition and Health - Estudio Latinoamericano de Nutrición y Salud (ELANS)	Argentina	Latin America and the Caribbean	UMIC	2015	2010–2019	National
Argentina - 2019 - 2nd Encuesta Nacional de Nutrición y Salud (ENNyS 2)	Argentina	Latin America and the Caribbean	UMIC	2019	2010–2019	National
Bangladesh - 1996 - International Food Policy Research Institute (IFPRI)	Bangladesh	Asia and the Pacific	LMIC	1996	1990–1999	Subnational
HarvestPlus Bangladesh Bio-fortified Rice Project - Baseline Dietary Survey	Bangladesh	Asia and the Pacific	LMIC	2008	2000–2009	Subnational
Bangladesh Integrated Household Survey (BIHS), 2011-2012	Bangladesh	Asia and the Pacific	LMIC	2012	2010–2019	National
Benin - 2006 - Transition Nutritionnelle (TRANSNUT)	Benin	Africa	LMIC	2006	2000–2009	Subnational
Benin - 2007 - Ghent University	Benin	Africa	LMIC	2007	2000–2009	Subnational
Benin - 2012 - Ghent University	Benin	Africa	LMIC	2012	2010–2019	Subnational
Benin - 2014 - Regional Institute of Public Health (IRSP) of Ouidah	Benin	Africa	LMIC	2014	2010–2019	Subnational
Benin - FoodAfrica Project - Bioversity 2015	Benin	Africa	LMIC	2015	2010–2019	Subnational
Bolivia - 2009–2012 - Lund University	Bolivia (Plurinational State of)	Latin America and the Caribbean	LMIC	2012	2010–2019	Subnational
Health Survey of the State of São Paulo (ISA-SP) 2001–2002	Brazil	Latin America and the Caribbean	UMIC	2002	2000–2009	Subnational
Health Survey São Paulo (ISA-Capital) 2003	Brazil	Latin America and the Caribbean	UMIC	2003	2000–2009	Subnational
Brazil - 2007 - Associação Brasileira de Nutrição (ASBRAN)	Brazil	Latin America and the Caribbean	UMIC	2007	2000–2009	National
Health Survey São Paulo (ISA-Capital) 2008	Brazil	Latin America and the Caribbean	UMIC	2008	2000–2009	Subnational
Brazilian National Dietary Survey 2008–2009	Brazil	Latin America and the Caribbean	UMIC	2009	2000–2009	National
Study of Cardiovascular Risk in Adolescents (ERICA)	Brazil	Latin America and the Caribbean	UMIC	2014	2010–2019	National
Brazil - 2015 - Latin American Study of Nutrition and Health – Estudio Latinoamericano de Nutrición y Salud (ELANS)	Brazil	Latin America and the Caribbean	UMIC	2015	2010–2019	National
Bulgaria - 2004 - National Survey Of Food Intake And Nutritional Status (NSFIN)	Bulgaria	Europe and Central Asia	UMIC	2004	2000–2009	National
Bulgaria - 2007 - Nutrition of children survey (NUTRICHILD)	Bulgaria	Europe and Central Asia	UMIC	2007	2000–2009	National
Burkina Faso - 2004 - Ghent University and Institute of Tropical Medicine of Antwerp, Belgium	Burkina Faso	Africa	LIC	2004	2000–2009	Subnational
Burkina Faso - 2006 - Institut de Recherche pour le Developpement (IRD)	Burkina Faso	Africa	LIC	2006	2000–2009	Subnational
Food consumption and iron status survey in two provinces of rural Burkina Faso	Burkina Faso	Africa	LIC	2010	2010–2019	Subnational
Burkina Faso - 2010 - Université de Montréal	Burkina Faso	Africa	LIC	2010	2010–2019	Subnational
Burkina Faso - 2014 - Moderate Acute Malnutrition Out Study	Burkina Faso	Africa	LIC	2014	2010–2019	Subnational

Survey name[A]	Country	Geographic region (FAO operational classification)	Income level[B]	Year of data collection	Year range[C]	Coverage
Cabo Verde - 2014 - Universidade Nova de Lisboa	Cabo Verde	Africa	LMIC	2014	2010–2019	Subnational
Cambodia - 2010 - Institute of Technology of Cambodia	Cambodia	Asia and the Pacific	LMIC	2010	2010–2019	Subnational
Cameroon - 2006 - Umeå University	Cameroon	Africa	LMIC	2006	2000–2009	Subnational
Cameroon - 2012 - University of California, Davis (UC Davis)	Cameroon	Africa	LMIC	2012	2010–2019	National
Cameroon - 2012 - University of Douala	Cameroon	Africa	LMIC	2012	2010–2019	Subnational
Cameroon - 2013 - Ghent University	Cameroon	Africa	LMIC	2013	2010–2019	Subnational
China Health and Nutrition Survey (CHNS)	China	Asia and the Pacific	UMIC	2009	2000–2009	National
Colombia - 2005 - Process for the Promotion of Child Feeding (ProPAN)	Colombia	Latin America and the Caribbean	UMIC	2005	2000–2009	Subnational
Colombia - 2015 - Latin American Study of Nutrition and Health – Estudio Latinoamericano de Nutrición y Salud (ELANS)	Colombia	Latin America and the Caribbean	UMIC	2015	2010–2019	National
Colombia - 2015 - Encuesta Nacional de la Situación Nutricional (ENSIN)	Colombia	Latin America and the Caribbean	UMIC	2015	2010–2019	National
Costa Rica - 1996 - Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud (INCIENSA)	Costa Rica	Latin America and the Caribbean	UMIC	1996	1990–1999	Subnational
Costa Rica - 1999–2000 - Encuesta Nacional de Nutrición - Comunidades centinela	Costa Rica	Latin America and the Caribbean	UMIC	2000	2000–2009	Subnational
Costa Rica - 2006 - Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud (INCIENSA)	Costa Rica	Latin America and the Caribbean	UMIC	2006	2000–2009	Subnational
Costa Rica - 2015 - Latin American Study of Nutrition and Health - Estudio Latinoamericano de Nutrición y Salud (ELANS)	Costa Rica	Latin America and the Caribbean	UMIC	2015	2010–2019	National
Democatric Republic of Congo - 2009 - University of Kisangani–Ghent University	Democratic Republic of the Congo	Africa	LIC	2009	2000–2009	Subnational
Women First Dietary Recall Data - Sud-Ubangi, Democratic Republic of the Congo 2014–2016	Democratic Republic of the Congo	Africa	LIC	2016	2010–2019	Subnational
Dominica - 2005–2006 - Clemson University	Dominica	Latin America and the Caribbean	UMIC	2006	2000–2009	Subnational
Ecuador - 2002 - Process for the Promotion of Child Feeding (ProPAN)	Ecuador	Latin America and the Caribbean	UMIC	2003	2000–2009	Subnational
Ecuador - 2012 - Encuesta Nacional de Salud y Nutrición (ENSANUT-ECU)	Ecuador	Latin America and the Caribbean	UMIC	2012	2010–2019	National
Ecuador - 2015 - Latin American Study of Nutrition and Health – Estudio Latinoamericano de Nutrición y Salud (ELANS)	Ecuador	Latin America and the Caribbean	UMIC	2015	2010–2019	National
Egypt - 1981 - National Nutrition Institute	Egypt	Near East and North Africa	LMIC	1981	1980–1989	National
Egypt - 1994 - Food Technology Research Institute/Agriculture Research Centre (FTRI/ARC)	Egypt	Near East and North Africa	LMIC	1994	1990–1999	National
Egypt - 1998 - National Nutrition Institute	Egypt	Near East and North Africa	LMIC	1998	1990–1999	National
Egypt - University of Maryland	Egypt	Near East and North Africa	LMIC	Not specified	2000–2009	Subnational
Egypt 2017 - Food consumption survey in the population aged from 1 to 50 - Danone	Egypt	Near East and North Africa	LMIC	2017	2010–2019	National
Equatorial Guinea - 1997 - Instituto de Salud Carlos III	Equatorial Guinea	Africa	UMIC	1997	1990–1999	National
Equatorial Guinea - 2004 - Instituto de Salud Carlos III	Equatorial Guinea	Africa	UMIC	2004	2000–2009	National
Ethiopia - 2005 - University of Gondar	Ethiopia	Africa	LIC	2005	2000–2009	Subnational
Ethiopia - 2009 - Instituto de Salud Carlos III	Ethiopia	Africa	LIC	2009	2000–2009	Subnational
Ethiopia - 2009–2010 - Jimma University	Ethiopia	Africa	LIC	2010	2010–2019	Subnational
Ethiopia - 2013 - Ethiopian Public Health Institute (EPHI)	Ethiopia	Africa	LIC	2013	2010–2019	National
Ethiopia - 2013 - University of Saskatchewan	Ethiopia	Africa	LIC	2013	2010–2019	Subnational
Ethiopia - 2013 - Addis Ababa Science and Technology University	Ethiopia	Africa	LIC	2013	2010–2019	Subnational
Ethiopia - 2013–2014 - Addis Ababa University	Ethiopia	Africa	LIC	2014	2010–2019	Subnational
Ethiopia - University of Saskatchewan	Ethiopia	Africa	LIC	Not specified	2010–2019	Subnational

Survey name[A]	Country	Geographic region (FAO operational classification)	Income level[B]	Year of data collection	Year range[C]	Coverage
Fiji - 1980 - Cardiovascular and Metabolic Disease Survey	Fiji	Asia and the Pacific	UMIC	1980	1980–1989	Subnational
Fiji - 1996 - Japan Women's University	Fiji	Asia and the Pacific	UMIC	1996	1990–1999	Subnational
Fiji - 2004 - National Nutrition Survey	Fiji	Asia and the Pacific	UMIC	2004	2000–2009	National
Fiji - 2010 - Impact Study on Iron Fortified Flour	Fiji	Asia and the Pacific	UMIC	2010	2010–2019	National
Fiji Nutrition Survey 2015	Fiji	Asia and the Pacific	UMIC	2015	2010–2019	National
Ghana - 2007 - University of Ghana	Ghana	Africa	LMIC	2007	2000–2009	Subnational
Ghana - 2010–2011 - Modeling the Epidemiologic Transition Study (METS)	Ghana	Africa	LMIC	2011	2010–2019	Subnational
Guatemala - 1996-1999 - Generational Effects Study, Institute of Nutrition of Central America and Panama (INCAP)	Guatemala	Latin America and the Caribbean	UMIC	1999	1990–1999	Subnational
Guatemala - 2006–2007–2009 - Institute of Nutrition of Central America and Panama (INCAP)	Guatemala	Latin America and the Caribbean	UMIC	2009	2000–2009	Subnational
Guatemala - 2012 - Food and Nutrition Technical Assistance Project (FANTA) / Institute of Nutrition of Central America and Panama (INCAP)	Guatemala	Latin America and the Caribbean	UMIC	2012	2010–2019	Subnational
Women First Dietary Recall Data - Chimaltenango, Guatemala 2014–2016	Guatemala	Latin America and the Caribbean	UMIC	2016	2010–2019	Subnational
Honduras - 2008–2010 - University of North Carolina	Honduras	Latin America and the Caribbean	LMIC	2010	2010–2019	Subnational
India - 1994–1996 - Pune Maternal Nutrition Study	India	Asia and the Pacific	LMIC	1996	1990–1999	Subnational
India - 2006–2010 - Hirabai Cowasji Jehangir Medical Research Institute	India	Asia and the Pacific	LMIC	2010	2010–2019	Subnational
India - 2009–2012 - Diet and Nutritional status of Rural population, Prevalence of hypertension and Diabetes among Adults and Infant & Young child feeding practices	India	Asia and the Pacific	LMIC	2012	2010–2019	National
India - 2013–2014 - All India Institute of Medical Sciences	India	Asia and the Pacific	LMIC	2014	2010–2019	Subnational
India - 2013–2014 - Hirabai Cowasji Jehangir Medical Research Institute	India	Asia and the Pacific	LMIC	2014	2010–2019	Subnational
Women First Dietary Recall Data - Belagavi, Karnataka, India 2014–2016	India	Asia and the Pacific	LMIC	2015	2010–2019	Subnational
Indonesia - 2003–2004 - The University of Tokyo	Indonesia	Asia and the Pacific	UMIC	2004	2000–2009	Subnational
Indonesia - 2011 - South East Asian Nutrition Survey (SEANUTS)	Indonesia	Asia and the Pacific	UMIC	2011	2010–2019	National
Food Consumption Survey (FCS) Indonesia 2014	Indonesia	Asia and the Pacific	UMIC	2014	2010–2019	National
Indonesia - 2016 - Developing Biomarkers of Exclusive Breastfeeding Practice – Healthy Birth, Growth and Development (HBGD)	Indonesia	Asia and the Pacific	UMIC	2016	2010–2019	Subnational
Iraq - 1998–2000 - College of Medicine and Health Technology	Iraq	Near East and North Africa	UMIC	2000	2000–2009	Subnational
Kenya - 1998 - Child Nutrition Project (CNP)	Kenya	Africa	LMIC	1998	1990–1999	Subnational
Kenya - 2001–2002 - University of Bologna	Kenya	Africa	LMIC	2002	2000–2009	Subnational
Kenya - 2007–2008 - Wageningen University	Kenya	Africa	LMIC	2008	2000–2009	Subnational
Kenya - 2009 - Washington University School of Medicine	Kenya	Africa	LMIC	2009	2000–2009	Subnational
Kenya - 2009–2010 - Jomo Kenyatta University of Agriculture and Technology	Kenya	Africa	LMIC	2010	2010–2019	Subnational
Kenya - 2011 - National Micronutrient Survey	Kenya	Africa	LMIC	2011	2010–2019	National
Kenya - 2012 - London School of Hygiene/Kenyatta University	Kenya	Africa	LMIC	2012	2010–2019	Subnational
Kenya - 2012 - Bioversity INULA	Kenya	Africa	LMIC	2013	2010–2019	Subnational
Kenya - University of Cape Town	Kenya	Africa	LMIC	Not specified	2010–2019	Subnational
Kenya - 2014–2015 - Bioversity International/Humid tropics CRP	Kenya	Africa	LMIC	2015	2010–2019	Subnational
Kenya: Humid Tropics Agrobiodiversity and Nutrition Project - Diagnostic Survey 2014–2015	Kenya	Africa	LMIC	2015	2010–2019	Subnational

