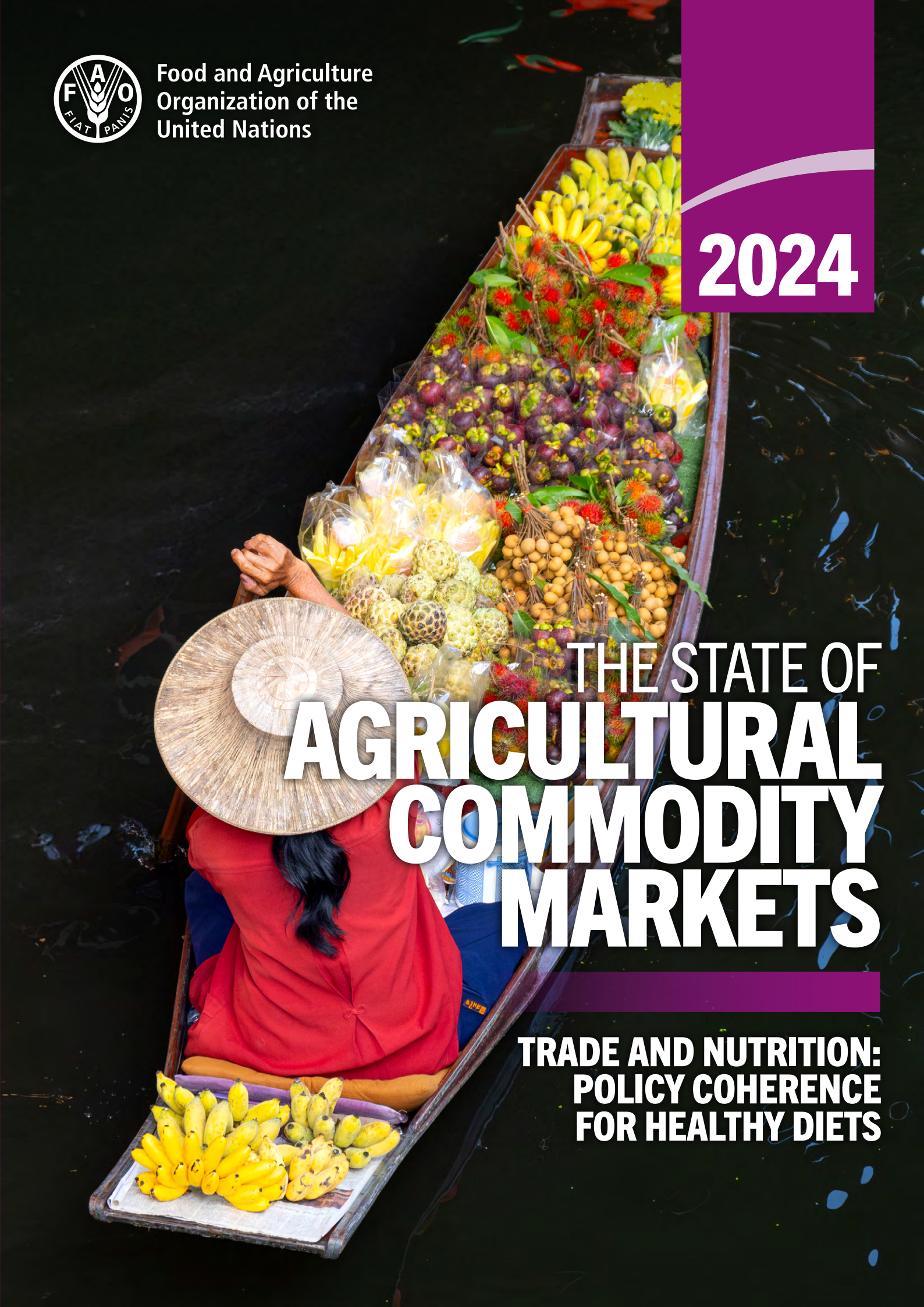

Food and Agriculture Organization of the United Nations

2024

THE STATE OF AGRICULTURAL COMMODITY MARKETS

TRADE AND NUTRITION: POLICY COHERENCE FOR HEALTHY DIETS

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THAILAND. Farmer heading to a floating market to sell organic produce.

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THE STATE OF AGRICULTURAL COMMODITY MARKETS

TRADE AND NUTRITION: POLICY COHERENCE FOR HEALTHY DIETS

Food and Agriculture Organization of the United Nations
Rome, 2024

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FOREWORD

Trade has played a vital role in human existence since the Neolithic period when foods, seeds and tools were exchanged through social networks and trade routes that connected our ancestors. Today, global food markets continue to connect people and countries and play a critical role in our agrifood systems. They facilitate the movement of food from surplus to deficit regions, share the food diversity and thereby contribute to global food security and nutrition.

Together with an increasingly interconnected worldwide economy, food markets have become more globalized and complementary. Between 2000 and 2022, the volume of food trade more than doubled. This surge reflects a world where more countries trade food with each other, with emerging economies becoming important players and low-income countries being better integrated into global food markets. Without a doubt, this significant expansion of food trade affects the availability, accessibility, affordability and diversity of foods in domestic markets and has important implications for our daily diets.

The 2024 edition of *The State of Agricultural Commodity Markets* (SOCO) explores the intricate linkages between food trade, diets and nutrition. Trade can affect diets and nutrition through many channels and its effects can be heterogeneous as, by its very nature, trade is intertwined with economic growth, demographic shifts and societal interactions. The report provides comprehensive evidence of how trade affects supply and price, two essential elements of the food environment, which, in turn, can influence dietary patterns and contribute to nutritional outcomes.

Today, in most high- and upper-middle-income countries, dietary patterns and lifestyles have contributed to a high prevalence of overweight and obesity. Many low- and lower-middle-income countries are also experiencing rapid shifts in dietary patterns and an increasing prevalence of overweight and obesity, while many have not yet been able to eradicate undernutrition. As a result, these countries are burdened with various forms of malnutrition including undernutrition, micronutrient deficiency, overweight and obesity all co-existing within the same country, community or household.

Healthy diets and good nutrition are necessary throughout the life course for survival, health, growth, development and all aspects of well-being. Eating a diet that is adequate in nutrients, diverse across food groups, balanced in energy, moderate in unhealthy food consumption and safe helps us to grow, stay healthy and live active lives. The aspiration to end hunger and all forms of malnutrition, while promoting sustainable agrifood systems, is at the core of Sustainable Development Goal 2 (Zero Hunger). With the Sustainable Development Goals intrinsic to FAO's work, in 2021, the Organization adopted the Strategic Framework 2022–31, developed to support achieving the 2030 Agenda for Sustainable Development through the transformation to MORE efficient, inclusive, resilient and sustainable agrifood systems under four pillars – the "four betters". One of the pillars, *better nutrition*, aims to end hunger, achieve food security and improve nutrition in all its forms through increased access to and consumption of healthy diets.

Food trade impacts nutrition through its effects on the availability, diversity and prices of foods. It can also have indirect impacts on nutrition through its effect on incomes, as trade can facilitate the structural transformation of the economy and growth.

Openness to trade can significantly increase the diversity of foods available for consumption in a country, a prerequisite to achieving healthy diets. Not all countries are endowed with adequate natural resources such as land and water to efficiently produce a wide variety of foods in sufficient quantities to meet the dietary needs and food preferences of their populations. As countries import foods that they are not able to produce efficiently, trade generates economic gains and, at the same time, it expands the variety of foods in a country, contributing to the diversity of foods available and potentially to nutrient

FOREWORD

supply. Indeed, the report finds that between 2010 and 2020, the average supply per capita of micronutrients across countries increased largely due to the expansion of trade. At the same time, food prices tend to be lower in countries that are more open to trade.

The contribution of trade to food availability, accessibility and affordability can inform the discussions on policy approaches to trade openness as compared with food self-sufficiency. The expansion of global food trade has been influenced by multilateral trade rules that have shaped a freer, fairer and more predictable trade environment, which, along with an increasing number of regional trade agreements, has promoted trade in food.

With the global rise in obesity affecting all world regions, there has been a growing emphasis on global guidelines and national policies in many countries. The report delves into the ongoing debate about the role of trade in undermining diet quality, and discusses the relationship between trade liberalization and regional trade agreements.

SOCO 2024 also examines the intersection of trade and nutrition policies such as food labelling and taxation and provides policymakers with an understanding of how such measures can support nutrition objectives in the changing landscape of global agrifood systems.

Regional trade agreements, which aim at deepening economic integration, are pivotal in shaping trade dynamics and the composition of food imports. The report accentuates that at a national level, there is scope to enhance policy coherence between trade and nutrition sectors by, for example, establishing mechanisms to facilitate collaboration between trade policymakers and those responsible for nutrition measures when negotiating and implementing trade agreements.

This edition of SOCO offers robust evidence and valuable insights for policymakers and other partners, enabling them to take practical steps towards enhancing access to nutritious food and enabling the consumption of healthy diets for improved nutrition. Achieving policy coherence between trade and nutrition sectors is imperative for addressing all the dimensions of sustainable development. Strengthening capacity among policymakers and partners can promote effective collaboration. FAO is steadfast in its commitment to collaborative efforts to advance the 2030 Agenda for Sustainable Development and the Sustainable Development Goals, striving towards the four betters: *better production*, *better nutrition*, a *better environment* and a *better life* – leaving no one behind.

Qu Dongyu
FAO Director-General

METHODOLOGY

The work on *The State of Agricultural Commodity Markets 2024* (SOCO 2024) began in June 2023. The research and writing team was composed of five staff members of the Food and Agriculture Organization of the United Nations (FAO) who were responsible for the data analysis, research and writing of the report. The FAO Statistics Division provided the datasets used in this report. A group of FAO's Food and Nutrition Division experts was engaged to support the writing team in developing this edition of the report. In light of the intensive data work required to inform the writing of the report, FAO engaged leading external experts in the area of food trade and nutrition to produce additional analytical work as follows:

For **Part 1**, econometric modelling exercises were undertaken to assess the long-term relationship between gross domestic product (GDP) growth and nutrition transition, and whether dietary patterns converged between countries at different levels of development. A literature review on the role of Foreign Direct Investment (FDI), local food industries and nutrition was commissioned to support the writing of the chapter.

For **Part 2**, analytical work was commissioned to assess the evolution of international food trade in terms of nutrient flows and examine the potential relationship between trade openness and nutritional outcomes.

For **Part 3**, technical work was commissioned to calculate food diversity indicators and nutrient gaps, and econometric models were developed to identify the relationships among food diversity, nutrient gaps and the role of trade. Analytical work was also commissioned to quantify implicit nutrient prices and their association with trade. Analysis was undertaken to assess the relationship between trade openness and the cost and affordability of a healthy diet.

For **Part 4**, technical work was commissioned to apply an import demand gravity model to estimate the impact of regional trade agreements on food trade and assess whether trade agreement provisions affected different types of foods differently.

For **Part 5,** an external expert produced a critical review of trade policies and nutrition measures with an analysis of the policy space available to pursue nutritional goals.

The manuscript was reviewed extensively by both internal and external experts who provided substantive comments and advice on the analysis of the report. The report was reviewed and discussed by the management team of the FAO Economic and Social Development stream in June 2024.

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Research and writing team
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ABBREVIATIONS

ALOP	Appropriate Level of Protection
AMS	Aggregate Measurement of Support
AoA	Agreement on Agriculture (WTO)
BMI	body mass index
CoAHD	cost and affordability of a healthy diet
FAO	Food and Agriculture Organization of the United Nations
FDI	foreign direct investment
FoPL	front-of-package nutrition labelling
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GIFT	Global Individual Food consumption data Tool
ICN2	Second International Conference on Nutrition
IFAD	International Fund for Agricultural Development
MERCOSUR	Southern Common Market
NAFTA	North American Free Trade Agreement
NCD	non-communicable diseases
NTM	non-tariff measures
OECD	Organisation for Economic Co-operation and Development
PPP	purchasing power parity
RTA	regional trade agreements
SDG	Sustainable Development Goals
SPS	sanitary and phytosanitary measures
TBT	technical barriers to trade
UNCTAD	UN Trade and Development
UNICEF	United Nations Children's Fund
VAT	value-added tax
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization
WTO	World Trade Organization

EXECUTIVE SUMMARY

Trade is integral to our agrifood systems as it fulfils the fundamental function of moving food from surplus to deficit regions, thus contributing to food security globally. Global food markets connect people and countries across the globe, contribute to efficient natural resources use worldwide, facilitate the supply of sufficient, safe and diverse food and generate income for farmers and those employed in the food and agricultural sectors. Trade is inherent to the economic, social and environmental dimensions of sustainable development. It is closely related to economic growth, it interacts with people and links with the environment.

Since the beginning of the twenty-first century, globalization and trade increased significantly. Food and agricultural trade nearly quintupled, rising from USD 400 billion in 2000 to USD 1.9 trillion in 2022. Food trade made up around 85 percent of all trade in food and agriculture. The energy it carried more than doubled between 2000 and 2021, reaching almost 5 000 trillion kilocalories in 2021. Adjusted for global population growth, food trade increased from 930 kcal per capita per day in 2000 to 1 640 kcal per capita per day in 2021.

This expansion in global food trade has been influenced by the establishment of the World Trade Organization (WTO) in 1995. WTO's multilateral trade rules have shaped a freer, fairer and more predictable trade environment, which, together with an increasing number of regional trade agreements, have promoted food and agricultural trade and economic growth.

Nevertheless, the rapid globalization of food markets has raised concerns about the potential impacts of progressively increasing food trade on societies. Food production for exports is seen as contributing to the depletion of natural resources. Trade could widen inequality, especially in countries where the agricultural sector is made up of a large number of resource-poor farmers who cannot compete globally. More exposure to global food markets could result in an increased availability of energy-dense foods with low nutritional value relative to nutritious foods, which could contribute towards unhealthy or poor diets, worsening nutritional outcomes.

The 2024 edition of *The State of Agricultural Commodity Markets* (SOCO 2024) explores the complex linkages between food trade and nutrition and generates evidence to identify how trade affects dietary patterns and nutritional outcomes. The report examines the intersection of trade policies and nutrition measures and provides policymakers with an understanding of how to address nutrition objectives in the changing landscape of global agrifood systems.

DEVELOPMENT AND THE NUTRITION TRANSITION

Placing the trade–nutrition nexus in the broader context of development shows how dietary patterns change because of economic, social and demographic dynamics. Economies develop through a process of structural transformation in which agriculture can play a key role. Economic growth is fuelled by a reallocation of economic activities from agriculture to other more productive sectors such as manufacturing and services. The structural transformation of the economies entails rising incomes, urbanization, deeper integration into global markets, the rise of modern industry and services, and lifestyle changes.

Along the development path, income growth, urbanization, globalization and changes in employment are interrelated, occur simultaneously and reinforce each other. All affect food consumption and the composition of diets, giving rise to a nutrition transition.

Income growth is a major driver of the nutrition transition. As incomes rise, dietary patterns shift from being predominantly composed of staple foods to becoming more diverse with people consuming more meat and fish, milk and dairy products, eggs, fruits and vegetables.

Together with the shift towards more diverse dietary patterns, the consumption of processed and ultra-processed foods high in fats, sugars and/or salt increases, contributing to the prevalence of overweight and obesity.

At the same time, as urbanization progresses, more women and men work outside the household and spend more time commuting to their jobs. This can affect food preparation in the household, driving the purchase of pre-prepared or ready-to-eat foods and to more food being consumed away from home. Since the 1980s, the transformation of the food processing industry and food retail sector has been a major factor in facilitating the nutrition transition in developing countries and emerging economies.

The nutrition transition is reflected by a decline in the prevalence of undernourishment and stunting in children under five years of age and an upward trend in the prevalence of overweight and obesity.

The prevalence of undernourishment in the world declined significantly from 12.7 percent to 9.2 percent between 2000 and 2022. In this same period, the prevalence of obesity in the adult population increased from 8.7 percent in 2000 to 15.8 percent in 2022 globally. In some high- and middle-income countries, over one-third of the adult population is obese. Overweight and obesity are increasing rapidly in countries that have not yet been able to eradicate the various forms of undernutrition, giving rise to multiple burdens of malnutrition.

TRADE IMPACTS ON NUTRITION

The linkages between trade and dietary patterns and resulting nutritional outcomes are intricate. Trade can affect nutrition through many direct and indirect pathways and complex mechanisms.

Trade is an accelerator of the nutrition transition. Its effects on food availability, dietary patterns and resulting nutritional outcomes can be widely heterogeneous across countries, population groups and individuals.

Trade's effects can vary across countries both in direction and magnitude, depending on a country's position on the development path, the size and structure of its economy and its agricultural sector, income per capita, demographic characteristics, and the national policy environment. This, and the multi-causal nature of all forms of malnutrition renders the relationship between trade and nutrition outcomes ambiguous and challenging to identify and measure empirically. For example, analysis suggests that openness to trade reduces stunting in children under five years of age at all levels of development. The effects of trade on overweight and obesity appear to be highly context specific. In import-dependent countries with limited domestic food and agricultural production capacity, food trade can be associated with an increasing prevalence of obesity.

Trade can directly impact nutrition through its effects on the availability, diversity and prices of foods. More indirect channels in which trade affects nutrition are through its effects on the wider economy.

Opening to food trade allows for more food imports and thus increases the availability of foods for consumption in a country. This can spur economic growth, accelerating the process of structural transformation, as food imports allow the workforce initially bound in agriculture to be freed-up and to migrate to more productive non-farm sectors.

TRADE EFFECTS ON THE DIVERSITY OF FOOD SUPPLY

Natural resources necessary for food production such as land and water are unevenly distributed across countries and climatic conditions vary widely. Some countries can produce only a small range of products, while others possess abundant natural resources and produce a large variety of foods. For example, China, one of the largest countries in the world by area, produced around 320 different items in 2020, as compared

with Kiribati, a small island developing state, that produced only 15 different terrestrial food items.

By participating in global food markets, most countries in the world would export foods that they can produce in abundance and import foods that can be more efficiently produced in other countries. At the country level, trade increases the overall diversity of foods available all-year-round. Small countries that face significant agroclimatic and natural resource constraints in food production achieve high levels of diversity through trade. Since not every country has a well-developed food processing industry, similar trade impacts can be found for diversity in processed foods.

On average, trade increases the diversity of foods available for consumption nearly twofold. At the same time, countries import around three times as many different processed and ultra-processed foods as they produce.

Openness to trade promotes specialization in the production of some foods, which, given natural resource endowments and the structure of the farm sector, can be produced at relatively lower costs, strengthening the competitiveness in global food markets. Net-importing countries can achieve a higher diversity of food supplies relative to export-oriented countries that experienced fast growth in their agricultural exports in the last decades.

TRADE AND THE NUTRIENT GAP

Globally, current food production provides an adequate supply of most nutrients. Nevertheless, many countries cannot produce a wide range of foods in sufficient quantities to meet their population's average nutrient requirements, and gaps in nutrient supply have been identified for several micronutrients in many countries, for example, for vitamin A and calcium. Trade can be an important contributor to bridging nutrient supply gaps. Food imports are critical for many countries to meet the dietary needs of their populations to maintain the health and nutritional well-being of all people. With the increase in food trade, there has been a corresponding rise in the trade of nutrients.

Between 2010 and 2020 the expansion of trade helped increase the average supply per capita of micronutrients across countries.

For example, during this period, the per capita trade of the B-vitamins riboflavin and thiamine and the minerals calcium and zinc increased by around 40 percent. The adequacy of a nutrient supply is affected by many factors such as natural resource endowments, climate and population density. Although the adequacy of the nutrient supply can be high in countries that are relatively less integrated in global markets, it is always high at elevated levels of trade openness.

TRADE IMPACTS ON FOOD PRICES

Food prices are an important pathway through which trade affects diets and ultimately nutrition. Within a country, imports can increase food availability and can lower domestic food prices. This can result in gains for consumers, for whom access to more diverse foods is improved.

Trade openness can affect the relative prices of different foods, which, in turn, can influence household food consumption and dietary patterns but this effect will depend on the intensity of trade. Foods that are produced and transported in bulk and can be stored for extended periods of time such as staple foods are traded more intensively than foods that require more resources for transportation such as fruits and vegetables.

Trade can help narrow the differences among prices of similar foods across countries, depending on how intensively these foods are traded. While trade has a significant effect on staple food prices, its impact on the prices of fruits and vegetables is small, and depends on the income levels of the countries.

Indeed, around 50 percent of the cheapest foods that are included in the Food and Agriculture Organization of the United Nation's (FAO) cost and affordability of a healthy diet index tend to be domestically sourced and not intensively traded; therefore, the direct impact of trade on their prices may be limited. Nevertheless, trade policies such as import tariffs do not appear to have a disproportionate effect on different foods.

On average, lower import tariffs are associated with lower food prices, whether the foods are included in the healthy diet basket or not.

Across countries lower import tariffs can result, on average, in a lower food price level and improve access to food. This relationship is not driven only by lower prices of foods of high energy density and minimal nutritional value but by all foods.

DOES TRADE CONTRIBUTE TO OBESITY?

Over the past decades, there has been increasing focus on obesity in global guidance and national policies in many countries, considering the political, economic, cultural and physical factors that would give rise to obesogenic environments. Nutrition experts point to a positive relationship between high consumption of ultra-processed foods of high energy density and, in some instances, low nutrient content and obesity. Ultra-processed foods can contain large amounts of free sugars and saturated fats, which can contribute to a high energy intake.

Income effects on the demand for food imports depend on the extent of processing. Processed and ultra-processed food imports respond strongly to income changes relative to unprocessed and minimally processed foods.

A 10 percent increase in income results in an 11 percent increase in the demand for imports of ultra-processed foods and a 7 percent increase in the demand for imports of unprocessed and minimally processed foods.

This is in line with the concept of nutrition transition, where increases in income can result in higher consumption of ultra-processed foods, including foods high in fats, sugars and/or salt.

Although, in 2021, the share of ultra-processed foods in total calories traded globally amounted to 7 percent, in the region of Oceania, which includes the Pacific Small Island Developing States with high levels of obesity, this share was significantly higher at 23 percent. For these islands, their geographical location results in high trade costs, constraining trade especially for fresh and perishable foods, which are relatively more expensive to transport than other foods.

The debate on whether trade promotes the availability of ultra-processed foods, contributing to obesity in the Pacific islands and other regions, also focuses on the role of trade liberalization and regional trade agreements. Modern and deeper regional trade agreements include provisions for deeper cooperation in regulation and standards to promote trade among their signatories and foresee a harmonization of sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBT) or provide for the mutual recognition of domestic standards. An analysis carried out for this report suggests that the depth of regional trade agreements (RTAs) in terms of SPS and TBT provisions affects the demand for food in different ways depending on the extent of processing.

Deep regional trade agreements with a focus on sanitary and phytosanitary measures and technical barriers to trade could facilitate imports of ultra-processed foods.

For example, RTAs with a high number of SPS provisions tend to facilitate imports of ultra-processed foods relative to other foods. TBT measures, including nutrition labelling, may affect import demand, leading to a lower expansion of trade in ultra-processed foods relative to the other processing levels of foods. This can have implications for trade policymakers who negotiate RTAs that are increasingly found in the spotlight of the public discourse surrounding nutrition.

TRADE POLICIES AND NUTRITION MEASURES: POLICY COHERENCE

Agricultural policies aim at ensuring food security sustainably and maintaining a level of farm income that keeps pace with the income trends in other economic sectors. Both domestic support and trade policy instruments are subject to the WTO rules and disciplines. Central to WTO agreements is the principle of non-discrimination, aimed at ensuring the fair and equitable treatment of all trade partners. This prohibits discrimination between like products of different foreign origins, as well as between like products of foreign and domestic origin.

However, there are concerns that WTO rules, as well as regional trade agreements, impose potential constraints on the policy space available for improving nutrition and enabling healthy diets, that is the ability of a government to pursue food and nutrition policies to achieve its own national goals.

Some countries use trade policy to address nutrition objectives. For example, in 2012, Fiji reduced tariffs on fruits and vegetables not grown domestically from 32 percent to 5 percent to explicitly promote healthier diets. In other instances, the use of trade policy instruments to improve nutrition has raised concerns about the principle of discrimination. For example, Samoa removed an import ban on turkey tails – an inexpensive meat cut with a high fat content – as part of their accession to WTO, largely due to concerns that it did not address other similar foods with high-fat content, and replaced the import ban with a tax measure.

World Trade Organization rules do not constrain the policy space of countries to pursue nutrition objectives, but they influence the choice of policy instruments due to the principle of non-discrimination.

For example, policy instruments such as excise taxes apply to both imported and domestically produced foods and beverages and can be effective in addressing nutrition objectives. Between 2017 and 2019, the percentage of World Health Organization (WHO) members implementing taxes on sugar-sweetened drinks rose from 23 percent to 38 percent.

Food labelling is one of the primary means of communication among actors along the value chain from the producer to the consumer. Nutrition labelling conveys the nutritional characteristics and attributes of foods to consumers, enabling them to make informed food choices.

In 2004, the World Health Organization proposed front-of-package nutrition labelling as a policy measure to improve diet and health.

A summary of key nutritional aspects and characteristics of food products can be conveyed in the form of an easy-to-understand label on the front of the package displaying logos, warning labels, symbols, icons, multiple traffic lights, or scores to lead to better consumer understanding and to support healthier food purchases.

Front-of-package nutrition labelling (FoPLs) is classified as TBT and thus are subject to the WTO Agreement on Technical Barriers to Trade. WTO members can request justifications for another member's FoPL if it significantly impacts trade, whether it is effective in addressing the relevant nutritional objective and whether there are alternative measures that could achieve the same result. At the WTO Committee on Technical Barriers to Trade, between 1995 and 2023, 77 specific trade concerns were raised by 37 countries pertaining to regulations on food and beverage products, out of which 52 were related to labelling requirements.