Survey name[A]	Country	Geographic region (FAO operational classification)	Income level[B]	Year of data collection	Year range[C]	Coverage
Kenya - 2016 - Innovative, participatory tools for dietary assessment and nutrition education in Turkana County - Diagnostic survey	Kenya	Africa	LMIC	2016	2010–2019	Subnational
Kenya - 2018 - Improving access to and benefits from a wealth of diverse seeds to support on-farm biodiversity for healthy people in resilient landscapes - Baseline Survey	Kenya	Africa	LMIC	2018	2010–2019	Subnational
Kiribati - 1981 - Kiribati Diabetes and Cardiovascular Disease Survey	Kiribati	Asia and the Pacific	LMIC	1981	1980–1989	Subnational
Lao's People Democratic Republic - 2005 - Institut Francophone pour la Médecine Tropicale	Lao People's Democratic Republic	Asia and the Pacific	LMIC	2005	2000–2009	Subnational
National Food Consumption Survey Lao PDR 2016–2017	Lao People's Democratic Republic	Asia and the Pacific	LMIC	2016	2010–2019	National
Lebanon - 1997 - American University of Beirut	Lebanon	Near East and North Africa	UMIC	1997	1990–1999	National
Lebanon - 1997–1998 - American University of Beirut	Lebanon	Near East and North Africa	UMIC	1998	1990–1999	National
Lebanon - 2003 - American University of Beirut	Lebanon	Near East and North Africa	UMIC	2003	2000–2009	National
Lebanon - 2005–2006 - University of Leicester	Lebanon	Near East and North Africa	UMIC	2006	2000–2009	Subnational
Nutrition and Non-communicable Diseases Risk Factor	Lebanon	Near East and North Africa	UMIC	2009	2000–2009	National
Early Life Nutrition and Health in Lebanon	Lebanon	Near East and North Africa	UMIC	2012	2010–2019	National
Lebanon - 2011–2012 - American University of Beirut	Lebanon	Near East and North Africa	UMIC	2012	2010–2019	Subnational
Lebanon - 2015 - Saint-Joseph University of Beirut	Lebanon	Near East and North Africa	UMIC	2015	2010–2019	Subnational
Libya - 2005–2007 - University of Giessen	Libya	Near East and North Africa	UMIC	2007	2000–2009	Subnational
Libya - 2008 - Newcastle University	Libya	Near East and North Africa	UMIC	2008	2000–2009	Subnational
NutriMad project	Madagascar	Africa	LIC	2004	2000–2009	Subnational
Malawi - 1998 - University of Otago	Malawi	Africa	LIC	1998	1990–1999	Subnational
Malawi - 2008 - Lilongwe University of Agriculture & Natural Resources	Malawi	Africa	LIC	2008	2000–2009	Subnational
Malawi - 2010 - The International Lipid-Based Nutrient Supplements (iLiNS) Project	Malawi	Africa	LIC	2010	2010–2019	Subnational
Malaysia - 2014 - Ministry of Health Malaysia	Malaysia	Asia and the Pacific	UMIC	2014	2010–2019	National
Maldives - 1997–1998 - University of Hohenheim	Maldives	Asia and the Pacific	UMIC	1998	1990–1999	Subnational
Mali - 2007 - University of Abomey Calavi/Wageningen University	Mali	Africa	LIC	2007	2000–2009	Subnational
Marshall Islands - 2007 - John Hopkins University	Marshall Islands	Asia and the Pacific	UMIC	2007	2000–2009	Subnational
Mexico - National Health and Nutrition Survey 2012	Mexico	Latin America and the Caribbean	UMIC	2012	2010–2019	National
Towards Sustainable Nutrition Improvement in Rural Mozambique (TSNI) - Baseline survey	Mozambique	Africa	LIC	2003	2000–2009	Subnational
Mozambique - 2006 - HarvestPlus	Mozambique	Africa	LIC	2006	2000–2009	Subnational
Mozambique - 2010 - ZANE Study	Mozambique	Africa	LIC	2010	2010–2019	Subnational
Myanmar - 2003–2005 - Department of Medical Research (Lower Myanmar)	Myanmar	Asia and the Pacific	LMIC	2005	2000–2009	Subnational
Nepal - 1989 - Mukogawa Women's University	Nepal	Asia and the Pacific	LIC	1989	1980–1989	Subnational
Nepal - 2000–2001 - University of Bergen	Nepal	Asia and the Pacific	LIC	2001	2000–2009	Subnational
Nepal - 2008–2009 - University of Bergen	Nepal	Asia and the Pacific	LIC	2009	2000–2009	Subnational
Nigeria - 1995 - Federal University of Agriculture, Abeokuta	Nigeria	Africa	LMIC	1995	1990–1999	Subnational
Nigeria - 2001–2003 - International Institute of Tropical Agriculture	Nigeria	Africa	LMIC	2003	2000–2009	Subnational

Survey name[A]	Country	Geographic region (FAO operational classification)	Income level[B]	Year of data collection	Year range[C]	Coverage
Nigeria - 2007 - Ambrose Alli University	Nigeria	Africa	LMIC	2007	2000–2009	Subnational
Nigeria - 2011 - HarvestPlus	Nigeria	Africa	LMIC	2011	2010–2019	Subnational
Nigeria - Federal University of Agriculture, Abeokuta	Nigeria	Africa	LMIC	2013	2010–2019	Subnational
Pakistan - 2008–2009 - University of Tübingen	Pakistan	Asia and the Pacific	LMIC	2009	2000–2009	Subnational
Women First Dietary Recall Data - Thatta, Pakistan 2014–2016	Pakistan	Asia and the Pacific	LMIC	2016	2010–2019	Subnational
West Bank and Gaza Strip - 2002 - Al-Quds University/Johns Hopkins Bloomberg School of Public Health	Palestine	Near East and North Africa	LMIC	2002	2000–2009	National
West Bank and Gaza Strip - 2003 - Al-Quds University/Johns Hopkins Bloomberg School of Public Health	Palestine	Near East and North Africa	LMIC	2003	2000–2009	National
Papua New Guinea - 2010/2011 - National institute of Health and Nutrition, Tokyo	Papua New Guinea	Asia and the Pacific	LMIC	2011	2010–2019	Subnational
Peru - 2003 - National Food Consumption Survey for Fertile Women and 12 to 35 Month Old Children	Peru	Latin America and the Caribbean	UMIC	2003	2000–2009	National
Peru - 2004–2005 - National Survey on Nutritional, Biochemical, Socioeconomic Indicators Related to Chronic Degenerative Diseases	Peru	Latin America and the Caribbean	UMIC	2005	2000–2009	National
Peru - 2015 - Latin American Study of Nutrition and Health / Estudio Latinoamericano de Nutrición y Salud (ELANS)	Peru	Latin America and the Caribbean	UMIC	2015	2010–2019	National
Philippines - 2002 - Cebu Longitudinal Health and Nutrition Survey (CLHNS)	Philippines	Asia and the Pacific	LMIC	2002	2000–2009	Subnational
6th Philippines National Nutrition Survey (NNS) - 2003 - Dietary component (lactating women) - DOST-FNRI	Philippines	Asia and the Pacific	LMIC	2003	2000–2009	National
Philippines - 2005 - Cebu Longitudinal Health and Nutrition Survey (CLHNS)	Philippines	Asia and the Pacific	LMIC	2005	2000–2009	Subnational
7th Philippines National Nutrition Survey (NNS) - 2008 - Dietary component - DOST-FNRI	Philippines	Asia and the Pacific	LMIC	2008	2000–2009	National
8th Philippines National Nutrition Survey (NNS) - 2013 - Dietary component - DOST-FNRI	Philippines	Asia and the Pacific	LMIC	2013	2010–2019	National
Russian Federation - 1992–1994 - Russian Longitudinal Monitoring Survey (Phase I)	Russian Federation	Europe and Central Asia	UMIC	1994	1990–1999	National
Russian Federation - 2002 - The State Research Center for Preventive Medicine of the Ministry of Health of the Russian Federation/Institute of Nutrition of the Russian Academy of Medical Sciences	Russian Federation	Europe and Central Asia	UMIC	2002	2000–2009	Subnational
Russian Federation - 2006 - Institute of Nutrition, Russian Academy of Medical Sciences (RAMS)	Russian Federation	Europe and Central Asia	UMIC	2006	2000–2009	National
Russian Federation - Saratov State Medical University	Russian Federation	Europe and Central Asia	UMIC	Not specified	2000–2009	Subnational
Russian Federation - 1995–2014 - Russian Longitudinal Monitoring Survey (Phase II)	Russian Federation	Europe and Central Asia	UMIC	2014	2010–2019	National
Rwanda - 2010–2011 - Food and Nutrition Survey	Rwanda	Africa	LIC	2010	2010–2019	Subnational
Samoa - 1990 - Hawaii Department of Health	Samoa	Asia and the Pacific	UMIC	1990	1990–1999	National
Nutritional adequacy in undernourished children from 6 to 59 months of age, in Cantagalo, São Tomé e Príncipe	Sao Tome and Principe	Africa	LMIC	2015	2010–2019	Subnational
Kosovo - 2010–2011 - University of Kassel	Serbia	Europe and Central Asia	UMIC	2011	2010–2019	Subnational
Serbia - 2014–2015 - University of Belgrade	Serbia	Europe and Central Asia	UMIC	2015	2010–2019	National
Solomon Islands - 2005 - University of California	Solomon Islands	Asia and the Pacific	LMIC	2005	2000–2009	Subnational
South Africa - 1999 - National Food Consumption Survey (NFCS)	South Africa	Africa	UMIC	1999	1990–1999	National
Sri Lanka - 2006 - University of Colombo	Sri Lanka	Asia and the Pacific	LMIC	2006	2000–2009	National
Sudan - 2006 - London Metropolitan University	Sudan	Africa	LIC	2006	2000–2009	Subnational
Tajikistan - 2000–2005 - Kazakh Academy of Nutrition	Tajikistan	Europe and Central Asia	LIC	2005	2000–2009	National
Thailand - 2008–2009 - Bureau of Nutrition, Department of Health, Ministry of Public Health	Thailand	Asia and the Pacific	UMIC	2009	2000–2009	National
Thailand - 2011 - SEANUTS	Thailand	Asia and the Pacific	UMIC	2011	2010–2019	National

Survey name[A]	Country	Geographic region (FAO operational classification)	Income level[B]	Year of data collection	Year range[C]	Coverage
Tunisia - 1996–1997 - Institut National de Nutrition et de Technologie Alimentaire	Tunisia	Near East and North Africa	LMIC	1997	1990–1999	National
Tunisia - 2011 - National Institute of Public Health	Tunisia	Near East and North Africa	LMIC	2011	2010–2019	Subnational
Uganda - 2006 - Makerere University	Uganda	Africa	LIC	2006	2000–2009	Subnational
HarvestPlus Reaching End Users (REU) Orange-Fleshed Sweet Potato (OFSP) Project	Uganda	Africa	LIC	2007	2000–2009	Subnational
The 2008 Uganda Food Consumption Survey	Uganda	Africa	LIC	2008	2000–2009	Subnational
Ukraine - 2012–2013 - State Research Center for Food Hygiene, Ministry of Health	Ukraine	Europe and Central Asia	LMIC	2013	2010–2019	National
Tanzania - 2009 - McGill University	United Republic of Tanzania	Africa	LMIC	2009	2000–2009	Subnational
United Republic of Tanzania - 2013 - Ghent University	United Republic of Tanzania	Africa	LMIC	2013	2010–2019	Subnational
Scale-N Nutrition Survey 2016	United Republic of Tanzania	Africa	LMIC	2016	2010–2019	Subnational
Vanuatu - 1985 - South Pacific Commission/WHO	Vanuatu	Asia and the Pacific	LMIC	1985	1980–1989	Subnational
Venezuela - 1998–1999 - CEINUT, Universidad de Carabobo	Venezuela (Bolivarian Republic of)	Latin America and the Caribbean	UMIC	1999	1990–1999	Subnational
Venezuela - 1999–2000 - Centro de Atención Nutricional Infantil Antímano	Venezuela (Bolivarian Republic of)	Latin America and the Caribbean	UMIC	2000	2000–2009	Subnational
Venezuela - 2002 - CEINUT, Universidad de Carabobo	Venezuela (Bolivarian Republic of)	Latin America and the Caribbean	UMIC	2002	2000–2009	Subnational
Venezuela - 2013 - Encuesta Nacional de Consumo de Alimentos (ENCA)	Venezuela (Bolivarian Republic of)	Latin America and the Caribbean	UMIC	2013	2010–2019	National
Venezuela - 2015 - Latin American Study of Nutrition and Health / Estudio Latinoamericano de Nutrición y Salud (ELANS)	Venezuela (Bolivarian Republic of)	Latin America and the Caribbean	UMIC	2015	2010–2019	National
Vietnam - Japan Women's University	Viet Nam	Asia and the Pacific	LMIC	Not specified	1990–1999	Subnational
Vietnam - 1999 - Japan Women's University	Viet Nam	Asia and the Pacific	LMIC	1999	1990–1999	Subnational
Vietnam - 2006 - Institute of Tropical Medicine, Antwerp	Viet Nam	Asia and the Pacific	LMIC	2006	2000–2009	Subnational
Vietnam - 2011 - SEANUTS	Viet Nam	Asia and the Pacific	LMIC	2011	2010–2019	National
Vietnam - 2014 - Bioversity	Viet Nam	Asia and the Pacific	LMIC	2014	2010–2019	Subnational
Zambia - 2008 - Zambian National Food and Nutrition Commission	Zambia	Africa	LMIC	2008	2000–2009	Subnational
The 2009 Food consumption and Vitamin A status survey in Zambia	Zambia	Africa	LMIC	2009	2000–2009	Subnational
Zambia - 2012 - University of Wisconsin	Zambia	Africa	LMIC	2012	2010–2019	Subnational
Zambia - 2012–2013 - Johns Hopkins University	Zambia	Africa	LMIC	2013	2010–2019	Subnational
Zimbabwe - 2003 - McMaster University	Zimbabwe	Africa	LMIC	2003	2000–2009	Subnational

[A] Survey name: As included in FAO/WHO GIFT's inventory of surveys (http://www.fao.org/gift-individual-food-consumption/inventory-of-surveys/en/).

[B] Income level: According to the World Bank 2020 classification (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups).

[C] Year range: When the year of data collection was not specified in the available documentation, the decade was imputed based on the date of publication of the survey report or scientific publication.

Annex 2.
Methods used for data analysis

Dataset

All analyses for **Section 3** (Visualizing dietary data) were conducted using dietary intake data from the Mexican National Health and Nutrition Survey (ENSANUT) 2012 (Romero-Martínez *et al*., 2013). The ENSANUT 2012 is a cross-sectional, multistage, probabilistic survey, representative of the national, regional, and rural/urban population of Mexico. Dietary intake was collected by 24-hour recall, using a multiple pass method in a random subsample (approximately 11 percent) of ENSANUT 2012 (Batis *et al*., 2016). A second recall was collected randomly for around 9 percent of the dietary sample on a non-consecutive day.

The analyses for this report used a dietary intake dataset that was submitted by the National Institute of Public Health of Mexico (INSP) to the Global Dietary Database at Tufts University; the dataset was subsequently prepared for submission to the FAO/WHO Global Individual Food consumption data Tool (FAO/WHO GIFT). With permission from INSP, FAO provided the dataset to Intake, who performed all analyses in consultation with FAO. The analyses for this report used data for adolescents aged 10–13 years and adults aged 19–50 years. Adult women were non-pregnant and non-lactating (NPNL). Analyses are reported by sex and by area (rural/urban).

Table 1 provides an overview of the number of individuals and days of recalls in each demographic group. Unless otherwise specified in the descriptions of specific analyses, all days were included in the analyses. For all analyses, to obtain a prevalence in a demographic group with intakes below or above a cutoff, the National Cancer Institute (NCI) usual intake method was used to adjust the distribution of intakes for day-to-day within-person variation (Tooze *et al*., 2006). Specifically, the Intake Program for Usual Diet Assessment was used for these analyses, which implements the NCI method macros in a streamlined process.[27] Some commonly consumed foods in Mexico are fortified; therefore the nutrient intakes presented include nutrients from fortification. Nutrient intake from dietary supplements were reported for some individuals in the recall data; these are excluded from the analyses. Details on the definitions and analytic methods used for each type of visualization are described throughout this annex. The results used to populate the visualizations are presented in **Annex 3**.

Table 1. Number of individuals and recalls by demographic group

	Total N	N with 1 recall day	N with 2 recall days
Rural			
Girls aged 10–13 years	246	224	22
Boys aged 10–13 years	269	244	25
Women aged 19–50 years (NPNL)	380	339	41
Men aged 19–50 years	277	257	20
Urban			
Girls aged 10–13 years	400	356	44
Boys aged 10–13 years	413	376	37
Women aged 19–50 years (NPNL)	698	637	61
Men aged 19–50 years	554	510	44

NOTE: N = number of individuals.

Overall diet

Figure A: contribution to energy intake by food group

The data visualization for Figure A depicts the mean energy contribution of different food groups to overall diet or energy intake. The proportional contribution of each food group is represented by the relative size of the box, with the highest to lowest proportion from top left to bottom right. The visualization therefore provides overall descriptive information on dietary patterns for each demographic group.

[27] The Intake Program for Usual Diet Assessment was developed by Intake to streamline the implementation of the National Cancer Institute (NCI) method to estimate usual dietary intakes of dietary components (foods, food groups and nutrients) using quantitative dietary intake data. It consists of four modules: Create Bootstrap Weights (to conduct bootstrap sampling procedures to produce confidence intervals); Distribution Run (to estimate usual intake distribution of a dietary component); Ratio Run (to jointly estimate two dietary components and a usual intake distribution of a ratio of the two components); and Regression Run (to estimate associations between usual intake of a dietary predictor and a health outcome). The Intake Program for Usual Diet Assessment will be available on the Intake website.

As a first step in deriving the data to populate this visualization, each food or ingredient in the food-level intake file was assigned to one of the 19 FAO/WHO GIFT food groups (FAO, 2021). Food groups were assigned using the FoodEx2 classification and description system (EFSA, 2021). For the analyses in this report, we excluded one group ("Food supplements and similar"), and combined two groups ("Foods for particular nutritional uses" and "Food additives") into a single group ("Other miscellaneous"). The group for composite dishes was renamed (as "Non-disaggregated composite dishes") because the majority of composite dishes were disaggregated, and their ingredients were therefore assigned to their respective food group. The primary types of non-disaggregated composite dishes were soup broth and pizza. Some food items were reassigned to other food groups to ensure that the "Fruits and their products" and "Vegetables and their products" groups in the overall diet analysis were consistent with the analysis for fruit and vegetable consumption; i.e. sweet corn was reassigned to "Cereals and their products", tamarind and coconut were reassigned to "Fruits and their products", and dried peppers, coriander leaves, parsley, spearmint and epazote were reassigned to "Vegetables and their products".

Next, energy intake from each food group was summed for each individual by day. For individuals with two days of data, the within-person mean was obtained. To obtain the mean intake for a demographic group, survey sample weights were applied, which resulted in a weighted mean energy intake from each food group for each demographic group. In addition, a total weighted mean energy intake across all food groups was obtained. For each demographic group and food group, the proportion was calculated by dividing the weighted mean energy intake for that food group by the total weighted mean energy intake across all food groups.

Micronutrient intake adequacy

Figures B1–B6: prevalence of micronutrient intake adequacy

Figures B1–B6 depict the proportion of the population with intakes of different micronutrients at or above the average requirement for that demographic group. This type of visualization has 100 boxes, with the number of filled boxes denoting the percentage of the population with adequate intakes (consuming at or above the average requirement), and the number of clear boxes denoting the percentage with inadequate intakes (below the average requirement).

In order to calculate the prevalence of adequacy at a population level, the distribution of usual intakes was obtained using the information from the individuals with more than one day of dietary information to estimate the within-person variation and remove its effects to estimate a population distribution. The Intake Program for Usual Diet Assessment was used to implement the NCI method, in order to model usual intakes and to output their distribution for each demographic group. Survey sample weights and covariates for weekend, sequence of recall day and area of residence (rural/urban) were incorporated into the modelling. Confidence intervals were obtained using the 250 bootstrap samples, which were created with the Create Bootstrap Weights module of the Intake Program for Usual Diet Assessment.

Separate NCI models were run for each of the four demographic groups (girls aged 10–13 years, boys aged 10–13 years, adult NPNL women and adult men). We combined rural and urban for the purpose of estimating within-person variation. The distributions for the rural and urban samples were estimated separately using the modelled pooled variance estimate. The use of pooled variance was implemented using the "subgroup" feature of the NCI method. For example, the NCI method estimates the within-person variation for the entire group of 10–13-year-old boys and uses that information to estimate the usual intake distribution of rural 10–13-year-old boys and urban 10–13-year-old boys. The "subgroup" feature was used because the number of individuals with a second day was not sufficient to reliably estimate variance separately by area of residence (Tooze, 2020).

The ratios of within-person to total variance were reviewed to determine whether any of them exceeded 0.9, which is considered a result of outliers and likely implausible (Davis *et al.*, 2019). When a ratio of within-person to total variance exceeds 0.9, the resulting estimate of the usual intake distribution is extremely narrow; this in turn suggests a very small between-person variation (0.1 or less), which is extremely unlikely. This occurs when one or more individuals have very large differences in their intake across multiple days. For any nutrient or food with a ratio greater than 0.9, we therefore examined the distribution of difference between intakes among individuals with two days of dietary information. Potential outliers were identified where the within-person difference between the two days exceeded 3 SDs (standard deviations) above the mean difference between the two days for the demographic group. Potential outliers were then excluded one at a time until the ratio fell below 0.9. In each of these cases, only one of the two days was omitted, such that the individual remained in the analysis. As a first step, the second day was omitted; if that did not improve the ratio, then the first day was omitted instead. Omission of one day of vitamin B_{12} intake was necessary for one urban 10–13-year-old girl, four rural adult males and one urban adult male.