The discussions among countries at the World Trade Organization Committee on Technical Barriers to Trade may influence or could shape a country's nutrition policies related to food labelling so that their potential to support healthier food choices is proportional to their impact on trade.

Understanding the interface between trade and nutrition policies can inform the design of policies that are effective and consistent with WTO rules. At the national level, there is scope to strengthen policy coherence between trade and nutrition, for example, by establishing mechanisms to enable engagement between the health and trade sectors in the negotiation and implementation of trade agreements.

Building capacities among trade policymakers and nutrition officials fosters policy coherence between trade and nutrition. Stakeholder engagement and transparency in negotiating trade agreements are critical to making trade improve nutrition.

For deep trade agreements, policy coherence between trade and nutrition objectives, as well as stakeholder engagement and transparency, are critical in making the negotiations more inclusive. Promoting the engagement of all stakeholders, especially those related to nutrition and public health, and increasing transparency in negotiations for deeper trade agreements can ensure that increased trade will address food security, economic and nutrition objectives.

The development and clear communication of nutrition guidelines, together with a mandate to address nutrition-related health concerns, can support trade policy action for nutrition. Strengthening transparency through forums for government, non-governmental stakeholders, civil society and the knowledge community to discuss nutrition issues arising from trade is also important in assessing the potential impact of trade agreements on nutrition. ■

COUNTRY NOT SPECIFIED
A shopping cart filled with a variety of foods.

PART 1
THE NUTRITION TRANSITION

KEY MESSAGES

➔ Along the development path, income growth, urbanization, globalization and changes in employment are interrelated, occur simultaneously and reinforce each other. All affect food consumption and the composition of diets, giving rise to a nutrition transition.

➔ A decline in the prevalence of undernourishment and stunting in children under five years of age and an upward trend in the prevalence of overweight and obesity are salient features of the nutrition transition. These trends are evident across countries, as their economies develop and dietary patterns change.

➔ Income growth is a major driver of the nutrition transition, leading to a more diverse food environment and a declining share of staple foods in consumption. A more diverse food supply can provide the basis for better nutrition but can also result in a higher availability of ultra-processed foods including foods high in fats, sugars and/or salt, which can increase the prevalence of overweight and obesity.

➔ Trade is an accelerator of the nutrition transition. Its effects on food availability, dietary patterns and resulting nutritional outcomes can be widely heterogeneous across countries, population groups and individuals.

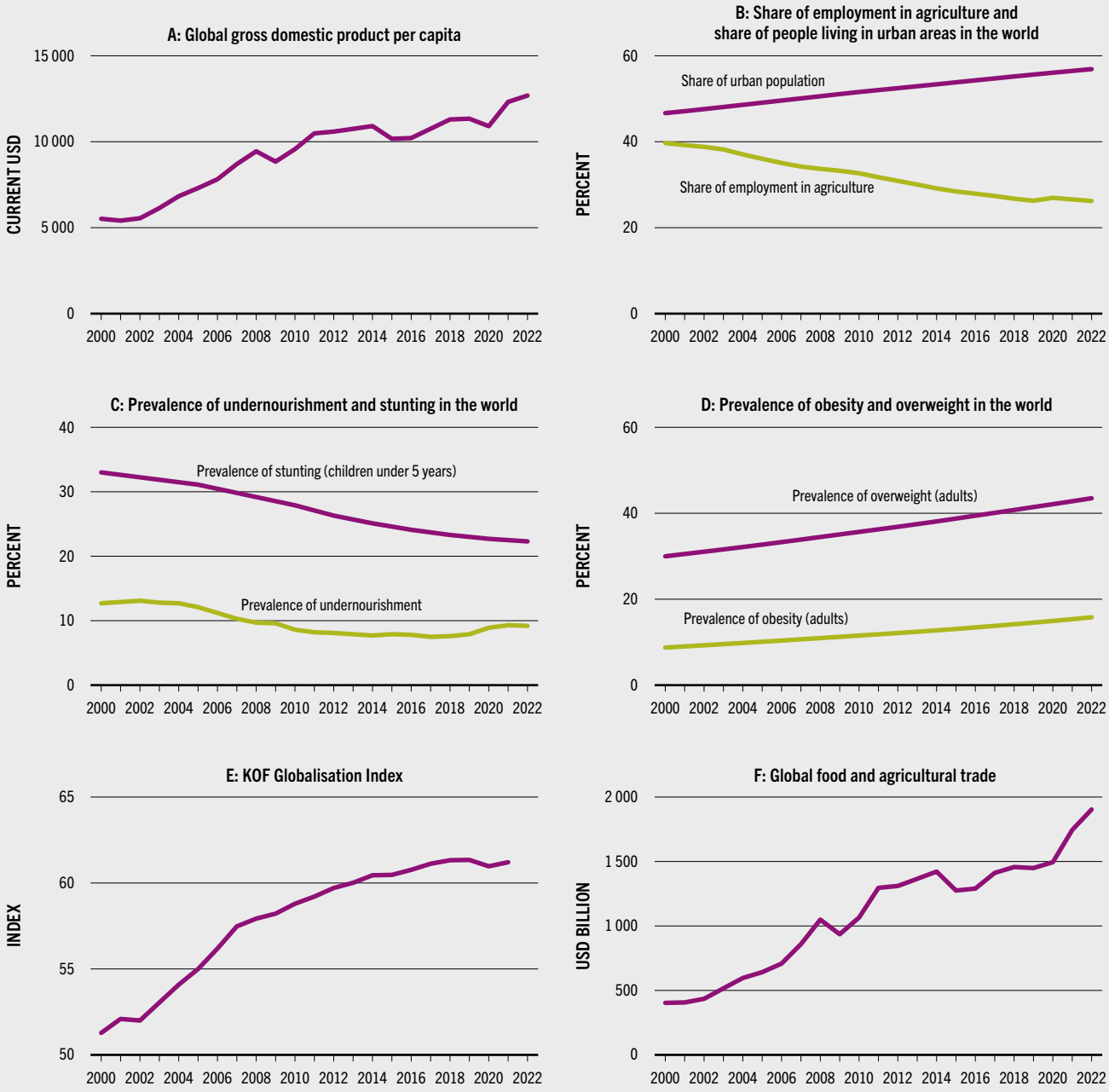
➔ Nutrition transition trends vary across countries and do not give rise to a globalized dietary pattern. Over the 1961–2019 period, the broad dietary patterns of high-income countries and emerging economies changed rapidly, with the share of staple foods in total calories available declining fast. During the same period, the dietary patterns of lower-income countries changed at a slower rate.

STRUCTURAL TRANSFORMATION AND THE NUTRITION TRANSITION

As countries develop, the relative importance of agriculture in gross domestic product (GDP) and employment declines. A reallocation of economic activities away from agriculture to other more productive sectors such as manufacturing and services takes place, fuelling economic growth. This structural transformation is also evident at the global level. On average, over the past decades, global GDP per capita more than doubled from USD 5 517 in 2000 to USD 12 688 in 2022, while the global share of agriculture in employment declined from 40 percent in 2000 to 26 percent in 2022 (Figure 1.1, panels A and B). Historically, this shift from a predominantly agrarian economy to one in which manufacturing and services play a larger role is also associated with urbanization, deeper integration into global markets and lifestyle changes including shifts in dietary patterns.

As the economy undergoes structural transformation, the reallocation of resources such as capital and labour across economic sectors increases productivity and income per capita.[1] With labour moving from agriculture to fast-growing, non-farm sectors, society becomes more urbanized. With this, the agglomeration of people and firms reduces transaction costs and allows technology spillovers, potentially resulting in further increases in productivity and income per capita in manufacturing and

FIGURE 1.1 STRUCTURAL TRANSFORMATION AND NUTRITION TRANSITION: MAIN DRIVERS AND OUTCOMES, 2000–2022



NOTES: Prevalence of obesity is defined as the percentage of adults whose body mass index (BMI) is equal to or greater than 30 kg/m^2. Prevalence of overweight is defined as the percentage of adults whose BMI is equal to or greater than 25 kg/m^2. The prevalence of stunting is defined as the percentage of children under the age of five years with a height-for-age less than -2 standard deviations below the World Health Organization Child Growth Standards median. The KOF Globalisation Index summarizes for each country the extent of trade, financial, interpersonal, informational, cultural and political globalization. Food and agricultural trade includes all food and agricultural products except fish and aquatic products.

SOURCES: Authors' own elaboration based on World Bank. 2024. World Development Indicators: GDP per capita (current US$). [Accessed on 12 April 2024]. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD. Licence: CC-BY-4.0; World Bank. 2024. World Development Indicators: Employment in agriculture (% of total employment) (modeled ILO estimate). [Accessed on 12 April 2024]. https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS. Licence: CC-BY-4.0; World Bank. 2024. World Development Indicators: Urban population (% of total population). [Accessed on 12 April 2024]. https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS. Licence: CC-BY-4.0; UNICEF, WHO & World Bank. 2023. Joint child malnutrition estimates (JME). In: *WHO*. Geneva, Switzerland. [Cited 15 June 2024]. https://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates; FAO. 2024. FAOSTAT: Suite of Food Security Indicators. [Accessed on 12 April 2024]. https://www.fao.org/faostat/en/#data/FS. Licence: CC-BY-4.0; WHO. 2024. The Global Health Observatory: Prevalence of obesity among adults. [Accessed on 27 May 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-); WHO. 2024. The Global Health Observatory: Prevalence of overweight among adults. [Accessed on 27 May 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-overweight-among-adults-bmi--25-(age-standardized-estimate)-(-); KOF Swiss Economic Institute. 2024. KOF Globalisation Index. In: *KOF Swiss Economic Institute*. Zurich, Switzerland. [Cited 12 April 2024]. https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html; Gygli, S., Haelg, F., Potrafke, N. & Sturm, J.-E. 2019. The KOF Globalisation Index – revisited. *The Review of International Organizations*, 14(3): 543–574. https://doi.org/10.1007/s11558-019-09344-2; FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Accessed on 12 April 2024]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig1.01

services.[2] Although the share of agriculture in GDP and employment declines, agricultural productivity per worker improves and farm incomes increase. Due to rural-to-urban migration and technological improvements, fewer people can produce more food.

Agriculture can play a key role along this development path. It provides resources such as labour to other economic sectors, and it addresses the economy's food needs.[3] Openness to trade plays an important role in sustaining growth rates.[4] Food and agricultural trade contribute to the structural transformation process, as cheaper imports can add to domestic food production and facilitate rural–urban migration.[5]

This structural change of both the traditional and modern sectors of the economy initiates the growth process, leading to sustained reductions in poverty and hunger and in higher standards of living, thereby transforming human lives.[a]

Along this development path, dietary patterns change, driven by structural transformation's economic, social and demographic dynamics. This nutrition transition takes place with changes in the types and quantities of foods consumed and the composition of diets. It is also reflected by a change in nutritional outcomes, most importantly, by a decline in the prevalence of undernourishment and the prevalence of stunting in children under five years of age and an upward trend in the prevalence of overweight and obesity.[b] In many developing countries, this shift from undernutrition to overweight and obesity is the most significant characteristic of the nutrition transition and is also evident in global averages. While the prevalence of undernourishment in the world declined significantly from 12.7 percent to 9.2 percent between 2000 and 2022 (Figure 1.1, panel C), the global prevalence of obesity in the adult population increased from 8.7 percent in 2000 to 15.8 percent in 2022 (Figure 1.1, panel D). Globally, the prevalence of stunting of children under five years of age declined from 33.0 percent in 2000 to 22.3 percent in 2022 (Figure 1.1, panel C). The prevalence of overweight in adults rose from 30.0 percent in 2000 to 43.5 percent in 2022 (Figure 1.1, panel D). In some high- and middle-income countries, over one-third of the adult population is obese. Overweight and obesity are increasing rapidly in countries that have not yet been able to eradicate the various forms of undernutrition, giving rise to multiple burdens of malnutrition.

The nutrition transition is driven by the same interrelated forces that shape the structural transformation of economies and bring about income growth, urbanization, the rise of the modern industry sector and integration in the global economy. The nutrition transition is also linked to increased life expectancy and reduced fertility rates. At the same time, disease patterns move from infectious and nutrient-deficiency diseases to a higher prevalence of overweight and obesity and diet-related non-communicable diseases (NCDs), including coronary heart disease, stroke, diabetes and some types of cancer.[6] Between 2000 and 2021, the global prevalence of diabetes increased from 4.6 to 9.8 percent.[7]

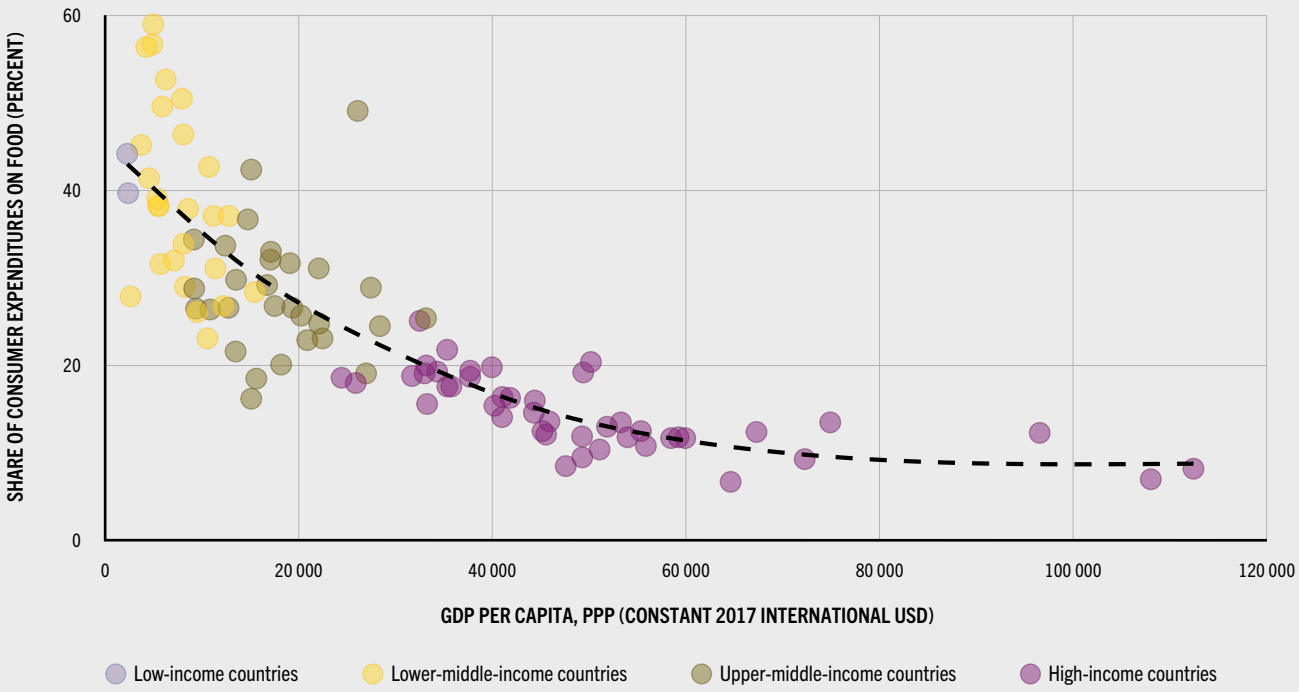
Income growth and the nutrition transition

Income growth is a major driver of the change in food consumption and dietary patterns. Poverty and chronic food insecurity are inextricably linked, and increasing incomes can lift people out of poverty and improve access to food. At low levels of income, a large portion of a household's expenditure is allocated to food. As incomes grow, the proportion of a household's budget spent on food declines. For example, household survey data across 46 countries between 1970 and 2007 suggest that, with few exceptions and across all development levels and regions, the poor spend a higher share of their

a Such patterns of structural transformation that distinguish the traditional and modern sectors of the economy have been observed historically in Northern America, Europe and in Eastern Asian countries such as China and the Republic of Korea during the 1970s and 1980s. Recent studies suggest that structural transformation in Latin America and Africa may not have followed exactly such patterns. For example, for Latin American countries, declining commodity prices during the 1990–2008 period affected the development path, while in Africa, most of the economic growth was due to productivity increases in agriculture. See Diao, X., McMillan, M. & Rodrik, D. 2019. *The recent growth boom in developing economies: A structural-change perspective*. Working Paper 23132. National Bureau of Economic Research. https://www.doi.org/10.3386/w23132

b The concept of a nutrition transition was developed by the nutrition researcher Barry M. Popkin. See Popkin, B.M. 1993. Nutritional Patterns and Transitions. *Population and Development Review*, 19(1): 138–157. https://doi.org/10.2307/2938388

FIGURE 1.2 ENGEL'S LAW: SHARE OF FOOD IN TOTAL CONSUMER EXPENDITURE AND GROSS DOMESTIC PRODUCT PER CAPITA, 2022



NOTES: The figure shows the relationship between the share of food in total consumer expenditure and gross domestic product (GDP) per capita across countries. PPP = purchasing power parity.

SOURCES: Authors' own elaboration based on USDA (United States Department of Agriculture). 2024. Data on expenditures on food and alcoholic beverages in selected countries. International Consumer and Food Industry Trends. In: *USDA*. Washington, DC. [Cited 4 March 2024]. https://www.ers.usda.gov/topics/international-markets-u-s-trade/international-consumer-and-food-industry-trends/#data; World Bank. 2024. World Development Indicators: GDP per capita, PPP (constant 2017 international $). [Accessed on 15 February 2024]. https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig1.02

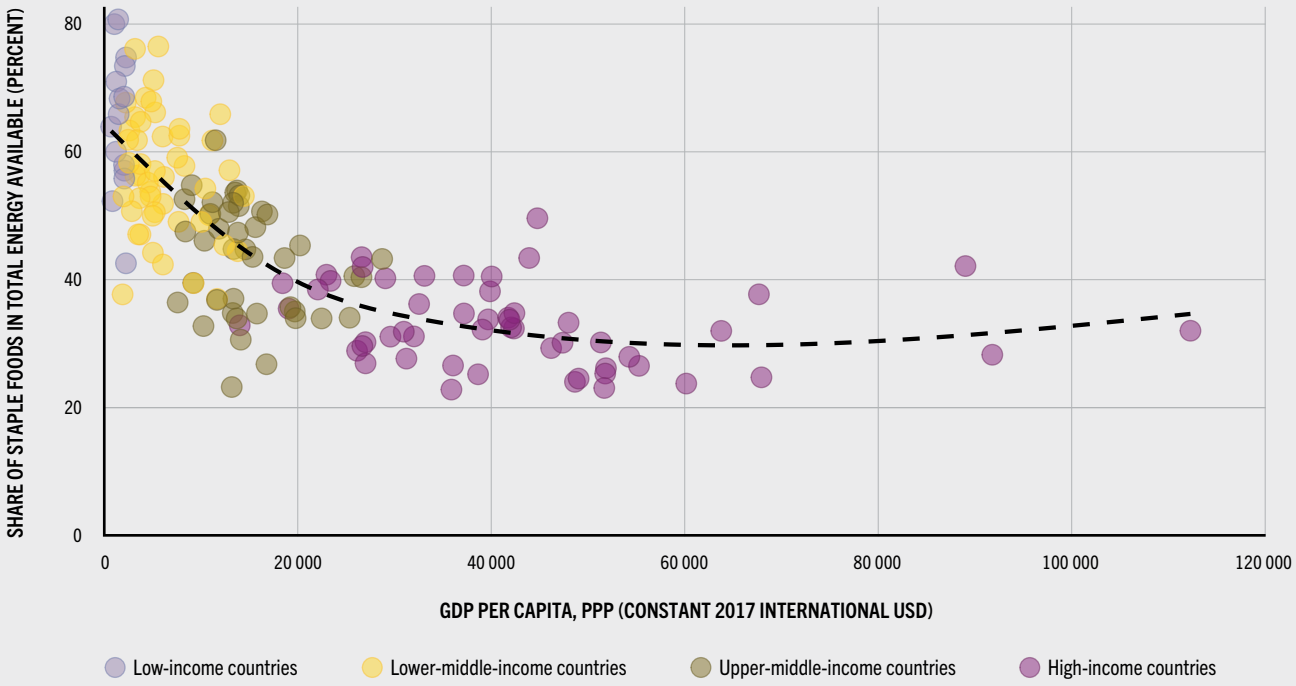
budget on food, compared with richer consumers. On average, the food budget share of the poorest households was found to be 20 percentage points higher than that of the richest households.[8]

This relationship between income and food expenditure – called Engel's law – suggests that a part of food consumption is independent of income because it is necessary to sustain life, and is found to be an empirical regularity of economic behaviour prevalent across populations and countries. For example, data suggest that in 2022 in Nigeria, where GDP per capita amounted to USD 4 963, food purchases comprised 59 percent of total consumer expenditure. In the same year, in the Kingdom of the Netherlands, a high-income country, consumers spent 11.8 percent of their total expenditure on food while GDP per capita amounted to USD 59 250. (Figure 1.2).[c, 9]

For the poor, as food budgets make up a large part of their income, diets tend to be

c In 1867, economist and statistician Ernst Engel (1821–1896) demonstrated that as incomes grow, food makes up for a smaller share of the total expenditure, while the share allocated to other expenditures (such as on housing or education) grows. In 1941, economist Merrill K. Bennet (1897–1969) observed that as income grows, the share of calories obtained from staples declines. Both relationships tend to be always present in the data and have been colloquially referred to as "laws" in the development economics literature.

FIGURE 1.3 BENNET'S LAW: SHARE OF STAPLE FOODS IN TOTAL ENERGY AVAILABLE FOR HUMAN CONSUMPTION AND GROSS DOMESTIC PRODUCT PER CAPITA, 2020



NOTES: The figure shows the relationship between the share of staple foods in total energy available for human consumption and gross domestic product (GDP). PPP = purchasing power parity.

SOURCES: Authors' own elaboration based on FAO. 2024. FAOSTAT: Food Balances. [Accessed on 10 May 2023]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0; World Bank. 2024. World Development Indicators: GPD per capita, PPP (constant 2017 international $). [Accessed on 15 February 2024]. https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig1.03

less diversified compared with high-income consumers. Many low-income consumers' diets consist of relatively cheaper staple foods to provide adequate calories, with more expensive foods making up a lesser part.[d] As income grows, dietary patterns shift from being predominantly composed of staple foods to including a higher share of other foods such as more animal-source foods, refined carbohydrates, oils and fats, fruits, vegetables and processed foods. This relationship – known as Bennet's law – implies that the share of calories from staple foods declines with increasing income and it forms a salient characteristic of the nutrition transition (Figure 1.3).[10, 11]

On average and across countries, the higher the income, proxied by GDP per capita, the lower the share of staple foods in the total calories that are available for consumption. For example, in Mali – a low-income country – the share of staple foods in the total calories available amounts to 73 percent, as compared with a share of 51 percent in the relatively more affluent South Africa, which is an upper-middle-income country (Figure 1.3).

In general, higher food diversity in diets can lead to improved nutrient adequacy of the diet

d A staple food is one that is eaten regularly, and in such quantities as to constitute the dominant part of the diet and supply a major proportion of total dietary energy. For the purposes of this report, staple foods include cereals and their products and roots, tubers, plantains and their products.

(see **Part 3**).[12] As incomes grow, dietary patterns become more diverse and progressively more people start consuming more meat and fish, milk and dairy products, eggs, fruits and vegetables, and sweets.

Together with the shift towards more diverse dietary patterns, the consumption of processed and ultra-processed foods including those high in fats, sugars and/or salt, which are associated with a higher risk of overweight and obesity, increases (Figure 1.1, panel D). Nutrition experts analysing the nutrition transition in Asia between 1999 and 2012 indicate that while sugar, salt and fat consumption from ultra-processed foods such as carbonated soft drinks, baked goods, and processed culinary ingredients including oils and fats had reached a maximum level or had declined in high-income countries, it was rapidly increasing in the upper-middle- and lower-middle-income countries in the region. This finding indicates that as countries develop economically, consumers tend to opt for more diverse dietary patterns but also for a higher consumption of processed and ultra-processed foods.[13] Urbanization and lifestyle changes also support this shift from diets composed of mainly staple foods towards a more diverse diet and higher consumption of processed foods.

Urbanization and nutrition transition

More than half of the world's population now live in urban areas (see Figure 1.1, panel B). By 2050, this share is estimated to grow to two-thirds. Although urbanization patterns differ both within and across countries, it is expected that Asia and Africa will experience the fastest growth in urbanization.[14]

Urbanization is an important element of the structural transformation process and is associated with changes in employment, which affect the opportunity cost of time for both women and men and reduce the time allocated to food preparation.[15] As urbanization progresses, more women and men work outside the household and spend more time commuting to their jobs. This can affect food preparation in the household, changing dietary patterns and resulting in a higher consumption of processed foods and food consumed away from home.[16]

Evidence from the 2008–09 and 2012–13 Tanzanian national household budget surveys, which allowed tracing individuals who migrated from rural areas to cities, suggests that relocation from the farm household to cities resulted in a drastic dietary shift from traditional staple foods to pre-prepared or ready-to-eat foods and foods containing high levels of sugar.[17] During this period, the urban population in the United Republic of Tanzania was rapidly growing, mainly through migration from rural areas. A survey conducted in 2015 revealed that 61.4 percent of urban dwellers had migrated from rural areas, while 38.6 percent – a smaller share – were born in urban areas.[18]

However, some researchers argue that the long-term increase in processed food consumption is not due to changes in employment brought about by urbanization but rather to technological improvements and innovations in food processing. Data from the American Time Use surveys, compiled by the United States Bureau of Labor Statistics, suggest that between 1965 and 1995 in the United States of America, technology led to a halving of the time for food preparation for both working and non-working women.[19]

Nutrition transition and the rise of the modern food industry and marketing

In developing countries, urbanization can cause dietary patterns to change rapidly. This is driven by higher incomes from urban jobs and by the food environment. Food environments comprise the foods available to people in their surroundings as they go about their daily lives. That is, the range of foods available in supermarkets, small retail outlets, wet markets, street food stalls, coffee shops, tea houses, school canteens, restaurants and all the other venues where people purchase and consume food. The food environment determines what food consumers can access at a given moment, at what price and with what degree of convenience and desirability.[20] Since the 1980s, the transformation of the food processing industry and the food retail sector has been a major factor in facilitating the nutrition transition in developing countries and emerging economies.