The estimated average requirements (EARs), as established by the National Academies of Sciences, Engineering, and Medicine (NASEM) (formerly the Institute of Medicine or IOM), were used as the cutoffs for estimating the prevalence of adequate intakes (Table 2) (NASEM, 2019). The EAR cut-point method (IOM, 2000), which is implemented by the Distribution Run module of the Intake Program for Usual Diet Assessment, was used for all nutrients except iron. In the case of iron (for which the EAR cut-point method cannot be used due to the skewed distribution of requirements for some demographic groups, such as menstruating women), we used tables from the IOM (2002), which provide ranges for usual iron intakes associated with probabilities of adequacy. Using SAS (Statistical Analysis System), we assigned probabilities to the usual iron intakes that were output by the simulated dataset from the Distribution Run module of the Intake Program for Usual Diet Assessment. For consistency, we used the probability approach for all demographic groups regardless of whether their requirement distribution was skewed. The following tables from IOM (2002) were used: Table I-6 for 9–13-year-old boys and girls, and Table I-7 for adult men and women (for menstruating non-oral contraceptive users). To adjust for the bioavailability of iron in the Mexican diet, an estimate of 12 percent was used, drawing from the ranges (5–18 percent) used in other analyses of the ENSANUT 2012 data (Sánchez-Pimienta *et al.*, 2016; Venegas-Aviles, 2020). For zinc, no adjustment was made for bioavailability (Sánchez-Pimienta *et al.*, 2016).

Table 2. Estimated average requirements (EARs)

	Calcium, mg	Iron, mg*	Zinc, mg	Vitamin A, mcg RAE	Folate, mcg DFE	Vitamin B12, mcg
Girls aged 10–13 years	1100	12.3	7.0	420	250	1.5
Boys aged 10–13 years	1100	12.7	7.0	445	250	1.5
Women aged 19–50 years (NPNL)	800	17.5	6.8	500	320	2.0
Men aged 19–50 years	800	13.0	9.4	625	320	2.0

NOTES: * Values are adjusted from 18 percent bioavailability (as used by NASEM) to 12 percent. RAE = retinol activity equivalent. DFE = dietary folate equivalent.

SOURCE: NASEM (National Academies of Sciences, Engineering, and Medicine). 2019. Dietary Reference Intakes for Sodium and Potassium. Appendix J: *Dietary Reference Intakes Summary Tables*. Washington, DC, National Academies Press. (also available at https://doi.org/10.17226/25353).

Figures C1–C6: extent of the micronutrient intake gap

Figures C1–C6 depict the micronutrient intake gap for different micronutrients, or the difference between the median intake and the estimated target median intake needed to achieve a very high prevalence of adequacy. The visualization shows the actual median intake as a filled box, and the gap as a clear box.

The micronutrient intake gap was defined as the difference between the median intake of the demographic group (by age, sex, and area of residence) and the target median intake for that demographic group, and was calculated according to procedures described by the IOM (2003). To calculate the micronutrient intake gap for each demographic group, we:

1) used the usual intake distribution (estimated from the NCI usual intake method) to identify the nutrient intake corresponding to the third percentile;
2) calculated the target median intake by adding the actual median of the demographic group distribution (i.e. the 50th percentile from the usual intake distribution) to the difference between the intake at the third percentile and the EAR; and
3) calculated the gap as the target median intake minus the actual median intake of the demographic group.

Figures D1–D6: contribution to micronutrient intake by food group

Figures D1–D6 depict the mean proportional contribution of each of the FAO/WHO GIFT food groups to the total intake for different micronutrients. The proportions are indicated visually by the relative size of the boxes, with the highest to lowest proportion from top left to bottom right.

To derive the micronutrient contributions of food groups to total diet, we used the same analytic procedures as when deriving the energy contributions of food groups to total diet. In this case, micronutrient intake — as opposed to energy intake — from each food group was summed for each individual and day. For individuals with two days of data, survey sample weights were used to obtain the weighted mean micronutrient intake for each food group for the two days.

Figures E1–E6: contribution to micronutrient intake by individual food

Figures E1–E6 show the mean proportional contribution of individual foods to the total intake for different micronutrients. While the preceding set of visualizations (Figures D1–D6) depict food groups, this set focuses on the individual foods, showing the top eight foods by proportional contribution for each micronutrient. The proportions are indicated visually by the relative size of the circle for each food.

To define a "food", some recoding of food codes was needed. Each food or ingredient in the food-level intake file had an assigned unique food code, but several different food codes pertained to the same general food (for example, varying due to cooking status, brand names or other slight differences). As a first step in identifying the top food sources for the different micronutrients, we identified the top 50 items (by FoodEx2 code) consumed by each demographic group. We then reviewed the list of unique foods in the source table to aggregate or disaggregate FoodEx2 codes to define a food item. For example, the source file had 37 unique food codes for maize tortillas; these were aggregated to define the food item "maize tortillas".

The same analytic procedures that were used to derive the micronutrient contribution of food groups to total diet were used to derive the micronutrient contributions of individual foods. In this case, micronutrient intake from each food — rather than from each food group — was summed for each individual and by day. For individuals with two days of data, survey sample weights were used to obtain the weighted mean micronutrient intake from each food for the two days.

Dietary intakes related to non-communicable disease risk

Figures F1–F3: percentage meeting dietary recommendations

Figures F1–F3 depict the proportion of the population with intakes that meet a given dietary recommendation for food groups or nutrients associated with non-communicable disease (NCD) risk. As with Figures B1–B6, this type of visualization has 100 boxes. The number of filled boxes denotes the percentage of the population whose intakes meet the recommendation, while the number of clear boxes denotes the percentage whose intakes do not meet the recommendation.

Figure F1: percentage meeting recommendation for sugar-sweetened beverages (3 percent or less of total energy intake from SSBs)

This recommendation is defined by the American Heart Association as the maximum threshold for sugar-sweetened beverage (SSB) intake (3 percent of total energy) that is considered healthy and does not increase risk for NCD-related outcomes such as obesity and heart disease (AHA, 2014).

For these analyses, SSBs were defined as any beverage with added sugar. These included commercially available soft drinks and fruit-flavoured drinks, as well as homemade drinks with added sugar; for example, flavoured water (*agua de sabor*, *agua de frutas*, *agua con chocolate*), *atole* without milk, coffee and tea with sugar, juices with added sugar, and others (*refresco de sabor*, *refresco de cola*, *ponche de frutas*). Milk drinks, soy-based drinks and oral rehydration products were not classified as SSBs.

Intake of energy from SSBs was summed for each individual by recall day. The Ratio Run module of the Intake Program for Usual Diet Assessment was used, which simultaneously models the energy intake from SSBs and the total energy intake, and produces a distribution of the ratio of the two components. Survey sample weights and covariates for weekend, sequence of recall day, area (rural/urban) and sex were incorporated into the modelling.

Given that SSBs were episodically consumed, and due to an inadequate number of individuals with non-zero intakes of SSBs on two days, for this analysis the sexes were pooled by age group. In this case, two NCI models were run — one for the 10–13 year-olds and one for the adults – and separate usual intake distributions were estimated for each of the eight subgroups using the "subgroup" feature. For outlier detection, the Ratio Run module in the Intake Program for Usual Diet Assessment does not estimate the ratio of within-person to total variation because of the joint modelling of the numerator (energy from SSBs) and denominator (total energy). However, we observed that the distribution for adult males was very narrow, and therefore examined the raw ratios of the energy from SSBs to total energy (calculated using raw data, by dividing the energy from SSBs by the total energy intake), and then calculated the difference between the ratios for adult males with two days of dietary information. We examined outliers for the difference in ratios (defined as over 3 SDs above the mean), and removed one recall day for one outlier (for an urban adult male) due to a difference of 100 percent between the two days.

Figure F2: percentage meeting recommendation for saturated fat (10 percent or less of energy intake)

This recommendation is defined by the World Health Organization (WHO) as the maximum threshold for saturated fat intake (10 percent of energy) that is considered healthy and will not increase risk for NCD-related outcomes such as heart disease (WHO 2020).

Intake of energy from saturated fat was summed for each individual by recall day. The Ratio Run module of the Intake Program for Usual Diet Assessment was used, which simultaneously models the energy intake from saturated fat and the total energy intake, and produces a distribution of the ratio of the two components. Survey sample weights and covariates for weekend, sequence of recall day, and area (rural/urban) were incorporated into the modelling. Separate NCI models were run for each of the four demographic groups, and usual intake distributions were estimated for each population/area (urban and rural) subgroup. We observed that the distribution for adolescent girls was very narrow. Therefore, we examined the raw ratios of the energy from saturated fat to total energy (calculated using raw data, by dividing the energy from saturated fat by the total energy intake), and calculated the difference between the ratios for adolescent girls with two days of dietary information. We examined outliers for the difference in ratios (defined as over 3 SDs above the mean), and removed one recall day for one rural adolescent girl and for three urban adolescent girls.

Figure F3: percentage meeting recommendation for fruits and vegetables (400 g or more)

This recommendation is defined by WHO to reflect the minimum threshold of fruit and vegetable intake that is associated with good health and a reduced risk of NCD-related outcomes such as cancer (WHO 2020). For adults, the threshold amount is 400 g. For adolescents, given that proportional recommended energy intakes are lower than for adults (1 800 kcal instead of 2 000 kcal), we modified the recommendation to 360 g.

For these analyses, fruits and vegetables were defined using the two FAO/WHO GIFT food groups for fruits and vegetables. We did not include 100 percent fruit and/or vegetable juices or juices from roots, tubers or plantains in the fruit and vegetable group.

The Distribution Run module of the Intake Program for Usual Diet Assessment was used to model the usual intake distribution of fruit and vegetable intakes for each demographic group. Survey sample weights and covariates for weekend, sequence of recall day, and area (rural/urban) were incorporated into the modelling. Separate NCI models were run for each of the four demographic groups, and usual intake distributions were estimated for each population/area (urban and rural) subgroup, using the "subgroup" feature. The ratios of within-person to total variance were reviewed, and none exceeded 0.9; therefore no outliers were considered for omission.

Figures G1–G3: contribution to intake by individual food

Figures G1–G3 depict the mean proportion of total intake provided by individual foods. Each figure features eight circles, representing the top eight foods or beverages by contribution to intake. The relative size of each circle indicates the proportional contribution of the given food or beverage to the total intake of that food, beverage, or nutrient.

The same analytic procedures that were used to derive the contribution of individual foods to total micronutrient intakes were used here, except in this case the denominator is the total amount of the food or beverage. For example, intake of energy from each type of SSB was summed for each individual by day; for individuals with two days of data, the mean micronutrient intake was obtained from each food for the two days. The denominator was calculated by summing the energy from all SSBs for each individual by day; for individuals with two days of data, the mean micronutrient intake was obtained from each food for the two days. Using survey sample weights, a weighted mean energy intake from each SSB type and a weighted mean energy intake from all SSBs was obtained for each demographic group. For each demographic group, the proportion was then calculated, by dividing the weighted mean energy intake from each SSB type by the total weighted mean energy intake from all SSBs. In each case, the eight foods with the highest proportions were selected for visualization.

Annex 3.