With growing per capita incomes and urbanization in Latin America, Asia and Eastern Europe, supermarkets have spread rapidly, giving rise to the "supermarket revolution" that addressed the increasing demand for more diverse foods in urban areas. For example, in Brazil, the transformation of the food retail sector and the expansion of supermarkets in the 1990s was equivalent to the changes in the food retail sector of the United States over a 50-year period.[21] Supermarkets and an expanding food processing industry facilitated the shift in dietary patterns by improving access to meat and fish, dairy and eggs, and vegetable oils as well as processed foods high in fats, sugars and/or salt.

In the 2000s, the supermarket revolution and the transformation of the food processing sector began in Africa. Studies suggest that by 2010, processed foods accounted for 70 percent of all food purchased in value terms for urban consumers in Eastern and Southern Africa, with 60 percent being highly processed.[22] In Kenya, purchasing food from supermarkets contributed to a higher consumption of processed and highly processed foods and a lower consumption of unprocessed foods, leading to a higher probability of being overweight or obese among adults.[23]

Globalization, trade and the nutrition transition

Across countries, the supermarket revolution and the expansion of the food processing industry have been fuelled by foreign direct investment (FDI). Since the 1980s and 1990s, capital market liberalization in countries such as Argentina, Brazil, Mexico and the Republic of Korea has attracted substantive investments in the food retail sectors and food processing industries of those countries, while significant foreign investments flowed into China and Eastern Europe as soon as privatization policies were initiated.[24] In African countries, after the privatization of the parastatal food marketing boards, which had a significant share of the food processing sector, small and medium enterprises, as well as larger companies and supermarkets, proliferated during the first decade of the new millennium.[25] Some researchers suggest that FDI levels were more strongly associated with rising obesity in low- and middle-income countries, compared to the influence of international trade (see Box 1.1 for a discussion on the impacts of FDI on nutrition).[26]

Increasing foreign investment flows is one of the many dimensions of globalization that results in a more connected and interdependent world. The term globalization is often used to describe the process of interaction among economies, cultures and populations across the world, brought about by international trade, technology spillovers, improved communication and flows of investment, people and information. The KOF Globalisation Index – a widely used measure of the economic, social and political dimensions of globalization – suggests that globalization has strengthened significantly since 2000, with the upward trend slowing down in 2020 due to the pandemic (see Figure 1.1, panel E).[e, 27]

As with FDI in food retail and processing, other dimensions of globalization can affect dietary patterns and the nutrition transition.[28] Trade is central to the globalization of food and agriculture. For example, following the first European contact with America at the end of the fifteenth-century, trade brought maize, potatoes and tomatoes from the New World to the Old World, and rice, barley and sugar cane from the Old World to the New. The range of foods exchanged across the Atlantic profoundly changed food production and dietary patterns.[29]

Since 2000, global food and agricultural trade more than doubled in volume and almost quintupled in (nominal) value, rising from USD 400 billion in 2000 to USD 1.9 trillion in 2022 (Figure 1.1, panel F). This growth in trade is the result of several drivers. Increases in income in both developed and developing countries have fuelled trade expansion in food. Lower transport costs have made it cheaper to trade. The decline in import tariffs and more transparent and predictable trade policies – resulting from the World Trade Organization (WTO) Agreement on Agriculture that entered into force in January 1995 and many bilateral and regional trade agreements – have also been key drivers in promoting food trade.[30]

e See Gygli, S., Haelg, F., Potrafke, N. & Sturm, J.-E. 2019. The KOF Globalisation Index – revisited. *The Review of International Organizations*, 14(3): 543–574.

BOX 1.1 FOREIGN DIRECT INVESTMENT AND NUTRITION

Trade in food and agricultural products has been a critically important component of the deep transformation of agrifood systems associated with globalization, and a key component of global, regional and domestic agrifood systems. Trade and investment liberalization also shapes investment patterns across country borders, affecting food processing, retail and promotion. Increased investment across borders has played a fundamental role in integrating country economies and has been a critical driver of changes to the structure and nature of agrifood systems – and the nutrition transition.

There are a range of options for foreign companies to enter new markets. These include through franchise agreements, cash and carry wholesale trading, strategic licensing agreements, manufacturing and wholly owned subsidiaries, and through foreign direct investment (FDI). FDI is defined as an investment made by a company from one country into a company (new or pre-existing) in another country, and one in which the original company owns a substantial interest (although not necessarily a majority interest). In this way, the foreign enterprise creates, or joins, what is described as a transnational corporation.

For companies, FDI provides a means to create demand by advertising and marketing products while at the same time more efficiently adapting to local consumer characteristics. FDI has become one of the preferred ways by which many company types, including transnational food and beverage corporations, enter new markets, and policymakers globally generally consider FDI a critical part of economic growth, thus seeking to attract FDI into their economies. With FDI, processed foods can often be produced in the host country for less than the costs associated with export (which entail transport and storage, as well as the navigation of tariff and non-tariff barriers), particularly when the host country has the raw materials for production.

The benefits of FDI to country economic development include the provision of non-debt servicing foreign exchange, job creation and increasing employment, enhanced foreign relations, increased export capacity, enhanced technology transfer and imitation, and a licensing agreement. FDI is a highly cost-effective way for transnational food and beverage companies to reach foreign markets. The large shift into FDI in food processing in the 1990s and beyond was characterized by the companies of high-income countries investing in the markets of low- and middle-income countries, which particularly affected (ultra-) processed food and beverage products in the host market (more so than products produced through primary processing). FDI into the food processing of confectionary and sugar-sweetened beverages was significant. A study describes how in Poland, for example, confectionary attracted more FDI in the 1990s "than FDI in meat, fish, flour, pasta, bread, sugar, potato products, fruits, vegetables, vegetable oils and fats put together", and in Mexico, approximately three-quarters of the FDI is in processed food products.[56]

In the 1970s, the primary focus of FDI into the agrifood system was on the raw commodities of agriculture (e.g. oil crops and cereals) for export. In the 1980s, the focus shifted onto food processing and retailing. Transnational food and beverage companies invested in manufacturing facilities in new countries for products such as confectionary, dairy products, baked goods, snacks and sugar-sweetened beverages. In the late 1990s, FDI into primary agricultural production surged again. In the 1990s, the global regulatory environment for FDI became significantly more liberal, with many new regulations forged in trade and investment agreements, and a proliferation of bilateral and regional trade agreements. As with trade in goods and services, fewer barriers and more incentives to investment facilitated corporate expansion by enabling transnational companies to reduce costs, increase market power, and obtain efficiencies in marketing and distribution.

Companies also started to use new cross-border strategies (of investment, commerce and collaboration) to expand their influence. Such changes led in the 1990s to greater inflows of FDI into low- and middle-income countries – in fact, growing more than six-fold in a decade. FDI became considerably more important than trade regarding agricultural and food products. Compared to trade, FDI has advantages as it enables companies to be located closer to customers to circumvent import tariffs, tailor products to local consumer preferences and more easily comply with national regulations.

The FDI-trade relationship is also context-specific, and it is important to note that FDI and trade in agricultural and food products are substitutes in some cases and complementary in others. In the food and agricultural sector, there was particularly intense investment into food processing. Globally, food processing became the principal recipient of agrifood-system-related FDI, with soaring investment into outlets selling processed foods.

The first years of the new millennium experienced a sharp decline in FDI flows because of political and economic disruptions in major recipient countries. The ensuing recovery in FDI flows came with some

BOX 1.1 (Continued)

changes: the emergence of increasingly protectionist measures; low- and middle-income countries increasing their share of outgoing FDI and with it the importance of South–South flows; small and medium enterprises also being drawn into FDI; institutional investment funds also becoming a novel component of FDI, particularly in energy; and greater importance of FDI in agriculture.

FDI into food retail also took off in the mid-1990s and 2000s leading to the "supermarket revolution" and similar trends in food service restaurants, with companies making significant investments and consequently increasing the number of food service outlets. Much of this FDI went to high-income countries, but it also went in increasing proportions to low- and middle-income countries, where spending on meals outside the home gradually increased.

The supermarket revolution was characterized by supermarkets in Europe, the United States of America, Japan and in the richer low- and middle-income countries making large investments, particularly in the markets of other low- and middle-income countries. Prior to the 1990s, supermarkets occupied only a tiny niche of the retail sector in most countries, but by the late 2000s this had changed dramatically. Many high-income country retailers joined the ranks of the top 100 largest holders of foreign assets globally.

The changes were driven by saturation and intense competition in home markets, weak competition and higher margins to be made in the markets of low- and middle-income countries, and the increasing use of cars and refrigerators in many low- and middle-income countries, which facilitated weekly shopping, with supermarkets able to sell products at low cost due to economies of scale in procurement. Institutional and regulatory reforms were a key facilitator of the changes. The regulatory environment for modern retail shifted to one far more facilitatory, coupled with the modernization of supermarket procurement systems, itself driven by practices from transnational supermarket chains, which reduced costs and increased the competitiveness of supermarkets relative to traditional retailers, and of transnational supermarkets relative to domestic chains.

The impact of FDI on local competitors is mixed, but in the case of the United States-based fast-food chains, it led to their near total dominance in many countries. In other cases, the entry of transnational food and beverage companies stimulated local competitor development by introducing new standards, products, technologies, marketing innovations and management concepts. The growth in supermarkets also opened a key channel for the sale and purchase of processed food products. Multinational retailers have an interest in selling processed products with long shelf lives and minimal waste. Companies developed sophisticated promotion or marketing strategies, resulting in processed foods becoming high-value items by targeting high-income consumers, lowering prices over time, expanding the market base and out-competing other companies. In Brazil, for example, prices of processed foods declined by 30 percent between 1994 and 1997. Despite such trends in food service and retailing, it is worth noting that in many low- and middle-income countries, especially countries in Africa and Asia, perishable products such as meat, fish and vegetables continue to be accessed primarily from traditional or informal outlets. This is often the case even in countries where supermarkets are now commonplace.

Companies may also expand their investments across multiple points of the agrifood system. The processes of trade and investment liberalization have resulted in companies being able to exert influence more easily over the length of food supply chains through processes of vertical integration, and to more easily horizontally integrate and increase control through mergers, acquisitions and joint ventures. With global vertical integration, a company brings together the entire process of producing, distributing and selling a particular food under its control by buying and contracting other companies and services worldwide.

Such vertical integration reduces transaction costs associated with having different suppliers and creates economies of scale, thus providing an important avenue for company growth, and for agrifood companies, resulting in greater market power. Such processes of vertical integration have been a key driver behind the dramatic changes in the global agrifood system, with marked increases in the supply of the types of foods associated with the nutrition transition.

SOURCE: Walls, H. (forthcoming). *Foreign direct investment: The nutrition transition, and its relationship with trade liberalization and trade agreements – Background paper for The State of Agricultural Commodity Markets 2024.* Rome, FAO.

BOX 1.2 UNITED NATIONS DECADE OF ACTION ON NUTRITION, 2016–2025

The Decade of Action on Nutrition was recommended at the Second International Conference on Nutrition (ICN2), co-hosted in November 2014 by FAO and the World Health Organization (WHO). The Rome Declaration on Nutrition and its companion Framework for Action were adopted, outlining a common vision for global action to eradicate hunger and end all forms of malnutrition and recommending policy commitments.[57]

In 2016, the United Nations General Assembly proclaimed the period 2016–2025 as the UN Decade of Action on Nutrition ("Nutrition Decade"), committing UN Member States to the sustained and coherent implementation of policies, programmes and increased investments to eliminate malnutrition in all its forms, everywhere, leaving no one behind. FAO and WHO co-lead the implementation of the Nutrition Decade in collaboration with the World Food Programme (WFP), the International Fund for Agricultural Development (IFAD) and the United Nations Children's Fund (UNICEF).

The Nutrition Decade's Work Programme[58] embraces six cross-cutting and connected action areas derived from the recommendations included in the ICN2 Framework for Action: (a) Sustainable, resilient food systems for healthy diets; (b) Aligned health systems providing universal coverage of essential nutrition actions; (c) Social protection and nutrition education; (d) Trade and investment for improved nutrition; (e) Safe and supportive environments for nutrition at all ages; and (f) Strengthened governance and accountability for nutrition.

The Nutrition Decade's Work Programme stresses that trade policies and trade agreements should support nutrition policies and programmes and not negatively impact the right to adequate food. It underlines the importance of achieving global food security and nutrition targets through opportunities identified in trade and investment policies, improving access to a safe and nutritious food supply through appropriate trade agreements and policies. Work in this action area is based on the ICN2 recommendations related to creating an enabling environment for effective action and international trade and investment.

The joint FAO/WHO Secretariat of the Nutrition Decade convened the Nutrition Decade's Mid-term Review in 2020 and 2021.[59] During the review period there has been increasing recognition of the need for trade policy and nutrition action coherence, and the importance of governance and cross-sectoral cooperation.[60] It was acknowledged that trade can expand consumer choices and contribute to healthy diets ensuring sufficiently available quantities of diverse, nutritious foods all year round. Imports can be a source of minimally processed nutritious foods with a longer shelf life that can contribute to offsetting the seasonal scarcity of perishable foods, but also of ultra-processed foods that are high in energy density, fats, sugars and/or salt. Trade can contribute to positive nutrition outcomes through its support to livelihoods and income generation, particularly for those engaged in primary food production.

The review also proposed priority focus areas for the remaining years of the Nutrition Decade such as considering using trade policy, including instruments such as tariffs, to improve the food supply, strengthening regional partnerships among countries and leveraging existing regional economic groups, improving data collection and developing tools to better understand trade policy impacts on nutrition.

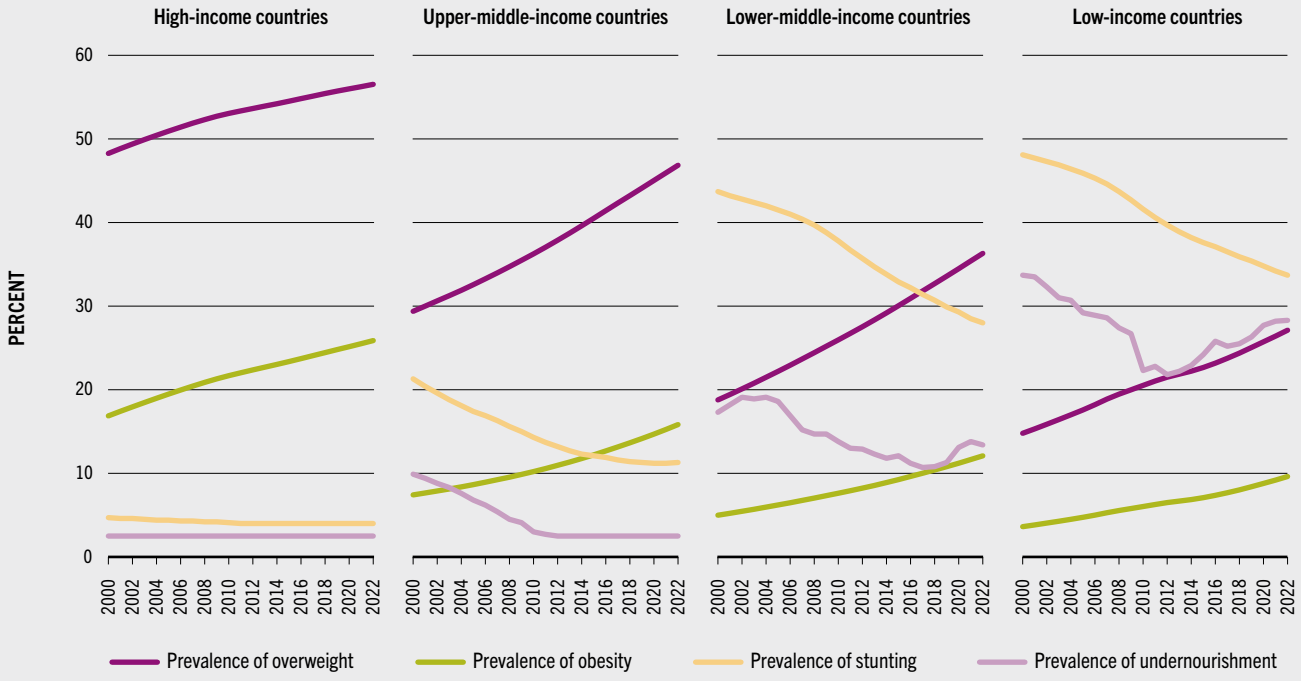
Trade can help balance food supply and demand globally by moving food from surplus to deficit areas, thus fostering food security globally. Higher food imports can increase the availability of calories and nutrients in a country and, by lowering prices, allow for better access to food. At times of shortages caused by extreme weather events, trade can help stabilize food supplies and prices (see **Part 2**). Global markets contribute to the availability of a variety of foods enabling dietary diversity, accelerating the nutrition transition and impacting nutritional outcomes (see **Part 3**).[31] At the same time, trade can increase the availability of ultra-processed foods that are high in energy density and high in fats, sugars and/or salt, shaping dietary patterns associated with overweight and obesity (see **Part 4**).

The nutrition transition in rural areas

While higher incomes, urban residency, market integration and sociocultural shifts have been major drivers of change in dietary patterns in urban areas, it is now clear that the nutrition transition is also taking place in rural areas. An increasing body of research shows that, in low- and middle-income countries, rural areas are rapidly catching up with the nutrition transition. A large-scale population study across 200 countries and territories indicates that between 1985 and 2017, the rate of body mass index (BMI) growth in rural areas was equal to or higher than that of cities in most low- and middle-income countries.[f, 32]

f With the exception of women in sub-Saharan Africa.

FIGURE 1.4 THE BURDEN OF UNDERNOURISHMENT AND MULTIPLE FORMS OF MALNUTRITION: SELECTED NUTRITIONAL OUTCOME INDICATORS, 2000–2022



NOTES: The prevalence of obesity is defined as the percentage of adults whose body mass index (BMI) is equal to or greater than 30 kg/m^2. Prevalence of overweight is defined as the percentage of adults whose BMI is equal to or greater than 25 kg/m^2. The prevalence of stunting is defined as the percentage of children under the age of five years with a height-for-age less than –2 standard deviations below the World Health Organization Child Growth Standards median.

SOURCES: Authors' own elaboration based on FAO. 2024. FAOSTAT: Suite of Food Security Indicators. [Accessed on 12 April 2024]. https://www.fao.org/faostat/en/#data/FS. Licence: CC-BY-4.0; UNICEF, WHO & World Bank. 2023. Joint child malnutrition estimates (JME). In: *WHO*. Geneva, Switzerland. [Cited 15 June 2024]. https://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates; WHO. 2024. The Global Health Observatory: Prevalence of obesity among adults. [Accessed on 27 May 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-); WHO. 2024. The Global Health Observatory: Prevalence of overweight among adults. [Accessed on 27 May 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-overweight-among-adults-bmi--25-(age-standardized-estimate)-(-)

https://doi.org/10.4060/cd2144en-Fig1.04

As the nutrition transition permeates rural areas, evidence is emerging that in many high-income countries, rural residents are currently more likely to be overweight and obese than urban residents. Examples include rural residents in Australia,[33] Denmark,[34] and the United States.[35, 36] Rural areas in low-income countries appear to follow similar trends. Recent research undertaken by the Food and Agriculture Organization of the United Nations (FAO) revealed that rural households purchase most of the food they consume, and that processed and ultra-processed foods are easily available in markets in remote rural areas across all 11 African countries studied.[37] This indicates a growing convergence between rural and urban diets in low-income countries, owing to the availability of processed foods in small rural food shops.

Multiple burdens of malnutrition

As the nutrition transition is occurring more rapidly in low- and middle-income countries than it did in high-income economies, overweight and obesity are increasing rapidly in countries

that have not yet been able to eradicate hunger. Multiple forms of malnutrition now exist, cutting across socioeconomic classes, including the coexistence of undernutrition and overweight and obesity among individuals and households within populations.[38]

The existence of multiple forms of malnutrition is evident in low- and lower-middle-income countries, owing to rapid increases in overweight and obesity and relatively moderate reductions in stunting, which was initially at high levels. The recognition of the need to renew efforts to tackle malnutrition in all its forms culminated with the proclamation of the United Nations Decade of Action on Nutrition in 2016 (Box 1.2).

Since 2000, in lower-middle-income countries, the prevalence of both obesity and overweight followed an upward trend, increasing to 12.1 and 36.3 percent respectively by 2022. In the same year, 13.4 percent of the population in lower-middle-income countries was undernourished, while 28.5 percent of children under five years of age were stunted. Since 2000, in low-income countries, the prevalence of overweight has been increasing where economic downturns, conflict and weather extremes have reversed the decline in the prevalence of undernourishment (Figure 1.4).

Nutrition experts suggest that, at the country level, the existence of multiple forms of malnutrition is mainly driven by the rise in overweight and obesity in high-income households, due to the accessibility of ultra-processed food and beverages that are often high in energy density and in fats, sugars and/or salt.[39, 40] Indeed, economic inequalities in rapidly developing low- and lower-middle-income countries can contribute to multiple burdens of malnutrition. A study analysing longitudinal trajectories in stunting and overweight in children in Ethiopia, India, Peru and Viet Nam, suggests that a child's likelihood of being stunted or overweight depends on the income level, urban or rural residence and maternal education level.[41] ■

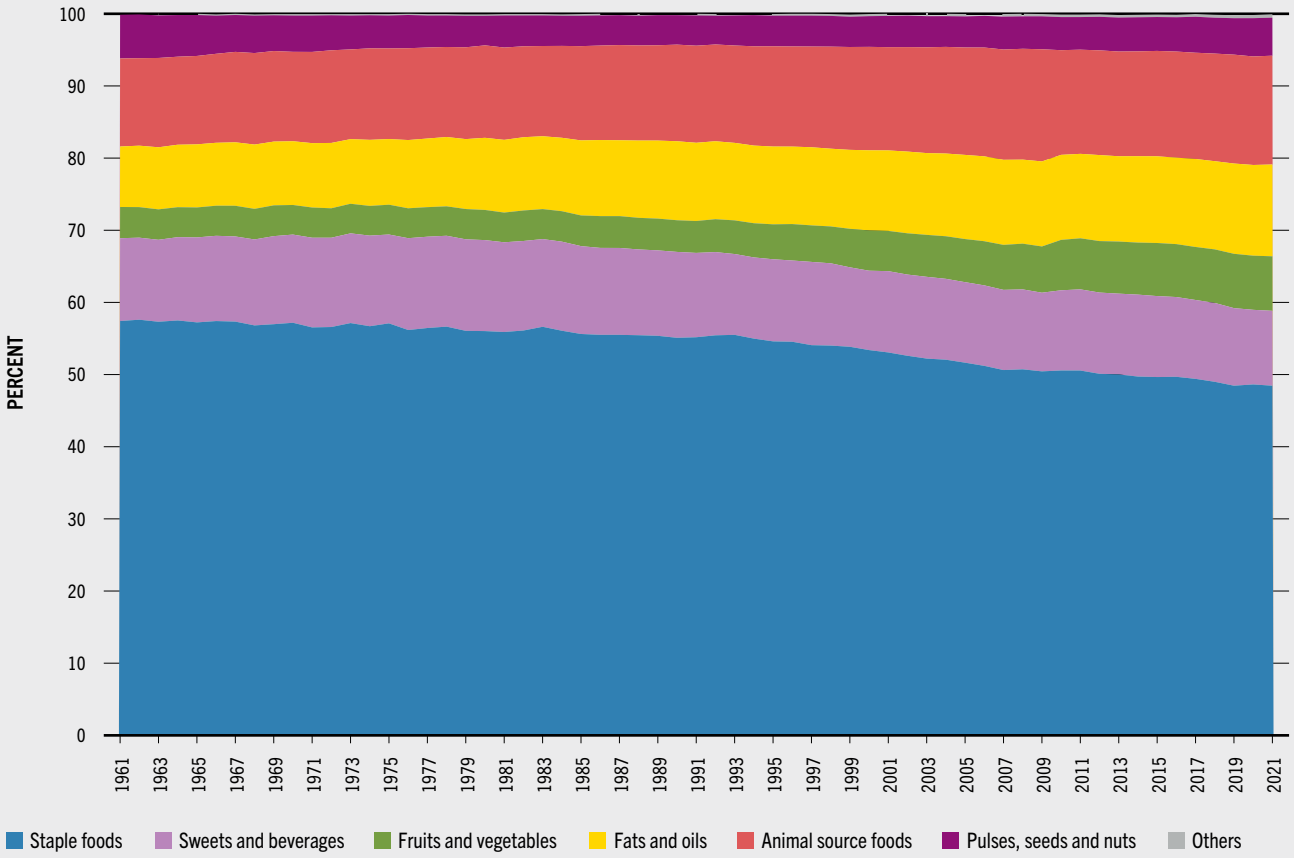
FOCUSSING ON THE RELATIONSHIP BETWEEN THE NUTRITION TRANSITION AND INCOME

Between 1961 and 2021, the global average dietary energy available for human consumption increased by 35 percent, from 2 200 to 2 980 calories per person per day. Globally, during the same period, the share of staple foods available for human consumption declined from 57.4 percent to 48.4 percent, while the share of animal source foods grew from 12.2 percent to 15.1 percent and that of fats and oils increased from 8.4 to 12.7 percent (Figure 1.5). Yet, these changes have been largely uneven across countries, depending on different rates of income growth and the trends of other drivers of the nutrition transition. For example, nutrition experts analysing the relationship between income and dietary patterns in the 1990s suggested that it was mainly improvements in technology that resulted in the increased availability of inexpensive vegetable oils, which, together with income growth, have made high-fat diets accessible even to relatively low-income societies.[42]

Many researchers analyse the nutrition transition by assessing the size of the income elasticity of demand for different foods – an economic measure of how responsive the demand for food is to a change in income. A meta-analysis on income elasticities for food in Africa found that income elasticities for beverages, meat, fish, eggs and dairy are significantly higher than those for staple foods, confirming Bennet's law and suggesting that, as income grows, the demand for animal source foods and processed products is more responsive than that for staple foods (see **Part 4** for a discussion on different income elasticities according to the processing level of foods).[43]

Other studies explore the relationship between income and the composition of food consumption in the context of households exiting poverty and hunger. Economists suggest that the shift away from cheap sources of calories such as staple foods, and towards other foods that are relatively

FIGURE 1.5 TOTAL CALORIES AVAILABLE FOR CONSUMPTION IN THE WORLD BY FOOD CATEGORY, 1961–2021



NOTE: A new methodology to calculate food balances has been applied by FAO since 2010.

SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Food Balances. [Accessed on 12 April 2024]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig1.05

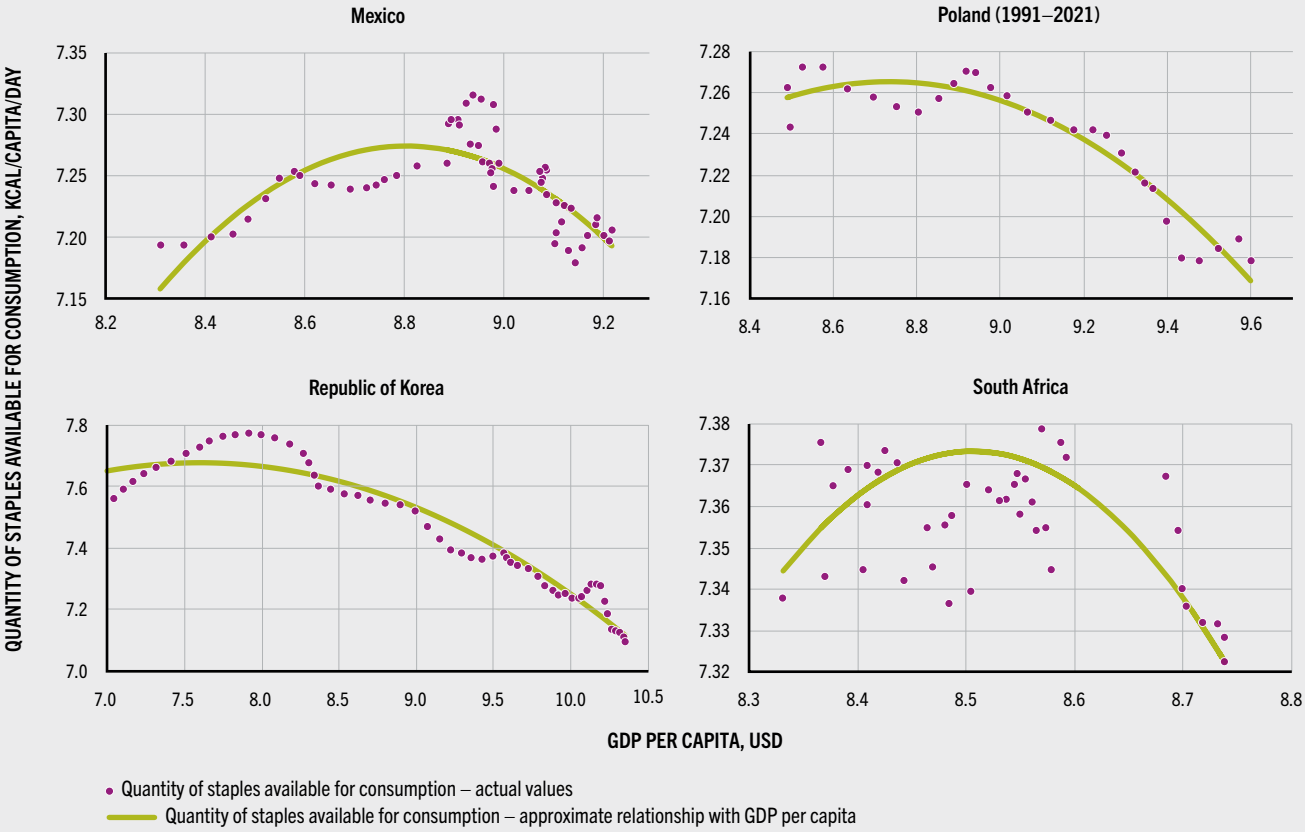
more expensive takes place immediately when income becomes sufficient to meet food subsistence needs.[44]

Using household data from the Sri Lankan 2016 Household Income and Expenditure Survey, a study suggests that an important factor in the shift away from staple foods is a subsistence threshold that reflects the extent to which the calories provided by a dietary pattern meet the energy needs of household members.[g] Below this threshold, poor people can experience hunger and adverse physical effects and will spend a large share of their additional income on relatively cheap, energy-dense staple foods, dedicating the smaller part to other foods. Above this subsistence threshold, income increases result in a progressive shift away from staple foods and increasing consumption of other relatively more expensive foods, including (ultra-) processed foods, that address aspirations for variety, taste, convenience, novelty and social status.[45, h]

g This subsistence threshold varies across individuals and is unobservable. See Jensen, R.T. & Miller, N.H. 2011. Do consumer price subsidies really improve nutrition? *Review of Economics and Statistics*, 93(4): 1205–1223. https://doi.org/10.1162/REST_a_00118

h Similar results are obtained analysing household data from China. See Jensen, R.T. & Miller, N.H. 2011. Do consumer price subsidies really improve nutrition? *Review of Economics and Statistics*, 93(4): 1205–1223. https://doi.org/10.1162/REST_a_00118

FIGURE 1.6 QUANTITY OF STAPLE FOODS AVAILABLE FOR CONSUMPTION (PER CAPITA, PER DAY) AND GROSS DOMESTIC PRODUCT PER CAPITA, 1961–2021



NOTES: The data have been transformed into logarithms of three-year moving averages. For Poland, data on gross domestic product (GDP) per capita are available only for the period 1991–2021.

SOURCES: Authors' own elaboration based on FAO. 2024. FAOSTAT: Food Balances. [Accessed on 15 February 2024]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0; World Bank. 2024. World Development Indicators: GDP per capita (constant 2015 US$). [Accessed on 15 February 2024]. https://data.worldbank.org/indicator/NY.GDP.PCAP.KD. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig1.06

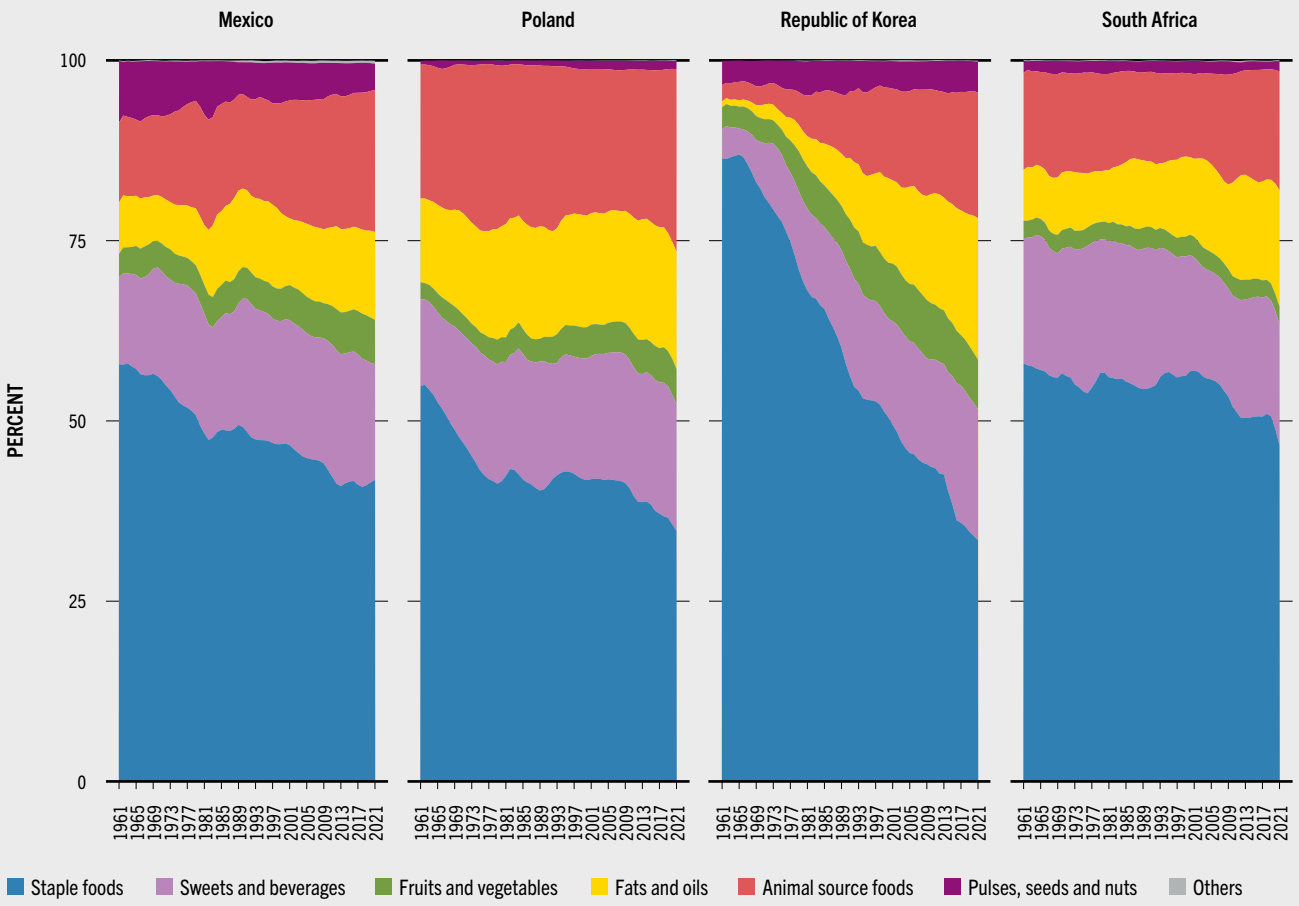
Case studies: Mexico, Poland, the Republic of Korea and South Africa

Measuring the relationship between income and the composition of dietary patterns at the country level requires a long time series that contains information on the country's economic growth and development trends. Using data from Mexico, Poland, the Republic of Korea and South Africa, covering the period 1961–2019, an analysis carried out for this report suggests a nonlinear (inverted U shape) relationship between the quantity of staple foods that is available for consumption per capita, measured in calories per day, and GDP per capita.[i, 46]

This inverted U shape is consistent with the studies on Bennet's law that utilized household data and arises due to the subsistence threshold under (over) which income growth brings about

i As the per capita consumption of calories provided by different food groups is not available, the study uses the per capita calories provided by the staples available for consumption as a proxy. The data is collected from the Supply Utilization Accounts of FAOSTAT.

FIGURE 1.7 MEXICO, POLAND, THE REPUBLIC OF KOREA AND SOUTH AFRICA: CHANGE IN THE COMPOSITION OF TOTAL FOOD SUPPLY, 1961–2021



NOTE: A new methodology to calculate food balances has been applied by FAO since 2010.

SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Food Balances. [Accessed on 12 April 2024]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig1.07

increases (decreases) in the consumption of staple foods. However, the use of aggregate instead of household data means that the relationship can only be approximated for countries that had relatively low levels of income per capita at the outset and experienced economic growth, poverty reduction and a nutrition transition during the 1961–2019 period.[j]

For Mexico, where maize is a staple crop, the analysis indicates that increases in real GDP per capita from USD 4 270 in 1961, resulted in proportionally smaller increases in the calories available for consumption from staple foods. As the nutrition transition set in in the early 1980s, progressive GDP per capita growth (to USD 9 760 in 2021) was observed to be coupled with a significant decline in the calories available for consumption from staple foods (Figure 1.6). On average, between 1961 and 2021, the share of staple foods in total calories available for consumption declined from 57.9 to 41.7 percent, while that of animal source foods nearly doubled from 11.1 to 20.1 percent. Fats and oils also showed a significant increase in their share

j There are many factors that can influence the calorie subsistence threshold and the shape of the relationship between the share of staples in total calories available for consumption and GDP per capita. At the individual level these include age, gender, height and weight, overall health and physical activity. At the country level and due to aggregation these factors are compounded by initial income levels and income growth rates, the extent of poverty and inequality at the outset, demographic trends, macroeconomic conditions, traditional diets and food preferences.

of total calories available for consumption from 7.1 percent in 1961 to 12.3 percent in 2021 (Figure 1.7). A study on Mexico's nutrition transition, using data between 1984 and 1998, also showed that the progressive decline in cereal consumption was accompanied by a significant increase in soft drinks consumption in both rural and urban areas. Soft drink purchases increased by as much as 150 percent in Mexico City during this period.[47]

As in most Eastern European countries, Poland's transition to a market economy in the early 1990s resulted in significant GDP per capita increases. GDP per capita increased more than threefold to USD 15 863 since 1991. The relationship between per capita calories available from staple foods and GDP per capita suggests a gradual decline in the daily calories available from staple foods per capita with increasing GDP (Figure 1.6). Poland's nutrition transition was also facilitated by a higher diversity of foods available due to openness to trade.[48] For example, between 1961 and 2021, the share of staple foods in total calories available for consumption declined from 54.8 to 33.6 percent, while the share of fruits and vegetables doubled from 2.4 to 4.9 percent (Figure 1.7).

The nutrition transition in the Republic of Korea provides interesting insights as the country underwent a rapid structural transformation between the 1960s and 1990s, prior to the deepening of the globalization process that accelerated growth after the mid-1990s. With a rapid structural transformation and significant increases in real GDP per capita from USD 1 066 in 1961 to USD 32 786 in 2021, a progressive decline in the daily calories available from staple foods per capita, took place from the mid-1970s onwards (Figure 1.6). Overall, the share of staple foods in total calories available for consumption decreased dramatically from 86.4 percent in 1961 to 32.9 percent in 2021. The changes in the shares of animal source foods and fats and oils in the calories available for consumption were even more significant. During the 60-year period between 1961 and 2021, the share of animal source foods increased from 2.3 to 17.4 percent and that of fats and oils from 0.8 to 20.0 percent (Figure 1.7).

In South Africa, the relationship between per capita calories available from staple foods and GDP per capita also approximates an inverted U shape (Figure 1.6). Following its transition to democracy in 1994, South Africa's economy experienced fast growth rates that sparked the nutrition transition. Nevertheless, South Africa has one of the highest inequality rates in the world and poverty is widespread, which together with well-rooted consumer preferences for maize, could potentially result in a relatively smaller shift away from staple foods. Indeed, the share of staple foods in total calories available for consumption declined from approximately 58.0 percent in 1960 to 44.6 percent in 2021, while that of fats and oils more than doubled from 7.1 to 16.3 percent (Figure 1.7). ■

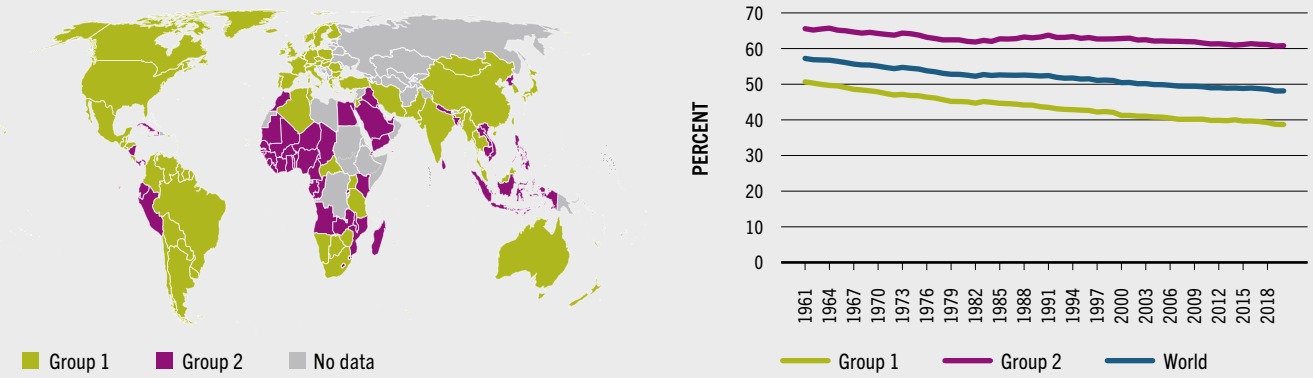
THE GLOBALIZATION OF DIETARY PATTERNS

Since the concept of the nutrition transition was first developed, a vast body of research on the evolution of dietary patterns across developed and developing economies has validated its salient characteristics. In parallel, a tendency for dietary patterns to converge globally was observed.[49] As developing countries underwent structural transformation and experienced economic growth, dietary patterns tended to resemble those of consumers in developed countries with a declining consumption of staple foods and an increased consumption of animal source foods, fats and oils, and sweets and beverages.

The convergence of dietary patterns across countries can be attributed to trends in income growth, urbanization, the development of the food retail and processing sectors and trade openness, all of which drive the nutrition transition in each nation and are, to a considerable degree, connected.[50] Experts focussing on various aspects of globalization suggest that, in addition to trade and foreign direct investment, global food advertising also plays an important role in promoting and accelerating this convergence.[51]

Most of the research on globalized dietary patterns occurred in the early 2000s, before the level of food prices increased globally.

FIGURE 1.8 CONVERGENCE IN THE SHARE OF STAPLE FOODS IN TOTAL CALORIES AVAILABLE FOR CONSUMPTION, 1961–2020



NOTES: Group 1 includes most of the high-income countries but also upper- and lower-middle-income countries. Group 2 consists of low-income countries, but also middle- and high-income countries such as Kuwait and Saudi Arabia. Globally, the average share of staple foods in total calories available for consumption is declining over time. On average, for group 2, which includes most of the low- and lower-middle-income countries, the relative share of staple foods is higher than the global average but declines at a slower rate, as compared with that of group 1.
Refer to the disclaimer on the copyright page for the names and boundaries used in this map. 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 Republic of Sudan and the Republic of South Sudan has not yet been determined.

SOURCE: Authors' own elaboration based on Kozłowska, M.K. (forthcoming). *Pathways to nutrition transition and the globalization of dietary patterns – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig1.08

At that time, the expansion in the availability of cheap vegetable oils, through increases in production and trade, was considered as central in the early stages of the nutrition transition in developing countries and a harbinger of the convergence process in dietary patterns worldwide.[52, 53] The analyses carried out show a global convergence of dietary patterns in line with the nutrition transition, with the share of staple foods in total calories available for consumption declining and the share of animal source foods, fats and oils and sweets and beverages increasing across all countries.

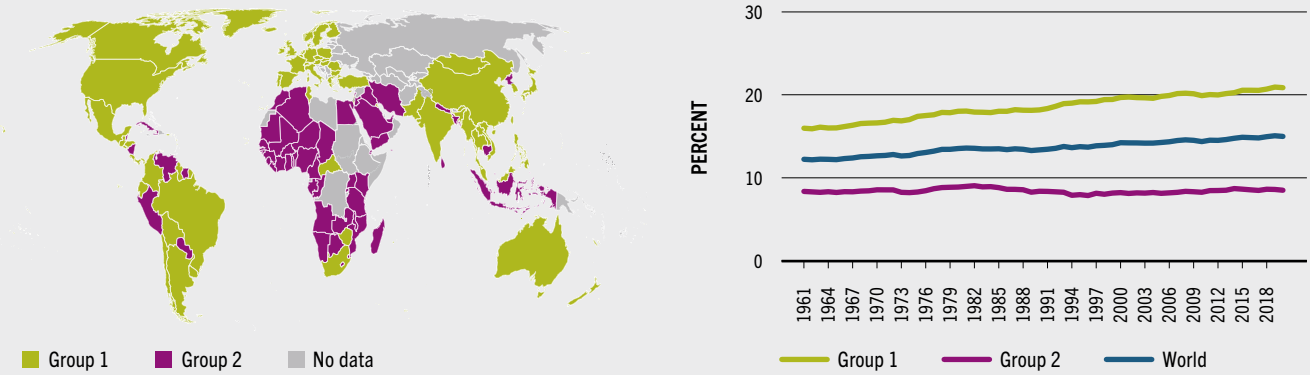
There are few formal statistical analyses on the convergence of dietary patterns. A study using a sample of 172 countries during the 1993–2013 period, rejected the hypothesis that dietary patterns across all countries converge towards a representative high-income country dietary pattern. This pattern was composed of animal source foods, vegetable oils and fats and sweeteners that made up 68 percent of total calories available for consumption.[54]

Nevertheless, although dietary patterns observed in multiple countries have been found to move together, driven by interrelated trends in income growth, globalization and urbanization, there is still significant heterogeneity in their nutrition transition trends. This heterogeneity may be due to several factors, including significantly different rates of economic growth, foreign investment and urbanization, diverse degrees of trade openness, differences in consumer preferences for food, and varying demographic trends.

As countries are at different stages of the nutrition transition, examining whether convergence occurs within different country groups, rather than globally, would consider the heterogeneity of the shift in dietary patterns.

An econometric analysis carried out for this report draws from the economic growth convergence literature and applies a modelling methodology that allows for examining a range of nutrition transition trends. This includes testing for convergence to a common global

FIGURE 1.9 CONVERGENCE IN THE SHARE OF ANIMAL SOURCE FOODS IN TOTAL CALORIES AVAILABLE FOR CONSUMPTION, 1961–2020

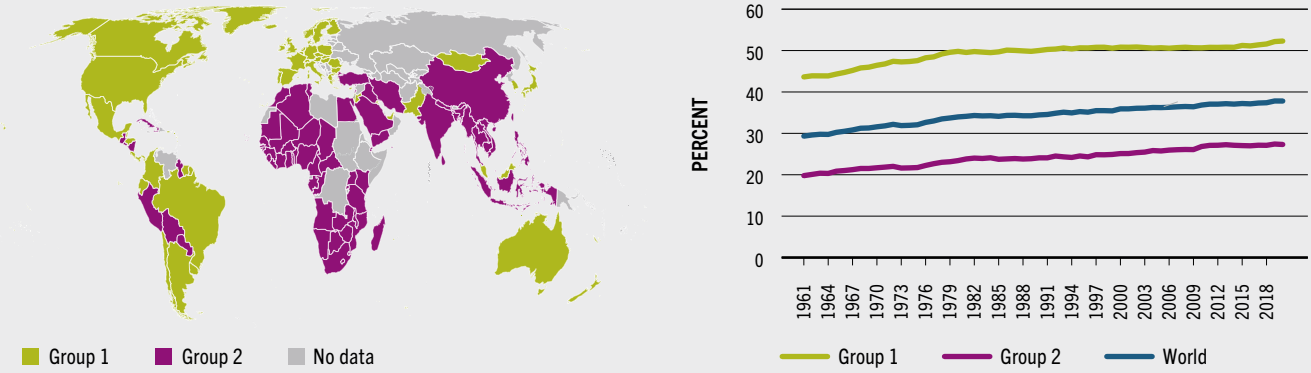


NOTES: In line with the salient characteristics of the nutrition transition, the global average share of animal source foods in total calories available for consumption increases over time. Most of the high- and upper-middle-income countries are shown to progressively have a higher share of animal source foods in total calories available for consumption (group 1). Their average share lies above the global average and increases at a faster rate. The share of animal source foods of group 2, which is predominantly composed of low- and lower-middle-income countries, does not closely follow the global average trend.
Refer to the disclaimer on the copyright page for the names and boundaries used in this map. 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 Republic of Sudan and the Republic of South Sudan has not yet been determined.

SOURCES: Authors' own elaboration based on Kozłowska, M.K. (forthcoming). *Pathways to nutrition transition and the globalization of dietary patterns – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig1.09

FIGURE 1.10 CONVERGENCE IN THE AGGREGATE SHARE OF ANIMAL SOURCE FOODS, FATS AND OILS, SWEETS AND BEVERAGES IN TOTAL CALORIES AVAILABLE FOR CONSUMPTION, 1961–2020



NOTES: The global average of the aggregate share of animal source foods, fats and oils, and sweets and beverages in total calories available for consumption follows an upward trend over the years. Predominantly high- and upper-middle-income countries (group 1) appear to drive this average share. However, on average, the share of low- and lower-middle-income countries (group 2), although significantly lower than the global average, increases over time.
Refer to the disclaimer on the copyright page for the names and boundaries used in this map. 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 Republic of Sudan and the Republic of South Sudan has not yet been determined.

SOURCES: Authors' own elaboration based on Kozłowska, M.K. (forthcoming). *Pathways to nutrition transition and the globalization of dietary patterns – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig1.10

dietary pattern but also for various transition paths that reflect varying convergence speeds for different country groups, and even divergence from the global average.[k, 55] The research uses FAO food balance sheet data from 1961 to 2019 to test for global convergence in the share of staple foods and the share of animal source foods in total calories available for consumption – both of which are well-identified features of the nutrition transition. In addition, the study tests for global convergence in the aggregate share of animal source foods, fats and oils, and sweets and beverages in total calories available for consumption to assess whether countries converge to a pattern similar to that of a high-income country.[l]

In all cases, the data rejects the idea of global convergence, indicating that the nutrition transition trends vary across countries. While the dietary patterns are not globalized, the analysis identified two groups within which the dietary patterns of countries tend to converge. One group is predominantly composed of high-income countries but also some upper- and lower-middle-income countries (group 1), while the other is made up of most of the low- and lower-middle-income countries (group 2).