Data values for visualizations

Rural girls aged 10–13 years

Mexico 2012

Overall diet

Contribution to energy intake by food group (Figure A)

	Food group	%
1	Cereals and their products	36.5
2	Sweets and sugars	13.6
3	Meat and meat products	8.4
4	Beverages	8.1
5	Milk and milk products	8.1
6	Fats and oils	5.9
7	Pulses, seeds and nuts and their products	5.5
8	Savoury snacks	4.0

	Food group	%
9	Fruits and their products	3.2
10	Eggs and their products	2.9
11	Vegetables and their products	2.1
12	Roots, tubers, plantains and their products	1.6
13	Spices and condiments	0.8
14	Fish, shellfish and their products	0.3
15	Non-disaggregated composite dishes	0.3
16	Other miscellaneous	0

Micronutrient intake adequacy

	Calcium	Iron	Zinc	Vitamin A	Folate	Vitamin B12
Prevalence of micronutrient intake adequacy (Figures B1–B6)	15.1%	90.3%	66.0%	27.1%	52.4%	50.8%
Extent of the micronutrient intake gap (Figures C1–C6)						
Median intake	773 mg	13.8 mg	7.9 mg	332 mcg RAE	259 mcg DFE	1.52 mcg
Target intake	1501 mg	15.9 mg	10.5 mg	601 mcg RAE	436 mcg DFE	2.68 mcg
Gap	728 mg	2.1 mg	2.6 mg	269 mcg RAE	177 mcg DFE	1.16 mcg

NOTES: RAE = retinol activity equivalent. DFE = dietary folate equivalent.

Contribution to micronutrient intake by food group (Figures D1–D6)

	Calcium		Iron		Zinc		Vitamin A		Folate		Vitamin B12	
	Food group	%	Food group	%	Food group	%	Food group	%	Food group	%	Food group	%
1	Cereals and their products	32.4	Cereals and their products	46.2	Cereals and their products	34.9	Milk and milk products	26.1	Cereals and their products	21.5	Meat and meat products	64.0
2	Milk and milk products	30.3	Pulses, seeds and nuts and their products	9.1	Meat and meat products	18.3	Vegetables and their products	21.5	Sweets and sugars	18.4	Milk and milk products	22.8
3	Beverages	14.6	Sweets and sugars	8.9	Milk and milk products	12.3	Eggs and their products	15.3	Pulses, seeds and nuts and their products	17.3	Eggs and their products	9.2
4	Sweets and sugars	6.6	Meat and meat products	6.5	Pulses, seeds and nuts and their products	9.6	Beverages	11.2	Eggs and their products	13.2	Fish, shellfish and their products	1.9
5	Vegetables and their products	5.1	Vegetables and their products	6.5	Sweets and sugars	5.8	Cereals and their products	11.1	Fruits and their products	7.7	Savoury snacks	1.0
6	Pulses, seeds and nuts and their products	4.0	Beverages	5.9	Eggs and their products	5.5	Fruits and their products	8.2	Vegetables and their products	7.3	Non-disaggregated composite dishes	0.7
7	Eggs and their products	2.5	Roots, tubers, plantains and their products	5.1	Beverages	5.4	Meat and meat products	4.4	Beverages	6.1	Spices and condiments	0.7
8	Fruits and their products	2.0	Eggs and their products	4.4	Vegetables and their products	3.6	Sweets and sugars	1.3	Milk and milk products	4.2	Cereals and their products	0.5

Rural girls aged 10–13 years

Mexico 2012

Contribution to micronutrient intake by individual food (Figures E1–E6)

	Calcium Food	%	**Iron** Food	%	**Zinc** Food	%	**Vitamin A** Food	%	**Folate** Food	%	**Vitamin B12** Food	%
1	Tortilla, maize	27.4	Tortilla, maize	30.9	Tortilla, maize	21.0	Egg	15.3	Beans	15.9	Beef meat	55.8
2	Milk, full fat	17.9	Beans	7.9	Beans	8.7	Milk, full fat	14.9	Egg	13.2	Milk, full fat	16.2
3	Cheese	9.7	Breakfast cereal	7.1	Beef meat	7.9	Breakfast cereal	12.3	Breakfast cereal	13.2	Egg	9.2
4	Water	7.5	Potato	4.8	Breakfast cereal	7.6	Carrot	9.2	*Pan dulce*	12.4	Cheese	4.8
5	Beans	3.4	Bread, refined	4.7	Milk, full fat	6.9	Chocolate drink, fortified	8.8	Tortilla, *maseca*	4.9	Turkey sausage	2.2
6	Water-based flavoured drink	2.7	Egg	4.4	Egg	5.5	Cheese	8.5	Chocolate drink, fortified	4.5	Pork sausage	1.9
7	Egg	2.5	Chocolate drink, fortified	3.4	Chicken meat	4.5	Mango	5.8	Maize, dough	3.4	Chicken meat	1.8
8	Maize, dough	2.4	Maize, dough	3.0	Cheese	4.4	Chili pepper	3.3	Milk, full fat	3.2	Yoghurt	1.5

Dietary intakes related to non-communicable disease risk

	Sugar-sweetened beverages	**Saturated fat**	**Fruits and Vegetables**
Percentage meeting the dietary recommendation (Figures F1–F3)	3% or less of energy	10% or less of energy	360 g or more
%	15.3	70.0	6.4

Contribution to intake by individual food (Figures G1–G3)

	Sugar-sweetened beverages Beverage	%	**Saturated fat** Food or beverage	%	**Fruits and vegetables** Food	%
1	Soft drink	40.0	Milk, full fat	13.0	Tomato	12.8
2	Water-based flavoured drink	27.1	*Pan dulce*	12.8	Onion	11.9
3	Coffee	20.6	Cheese	10.4	Mango	10.8
4	Fruit juice (not 100%)	9.7	Chips	8.3	Banana	8.7
5	Cereal-based drink	8.0	Beef meat	7.7	Orange	7.0
6	Chocolate flavoured drink	0.3	Animal fat	7.0	Tomatillo	5.3
7	Tea	0.2	Egg	5.7	Courgette	5.2
8	Sports drink	0.2	Vegetable oil	4.3	*Nopal*	3.9

Urban girls aged 10–13 years

Mexico 2012

Overall diet

Contribution to energy intake by food group (Figure A)

	Food group	%
1	Cereals and their products	27.3
2	Sweets and sugars	14.1
3	Milk and milk products	12.7
4	Meat and meat products	12.0
5	Beverages	8.7
6	Fats and oils	5.6
7	Savoury snacks	5.4
8	Pulses, seeds and nuts and their products	4.3

	Food group	%
9	Fruits and their products	3.3
10	Vegetables and their products	2.3
11	Eggs and their products	2.2
12	Roots, tubers, plantains and their products	1.6
13	Spices and condiments	1.1
14	Non-disaggregated composite dishes	1.0
15	Fish, shellfish and their products	0.4
16	Other miscellaneous	0.1

Micronutrient intake adequacy

	Calcium	Iron	Zinc	Vitamin A	Folate	Vitamin B12
Prevalence of micronutrient intake adequacy (Figures B1–B6)	21.1%	86.1%	76.2%	65.4%	60.8%	78.4%
Extent of the micronutrient intake gap (Figures C1–C6)						
Median intake	832 mg	12.7 mg	8.7 mg	484 mcg RAE	295 mcg DFE	2.49 mcg
Target intake	1518 mg	15.4 mg	10.7 mg	669 mcg RAE	458 mcg DFE	3.32 mcg
Gap	686 mg	2.7 mg	2.1 mg	185 mcg RAE	163 mcg DFE	0.83 mcg

NOTES: RAE = retinol activity equivalent. DFE = dietary folate equivalent.

Contribution to micronutrient intake by food group (Figures D1–D6)

	Calcium FOOD GROUP	%	Iron FOOD GROUP	%	Zinc FOOD GROUP	%	Vitamin A FOOD GROUP	%	Folate FOOD GROUP	%	Vitamin B12 FOOD GROUP	%
1	Milk and milk products	44.7	Cereals and their products	38.3	Cereals and their products	26.0	Milk and milk products	30.2	Cereals and their products	29.9	Meat and meat products	49.5
2	Cereals and their products	21.2	Meat and meat products	11.1	Meat and meat products	26.0	Vegetables and their products	20.9	Sweets and sugars	16.1	Milk and milk products	38.2
3	Beverages	13.4	Sweets and sugars	10.0	Milk and milk products	18.5	Beverages	15.1	Pulses, seeds and nuts and their products	11.6	Eggs and their products	7.2
4	Sweets and sugars	5.7	Beverages	8.4	Pulses, seeds and nuts and their products	6.3	Cereals and their products	9.9	Eggs and their products	8.7	Fish, shellfish and their products	4.0
5	Vegetables and their products	3.9	Pulses, seeds and nuts and their products	6.6	Sweets and sugars	5.8	Eggs and their products	8.5	Beverages	8.2	Cereals and their products	2.5
6	Pulses, seeds and nuts and their products	3.0	Milk and milk products	5.9	Beverages	5.8	Meat and meat products	7.6	Milk and milk products	6.7	Sweets and sugars	2.2
7	Meat and meat products	2.1	Vegetables and their products	5.8	Eggs and their products	3.8	Fruits and their products	3.3	Vegetables and their products	6.1	Savoury snacks	1.4
8	Savoury snacks	1.8	Roots, tubers, and plantains	5.7	Vegetables	3.2	Sweets and sugars	2.6	Fruits	5.9	Non-disaggregated composite dishes	1.1

Urban girls aged 10–13 years

Mexico 2012

Contribution to micronutrient intake by individual food (Figures E1–E6)

	Calcium		Iron		Zinc		Vitamin A		Folate		Vitamin B12	
	Food	%	Food	%	Food	%	Food	%	Food	%	Food	%
1	Milk, full fat	29.1	Tortilla, maize	18.1	Beef meat	13.0	Milk, full fat	18.9	Breakfast cereal	19.6	Beef meat	34.6
2	Tortilla, maize	14.7	Breakfast cereal	8.5	Milk, full fat	11.5	Chocolate drink, fortified	11.6	*Pan dulce*	9.4	Milk, full fat	28.4
3	Cheese	9.9	Chocolate drink, fortified	6.4	Tortilla, maize	11.1	Carrot	10.1	Beans	9.3	Egg	7.2
4	Water	5.2	Bread, refined	5.7	Chicken meat	5.9	Egg	8.5	Egg	8.7	Cheese	4.9
5	Yogurt	4.9	Beans	5.4	Beans	5.0	Breakfast cereal	7.8	Chocolate drink, fortified	7.3	Yoghurt	4.4
6	Water-based flavoured drink	4.1	Potato	5.3	Cheese	4.6	Cheese	6.6	Milk, full fat	5.2	Pork sausage	3.2
7	Chocolate drink, fortified	2.5	Beef meat	4.3	Chocolate drink, fortified	4.4	Chili pepper	4.0	Biscuit	3.9	Chicken meat	2.8
8	Bread, refined	2.1	Egg	3.4	Breakfast cereal	4.0	Sour cream	3.1	Bread, refined	3.8	Fish, fresh	2.6

Dietary intakes related to non-communicable disease risk

	Sugar-sweetened beverages	Saturated fat	Fruits and Vegetables
Percentage meeting the dietary recommendation (Figures F1–F3)	3% or less of energy	10% or less of energy	360 g or more
%	16.0	2.6	4.2

Contribution to intake by individual food (Figures G1–G3)

	Sugar-sweetened beverages		Saturated fat		Fruits and vegetables	
	Beverage	%	Food or beverage	%	Food	%
1	Soft drink	46.4	Milk, full fat	17.7	Onion	14.0
2	Water-based flavoured drink	28.7	Beef meat	8.9	Tomato	13.6
3	Fruit juice (not 100%)	24.5	Chips	8.9	Banana	9.6
4	Coffee	4.4	Cheese	8.8	Orange	9.2
5	Sports drink	1.2	Pan dulce	8.6	Apple	8.3
6	Chocolate drink	0.6	Pork sausage	5.1	Mango	7.2
7	Cereal-based drink	0.6	Animal fat	4.7	Chili pepper	5.0
8	Tea	0.3	Chicken meat	4.2	Cucumber	4.1

Rural boys aged 10–13 years

Mexico 2012

Overall diet

Contribution to energy intake by food group (Figure A)

	Food group	%
1	Cereals and their products	37.5
2	Sweets and sugars	12.3
3	Meat and meat products	9.5
4	Beverages	9.0
5	Milk and milk products	7.8
6	Fats and oils	6.8
7	Pulses, seeds and nuts and their products	4.2
8	Fruits and their products	3.4

	Food group	%
9	Savoury snacks	3.2
10	Eggs and their products	2.5
11	Vegetables and their products	1.8
12	Roots, tubers, plantains and their products	1.0
13	Spices and condiments	0.9
14	Fish, shellfish and their products	0.6
15	Non-disaggregated composite dishes	0.4
16	Other miscellaneous	0

Micronutrient intake adequacy

	Calcium	Iron	Zinc	Vitamin A	Folate	Vitamin B12
Prevalence of micronutrient intake adequacy (Figures B1–B6)	23.1%	88.8%	74.4%	25.3%	54.7%	63.6%
Extent of the micronutrient intake gap (Figures C1–C6)						
Median intake	842 mg	14.6 mg	8.8 mg	320 mcg RAE	270 mcg DFE	1.96 mcg
Target intake	1578 mg	17.1 mg	11.3 mg	653 mcg RAE	449 mcg DFE	3.10 mcg
Gap	736 mg	2.5 mg	2.5 mg	333 mcg RAE	179 mcg DFE	1.13 mcg

NOTES: RAE = retinol activity equivalent. DFE = dietary folate equivalent.

Contribution to micronutrient intake by food group (Figures D1–D6)

	Calcium Food group	%	Iron Food group	%	Zinc Food group	%	Vitamin A Food group	%	Folate Food group	%	Vitamin B12 Food group	%
1	Cereals and their products	35.9	Cereals and their products	48.3	Cereals and their products	34.8	Milk and milk products	30.4	Cereals and their products	23.5	Meat and meat products	53.6
2	Milk and milk products	28.8	Meat and meat products	8.9	Meat and meat products	23.1	Vegetables and their products	21.9	Sweets and sugars	19.8	Milk and milk products	27.7
3	Beverages	15.4	Sweets and sugars	8.5	Milk and milk products	10.5	Eggs and their products	15.2	Pulses, seeds and nuts and their products	14.7	Eggs and their products	10.1
4	Sweets and sugars	5.4	Pulses, seeds and nuts and their products	7.5	Pulses, seeds and nuts and their products	8.1	Beverages	12.5	Eggs and their products	12.4	Fish, shellfish and their products	6.3
5	Vegetables and their products	3.4	Beverages	5.6	Sweets and sugars	5.0	Cereals and their products	6.9	Beverages	8.1	Sweets and sugars	1.1
6	Pulses, seeds and nuts and their products	2.9	Vegetables and their products	4.3	Eggs and their products	4.9	Fruits and their products	5.2	Fruits and their products	7.9	Spices and condiments	0.8
7	Eggs and their products	2.3	Eggs and their products	4.0	Beverages	4.5	Meat and meat products	4.0	Vegetables and their products	5.2	Non-disaggregated composite dishes	0.7
8	Meat and meat products	1.9	Roots, tubers, plantains and their products	3.9	Vegetables and their products	2.7	Sweets and sugars	1.5	Milk and milk products	3.6	Savoury snacks	0.7

Rural boys aged 10–13 years

Mexico 2012

Contribution to micronutrient intake by individual food (Figures E1–E6)

	Calcium		**Iron**		**Zinc**		**Vitamin A**		**Folate**		**Vitamin B12**	
	Food	%	Food	%	Food	%	Food	%	Food	%	Food	%
1	Tortilla, maize	29.8	Tortilla, maize	33.6	Tortilla, maize	22.6	Milk, full fat	15.7	Beans	13.3	Beef meat	42.7
2	Milk, full fat	16.8	Beans	6.3	Beef meat	10.9	Egg	15.2	*Pan dulce*	12.7	Milk, full fat	20.5
3	Cheese	8.6	Bread, refined	5.6	Beans	6.9	Carrot	9.4	Egg	12.4	Egg	10.1
4	Water	7.2	Egg	4.0	Milk, full fat	5.6	Chocolate drink, fortified	7.0	Breakfast cereal	8.6	Cheese	4.6
5	Water-based flavoured drink	2.8	Potatoes	3.8	Egg	4.9	Cheese	6.8	Biscuit	6.7	Fish, fresh	3.4
6	Beans	2.7	Chips	3.4	Chicken meat	4.9	Sour cream	6.4	Tortilla, *maseca*	5.1	Chicken meat	2.5
7	Coffee	2.4	Beef meat	3.1	Cheese	3.7	Chili pepper	4.3	Chocolate drink, fortified	3.4	Turkey sausage	2.3
8	Egg	2.3	Breakfast cereal	2.8	Pork meat	3.1	Sweet pepper	4.3	Milk, full fat	2.7	Pork meat	2.2

Dietary intakes related to non-communicable disease risk

	Sugar-sweetened beverages	**Saturated fat**	**Fruits and Vegetables**
Percent consuming recommendation (Figures F1–F3)	3% or less of energy	10% or less of energy	360 g or more
%	13.8	51.3	10.7

Contribution to intake by individual food (Figures G1–G3)

	Sugar-sweetened beverages		**Saturated fat**		**Fruits and vegetables**	
	Beverage	%	Food or beverage	%	Food	%
1	Soft drink	37.9	*Pan dulce*	12.0	Tomato	15.8
2	Water-based flavoured drink	21.9	Milk, full fat	11.1	Onion	15.2
3	Coffee	20.2	Cheese	8.6	Banana	13.6
4	Fruit juice (not 100%)	12.4	Beef meat	8.5	Orange	9.6
5	Cereal-based drink	9.8	Animal fat	7.6	Mango	7.8
6	Sports drink	1.5	Chips	6.4	Watermelon	4.4
7	Chocolate flavoured drink	0.5	Sour cream	5.4	Apple	3.6
8	Tea	0.4	Egg	4.9	Avocado	3.4

Urban boys aged 10–13 years

Mexico 2012

Overall diet

Contribution to energy intake by food group (Figure A)

	Food group	%
1	Cereals and their products	29.5
2	Sweets and sugars	12.9
3	Meat and meat products	12.0
4	Milk and milk products	11.7
5	Beverages	8.7
6	Fats and oils	6.1
7	Savoury snacks	5.7
8	Pulses, seeds and nuts and their products	3.0
9	Fruits and their products	2.8
10	Eggs and their products	2.6
11	Vegetables and their products	1.9
12	Spices and condiments	1.3
13	Roots, tubers, plantains and their products	1.2
14	Non-disaggregated composite dishes	0.9
15	Fish, shellfish and their products	0.5
16	Other miscellaneous	0.1

Micronutrient intake adequacy

	Calcium	Iron	Zinc	Vitamin A	Folate	Vitamin B12
Prevalence of micronutrient intake adequacy (Figures B1–B6)	28.5%	87.8%	85.2%	56.7%	72.4%	82.4%
Extent of the micronutrient intake gap (Figures C1–C6)						
Median intake	896 mg	14.2 mg	10.0 mg	481 mcg RAE	359 mcg DFE	2.95 mcg
Target intake	1593 mg	16.9 mg	11.8 mg	738 mcg RAE	506 mcg DFE	3.79 mcg
Gap	697 mg	2.7 mg	1.8 mg	257 mcg RAE	147 mcg DFE	0.83 mcg

NOTES: RAE = retinol activity equivalent. DFE = dietary folate equivalent.

Contribution to micronutrient intake by food group (Figures D1–D6)

	Calcium Food group	%	Iron Food group	%	Zinc Food group	%	Vitamin A Food group	%	Folate Food group	%	Vitamin B12 Food group	%
1	Milk and milk products	39.3	Cereals and their products	40.1	Cereals and their products	28.1	Milk and milk products	29.7	Cereals and their products	35.0	Meat and meat products	39.1
2	Cereals and their products	25.8	Meat and meat products	11.5	Meat and meat products	25.5	Vegetables and their products	20.2	Sweets and sugars	17.9	Milk and milk products	36.1
3	Beverages	13.1	Sweets and sugars	10.1	Milk and milk products	17.5	Beverages	14.5	Eggs and their products	10.1	Eggs and their products	8.2
4	Sweets and sugars	5.0	Beverages	7.6	Sweets and sugars	5.5	Cereals and their products	11.2	Pulses, seeds and nuts and their products	8.0	Cereals and their products	5.8
5	Vegetables and their products	4.6	Milk and milk products	6.4	Pulses, seeds and nuts and their products	5.1	Eggs and their products	11.1	Beverages	7.1	Fish, shellfish and their products	5.3
6	Meat and meat products	2.3	Pulses, seeds and nuts and their products	5.2	Beverages	5.0	Meat and meat products	3.8	Vegetables and their products	5.6	Savoury snacks	1.9
7	Savoury snacks	2.2	Vegetables and their products	4.7	Eggs and their products	4.3	Fruits and their products	3.4	Fruits and their products	5.1	Sweets and sugars	1.7
8	Eggs and their products	2.1	Eggs and their products	4.1	Vegetables and their products	3.0	Sweets and sugars	2.2	Milk and milk products	5.0	Spices and condiments	1.0

Urban boys aged 10–13 years

Mexico 2012

Contribution to micronutrient intake by individual food (Figures E1–E6)

	Calcium		**Iron**		**Zinc**		**Vitamin A**		**Folate**		**Vitamin B12**	
	Food	%	Food	%	Food	%	Food	%	Food	%	Food	%
1	Milk, full fat	24.6	Tortilla, maize	18.7	Beef meat	13.7	Milk, full fat	17.8	Breakfast cereal	17.1	Beef meat	28.7
2	Tortilla, maize	15.7	Bread, refined	6.5	Tortilla, maize	11.2	Egg	11.1	Egg	10.1	Milk, full fat	26.8
3	Cheese	9.6	Breakfast cereal	6.5	Milk, full fat	9.6	Chocolate drink mix fortified	10.2	*Pan dulce*	9.8	Egg	8.2
4	Water	5.5	Chocolate drink, fortified	5.1	Cheese	6.3	Carrot	10.0	Beans	7.2	Cheese	6.2
5	Bread, refined	3.6	Beef meat	4.8	Breakfast cereal	4.4	Breakfast cereal	8.4	Bread, refined	5.7	Breakfast cereal	4.6
6	Water-based flavoured drink	3.4	Beans	4.4	Egg	4.3	Cheese	6.5	Biscuit	5.6	Fish, fresh	3.1
7	Yoghurt	2.8	Egg	4.1	Beans	4.1	Chili pepper	5.3	Tortilla, *maseca*	5.6	Pork sausage	2.4
8	Chips	2.2	Milk, full fat	3.7	Bread, refined	4.1	Sour cream	3.1	Chocolate drink mix fortified	5.5	Turkey sausage	2.3

Dietary intakes related to non-communicable disease risk

	Sugar-sweetened beverages	**Saturated fat**	**Fruits and Vegetables**
Percent consuming recommendation (Figures F1–F3)	3% or less of energy	10% or less of energy	360 g or more
%	14.1	2.4	9.9

Contribution to intake by individual food (Figures G1–G3)

	Sugar-sweetened beverages		**Saturated fat**		**Fruits and vegetables**	
	Beverage	%	Food or beverage	%	Food	%
1	Soft drink	48.3	Milk, full fat	13.5	Tomato	16.1
2	Water-based flavoured drink	31.2	Cheese	12.2	Onion	12.7
3	Fruit juice (not 100%)	16.9	*Pan dulce*	9.1	Banana	9.2
4	Coffee	5.2	Beef meat	9.1	Orange	8.2
5	Cereal-based drink	1.0	Chips	9.0	Mango	6.0
6	Tea	0.8	Pork sausage	4.3	Nopale	6.0
7	Chocolate drink	0.3	Animal fat	4.1	Courgette	5.7
8	–	–	Egg	3.9	Apple	5.6

Rural non-pregnant, non-lactating women aged 19–50 years **Mexico 2012**

Overall diet

Contribution to energy intake by food group (Figure A)

	Food group	%
1	Cereals and their products	37.1
2	Sweets and sugars	12.1
3	Beverages	9.8
4	Meat and meat products	9.8
5	Fats and oils	7.5
6	Milk and milk products	6.9
7	Pulses, seeds and nuts and their products	5.2
8	Fruits and their products	3.7

	Food group	%
9	Eggs and their products	2.8
10	Vegetables and their products	2.2
11	Roots, tubers, plantains and their products	1.6
12	Savoury snacks	1.2
13	Fish, shellfish and their products	0.9
14	Spices and condiments	0.6
15	Non-disaggregated composite dishes	0.4
16	Other miscellaneous	0

Micronutrient intake adequacy

	Calcium	Iron	Zinc	Vitamin A	Folate	Vitamin B12
Prevalence of micronutrient intake adequacy (Figures B1–B6)	33.6%	50.3%	59.9%	9.8%	20.9%	41.1%
Extent of the micronutrient intake gap (Figures C1–C6)						
Median intake	726 mg	12.3 mg	7.2 mg	285 mcg RAE	246 mcg DFE	1.73 mcg
Target intake	1072 mg	26.4 mg	9.2 mg	674 mcg RAE	438 mcg DFE	3.28 mcg
Gap	346 mg	14.1 mg	2.0 mg	389 mcg RAE	192 mcg DFE	1.55 mcg

NOTES: RAE = retinol activity equivalent. DFE = dietary folate equivalent.