Group 1 is characterized by low and decreasing shares of staple foods, high and increasing shares of animal source foods and a higher aggregate share of animal source foods, fats and oils, and sweets and beverages in total calories available for consumption (Figure 1.8 to Figure 1.10). In this group, the dietary patterns of countries converge among themselves and towards the global average share. Countries in group 2, on average, are shown to have a significantly higher share of staple foods and a lower aggregate share of animal source foods, fats and oils, and sweets and beverages, following the global average at a slower rate.

The difference in the speed of convergence between the two country groups, one being composed of mostly high- and upper-middle-income countries, while the other of lower-income countries, suggests that, on average, income is the main driver of the evolution of the nutrition transition. However, other important factors such as consumer preferences can play a role in shaping nutrition transition trends for each country and in determining the position of a country in one convergence group or another. Additional analysis of the factors that affect the membership of a country in one group or another suggests that trends in GDP per capita, globalization and trade openness shape, on average, the nutrition transition trends across countries and their convergence rates. ■

k The modelling framework is that of Phillips, P.C. & Sul, D. 2007. Transition modeling and econometric convergence tests. *Econometrica*, 75(6): 1771–1855. https://doi.org/10.1111/j.1468-0262.2007.00811.x; and Phillips, P.C. & Sul, D. 2009. Economic transition and growth. *Journal of Applied Econometrics*, 24(7): 1153–1185. https://doi.org/10.1002/jae.1080

l See Kozłowska, M.K. (forthcoming). *Pathways to nutrition transition and the globalization of dietary patterns – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO. Intuitively, the modelling framework allows for heterogeneity across countries and over time. For example, testing for convergence in the share of staples in total calories available among countries relies on the behaviour of the cross-sectional variance of the shares over time. Decreasing (increasing) cross-sectional variance suggests convergence (divergence). Country clusters can be formed through clustering algorithms based on similar cross-sectional variance behaviour among countries within different groups.

CANADA
A container ship: Food imports are critical for food security and nutrition.
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PART 2
TRADE AND NUTRITION: IDENTIFYING THE LINKAGES

KEY MESSAGES

➔ During the last two decades, food and agricultural trade increased significantly. In 2021, nearly 5 000 trillion kilocalories were traded, more than double the energy traded in 2000. Daily per capita food trade increased from 930 kcal in 2000 to 1 640 kcal in 2021. The value of food and agricultural trade increased fivefold, reaching USD 1.9 trillion in 2022.

➔ Trends in global food trade followed nutrition transition trends. The share of staple foods traded decreased from 48 percent in 2000 to around 42 percent in 2021. Globally, unprocessed and minimally processed foods contributed to 65 percent of the calories traded in 2021. Ultra-processed and processed foods accounted for 7 percent and 1.4 percent, respectively.

➔ Food imports remain critical for food security and nutrition. With the increase in food trade, more nutrients are exchanged across the world. Between 2000 and 2021, per capita trade in vitamin C and calcium increased by almost 90 percent.

➔ Food trade can affect nutrition through multiple pathways. Openness to food trade promotes higher availability, greater diversity and a more stable food supply throughout seasons. It can lower prices and improve access to food. Trade also affects the wider economy, spurring economic growth and accelerating the nutrition transition.

➔ The linkages between trade and diets and the resulting nutrition outcomes are intricate and vary across countries. Trade openness can help reduce the prevalence of stunting in children under five years of age, while its association with obesity is more ambiguous and context-specific. Economic growth reduces stunting, and, at the same time, can increase the prevalence of obesity.

PATTERNS AND EVOLUTION OF FOOD TRADE

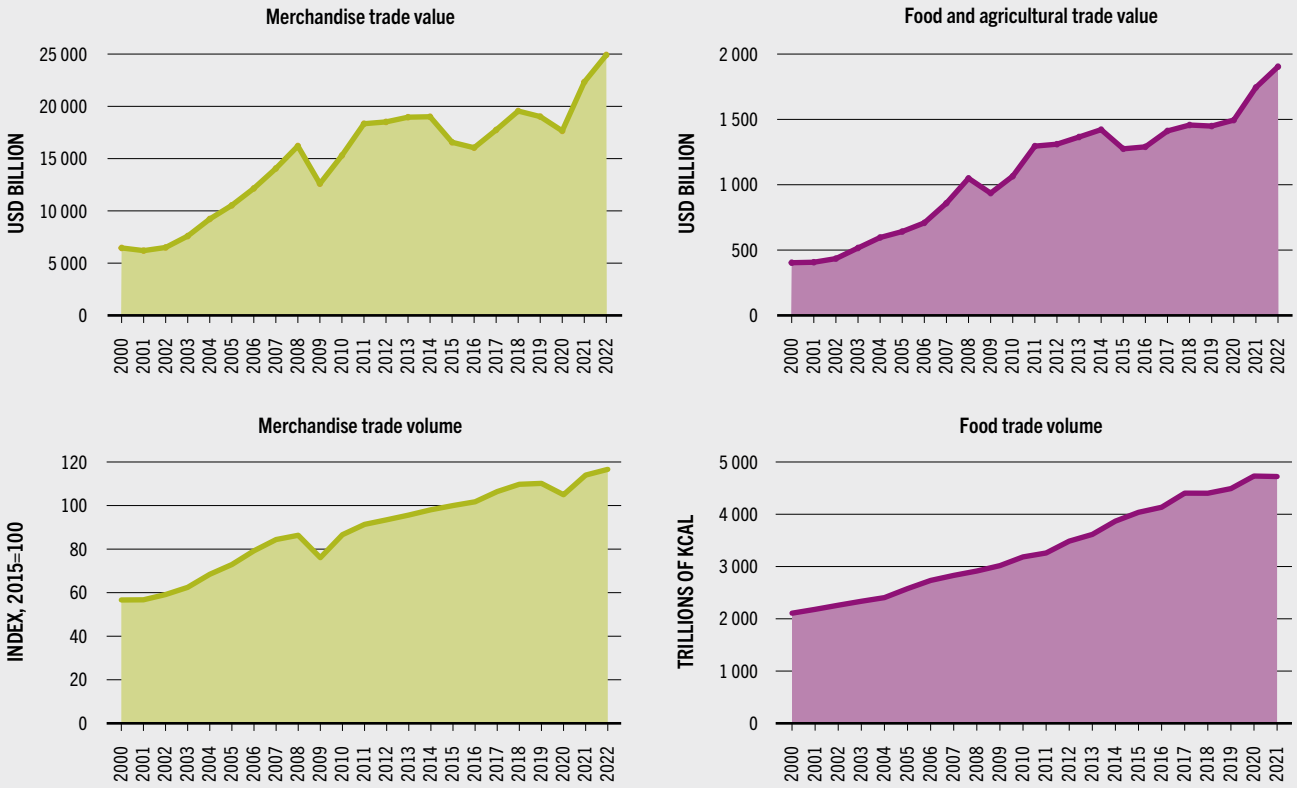
Trade is an integral part of our agrifood systems, where it fulfils a fundamental function: it moves food from surplus to deficit regions, thus contributing to food security globally. Global food markets facilitate the supply of sufficient, safe and diverse food to people across countries, generating income for farmers and those employed in the food and agricultural sectors. How many and which foods are traded depends on a multitude of factors, most importantly an intricate interplay of demand and supply.

Globalization and trade increased between 2000 and 2022 (see **Part 1**). World merchandise export value increased almost fourfold; merchandise export volume doubled (Figure 2.1). Food and agricultural trade nearly quintupled, rising from USD 400 billion in 2000 to USD 1.9 trillion in 2022.[m] In 2022, food trade made up around 85 percent of all trade in food and agriculture. The energy it carried more than doubled between 2000 and 2021, reaching almost 5 000 trillion kilocalories in 2021.[n] Adjusted for global population growth, food trade increased from 930 kcal per capita per day in 2000 to 1 640 kcal per capita per day in 2021 (Figure 2.3).

m Food and agricultural trade includes all food and agricultural products except fish and aquatic products. Stylized facts on trade in aquatic products are discussed in Box 2.3. Information on data conversions and limitations is also given in Box 3.2.

n Approximately similar values have been observed by Traverso, S. & Schiavo, S. 2020. Fair trade or trade fair? International food trade and cross-border macronutrient flows. *World Development*, 132: 104976. https://doi.org/10.1016/j.worlddev.2020.104976

FIGURE 2.1 MERCHANDISE AND FOOD AND AGRICULTURAL TRADE, 2000–2022



SOURCES: Authors' own elaboration based on FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Accessed on 15 February 2024]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0; WTO (World Trade Organization). 2024. WTO STATS: International trade statistics. [Accessed on 15 February 2024]. https://stats.wto.org/

https://doi.org/10.4060/cd2144en-Fig2.01

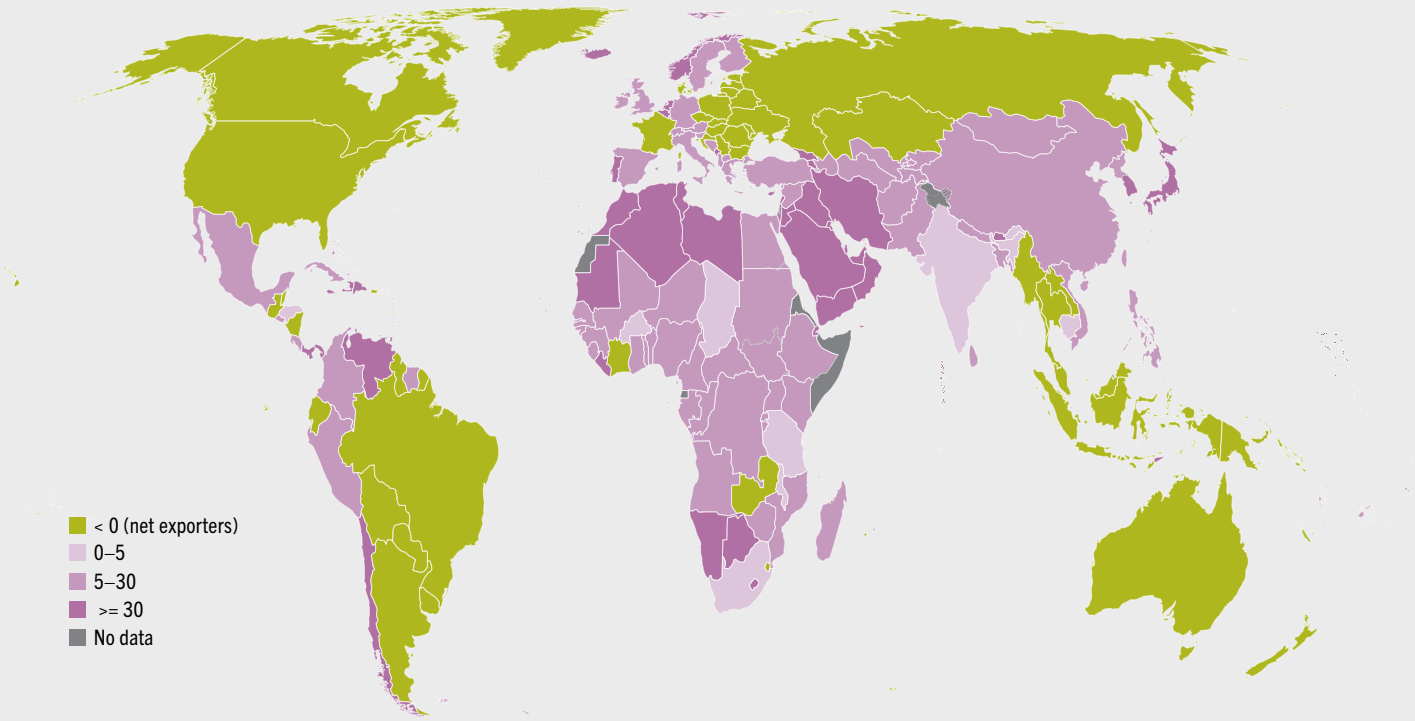
Most countries both import and export foods and depend on trade in both ways – on imports to ensure food availability and diversity and on exports to promote livelihoods in export-oriented sectors, fuelling the economy. Net trade position patterns are largely driven by natural resource endowments, climatic conditions for agricultural production, population density and productivity.

Large countries with relatively low population density such as Argentina, Australia, Brazil, Canada, the Russian Federation and the United States tend to be net calorie exporters – they produce more food than they consume (Figure 2.2). Population-dense countries such as China and India, regions with unfavourable agroecological conditions such as Northern Africa and Western Asia, and regions with low productivity such as sub-Saharan Africa tend to be net food importers. Some countries critically depend on food imports to feed their population. These are countries with arid climates in Northern Africa and Western Asia where net imports as a share of total food supply, expressed in calories, can reach over 50 percent.

What foods are traded?

It is not only trade's role in ensuring calorie availability and livelihoods that is important for nutrition, but also which foods are traded (see **Part 3**). Trade increased in all food categories between 2000 and 2021. For example, trade in staple foods increased from 444 kcal per day per capita in 2000 to 697 in 2021. Trade in

FIGURE 2.2 SHARE OF NET FOOD IMPORTS IN TOTAL DOMESTIC SUPPLY (IN KCAL), 2020, PERCENT



NOTES: Countries coloured in green are net exporters of terrestrially produced food measured in energy content (kcal). Countries coloured in magenta are net importers. The darker the magenta, the higher the share of imports in domestic supply.
Refer to the disclaimer on the copyright page for the names and boundaries used in this map. 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 Republic of Sudan and the Republic of South Sudan has not yet been determined.

SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Supply Utilization Accounts. [Accessed on 15 February 2024]. https://www.fao.org/faostat/en/#data/SCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig2.02

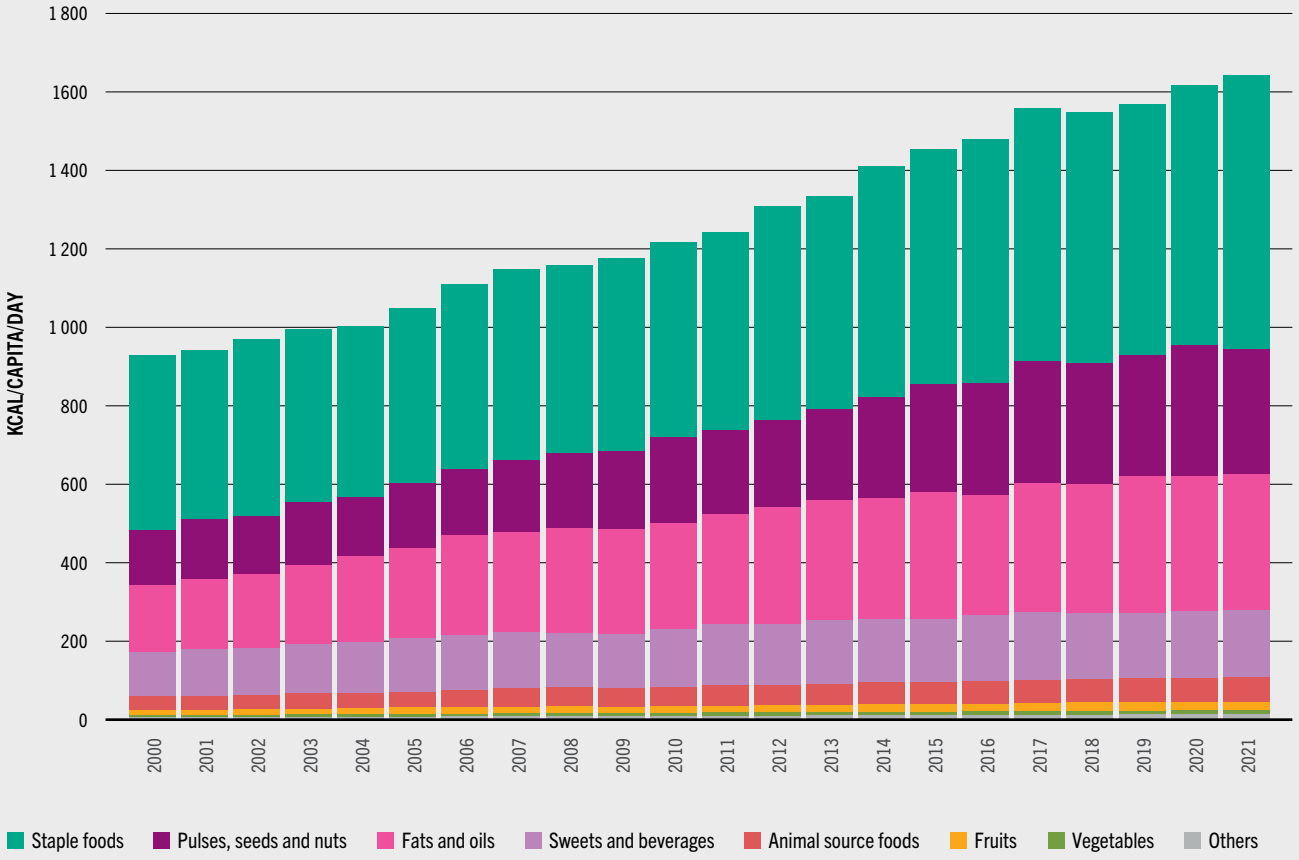
animal source foods was 37 kcal per day per capita in 2000 increasing to 64 in 2021 (Figure 2.3, see Box 2.1 for a description of the food categories). Staple foods account for the largest share of calories traded.

However, reflecting the nutrition transition, the share of staple foods in global food trade decreased from 48 percent in 2000 to around 42 percent in 2021, while the shares of fats and oils, and pulses, seeds and nuts increased (see **Part 1** for a discussion on the nutrition transition). Trade in sweets and beverages as a share of traded calories decreased slightly.[o] In the other food categories, including animal source foods, fruits and vegetables, the shares in global food trade remained relatively stable between 2000 and 2021.

In 2021, staple foods accounted for the bulk of calories imported in both the group of high-income countries and the group of low- and middle-income countries (Figure 2.4). In line with the nutrition transition in low- and middle-income countries, the share of calories from staple food imports declined from more than 53 percent in 2000 to around 44 percent in 2021. For high-income countries, which underwent a nutrition transition before the 2000s, this reduction was lower with a share of 43 percent in 2000 and 40 percent in 2021.

o Trade in beverages makes up around 16 percent of the global trade in sweets and beverages.

FIGURE 2.3 EVOLUTION OF TRADE BY FOOD CATEGORY (BASED ON DAILY PER CAPITA ENERGY CONTENT), WORLD, 2000–2021



SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Accessed on 15 May 2023]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig2.03

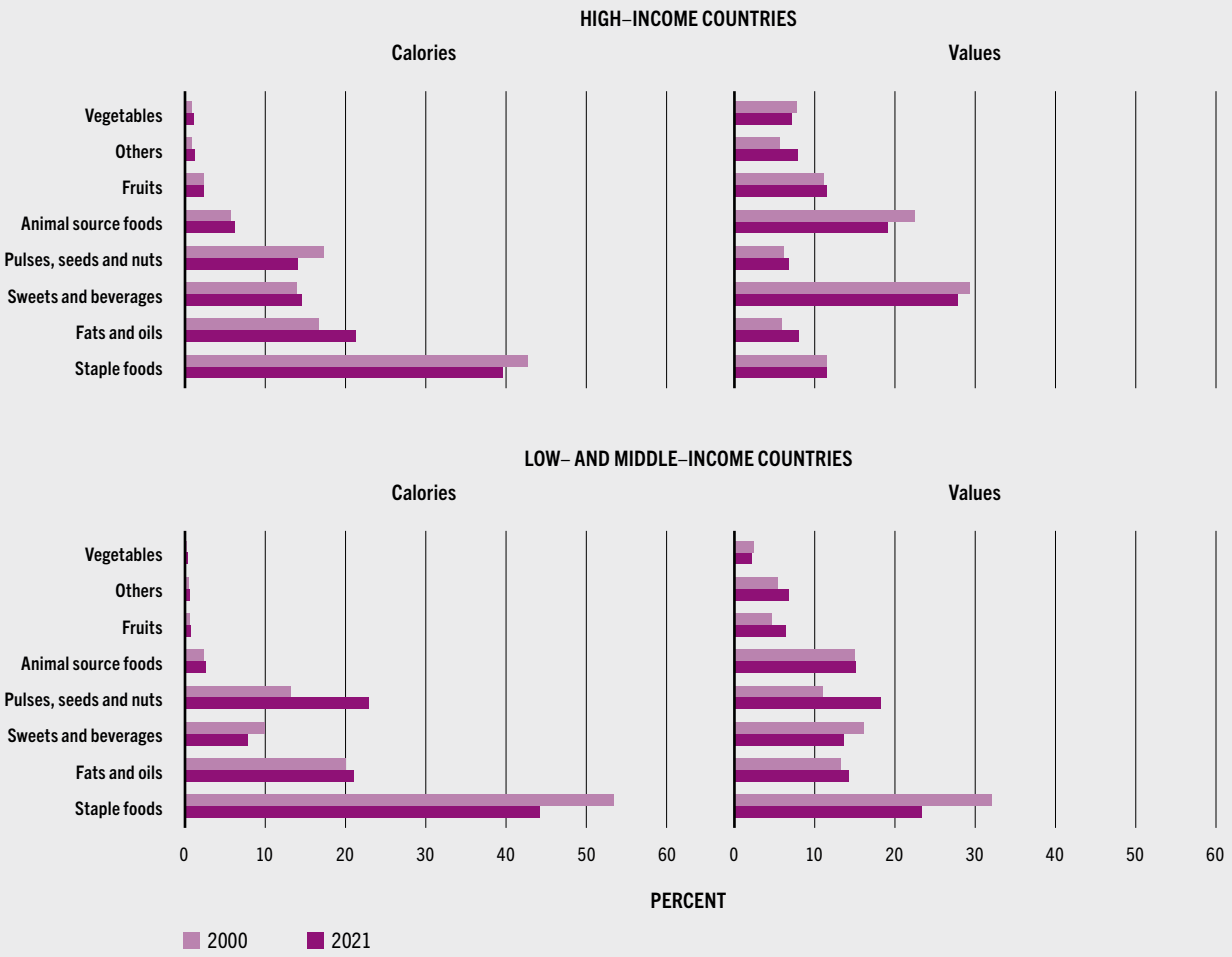
As fruits and vegetables are low in calories, their shares in total calories traded are very low. In 2021, the share of fruit imports by high-income countries was 2.3 percent, that of vegetables amounted to 1.0 percent. However, in terms of value, fruits made up 11.5 percent of total imports, while vegetables accounted for 7.2 percent of total imports. In low- and middle-income countries, these shares were even lower, both in terms of calories (0.7 percent for fruits and 0.3 percent for vegetables) and value (Figure 2.4).

In terms of value, trade in sweets and beverages accounted for the largest share across the food categories globally (more than 22 percent of global trade value in 2021). Although in 2021, in high-income countries, sweets and beverages contributed 15 percent of imported calories, they made up 28 percent of import value in 2021. In low- and middle-income countries, the share of the import value of animal source foods was six times higher than their contribution to the share of imported calories.

Food trade by processing level

Foods can also be distinguished by processing level (see Box 2.2). Trade in food at all processing levels increased between 2000 and 2021 (Figure 2.5). Globally, unprocessed and minimally processed foods contributed to almost two thirds (65 percent) of the calories traded in 2021.

FIGURE 2.4 SHARES OF IMPORTS BY FOOD CATEGORY IN ALL FOOD IMPORTS (BASED ON ENERGY CONTENT AND MONETARY VALUE), 2000 AND 2021



SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Accessed on 15 May 2023]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig2.04

The second largest share of traded calories was made up of processed culinary ingredients (around 27 percent), followed by ultra-processed (7 percent) and processed foods (1.4 percent). These shares remained relatively stable between 2000 and 2021.

There are considerable differences in the trade patterns of foods by level of processing of high-income countries compared to low- and middle-income countries (Figure 2.6). In 2021, the share of total calories from unprocessed and minimally processed foods imported by high-income countries amounted to around 60 percent, while this was almost 70 percent in low- and middle-income countries. Both country income groups imported about the same share of processed culinary ingredients, which are used for further processing in the domestic industry or for food preparation at home (around 27 percent). Globally, imports of ultra-processed and processed foods in low- and middle-income countries comprised only 4 percent and 0.5 percent of total calories traded, respectively. These shares were much higher in high-income countries.

BOX 2.1 FOOD CATEGORIES IN THIS REPORT

Food categories in this report are defined based on the FAO/World Health Organization (WHO) Global Individual Food consumption data Tool (FAO/WHO GIFT)[96, 97] food group classification. GIFT food groups combine foods of different processing levels. This is an important limitation for the interpretation of trade flows because in some of the groups no distinction can be made between imports for food, feed, processing or other uses (for example, industrial or biofuels). For the analyses in this report, the food groups have been further aggregated to form eight aggregate food categories. Table 2.1 provides an overview of these food categories, along with examples of the most-traded items in each of the categories.

TABLE 2.1 FOOD CATEGORIES USED IN THE REPORT

Food categories in the report	Description based on the FAO/WHO GIFT food groups	Most traded foods in the food category
Animal source foods	Eggs and their products, meat and meat products, milk and milk products	Cheese, meat of cattle, chicken and pig, milk powder
Fats and oils	Fats and oils	Palm oil, soya bean oil, sunflower and rapeseed oil
Fruits	Fruits and their products	Bananas, prepared fruits, apples, avocados, dates
Miscellaneous (others)	Miscellaneous, spices and condiments, foods for particular nutritional uses	Food preparations, infant food, chillies and peppers, spices
Pulses, seeds and nuts	Pulses, seeds and nuts, and their products	Soya beans, sunflower and rapeseed, peas, groundnuts
Staple foods	Cereals and their products, roots, tubers, plantains, and their products	Maize, wheat and wheat flour, rice, barley
Sweets and beverages	Sweets and sugars, beverages	Raw cane and beet sugar, refined sugar, pastry, chocolate products, cocoa beans
Vegetables	Vegetables and their products	Onions, tomato paste, dehydrated or frozen vegetables, garlic

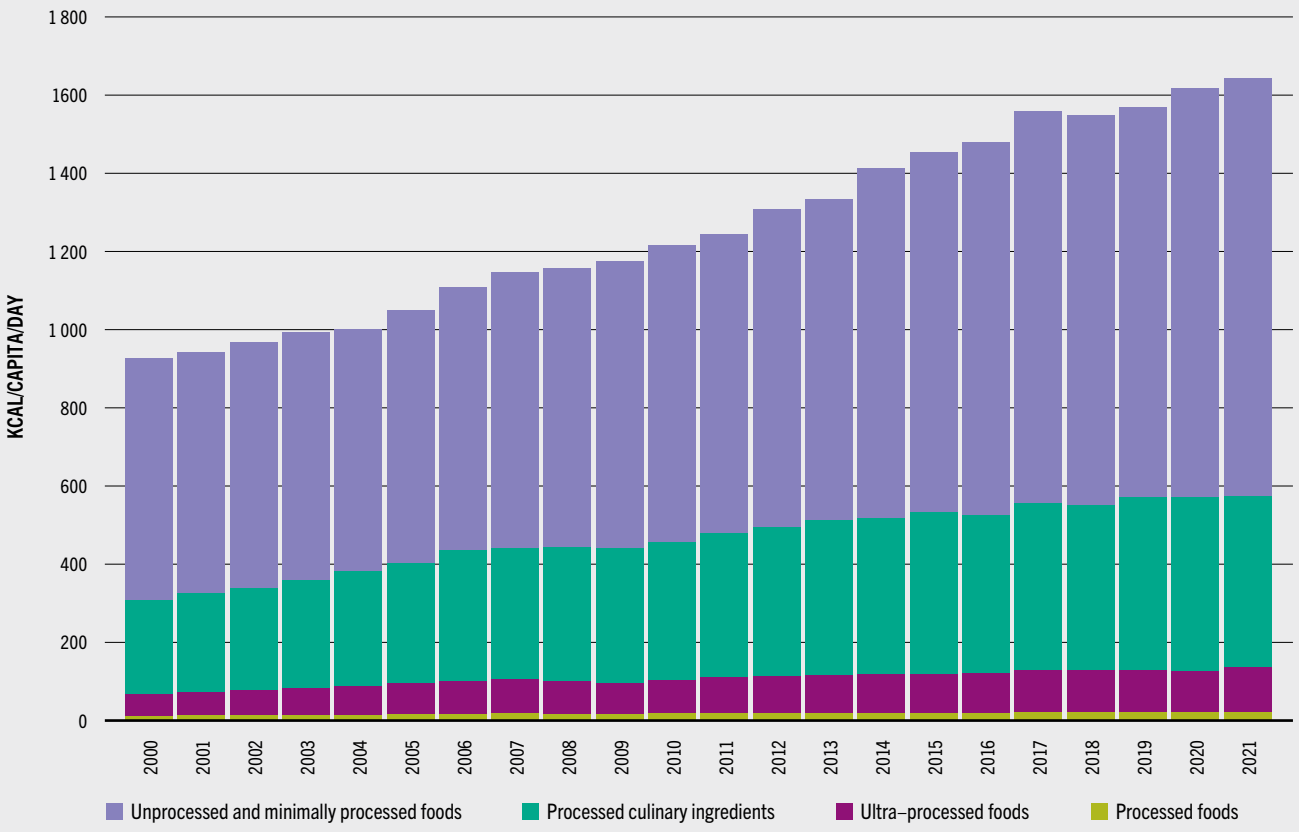
NOTES: The FAO/WHO GIFT food group classification includes a number of food groups not mentioned in this table as no data in these groups were available in the FAO supply utilization accounts. The most traded foods are determined based on their trade shares measured in calories.

SOURCES: Adapted from FAO, IFAD, UNICEF, WFP & WHO. 2023. *The State of Food Security and Nutrition in the World 2023 – Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum.* Rome, FAO. https://doi.org/10.4060/cc3017en; FAO. 2022. *FAO/WHO Global Individual Food consumption data Tool (GIFT): methodological document.* Rome, FAO. https://openknowledge.fao.org/items/6a38654d-c398-4ea7-8bde-cd477dc2823f

Trade patterns according to food processing levels have not significantly changed in either income group between 2000 and 2021, except that high-income countries showed a declining trend of imported calories from unprocessed and minimally processed foods, while the relative shares of imported calories in the other processing levels increased, especially those of ultra-processed products (from 8 percent of all traded calories in 2000 to 12 percent in 2021).

Processed foods are relatively expensive, as reflected in their trade values (see **Part 3**). While imports of ultra-processed foods accounted for 12 percent of all imports in terms of calories in high-income countries

FIGURE 2.5 EVOLUTION OF FOOD TRADE BY PROCESSING LEVEL (BASED ON DAILY PER CAPITA ENERGY CONTENT), WORLD, 2000–2021



SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Accessed on 15 May 2023]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig2.05

in 2021, their value made up 29 percent of the total value of imported foods (Figure 2.6). Similarly, ultra-processed foods contributed around 4 percent of calories imported, but 16 percent of the food import value in low- and middle-income countries in 2021.[p]

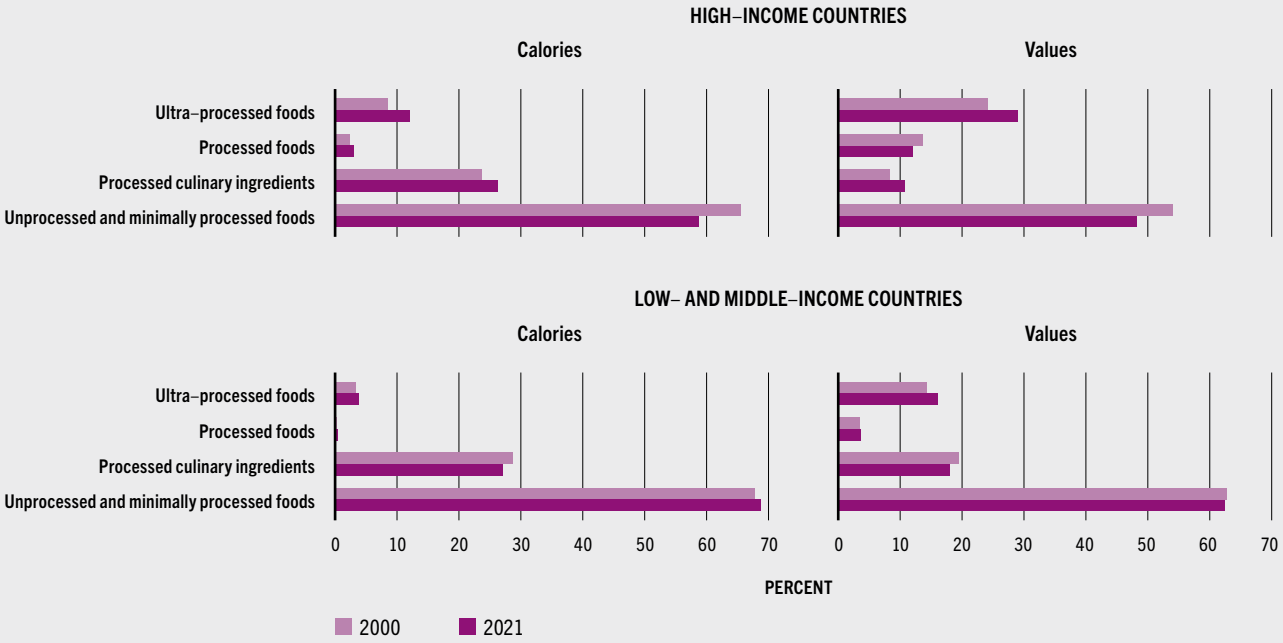
Food trade and nutrient movements

Food trade plays an important role in contributing to the supply of nutrients around the world (see **Part 3**). With the increase in food trade, there has been a corresponding rise in the trade of nutrients. For example, per capita trade in vitamin C and calcium from food increased by almost 90 percent between 2000 and 2021.[q, 61] The trade in these two micronutrients exhibits a characteristic pattern. Generally, food trade among countries

p Unprocessed and minimally processed foods made up around 48 percent of the value of imported foods from high-income countries in 2021. In the group of low- and middle-income countries this share was 62 percent. Although based on different food and country classifications, these shares are comparable to those identified by UNCTAD (UN Trade and Development). 2024. *Trade in processed food.* Geneva, Switzerland, United Nations. https://unctad.org/system/files/official-document/stat2023d4_en.pdf

q Data conversions are based on a newly developed global nutrient conversion table. Information on data conversions and limitations is also given in Box 3.2.

FIGURE 2.6 SHARES OF IMPORTS BY PROCESSING LEVEL IN ALL FOOD IMPORTS (BASED ON ENERGY CONTENT AND MONETARY VALUE), 2000 AND 2021



SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Accessed on 15 May 2023]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig2.06

in the same region tends to be higher than with countries in other regions, as geographical proximity lowers transport and other trade costs.[62] This is also evident in the trade of most micronutrients. For example, intraregional trade makes up around 70 percent of all European vitamin C imports from food. Only 30 percent are sourced from other regions. Nevertheless, persistent deficits can lead to interregional trade, despite this being more costly.

When examining trade between different regions, Europe and Northern America stand out as the world's top importers of vitamin C from food in absolute terms (Figure 2.7). These imports are mainly sourced from southern hemisphere regions. Northern American interregional vitamin C imports primarily come from Latin America and the Caribbean, while Europe imports from Africa, Asia, and Latin America and the Caribbean. This pattern is reversed in the case of the interregional trade of calcium.

Asia is the region with the highest interregional calcium imports from food, followed by Europe and Africa. Asia primarily imports calcium from Europe and Northern America, with significant amounts also coming from Latin America and the Caribbean, and Oceania (Figure 2.8). Africa sources calcium from all other regions, with the highest shares coming from Europe.

Many low- and middle-income countries are net importers of food. Relatively low agricultural productivity, rapid population growth and increasing income levels imply that low- and middle-income countries as a group deepened their net import position in the last two decades.[63] This is also visible in their nutrient flows, measured on a daily per capita basis, that is accounting for population growth (Figure 2.9).

In the early 2000s, net imports of low- and middle-income countries amounted to 60 kcal/capita/day. By the end of the second

BOX 2.2 FOOD PROCESSING AND THE NOVA CLASSIFICATION SYSTEM

The term "food processing" involves applying scientific and technological principles to preserve foods by slowing down or stopping the natural processes of decay. Reasons for food processing include converting inedible raw materials into edible foods, increasing the digestibility of raw foods (e.g. through cooking), ensuring food safety, altering the shelf-life (e.g. through fermentation, canning or freezing), simplifying meal preparation, improving transportability, or increasing the palatability of food products (e.g. by adding flavourings). The degree of food processing can vary from unprocessed raw foods (e.g. fresh fruit eaten as such) to food products with ingredients that are derived from food but contain little or no whole food (e.g. extruded cereals).[98]

Numerous food processing classification systems exist. Among them are food classification systems that emphasize industrial food processing, whereby foods are categorized according to processing-related criteria, with each employing different criteria and metrics. The NOVA food classification is one of the available food processing classification systems that has been widely used in public health, nutrition and epidemiological research. The definition of food processing levels, as proposed by NOVA, is complex and multidimensional. This increases the risk of misclassifying food items,[99] and makes study of the associations between NOVA and health outcomes also complex.

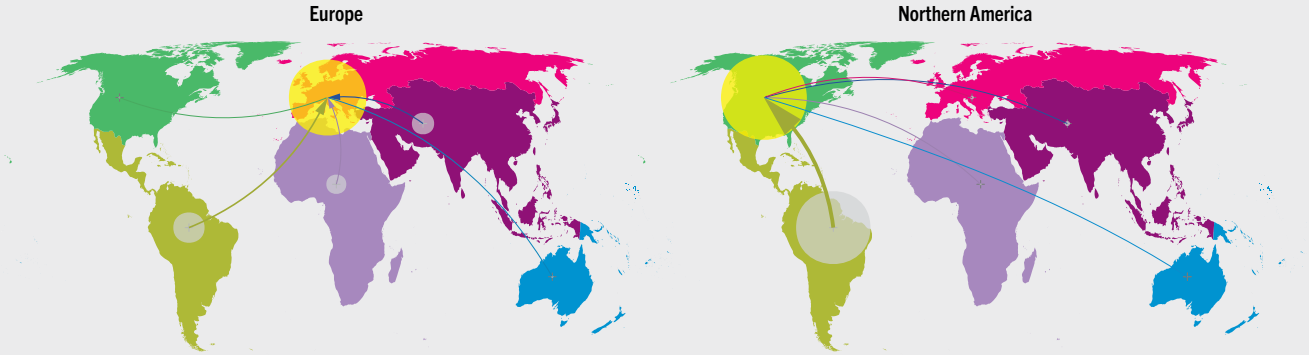
NOVA's first food processing category combines unprocessed and minimally processed foods. This is an important limitation of NOVA particularly for the interpretation of trade flows, because in some of the categories no distinction can be made between imports for food, feed, processing or other uses (for example, industrial or biofuels). Results, particularly of the unprocessed and minimally processed foods in this report, therefore, should be interpreted with caution.

For this report, the NOVA food processing classification was applied to all 445 items considered as food in FAOSTAT's supply utilization accounts, whereby all foods were classified according to the nature, extent and purpose of the industrial processing they undergo. A brief overview of the four NOVA processing levels, with examples of foods used in this analysis, follows.

- **Unprocessed and minimally processed foods:** Unprocessed foods are of plant or animal origin, consumed shortly after harvesting, gathering or slaughter. Minimally processed foods are unprocessed foods altered in ways that do not add or introduce any substance but may involve subtracting parts of the food. Examples of unprocessed and minimally processed foods include fresh and frozen fruits, vegetables, pulses and meat; dried and fresh milk and milk products such as plain yoghurt; eggs; grains (cereals); flours and pastas. Maize, wheat, soya beans, milled rice and barley are the most traded products in the group of unprocessed and minimally processed foods.
- **Processed culinary ingredients:** Processed culinary ingredients are those that are extracted and purified by industry from constituents of foods, or else obtained from nature such as salt. Examples include vegetable oils crushed from seeds, nuts or fruits (notably olives); butter obtained from milk and lard from pork; sugar and molasses obtained from cane or beet. The most traded items in the category of processed culinary ingredients are palm oil, raw cane or beet sugar, soya bean oil, crude sunflower-seed oil and refined sugar.
- **Processed foods:** These foods are manufactured by adding salt or sugars or other substances of culinary use such as oils or vinegar to whole foods to make them more durable and sometimes to modify their palatability. Examples include vegetables preserved in brine, fruits preserved in syrup; salted nuts; unreconstituted processed meat such as ham and bacon; cheese; fresh unpackaged breads; beer, cider and wine. Many of the highly traded foods considered as processed foods are high-value products such as cheese, beer, wine, prepared fruits, vegetables and nuts.
- **Ultra-processed foods and drink products:** These products are formulated mostly or entirely from substances derived from foods or other organic sources and typically contain little or no whole foods. Examples include many types of sweets, fatty or salty snack products; ice cream, chocolates, candies (confectionery); sausages; soft drinks, spirits. The most traded ultra-processed foods are pastry, chocolate products, hydrogenated oils and fats (i.e. those that have undergone modification beyond crushing), and various food and fat preparations.

SOURCES: Adapted from FAO, IFAD, UNICEF, WFP & WHO. 2023. *The State of Food Security and Nutrition in the World 2023 – Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum*. Rome, FAO. https://doi.org/10.4060/cc3017en; Monteiro, C.A., Cannon, G., Lawrence, M., Costa Louzada, M.L. & Pereira Machado, P. 2019. *Ultra-processed foods, diet quality, and health using the NOVA classification system.* Rome, FAO. https://openknowledge.fao.org/server/api/core/bitstreams/5277b379-0acb-4d97-a6a3-602774104629/content

FIGURE 2.7 PATTERNS OF TRADE BETWEEN REGIONS: VITAMIN C FROM EUROPEAN AND NORTHERN AMERICAN FOOD IMPORTS, 2021

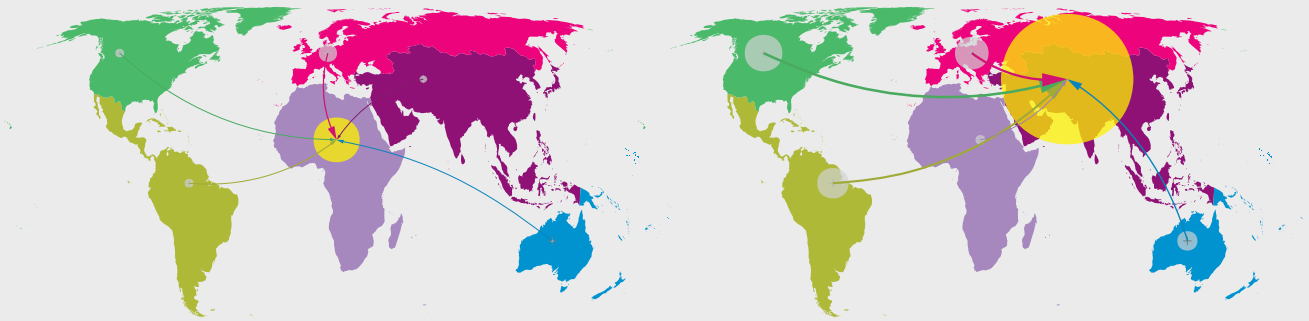


NOTES: Yellow circles denote the total amount of vitamin C from food imported by a given region. Grey circles denote the amount of vitamin C exported from each region. Arrows indicate the direction of the trade flow from the origin to the destination region. Intraregional trade is excluded.
Refer to the disclaimer on the copyright page for the names and boundaries used in this map.

SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Detailed trade matrix. [Accessed on 15 May 2023]. https://www.fao.org/faostat/en/#data/TM. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig2.07

FIGURE 2.8 PATTERNS OF TRADE BETWEEN REGIONS: CALCIUM FROM AFRICAN AND ASIAN FOOD IMPORTS, 2021



NOTES: Yellow circles denote the total amount of calcium from food imported by a given region. Grey circles denote the amount of calcium exported from each region. Arrows indicate the direction of the trade flow from the origin to the destination region. Intraregional trade is excluded.
Refer to the disclaimer on the copyright page for the names and boundaries used in this map.

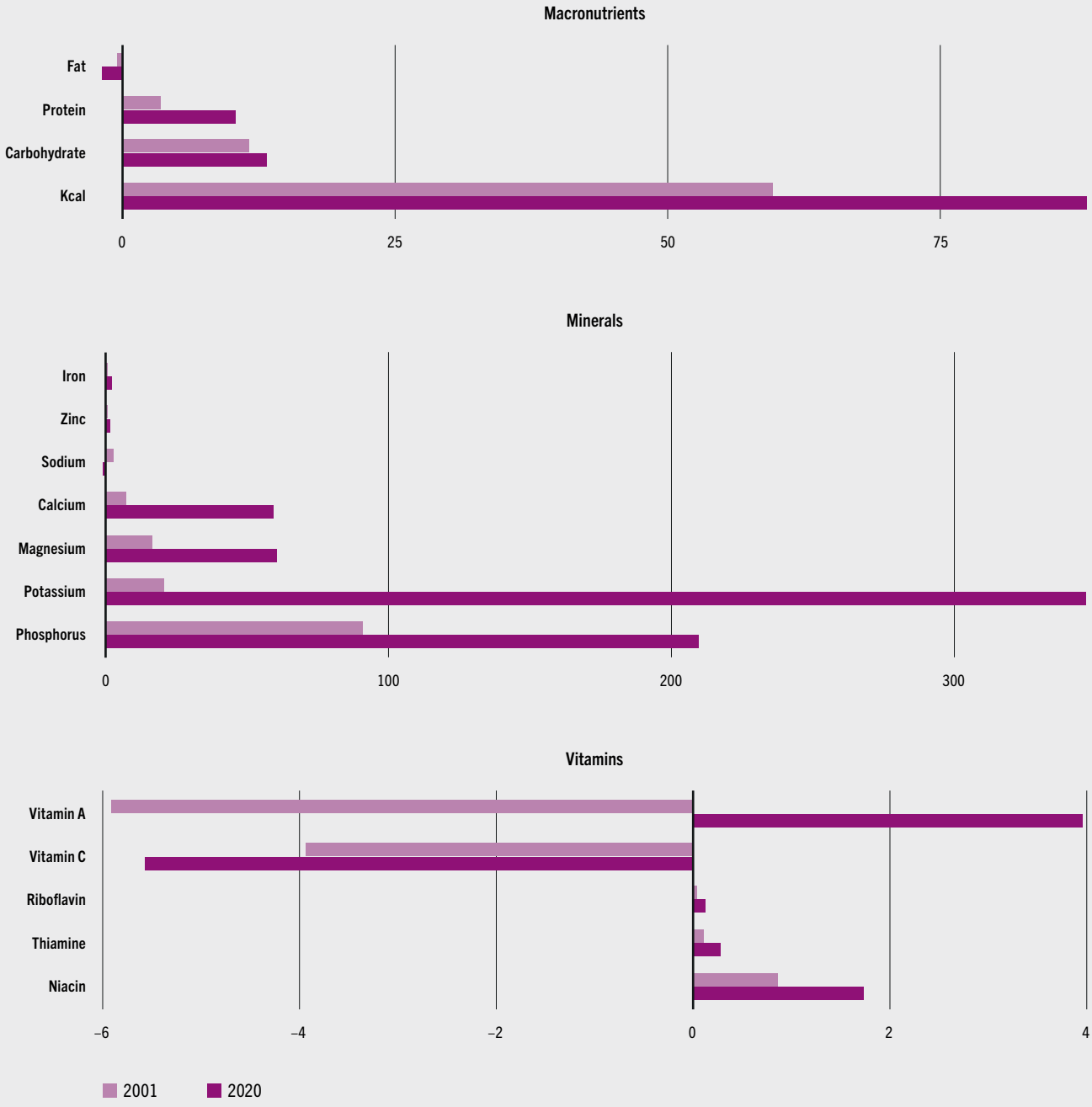
SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Detailed trade matrix. [Accessed on 15 May 2023]. https://www.fao.org/faostat/en/#data/TM. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig2.08

decade of the twenty-first century this number had risen to almost 90 kcal/capita/day. This probably reflects the nutrition transition of an increasingly affluent population. Net imports of proteins increased, from around 3.5 g/capita/day in 2001 to 10 g/capita/day in 2020. During the same period, net imports of carbohydrates increased slightly, while the group of low- and middle-income countries became a net exporter of fats.

Net imports of many minerals from foods increased significantly between 2001 and 2020, particularly those of potassium, phosphorus, magnesium and calcium. While the group of low- and middle-income countries was a net exporter of vitamin A from food at the beginning of the twenty-first century, this had changed by 2020, when around 4 µg of vitamin A per capita per day were imported. For vitamin C, the group is a net exporter.

FIGURE 2.9 NUTRIENT NET IMPORTS FROM FOOD OF LOW- AND MIDDLE-INCOME COUNTRIES, 2001 AND 2020



NOTES: Positive values indicate net imports, negative values indicate net exports. Values are reported on a daily per capita basis. Macronutrients (carbohydrate, fat and protein) are measured in grams. All micronutrients are measured in milligrams except for vitamin A, which is measured in micrograms.

SOURCE: Authors' own elaboration based on Traverso, S. (forthcoming). *Food trade, macronutrient prices, trade tariffs and the price of food imports – Background paper for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig2.09

BOX 2.3 TRADE OF AQUATIC PRODUCTS AND NUTRITION

Importance of aquatic foods for nutrition

While this report focuses on terrestrial foods, which supply most of the food consumed globally, aquatic foods – including animals and algae farmed in and harvested from water – are important for a healthy and balanced diet. Aquatic foods have significant positive nutritional impacts as they provide essential nutrients that are scarce in plant-based diets. For example, aquatic foods provide high-quality proteins and essential amino acids, vitamins (particularly A, B and D), and minerals such as iron, calcium, zinc, iodine, magnesium, potassium, phosphorus and selenium, and are primary dietary sources of heart-healthy omega-3 fatty acids. Diverse aquatic foods play an important role in ensuring food security and nutrition while providing livelihoods to people around the world.[100, 101]

Globally, aquatic animal foods supplied 15 percent of animal protein and 6 percent of all protein in 2021.[102] They play an important role as a source of animal protein, especially in lower-income countries. The share of protein from aquatic animal foods in the diets of low- and middle-income countries tends to be greater than in the diets of high-income countries.