Contribution to micronutrient intake by food group (Figures D1–D6)

	Calcium Food group	%	Iron Food group	%	Zinc Food group	%	Vitamin A Food group	%	Folate Food group	%	Vitamin B12 Food group	%
1	Cereals and their products	34.3	Cereals and their products	47.4	Cereals and their products	35.7	Vegetables and their products	25.7	Cereals and their products	20.3	Meat and meat products	53.5
2	Milk and milk products	26.7	Meat and meat products	10.6	Meat and meat products	23.3	Milk and milk products	25.7	Pulses, seeds and nuts and their products	19.4	Milk and milk products	24.5
3	Beverages	17.2	Pulses, seeds and nuts and their products	9.2	Milk and milk products	10.8	Eggs and their products	16.5	Sweets and sugars	16.1	Eggs and their products	10.8
4	Vegetables and their products	5.3	Sweets and sugars	7.6	Pulses, seeds and nuts and their products	9.6	Beverages	9.3	Eggs and their products	15.0	Fish, shellfish and their products	10.7
5	Sweets and sugars	4.0	Vegetables and their products	6.2	Eggs and their products	5.6	Cereals and their products	5.6	Fruits and their products	9.9	Cereals and their products	1.1
6	Pulses, seeds and nuts and their products	3.5	Roots, tubers, plantains and their products	5.1	Vegetables and their products	3.9	Fruits and their products	5.4	Vegetables and their products	7.8	Sweets and sugars	0.9
7	Fruits and their products	2.9	Eggs and their products	4.5	Sweets and sugars	3.9	Meat and meat products	5.0	Beverages	4.2	Non-disaggregated composite dishes	0.8
8	Eggs and their products	2.4	Beverages	4.1	Beverages	2.9	Roots, tubers, plantains and their products	3.8	Milk and milk products	3.7	Spices and condiments	0.6

Rural non-pregnant, non-lactating women aged 19–50 years **Mexico 2012**

Contribution to micronutrient intake by individual food (Figures E1–E6)

	Calcium		**Iron**		**Zinc**		**Vitamin A**		**Folate**		**Vitamin B12**	
	Food	%	Food	%	Food	%	Food	%	Food	%	Food	%
1	Tortilla, maize	29.5	Tortilla, maize	35.4	Tortilla, maize	23.8	Egg	16.5	Bean	17.0	Beef meat	37.9
2	Milk, full fat	15.4	Bean	8.2	Bean	8.5	Milk, full fat	14.8	Egg	15.0	Milk, full fat	17.0
3	Cheese	9.7	Potato	4.6	Beef meat	7.9	Carrot	9.1	*Pan dulce*	14.1	Egg	10.8
4	Water, drinking	8.6	Egg	4.5	Milk, full fat	6.0	Cheese	7.5	Breakfast cereal	6.9	Fish, fresh	9.4
5	Water-based flavoured drink	3.9	Bread, refined	2.8	Egg	5.6	Chili pepper	6.1	Tortilla, *maseca*	5.0	Cheese	6.0
6	Bean	3.3	*Pan dulce*	2.6	Chicken meat	5.4	Tomato	4.5	Orange	3.7	Beef, stomach	4.1
7	Coffee	2.7	Beef meat	2.3	Cheese	4.1	Sweet potato	3.2	Milk, full fat	2.9	Pork sausage	2.8
8	Egg	2.4	Chili pepper	2.2	Pork meat	3.3	Mango	3.2	Avocado	2.7	Pork meat	2.7

Dietary intakes related to non-communicable disease risk

	Sugar-sweetened beverages	**Saturated fat**	**Fruits and Vegetables**
Percent consuming recommendation (Figures F1–F3)	3% or less of energy	10% or less of energy	400 g or more
%	18.9	66.4	0.6

Contribution to intake by individual food (Figures G1–G3)

	Sugar-sweetened beverages		**Saturated fat**		**Fruits and vegetables**	
	Beverage	%	Food or beverage	%	Food	%
1	Soft drink	44.1	*Pan dulce*	13.3	Tomato	17.0
2	Water-based flavoured drink	26.8	Milk, full fat	11.4	Orange	16.3
3	Coffee	21.0	Cheese	10.3	Onion	11.0
4	Fruit juice (not 100%)	9.8	Animal fat	8.9	Banana	6.9
5	Cereal-based drink	2.1	Beef meat	6.6	Mango	6.2
6	Tea	0.8	Vegetable oil	5.7	Nopale	4.8
7	Sports drink	0.8	Egg	5.7	Avocado	4.2
8	Chocolate drink	0.3	Chicken meat	5.3	Cucumber	4.0

Urban non-pregnant, non-lactating women aged 19–50 years **Mexico 2012**

Overall diet

Contribution to energy intake by food group (Figure A)

	Food group	%
1	Cereals and their products	29.6
2	Meat and meat products	13.4
3	Sweets and sugars	12.7
4	Beverages	11.5
5	Milk and milk products	8.9
6	Fats and oils	7.4
7	Fruits and their products	3.7
8	Pulses, seeds and nuts and their products	3.4
9	Vegetables and their products	2.7
10	Eggs and their products	2.3
11	Savoury snacks	1.7
12	Spices and condiments	1.3
13	Roots, tubers, plantains and their products	1.1
14	Fish, shellfish and their products	0.7
15	Non-disaggregated composite dishes	0.7
16	Other miscellaneous	0.1

Micronutrient intake adequacy

	Calcium	Iron	Zinc	Vitamin A	Folate	Vitamin B12
Prevalence of micronutrient intake adequacy (Figures B1–B6)	40.9%	48.4%	83.1%	22.6%	38.3%	63.7%
Extent of the micronutrient intake gap (Figures C1–C6)						
Median intake	758 mg	12.0 mg	8.3 mg	365 mcg RAE	290 mcg DFE	2.48 mcg
Target intake	1079 mg	26.3 mg	9.5 mg	714 mcg RAE	456 mcg DFE	3.77 mcg
Gap	321 mg	14.3 mg	1.2 mg	349 mcg RAE	166 mcg DFE	1.29 mcg

NOTES: RAE = retinol activity equivalent. DFE = dietary folate equivalent.

Contribution to micronutrient intake by food group (Figures D1–D6)

	Calcium: Food group	%	Iron: Food group	%	Zinc: Food group	%	Vitamin A: Food group	%	Folate: Food group	%	Vitamin B12: Food group	%
1	Milk and milk products	32.8	Cereals and their products	40.4	Meat and meat products	30.4	Vegetables and their products	27.6	Cereals and their products	30.0	Meat and meat products	53.5
2	Cereals and their products	25.7	Meat and meat products	12.9	Cereals and their products	27.1	Milk and milk products	27.5	Sweets and sugars	17.7	Milk and milk products	23.4
3	Beverages	18.1	Sweets and sugars	9.4	Milk and milk products	13.5	Beverages	11.8	Pulses, seeds and nuts and their products	10.7	Fish, shellfish and their products	9.4
4	Vegetables and their products	6.4	Vegetables and their products	7.3	Sweets and sugars	6.0	Eggs and their products	10.9	Eggs and their products	10.5	Eggs and their products	7.0
5	Sweets and sugars	6.0	Pulses, seeds and nuts and their products	6.3	Pulses, seeds and nuts and their products	5.5	Cereals and their products	7.8	Vegetables and their products	8.5	Cereals and their products	3.0
6	Pulses, seeds and nuts and their products	2.7	Beverages	6.0	Vegetables and their products	4.3	Meat and meat products	5.1	Fruits and their products	7.5	Sweets and sugars	1.4
7	Meat and meat products	2.4	Milk and milk products	5.1	Eggs and their products	4.2	Fruits and their products	4.4	Beverages	5.1	Beverages	1.3
8	Eggs and their products	2.0	Roots, tubers, plantains and their products	4.0	Beverages	4.0	Sweets and sugars	2.5	Milk and milk products	4.7	Non-disaggregated composite dishes	0.9

Urban non-pregnant, non-lactating women aged 19–50 years **Mexico 2012**

Contribution to micronutrient intake by individual food (Figures E1–E6)

	Calcium		**Iron**		**Zinc**		**Vitamin A**		**Folate**		**Vitamin B12**	
	Food	%	Food	%	Food	%	Food	%	Food	%	Food	%
1	Tortilla, maize	18.5	Tortilla, maize	21.8	Beef meat	16.4	Milk, full fat	13.0	Breakfast cereal	15.8	Beef meat	42.4
2	Milk, full fat	16.6	Bread, refined	5.7	Tortilla, maize	13.4	Carrot	11.4	*Pan dulce*	11.5	Milk, full fat	15.0
3	Cheese	11.0	Beef meat	5.4	Milk, full fat	6.7	Egg	10.9	Egg	10.5	Egg	7.0
4	Water	9.8	Breakfast cereal	5.4	Chicken meat	5.9	Cheese	8.6	Beans	9.7	Fish, fresh	4.7
5	Water-based flavoured drink	3.3	Beans	5.1	Cheese	4.8	Breakfast cereal	4.8	Biscuit	4.4	Cheese	4.6
6	Yoghurt	3.0	Egg	3.9	Beans	4.3	Chili pepper	4.7	Tortilla, *maseca*	4.3	Chicken meat	2.6
7	Nopal	2.3	Potato	3.7	Egg	4.2	Chocolate drink, fortified	4.5	Bread, refined	3.5	Breakfast cereal	2.6
8	Beans	2.2	*Pan dulce*	2.9	Pork meat	3.3	Tomato	4.0	Tortilla, wheat	3.1	Fish, canned tuna	2.4

Dietary intakes related to non-communicable disease risk

	Sugar-sweetened beverages	**Saturated fat**	**Fruits and Vegetables**
Percent consuming recommendation (Figures F1–F3)	3% or less of energy	10% or less of energy	400 g or more
%	8.9	32.7	2.7

Contribution to intake by individual food (Figures G1–G3)

	Sugar-sweetened beverages		**Saturated fat**		**Fruits and vegetables**	
	Beverage	%	Food or beverage	%	Food	%
1	Soft drink	54.5	Beef meat	11.4	Tomato	17.3
2	Water-based flavoured drink	23.5	*Pan dulce*	10.2	Onion	13.7
3	Coffee	12.1	Cheese	10.2	Orange	6.9
4	Fruit juice (not 100%)	10.5	Milk, full fat	9.9	Apple	6.8
5	Cereal-based drink	1.6	Animal fat	6.2	Banana	6.8
6	Sports drink	1.0	Vegetable oil	4.5	Nopal	4.7
7	Tea	0.9	Chicken meat	4.2	Chili pepper	4.6
8	Energy drink	0.1	Pork sausage	3.9	Avocado	4.5
9	Chocolate drink	0.1	-	-	-	-

Rural men aged 19–50 years

Mexico 2012

Overall diet

Contribution to energy intake by food group (Figure A)

	Food group	%
1	Cereals and their products	39.3
2	Meat and meat products	11.7
3	Beverages	11.7
4	Sweets and sugars	10.5
5	Fats and oils	6.5
6	Pulses, seeds and nuts and their products	5.6
7	Milk and milk products	4.5
8	Fruits and their products	2.5

	Food group	%
9	Eggs and their products	2.3
10	Vegetables and their products	2.2
11	Roots, tubers, plantains and their products	1.1
12	Savoury snacks	1.0
13	Fish, shellfish and their products	0.8
14	Spices and condiments	0.5
15	Non-disaggregated composite dishes	0.3
16	Other miscellaneous	0.1

Micronutrient intake adequacy

	Calcium	Iron	Zinc	Vitamin A	Folate	Vitamin B12
Prevalence of micronutrient intake adequacy (Figures B1–B6)	60.0%	88.8%	49.7%	0.9%	36.2%	59.6%
Extent of the micronutrient intake gap (Figures C1–C6)						
Median intake	850 mg	15.0 mg	9.4 mg	290 mcg RAE	264 mcg DFE	2.30 mcg
Target intake	1113 mg	17.7 mg	14.0 mg	772 mcg RAE	498 mcg DFE	3.55 mcg
Gap	263 mg	2.7 mg	4.7 mg	482 mcg RAE	234 mcg DFE	1.26 mcg

NOTES: RAE = retinol activity equivalent. DFE = dietary folate equivalent.

Contribution to micronutrient intake by food group (Figures D1–D6)

	Calcium Food group	%	Iron Food group	%	Zinc Food group	%	Vitamin A Food group	%	Folate Food group	%	Vitamin B12 Food group	%
1	Cereals and their products	41.8	Cereals and their products	51.2	Cereals and their products	34.9	Vegetables and their products	30.2	Pulses, seeds and nuts and their products	23.0	Meat and meat products	73.8
2	Milk and milk products	19.5	Meat and meat products	10.7	Meat and meat products	29.6	Meat and meat products	17.7	Cereals and their products	19.6	Milk and milk products	11.4
3	Beverages	19.0	Pulses, seeds and nuts and their products	8.7	Pulses, seeds and nuts and their products	9.8	Milk and milk products	17.7	Sweets and sugars	17.5	Fish, shellfish and their products	9.2
4	Vegetables and their products	4.2	Sweets and sugars	6.7	Milk and milk products	6.9	Eggs and their products	15.7	Eggs and their products	12.6	Eggs and their products	6.4
5	Pulses, seeds and nuts and their products	4.1	Vegetables and their products	5.9	Eggs and their products	4.4	Beverages	6.7	Vegetables and their products	8.0	Beverages	1.1
6	Sweets and sugars	3.7	Beverages	4.4	Vegetables and their products	4.0	Cereals and their products	5.2	Fruits and their products	6.5	Non-disaggregated composite dishes	0.7
7	Eggs and their products	2.2	Roots, tubers, plantains and their products	4.0	Beverages	3.7	Fruits and their products	3.8	Beverages	5.0	Sweets and sugars	0.4
8	Meat and meat products	2.0	Eggs and their products	3.7	Sweets and sugars	3.3	Fish, shellfish and their products	1.1	Meat and meat products	3.5	Spices and condiments	0.3

Rural men aged 19–50 years

Mexico 2012

Contribution to micronutrient intake by individual food (Figures E1–E6)

	Calcium Food	%	**Iron** Food	%	**Zinc** Food	%	**Vitamin A** Food	%	**Folate** Food	%	**Vitamin B12** Food	%
1	Tortilla, maize	35.8	Tortilla, maize	40.4	Tortilla, maize	25.1	Beef, liver	15.9	Beans	16.3	Beef meat	57.8
2	Water	10.9	Beans	6.9	Beef meat	15.3	Egg	15.7	*Pan dulce*	15.5	Beef, liver	9.1
3	Milk, full fat	10.3	Beef meat	4.6	Beans	7.7	Milk, full fat	9.9	Egg	12.6	Milk, full fat	7.9
4	Cheese	7.4	Egg	3.7	Chicken meat	5.2	Carrot	8.1	Tortilla, *maseca*	6.5	Egg	6.4
5	Beans	3.1	Potato	3.6	Pork meat	5.0	Chili pepper	7.4	Pigeon pea	4.7	Fish, fresh	6.2
6	Water-based flavoured drink	2.8	Bread, refined	3.4	Egg	4.4	Cheese	5.6	Tortilla, wheat	3.0	Pork meat	2.6
7	Coffee	2.4	*Pan dulce*	2.9	Milk, full fat	3.2	Tomato	4.8	Bread, refined	2.8	Cheese	2.5
8	Egg	2.2	Chili pepper	2.5	Cheese	3.0	Chicken meat	2.7	Breakfast cereal	2.4	Chicken meat	1.9

Dietary intakes related to non-communicable disease risk

	Sugar-sweetened beverages	**Saturated fat**	**Fruits and Vegetables**
Percent consuming recommendation (Figures F1–F3)	3% or less of energy	10% or less of energy	400 g or more
%	10.9	72.6	9.8

Contribution to intake by individual food (Figures G1–G3)

	Sugar-sweetened beverages Beverage	%	**Saturated fat** Food or beverage	%	**Fruits and vegetables** Food	%
1	Soft drink	61.8	*Pan dulce*	14.8	Tomato	19.7
2	Water-based flavoured drink	17.6	Beef meat	13.7	Onion	18.1
3	Coffee	12.2	Milk, full fat	7.5	Banana	9.4
4	Cereal-based drink	5.0	Cheese	7.1	Orange	5.6
5	Fruit juice (not 100%)	4.9	Vegetable oil	5.8	Chili pepper	5.1
6	Chocolate flavoured drink	0.5	Pork meat	5.1	Apple	4.2
7	Tea	0.2	Egg	5.1	Tomatillo	4.2
8	Sports drink	0.2	Chicken meat	4.9	Mango	4.1
9	Energy drink	0.2	-	-	-	-

Urban men aged 19–50 years

Mexico 2012

Overall diet

Contribution to energy intake by food group (Figure A)

	Food group	%
1	Cereals and their products	31.2
2	Beverages	14.8
3	Meat and meat products	13.1
4	Sweets and sugars	11.3
5	Milk and milk products	7.5
6	Fats and oils	6.5
7	Fruits and their products	3.0
8	Pulses, seeds and nuts and their products	2.9

	Food group	%
9	Eggs and their products	2.4
10	Vegetables and their products	2.2
11	Savoury snacks	1.9
12	Spices and condiments	1.3
13	Non-disaggregated composite dishes	1.1
14	Roots, tubers, plantains and their products	0.8
15	Fish, shellfish and their products	0.6
16	Other miscellaneous	0

Micronutrient intake adequacy

	Calcium	Iron	Zinc	Vitamin A	Folate	Vitamin B12
Prevalence of micronutrient intake adequacy (Figures B1–B6)	67.9%	87.5%	59.4%	11.2%	51.5%	82.8%
Extent of the micronutrient intake gap (Figures C1–C6)						
Median intake	890 mg	14.6 mg	10.2 mg	421 mcg RAE	325 mcg DFE	3.32 mcg
Target intake	1125 mg	17.5 mg	14.4 mg	828 mcg RAE	534 mcg DFE	4.16 mcg
Gap	235 mg	2.9 mg	4.2 mg	407 mcg RAE	209 mcg DFE	0.84 mcg

NOTES: RAE = retinol activity equivalent. DFE = dietary folate equivalent.

Contribution to micronutrient intake by food group (Figures D1–D6)

	Calcium Food group	%	Iron Food group	%	Zinc Food group	%	Vitamin A Food group	%	Folate Food group	%	Vitamin B12 Food group	%
1	Cereals and their products	31.3	Cereals and their products	43.4	Meat and meat products	33.5	Milk and milk products	26.1	Cereals and their products	25.2	Meat and meat products	55.7
2	Milk and milk products	30.6	Meat and meat products	13.8	Cereals and their products	28.7	Vegetables and their products	24.8	Sweets and sugars	19.7	Milk and milk products	22.3
3	Beverages	17.1	Sweets and sugars	9.6	Milk and milk products	10.7	Eggs and their products	13.7	Eggs and their products	12.5	Fish, shellfish and their products	9.7
4	Sweets and sugars	5.0	Vegetables and their products	5.9	Sweets and sugars	6.0	Beverages	10.6	Pulses, seeds and nuts and their products	9.5	Eggs and their products	8.4
5	Vegetables and their products	4.2	Pulses, seeds and nuts and their products	5.4	Pulses, seeds and nuts and their products	5.2	Meat and meat products	8.6	Beverages	7.8	Non-disaggregated composite dishes	1.3
6	Meat and meat products	2.9	Beverages	5.4	Eggs and their products	4.6	Fruits and their products	4.9	Vegetables and their products	7.7	Sweets and sugars	1.3
7	Pulses, seeds and nuts and their products	2.7	Eggs and their products	4.3	Beverages	3.8	Cereals and their products	3.9	Fruits and their products	6.7	Spices and condiments	1.1
8	Eggs and their products	2.3	Milk and milk products	3.6	Vegetables and their products	3.5	Sweets and sugars	2.4	Milk and milk products	3.7	Beverages	0.7

Urban men aged 19–50 years

Mexico 2012

Contribution to micronutrient intake by individual food (Figures E1–E6)

	Calcium		**Iron**		**Zinc**		**Vitamin A**		**Folate**		**Vitamin B12**	
	Food	%	Food	%	Food	%	Food	%	Food	%	Food	%
1	Tortilla, maize	22.3	Tortilla, maize	26.6	Beef meat	19.5	Egg	13.7	*Pan dulce*	14.1	Beef meat	41.7
2	Milk, full fat	16.4	Bread, refined	7.5	Tortilla, maize	15.4	Milk, full fat	13.5	Egg	12.5	Milk, full fat	15.1
3	Cheese	9.9	Beef meat	6.6	Milk, full fat	5.4	Carrot	11.5	Beans	8.4	Egg	8.4
4	Water	8.5	Beans	4.3	Chicken meat	4.8	Cheese	7.5	Tortilla, *maseca*	6.2	Fish, fresh	6.2
5	Water-based flavoured drink	3.7	Egg	4.3	Egg	4.6	Chocolate drink, fortified	4.9	Tortilla, wheat	5.6	Cheese	4.2
6	Bread, refined	3.0	*Pan dulce*	3.5	Pork meat	4.2	Chili pepper	4.3	Bread, refined	5.4	Pork sausage	2.8
7	Yoghurt	2.9	Potato	3.4	Bread, refined	4.2	Sour cream	3.4	Breakfast cereal	4.6	Pork meat	2.8
8	Tortilla, wheat	2.7	Tortilla, *maseca*	2.5	Beans	4.1	Mango	3.3	Pizza	3.1	Yoghurt	2.2

Dietary intakes related to non-communicable disease risk

	Sugar-sweetened beverages	**Saturated fat**	**Fruits and Vegetables**
Percent consuming recommendation (Figures F1–F3)	3% or less of energy	10% or less of energy	400 g or more
%	4.8	30.6	13.3

Contribution to intake by individual food (Figures G1–G3)

	Sugar-sweetened beverages		**Saturated fat**		**Fruits and vegetables**	
	Beverage	%	Food or beverage	%	Food	%
1	Soft drink	66.9	Beef meat	14.6	Onion	17.4
2	Water-based flavoured drink	19.8	*Pan dulce*	11.7	Tomato	15.8
3	Fruit juice (not 100%)	6.8	Milk, full fat	9.5	Banana	9.8
4	Coffee	5.9	Cheese	8.6	Apple	5.9
5	Cereal-based drink	1.4	Animal fat	5.6	Orange	4.8
6	Chocolate flavoured drink	0.8	Pork sausage	4.3	Avocado	4.6
7	Tea	0.6	Egg	4.3	Mango	4.5
8	Sports drink	0.4	Vegetable oil	4.0	Chili pepper	4.5

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