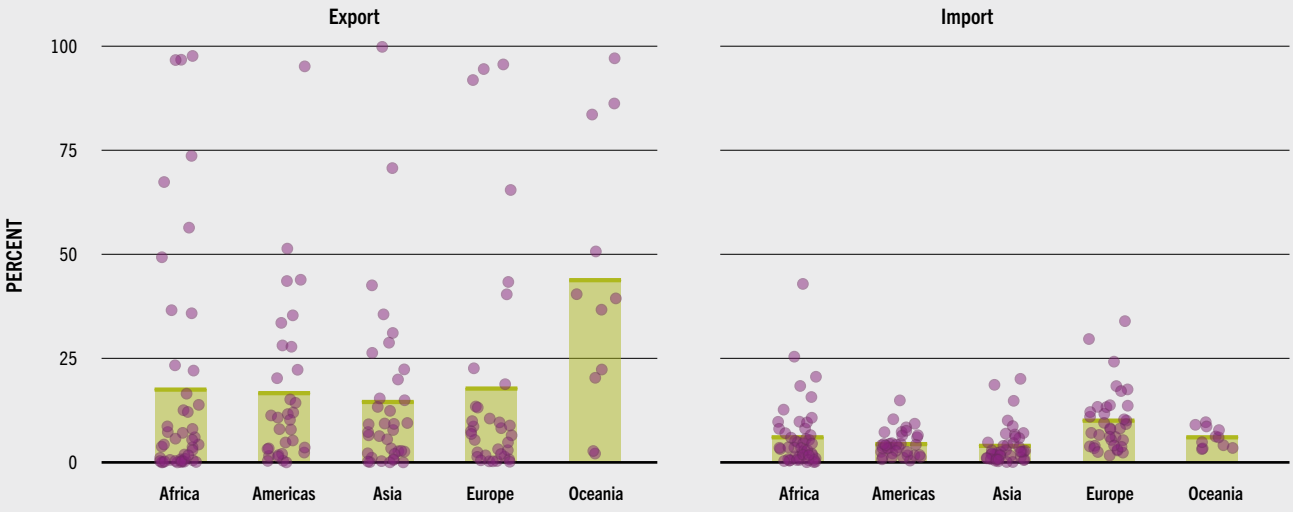
Aquatic foods can be sourced from both capture fisheries and aquaculture. In 2022, for the first time in history, the global aquaculture production of aquatic animals surpassed capture fisheries production, with aquaculture contributing 57 percent to the amount used for human consumption.

Trade of aquatic products

The trade of aquatic products is significant, as it allows many countries to access larger quantities and a wider diversity of aquatic foods that may not be available domestically. There has been a substantial increase in the share of aquatic animal production that is being traded internationally. This share increased from 25 percent in the mid-1970s to almost 38 percent in 2022.[103]

In most regions, the majority of countries have a low export share of aquatic products in total food and agricultural trade (Figure 2.10). As an exception, the small island developing states of the Bahamas, Cabo Verde, Maldives and Seychelles feature very high shares of aquatic products in their total food and agricultural exports. Also, many Oceanian countries strongly depend on exports of aquatic products.

FIGURE 2.10 SHARE OF EXPORTS AND IMPORTS OF AQUATIC PRODUCTS IN TOTAL FOOD AND AGRICULTURAL TRADE, BY REGION, 2021



NOTES: Dots mark the shares of exports and imports of aquatic products in total food and agricultural trade of individual countries within the region. The average of the individual country shares is shown by the green line on top of each bar.

SOURCES: Authors' own elaboration based on FAO. 2024. FishStat: Global aquatic trade. [Accessed on 16 October 2023]. https://www.fao.org/fishery/en/statistics/software/fishstatj; FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Accessed on 15 May 2023]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

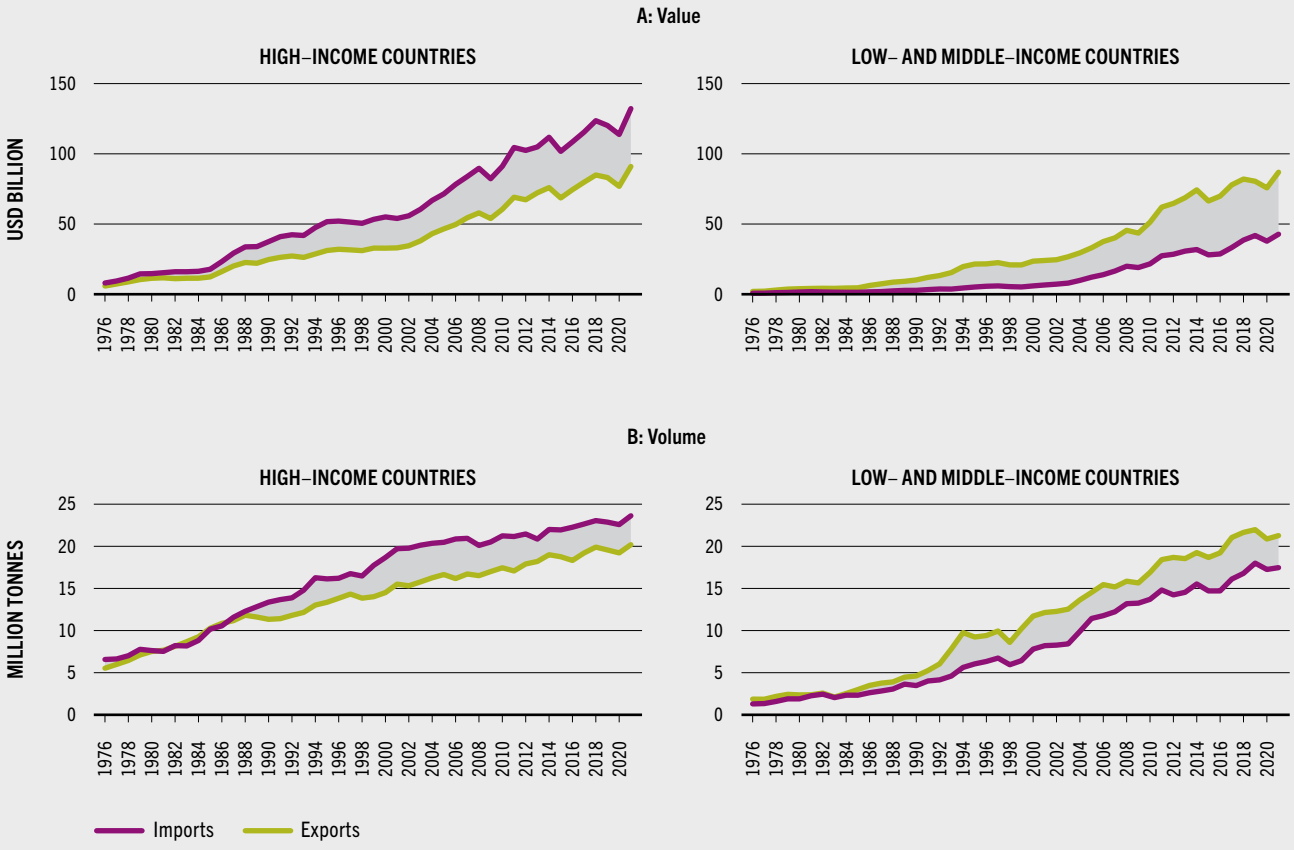
https://doi.org/10.4060/cd2144en-Fig2.10

BOX 2.3 (Continued)

The importance of exports of aquatic products in a country strongly depends on its natural endowments in terms of access to the sea and inland water resources, as well as to the possibility of aquaculture development. This explains the large variance in export shares of aquatic products across countries. Imports of aquatic products are more determined by consumer tastes and preferences. Across all regions, the share of imports of aquatic products in total food and agricultural imports is relatively stable at around 4 to 10 percent.

Historically, an important feature of trade flows in aquatic foods has been the role of low- and middle-income countries as suppliers to high-income countries. The value and quantity of aquatic products imported by high-income countries as a group are much higher than those imported by low- and middle-income countries (Figure 2.11). Research has shown that lower-income countries tend to export high-value aquatic products to high-income countries and import lower-value aquatic products from high-income countries in turn.[104] In fact, export quantities of both groups are about the same, while average import values in high-income countries are much higher than in the group of low- and middle-income countries (Figure 2.11). On average, high-income countries tend to import higher-value aquatic products and export lower-value aquatic products, while the opposite holds for low- and middle-income countries. Similar patterns have been found for the trade in terrestrial products (see nutritional arbitrage in **Part 3**).[105]

FIGURE 2.11 VALUE AND QUANTITY OF AQUATIC PRODUCTS TRADE, 1976–2021



NOTES: The figure includes within-group trade. Volume is expressed in product weight.

SOURCE: Authors' own elaboration based on FAO. 2024. FishStat: Global aquatic trade. [Accessed on 16 October 2023]. https://www.fao.org/fishery/en/statistics/software/fishstatj. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig2.11

Different trade patterns and the exchange of foods and nutrients between high-income and low- and middle-income countries constitute a defining feature of global food trade (see also **Part 3**) and play an important role in the trade of aquatic products (see Box 2.3). ■

HOW CAN TRADE AFFECT NUTRITION?

Most economists would agree that, in general, trade increases welfare. Since the establishment of the WTO in 1995, trade has expanded significantly and recent research suggests that this resulted, on average, in largely positive but heterogeneous welfare effects.[64] In countries that are open to trade, resources are allocated in line with comparative advantage, and this reduces production costs and increases efficiency. In the longer term, trade promotes technology and knowledge spillovers across countries. This increases growth by improving productivity and product quality and promoting innovation.[65]

In food and agriculture, gains from openness to trade can be larger than in other sectors. Comparative advantage in agriculture is shaped by technology and natural resource endowments such as land and water, of which there are significant differences across countries. Trade helps countries overcome their natural resource constraints and generate gains by importing food at lower prices from countries with abundant land and water, thus ensuring food security for their citizens.[66]

Nevertheless, openness to trade and its effects on society are contentious and subject to a heated debate between free trade proponents and critics of globalization. Indeed, gains from trade can be asymmetrically distributed, giving rise to inequality across and within countries.[67] Trade openness affects the prices of goods and those of the factors of production, including labour wages, and thus can result in winners and losers. In agriculture, a major concern relates to the capacity of smallholder farmers in developing countries to compete globally in open markets but also to the linkages between trade, health and nutrition.[68]

Trade and health

Many researchers examine the impact of trade openness on an economy by studying health outcomes as an alternative measure of welfare. Improving people's health and reducing health inequalities are central for achieving the Sustainable Development Goals (SDGs). A systematic review of trade's health impacts points to a range of outcomes, including reduced child mortality, increased life expectancy, improved worker health and changes in the composition of food available for consumption that could affect dietary patterns and thus nutrition.[69, 70]

For example, analysts, using data from 80 emerging economies and developing countries between 1960 and 2010, found evidence that trade liberalization reduced infant mortality in approximately half the countries examined, while there was no significant impact for the remaining cases. This could be attributed to higher incomes and, more specifically, reduced taxation of agriculture that had a positive effect on farm incomes.[71]

In Africa, a policy allowing duty-free access to the United States by many sub-Saharan African countries – the African Growth and Opportunity Act that was enacted in 2000 – was found to reduce infant mortality in those sub-Saharan countries that exported large amounts of agricultural products and mineral ores to the United States, as compared with oil exporting countries.[72] Increased employment in these labour-intensive sectors generated income and helped reduce infant mortality. Indeed, a greater decline in infant mortality was observed in families in which mothers were employed in agriculture and manual labour.

Most studies underline that incomes are the main pathway of trade impacts on health. However, this positive effect can be limited to specific population groups or sectors of the economy that benefit from increased trade, giving rise to income inequalities that could lead to multiple burdens of malnutrition (see **Part 1**).

Trade and nutrition

Trade in goods and services can affect nutrition through many direct and indirect channels

and complex mechanisms. Trade is likely to be jointly determined with other economic and social drivers such as income, investment, education and lifestyle that also affect nutrition, making the identification of its effects in empirical assessments difficult. In fact, the exact mechanisms and impacts on different nutritional outcomes can vary by context and stage of development, but there has so far been only little empirical evidence on these relationships.[73, 74]

Some studies have attempted to disentangle the impacts of the economic, political and social dimensions of globalization on nutrition outcomes such as the prevalence of obesity or the average body mass index (BMI) – a measure of body fat based on height and weight. This body of empirical research provides mixed results (see Box 2.4). Some findings indicate that political and social globalization increases BMI by affecting lifestyles through information flows and societal influences. Expanding economic globalization, which includes trade in goods and services as well as foreign direct investment, is found to be associated either with higher or lower mean BMI or prevalence of obesity and overweight, depending on the specific nutrition outcome and the globalization index chosen by the analyst, the number of countries considered in the sample and the estimation methods.

Another strand of empirical studies explores the relationship between merchandise (all goods), trade openness and nutrition outcomes (see Box 2.5 for more details on nutritional outcomes). In Brazil, merchandise trade openness was shown to have a positive and significant impact on the prevalence of overweight and obesity between 1988 and 2008, suggesting that trade increased the availability of processed foods high in calories and other goods and services that could promote a more sedentary lifestyle.[75]

At the global level, a study across 175 countries during the 1975–2016 period, found that merchandise trade openness was positively associated with the prevalence of obesity, with a 10 percent increase in trade openness resulting in a 0.8 percent increase in the prevalence of obesity, on average.[76]

This impact was found to be strongest for lower-middle-income countries, followed by upper-middle-income countries and low-income countries, suggesting that income increases were the pathway of trade effects on nutrition. In fact, in another cross-country study, increasing merchandise trade openness was found to result in reduced rates of stunting, with the effect being transmitted, to a large part, through increased incomes.[77]

The importance of incomes as a pathway through which merchandise trade openness affects nutrition is also suggested by a study across 151 countries exploring trade effects on dietary energy supply adequacy, dietary diversity and quality-related aspects of food security between 1980 and 2007.[78] On average, merchandise trade openness was found to have a positive and significant net impact on food security measured as dietary energy supply adequacy. Openness was also found to contribute to improved diets by expanding the availability of average animal source protein for consumption in each country, and by increasing income, resulting in stronger demand for animal source products.

The pathways of food trade effects on nutrition

Empirical evidence on the linkages between food trade and nutritional outcomes remains scarce, and, so far, only a handful of studies have explored these linkages more systematically.[79] Agricultural and food trade constitute an important means of ensuring dietary diversity. As trade improves the availability and accessibility of foods that support a healthy diet as well as energy-dense foods high in fats, sugars and/or salt, it can have mixed effects on nutritional outcomes.[80, 81]

The linkages between trade and dietary patterns and resulting nutritional outcomes are intricate. Trade's effects can be widely heterogeneous across countries both in direction and magnitude, depending on a country's position on the development path, its structural characteristics and the national policy environment. This renders the relationship between trade and nutrition outcomes ambiguous and challenging to identify and measure empirically.

BOX 2.4 GLOBALIZATION AND NUTRITION OUTCOMES: EMPIRICAL STUDIES

A study analysing the effects of globalization and other variables across 190 countries during the 1980–2008 period suggests that domestic factors such as increasing gross domestic product (GDP) per capita and urbanization were associated with increases in the average body mass index (BMI) for men and women. While economic globalization did not predict any increases in mean BMI, income per capita was found to have a significant effect. Among low-income countries, higher GDP per capita was associated with increases in BMI. In high-income countries, this effect was reversed with increases in GDP per capita being associated with declining BMI, potentially pointing to reductions in the prevalence of overweight and obesity.[106]

On the contrary, in another study using a sample of 127 countries between 1980 and 2008, economic globalization was positively related to modest increases in the mean adult BMI.[107] Several studies considered indicators different from BMI such as the prevalence of obesity or overweight. Economic globalization is often shown to have no effect or a decreasing effect on the prevalence of obesity or overweight. A study covering 56 countries between 1991 and 2009 found that globalization is substantially and significantly associated with an increase in the individual propensity to be overweight among women. However, this impact was found to be dominated by the political and social dimensions of globalization rather than the economic one.[108]

Another study across 180 countries finds that the economic and political dimensions of globalization reduce the prevalence of obesity among children and youth.[109]

Other dimensions of globalization such as improved communication and information flows can affect consumer preferences, dietary patterns and nutrition outcomes. Across the world, closer social integration, measured as an index of personal international contacts, international information flows and cultural proximity, was found to be positively associated with obesity.[110, 111]

Another study suggests that sociocultural aspects of globalization and access to information and communication technology reduce the share of overweight and obese young people aged between 15 and 19 years. This suggests that increased international interconnectivity within this age group could help promote knowledge about healthier eating and lifestyle habits.[112]

In a study on the effects of social globalization and trade openness on average BMI, increasing social globalization was associated with higher mean BMI and a higher availability of animal protein and sugar for consumption. These results were primarily influenced by specific components of social globalization such as information flows through television and the internet. Trade openness did not reveal any effect on dietary outcomes or health.[113]

Focusing on the impact of food and agricultural trade policies also provides conflicting results. Trade liberalization has been identified as one of the key mechanisms through which trade impacts health and nutrition.[82] Overall, the empirical literature appears to point to a broad association between trade liberalization, improved dietary quality and reduced undernutrition.[83] Other studies suggest that trade, and in particular trade agreements, increase the availability of processed foods and lead to higher obesity rates.[84, 85, 86] Recognizing the multitude of pathways and effects that food trade can have on nutrition, it may be necessary to take a narrow focus on the trade of specific food categories and their linkages with nutritional outcomes. Nevertheless, many pathways through which trade affects nutrition can be conceptualized. However, most of these effects are endogenous, occurring simultaneously and reinforcing each other, making it difficult to identify causal relationships. An econometric exercise carried out for this report attempts to distinguish the individual effects of trade openness and income on selected nutritional indicators (see Box 2.6).

Availability and access to food

Food trade allows for more food imports and thus increases the availability of foods for consumption in a country. This helps overcome the constraints that the uneven distribution of natural resource endowments poses on the supply of foods and nutrients across countries. With higher availability, domestic food prices decline, making food more accessible. Higher availability and lower prices can impact

BOX 2.5 GLOBAL NUTRITION TARGETS

On the occasion of the Sixty-fifth World Health Assembly (WHA) in 2012, national governments committed to six nutrition targets to be achieved by 2025: a 40 percent reduction of the global number of children under five who are stunted; a 50 percent reduction in the prevalence of anaemia in women of reproductive age; a 30 percent reduction in the prevalence of low birth weight; no increase in the incidence of childhood overweight; increase the rate of exclusive breastfeeding in the first six months up to at least 50 percent; and reduce and maintain childhood wasting to less than 5 percent everywhere. A seventh target, to halt the rise in adult obesity, was adopted by the WHA as part of the Global Action Plan for the Prevention and Control of Noncommunicable Diseases in 2013. Progress was made on most of the global nutrition targets, but this was mixed across indicators and the world is still not on track to achieve all of them.

The prevalence of undernourishment is used to monitor hunger at the global and regional level, as well as Sustainable Development Goal (SDG) indicator 2.1.1. It is defined as the proportion of the population with a habitual food consumption insufficient to provide, on average, the amount of dietary energy required to maintain a normal, active and healthy life. The prevalence of adult overweight is also an important indicator of an individual's overall health status. Overweight has increased rapidly across most countries and in all regions of the world. The global prevalence of overweight was estimated at 43 percent in 2022.

GLOBAL NUTRITION TARGETS

Target	Definition	Status (latest data available)
Stunting in children under 5 years of age	Height-for-age less than two standard deviations of the World Health Organization (WHO) Child Growth Standards median among children aged 0–59 months	In 2022, this indicator stood at 22.3 percent
Anaemia	Defined as haemoglobin levels under 120 g/L in women of reproductive age and children	In 2019, global anaemia prevalence was 29.9 percent in women of reproductive age and 39.8 percent in children aged 6–59 months
Low birth weight	Newborns weighing less than 2 500 g at birth	In 2020, an estimated 14.7 percent of newborns had low birthweight globally
Childhood overweight	Prevalence of overweight among children and adolescents is defined as a body mass index (BMI) over one standard deviation above the median	Worldwide, an estimated 5.6 percent of children under 5 years of age were overweight in 2022
Breastfeeding	Rate of exclusive breastfeeding in the first 6 months of life	An estimated 47.7 percent of infants under 6 months were exclusively breastfed in 2021
Wasting in children under 5 years of age	Weight-for-height over two standard deviations below the median for the international reference population ages 0–59 months	In 2022, an estimated 6.8 percent of children under 5 years of age suffered from wasting
Prevalence of obesity among adults	Defined as a BMI where the index is calculated as the weight in kilograms divided by the square of the height in metres and resulting in a value that is equal to or greater than 30	In 2022, the prevalence of obesity in the adult population was estimated at 16 percent

SOURCES: FAO, IFAD, UNICEF, WFP & WHO. 2023. *The State of Food Security and Nutrition in the World 2023: Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum.* Rome, FAO. https://doi.org/10.4060/cc3017en; WHO. n.d. Global Targets 2025: To improve maternal, infant and young child nutrition. In: *WHO*. [Cited 30 April 2024]. https://www.who.int/teams/nutrition-and-food-safety/global-targets-2025

BOX 2.6 ESTIMATING THE AVERAGE IMPACT OF FOOD TRADE OPENNESS ON SELECTED NUTRITIONAL INDICATORS

A simple correlation between a nutritional indicator, say, the prevalence of obesity, and openness to food trade, would not necessarily reveal the underlying average causal effect. Food trade openness could affect obesity through several pathways, including income. At the same time, openness to food trade and incomes can be simultaneously determined, although both can affect obesity independently. For example, openness to food trade can facilitate structural transformation and income growth by increasing the availability of and access to food in a country. Such an analysis requires a modelling framework that can separate the effect of trade openness from the income effect.

Using data on the prevalence of obesity among adults and the prevalence of stunting in children under five years of age, a modelling exercise undertaken for this report identified and estimated the separate effects of food trade openness and gross domestic product (GDP) per capita across countries. To accommodate the heterogeneity in impacts, as the effects of trade openness and income are likely to differ across countries at different levels of development, the modelling framework provides estimates along the distribution of the nutrition outcomes, that is for lower values of obesity and stunting (the 10th percentile of the distribution), the median values (the 50th percentile) and higher values (the 90th percentile). For example, high values of obesity are, in general, found in middle- and high-income countries, while high values of stunting are prevalent in low-income countries.

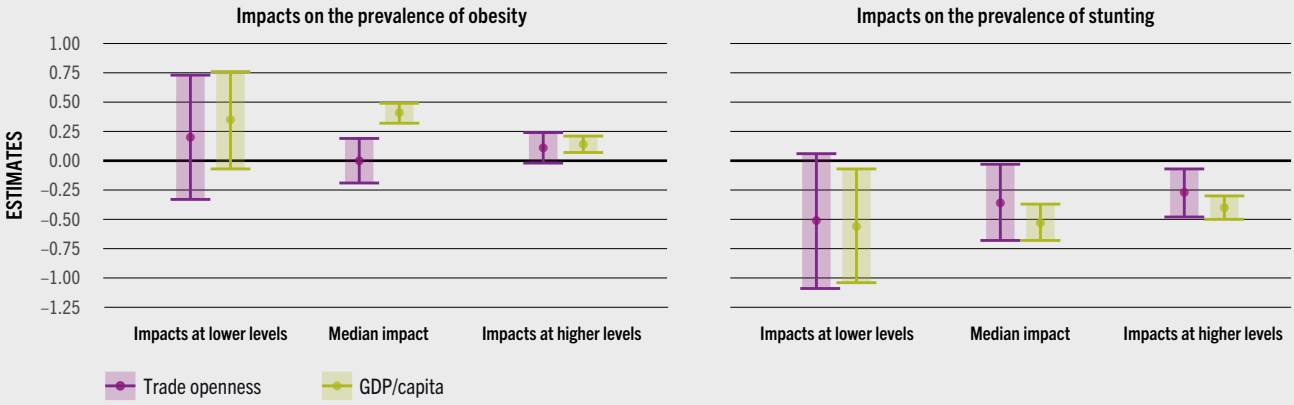
The estimated impacts support the concept of nutrition transition. Income growth is a major driver of the nutrition transition and the effects of GDP per capita on obesity and stunting are always stronger than the impact of trade openness. Higher incomes result in lower rates of stunting and higher rates of obesity. These effects are strongest for rapidly developing middle-income countries with low to medium levels of stunting and obesity (Figure 2.12).

Trade in food is important for food security and nutrition. Food trade openness is shown to reduce stunting at all levels of development, as more trade increases the availability and diversity of food (see **Part 3**). The effects are weakest in countries with high levels of stunting, which are typically observed in low-income countries, potentially because these countries are not well integrated into global food markets and do not trade intensively.

Trade openness is relatively clearly associated with an increasing prevalence of obesity only at very high levels of obesity. The highest levels of obesity are found in many Small Island Developing States including the Pacific islands and countries in Northern Africa and Western Asia (see **Part 4**). Due to land, water and other resource constraints that affect their food and agricultural production capacity, these countries are highly dependent on food imports to feed their populations and they trade a lot (Figure 2.2).

In these cases, where domestic production capacity is limited, food trade can be directly related to increasing rates of obesity. In countries with low to medium levels of obesity, the effect of food trade openness on obesity rates is not significantly different from zero.

FIGURE 2.12 AVERAGE IMPACTS OF FOOD TRADE OPENNESS AND GROSS DOMESTIC PRODUCT PER CAPITA ON THE PREVALENCE OF OBESITY AMONG ADULTS AND THE PREVALENCE OF STUNTING IN CHILDREN



NOTES: The figure shows estimated effects of trade openness and gross domestic product (GDP) per capita on the prevalence of obesity in the adult population and the prevalence of stunting in children under five years. Effects are estimated for lower levels, median, and higher levels of obesity and stunting. Shaded areas denote confidence intervals of the estimates. Trade openness is defined as the ratio of food and agricultural trade over the size of the food and agricultural sector in a country. Prevalence of obesity is defined as the percentage of adults whose body mass index (BMI) is equal to or greater than 30 kg/m^2. Prevalence of stunting is defined as the percentage of children under five years of age with a height-for-age less than –2 standard deviations below the World Health Organization (WHO) Child Growth Standards median.

SOURCE: Adapted from Engemann, H., Jafari, Y. & Zimmermann, A. (forthcoming). *Diversity of food supply across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig2.12

total food consumption and dietary composition, thus affecting nutrition outcomes at individual and population levels (see **Part 3**).[87] At the same time, trade can increase the availability of ultra-processed foods of high energy density and that are high in fats, sugars and/or salt, thus shaping dietary patterns associated with overweight and obesity (see **Part 4**).

Food diversity

Greater openness to food trade also allows for a greater variety of food imports and a more diversified food supply. Global markets enable the exchange of foods that are produced under specific climates, soil and other natural conditions and, thus, contribute to the diversity of diets, which could improve nutritional outcomes (see **Part 3**).[88] Food trade was found to promote a healthier and more balanced diet, as countries have access to an increased variety of foods and an adequate supply of macro and micronutrients.[89]

Stability of food supply

Food trade openness also allows for seasonal adjustments in food imports, enabling a more stable food supply in terms of both quantity and diversity throughout the year or in the event of shocks such as weather extremes that affect production. Trade is, therefore, a potentially powerful mechanism to even out supply fluctuations and to reduce price volatility in a country. Stability in food supply and food prices addresses short-term nutrition outcomes such as child wasting. Recent analysis suggests that, on average in middle- and low-income countries, a 5 percent increase in the real price of food increases the risk of wasting by 9 percent and severe wasting by 14 percent. These risks apply to young infants, as well as to older children who typically experience a deterioration in diet quality in the wake of food price increases.[90]

Income growth

More indirect channels in which trade affects nutrition are through its effects on the wider economy. Opening to food trade can spur economic growth in a country, accelerating the process of structural transformation. Trade in food, especially imports, can help meet domestic food requirements without keeping a large labour force in agriculture. Food imports allow the workforce initially bound in agriculture to be freed-up and to migrate to more productive non-farm sectors, thus further accelerating growth.[91] Analysing the process of structural transformation in the Republic of Korea, a study finds that agricultural imports played a crucial role in the development of the economy.[92]

The effects of increasing incomes on food intake and nutrition are well-researched. Increasing incomes can improve access to food and result in a shift from the consumption of a high share of staple foods to more diverse dietary patterns, including meat and fish, milk, eggs, fruits and vegetables, and fats and oils (see **Part 1**). This shift can improve the nutrient adequacy of diets but can also result in a higher consumption of ultra-processed foods high in fats, sugars and/or salt, which can contribute to an increased prevalence of overweight and obesity (see **Part 4**).

At the same time, trade openness, either by intensifying competition or by fuelling the structural transformation process, can also affect income distribution and inequality with negative implications for food security and nutrition. A study suggests that, depending on initial income levels, size and competitiveness of the food and agricultural sector in a country, food trade openness may increase the prevalence of undernourishment as farmers experience a decline in incomes due to lower prices, counterbalancing any nutrition gains in the non-farm sectors of the economy.[93]

Consumer habit formation

Trade can also affect eating habits by transferring foods and flavours between countries.[94] An increased availability of imported foods can shift consumer preferences and tastes towards them, sustaining their consumption. For example, an analysis focusing on the reunification of Germany suggests that the introduction of a wide range of foods to East Germans changed their eating habits, resulting in a shift in dietary patterns that could explain increases in the prevalence of overweight and obesity.[95] ■

SERBIA
Apples and pears in crates ready for shipping.
© dusanpetkovic/ iStock.com

PART 3
TRADE IN FOOD AND NUTRIENTS: FOOD DIVERSITY, NUTRIENT SUPPLY AND THE COST OF HEALTHY DIET BASKETS

KEY MESSAGES

➔ Trade forms an integral part of our agrifood systems and it is indispensable for addressing nutritional objectives. In economics, the love of variety is an important determinant of gains from trade. Nutrition science adds to this finding. Dietary diversity is key for the adequacy of micronutrient supply.

➔ Trade promotes the diversity of food supply significantly. In 2020, on average, trade increased the diversity of foods available for consumption twofold. This effect is stronger for net-food-importing than for export-oriented countries.

➔ Between 2010 and 2020, the average supply per capita of essential micronutrients increased across countries. Those countries that are more open to trade achieved higher levels of adequacy of nutrient supply.

➔ Nutrient density appears to be an important determinant of food prices. The higher the micronutrient content in a food, the higher its price in the global market. For example, fruits and vegetables are rich in nutrients, fibre and water but less energy-dense, which makes them relatively expensive when prices are measured on a per calorie basis.

➔ Trade openness is associated with higher food trade volumes and lower food prices. A lower level of import tariffs is associated with lower prices for both nutritious foods and energy-dense foods with low nutritional value.

HOW DOES TRADE PROMOTE THE DIVERSITY OF FOOD SUPPLY?

One of the most direct pathways in which trade affects nutrition is through its effect on the diversity of foods available in a country. Agroclimatic conditions and natural resource endowments can, to a large extent, determine the quantity and diversity of food production. As not all foods can be sufficiently produced in all regions of the world and at all times of the year, the diversity of foods a country can produce is often limited. Trade is an important means to promote the availability and accessibility of more diverse foods. Higher food diversity in diets can lead to improved nutrient adequacy and ensure human health.[114]

The natural resources necessary for agricultural production such as land and water are unevenly distributed across countries and climatic conditions vary widely. Some countries can produce only a small range of products, while others possess abundant natural resources and produce a large variety of foods. For example, China, one of the largest countries in the world by area, produced around 320 different items in 2020, as compared with Kiribati, a small island developing state that produced only 15 different terrestrial food items. By participating in global food markets, most countries in the world would export foods that they can produce in abundance and import foods that can be more efficiently produced in other countries. This exchange fosters food trade globally and, at a country level, increases the overall diversity of foods available all-year-round.

In economics, the love of variety is an important determinant of the gains from trade.[115, 116] In nutrition science, dietary diversity is a good predictor for micronutrient adequacy,[117] and strong associations have been found between the diversity of foods available for consumption and nutrition outcome indicators. Higher levels of diversity of national food supplies are associated with a lower prevalence of child stunting, wasting and underweight. While the prevalence of overweight increases with the availability of food and calories, it is found to be independent of the diversity of foods available for consumption.[118]

A body of literature has investigated the relationship between trade and the diversity of foods available for human consumption. Between the beginning of the 1960s and 2013, global trade in crops expanded, a process that has been identified as the main driver of the diversity of the supply of crop products globally. Although within countries, crop production diversified only marginally, the diversity of crop products available for consumption increased rapidly through trade.[119] Another study suggests that, as a result of increased trade, a higher diversity of foods available within countries meant that both food and nutrients were more equally distributed in 2010 as compared with 1970.[120]

Nevertheless, the extent to which trade improves the diversity of foods available for consumption in a country depends on its integration in global markets. In fact, for low-income countries, which are less integrated in international trade, the diversity of foods produced is a strong predictor of the diversity of foods supplied for consumption. In middle- and high-income countries, food supply diversity was shown to be independent of production diversity, with trade being the main factor contributing to the diversity of foods available for consumption.[121] However, since trade can improve the availability and accessibility of all foods – that is, foods that support a healthy diet and energy-dense foods high in fats, sugars and/or salt– the effects on nutritional outcomes can be mixed and depend on the interplay of a multitude of factors including income, relative prices of foods and consumer preferences, which all shape the demand for food.

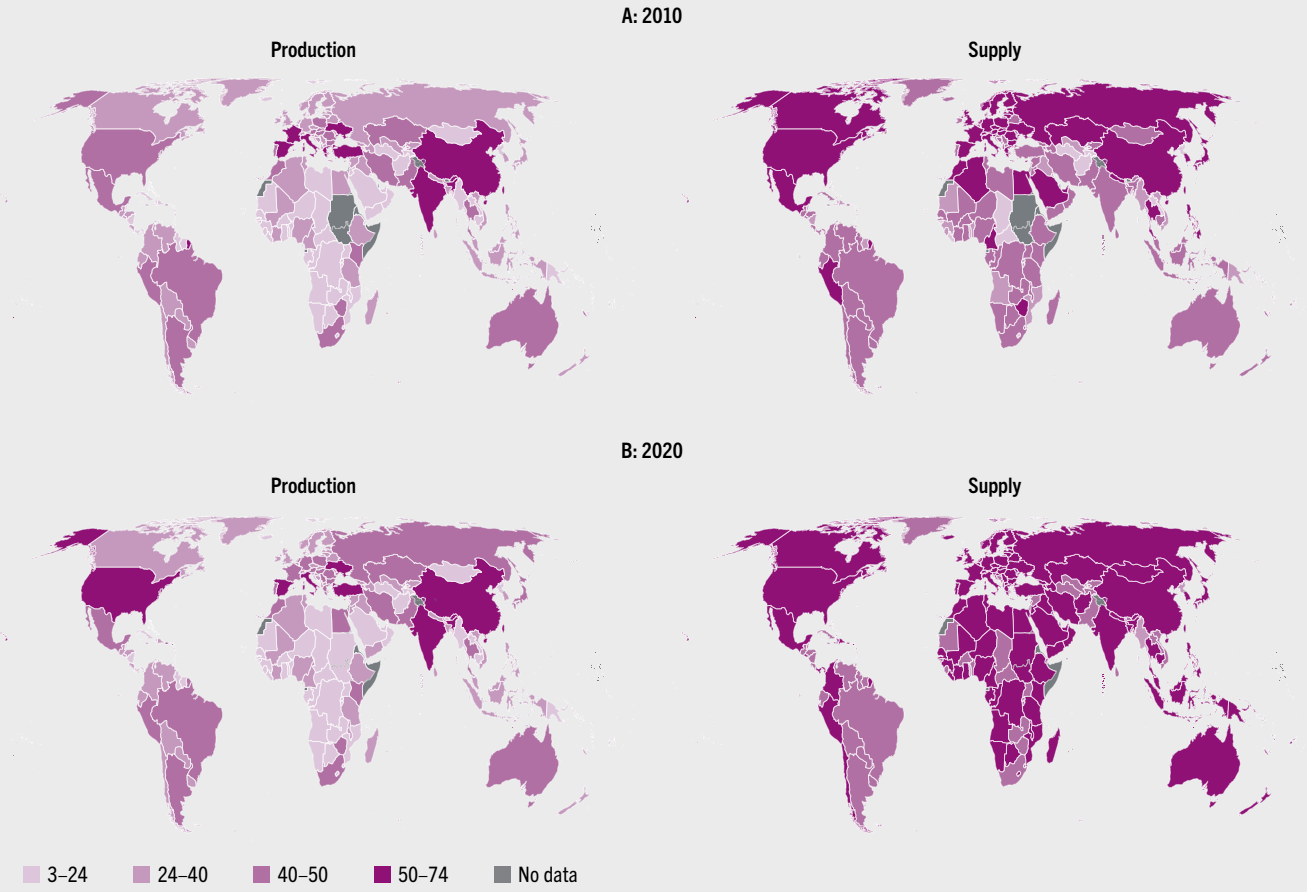
A simple measure such as the number of food items produced and supplied for consumption in a country clearly shows the impact of trade on the diversity of foods available (Figure 3.1).[r] While the number of food items produced is constrained by natural resource endowments and various other factors, the number of items available for consumption is much higher. In 2020, countries produced an average of 120 different food items, while the number of food items available for human consumption amounted to an average of 225 (out of 445 items considered in this analysis).

In most countries, the diversity of production has not changed significantly over time. Across countries, the average number of different food items produced remained stable between 2010 and 2020, reflecting the role of natural resource constraints in shaping the composition of food production. However, the average number of different food items available for consumption increased significantly between 2010 and 2020. In 2010, on average, the number of foods available for consumption was almost 60 percent higher than those produced domestically. In 2020, this had risen to almost 90 percent, indicating that trade could, on average and across countries, increase the diversity of foods available for consumption around twofold.

Among the countries with the lowest diversity of foods available in 2020 were many Small Island Developing States, especially in Oceania such as Kiribati and Nauru, in Latin America and the Caribbean such as Dominica and Saint Kitts and Nevis, and in Africa such as Cabo Verde and the Comoros. Countries with the highest diversity of foods available for consumption in 2020 included China, a large country that produces a high number of foods, and Bahrain and Oman, small countries that face significant agroclimatic and natural resource constraints in food production and that achieve high levels of diversity through trade.

r The analysis is based on FAO's supply utilization accounts. Depending on the food item classification in the supply utilization accounts, food items refer to individual foods such as blueberries and potatoes or to broader aggregates such as frozen vegetables and chocolate products. In total, 445 different food items are considered in the analysis. Information on data conversions and limitations is also given in Box 3.2.

FIGURE 3.1 SHARE OF FOOD ITEMS PRODUCED AND SUPPLIED IN ALL FOOD ITEMS, 2010 AND 2020, PERCENT



NOTE: The figure shows the number of food items produced nationally (expressed as a share of all food items) and the number of food items available for consumption (expressed as a share of all food items) across countries in 2010 and 2020.
Refer to the disclaimer on the copyright page for the names and boundaries used in this map. 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 Republic of Sudan and the Republic of South Sudan has not yet been determined.

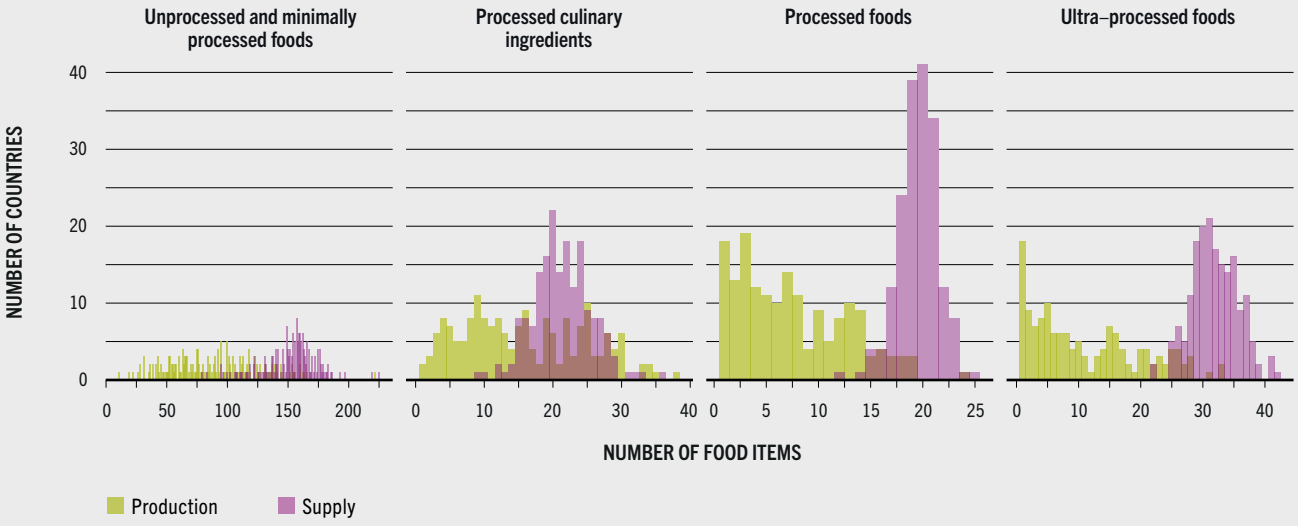
SOURCE: Authors' own elaboration based on Engemann, H., Jafari, Y. & Zimmermann, A. (forthcoming). *Diversity of food supply across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.01

Similar diversity patterns can be found when food items are classified by processing level. At all processing levels, the diversity of food items available for consumption is much higher than that of foods produced domestically (Figure 3.2). Globally, in 2020, the cross-country average of unprocessed and minimally processed foods produced and supplied to be available for consumption was 89 and 152 items, respectively. While every country produces unprocessed and minimally processed foods, their large dispersion around the global average reflects wide differences in natural resource endowments and climatic zones. For example, in 2020, the minimum number of unprocessed and minimally processed foods produced was 11 (Kiribati), while the maximum number was 222 (China).

At higher processing levels, there are fewer food items; nevertheless, a similar pattern emerges with trade and, more specifically, imports resulting in the diversity of foods available for consumption being higher than that of foods produced domestically. In 2020, on average, countries imported up to twice as many different unprocessed and minimally processed food items and different processed culinary items as they produced. Since not

FIGURE 3.2 GLOBAL DISTRIBUTION OF FOOD ITEMS BY PROCESSING LEVEL: PRODUCTION AND AVAILABILITY FOR CONSUMPTION, 2020



NOTE: The distribution of food items available for consumption lies to the right of that of food items produced, reflecting a higher diversity of food items available for consumption across all processing levels.

SOURCE: Adapted from Engemann, H., Jafari, Y. & Zimmermann, A. (forthcoming). *Diversity of food supply across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.02

every country has a well-developed food processing industry, in the same year countries imported nearly three times as many different processed and ultra-processed foods as they produced. Trade led to consistently higher diversity in foods available for consumption as compared with foods produced domestically at all processing levels.

Similar patterns hold when food items are classified according to food categories (Figure 3.3). For most food categories, the diversity of foods available for consumption is shown to be much higher than that of production. In 2020, and in most food categories, trade resulted in the average country supplying around twice as many different foods than it produced.

Trade barriers can hinder the exchange of foods and thus food diversity across countries. A study on trade and food diversity in Eastern Europe and Central Asia found that, between 1996 and 2013, trade barriers reduced the diversity of foods available in countries in the region including that of fruits and vegetables.[122] A global study of 151 countries during the period 1980–2007, suggests that trade openness was associated with higher dietary diversity as indicated by the share of dietary energy supply derived from non-staple foods.[123]

A study conducted for this report shows that, on average, between 2010 and 2020, trade openness contributed to the diversity of foods available for consumption, measured in terms of the number of food items and other diversity metrics.[124] Broadly, higher levels of trade openness were found to be associated with higher diversity of food supply (Figure 3.4). Although high diversity of foods can also be attained by countries with relatively lower levels of trade openness, those that are very open to trade consistently feature a high diversity of foods available for consumption. Nevertheless, the interplay of comparative advantage and specialization in production can also affect food supply diversity (see Box 3.1). ■

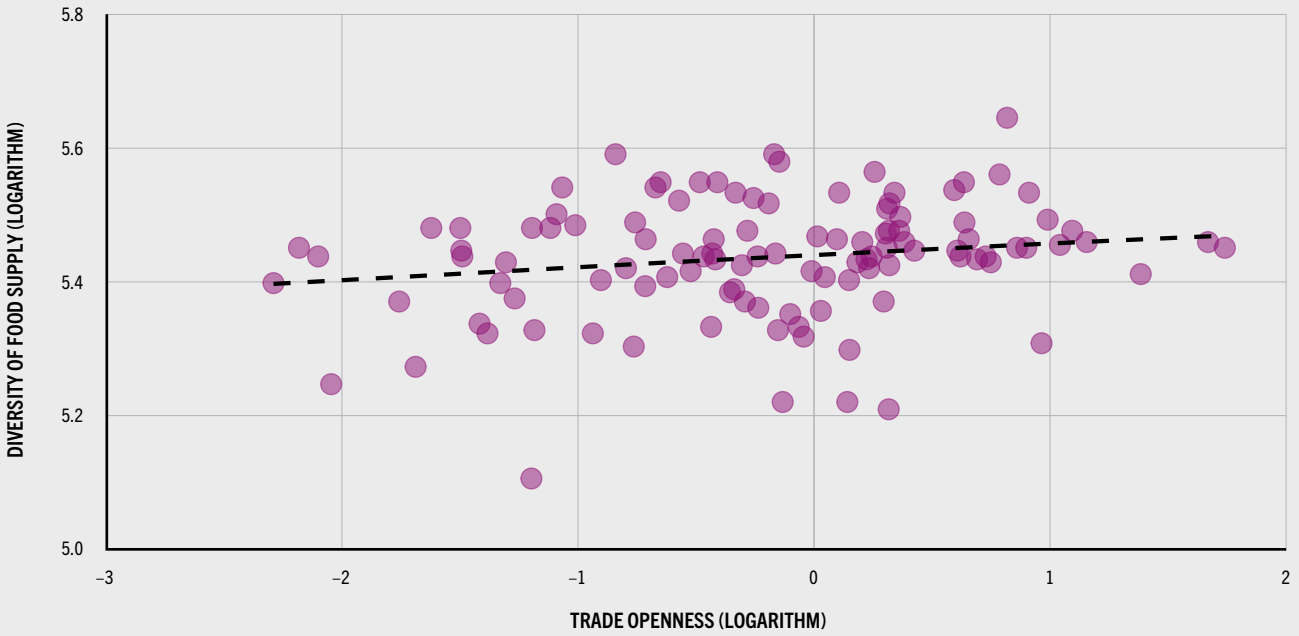
FIGURE 3.3 GLOBAL DISTRIBUTION OF FOOD ITEMS BY FOOD CATEGORY: PRODUCTION AND AVAILABILITY FOR CONSUMPTION, 2020

NOTE: The distribution of food items available for consumption lies to the right of that of food items produced, reflecting a higher diversity of food items available for consumption across most food categories.

SOURCE: Adapted from Engemann, H., Jafari, Y. & Zimmermann, A. (forthcoming). *Diversity of food supply across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.03

FIGURE 3.4 RELATIONSHIP BETWEEN TRADE OPENNESS AND DIVERSITY OF FOOD SUPPLY, 2020



NOTES: Each dot denotes one country. Trade openness is defined as the ratio of food and agricultural trade over the size of the food and agricultural sector in a country. Diversity of food supply is defined as the number of different food items available for consumption.

SOURCE: Adapted from Engemann, H., Jafari, Y. & Zimmermann, A. (forthcoming). *Diversity of food supply across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.04

BOX 3.1 NET TRADE POSITION AND THE DIVERSITY OF FOOD SUPPLY

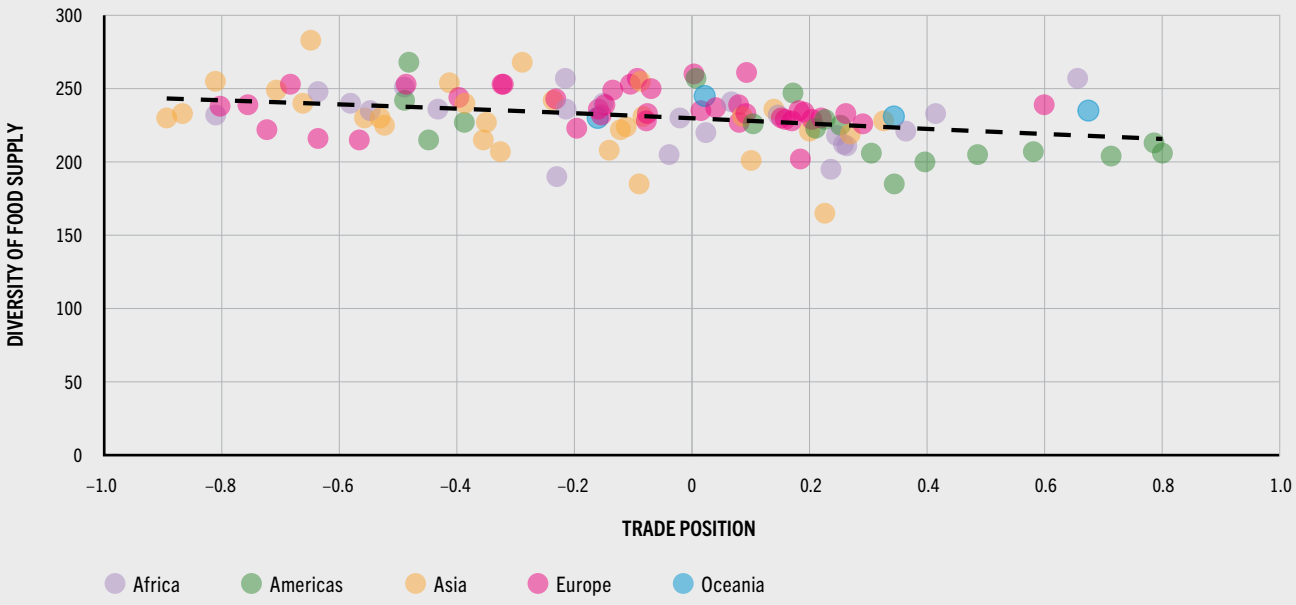
While openness to trade is generally seen as being conducive to a higher diversity of foods available in a country, certain causal channels could also imply the opposite effects. Trade openness allows for a variety of foods to be imported, thus increasing the diversity of foods available to consumers. At the same time, for a country trade openness can shape agricultural production in line with its comparative advantage, thus fostering economic growth but promoting specialization in the production of some crops or animal source foods destined for exports, which may reduce the diversity of foods produced domestically.[155]

For example, a study points out that while more imports resulted in significant increases in the diversity of foods available in most countries in the world during the period 1987–2013, food production diversity with regard to protein declined in some major exporting countries such as Argentina, Brazil and the United States of America, as well as in some regions such as Eastern Europe and Central Asia.[156]

Another study found that, in the beginning of the 1960s, countries with a larger share of exports in total production were more specialized, often showing a lower diversity in crop production. While deepening their export position over time, some of the major crop exporting countries including Argentina, Brazil, Malaysia, Paraguay and the United States further reduced their production diversity by 2011–2013, while Australia and Canada increased it.[157] This suggests that the impact of specialization on the diversity of foods produced by exporting countries is highly context- and location-specific, depending on the comparative advantage of producing a specific food relative to another.

The study carried out for this report identified a weak association between the net trade position of a country and its food supply diversity (Figure 3.5).

FIGURE 3.5 RELATIONSHIP BETWEEN NET TRADE POSITION AND DIVERSITY OF FOOD SUPPLY, 2020



NOTES: Each dot denotes one country, coloured by region. A positive net trade position refers to net food exporting countries, a negative net trade position indicates net food importing countries. Diversity of food supply is defined as the number of different food items available for consumption.

SOURCE: Adapted from Engemann, H., Jafari, Y. & Zimmermann, A. (forthcoming). *Diversity of food supply across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.05

BOX 3.1 (Continued)

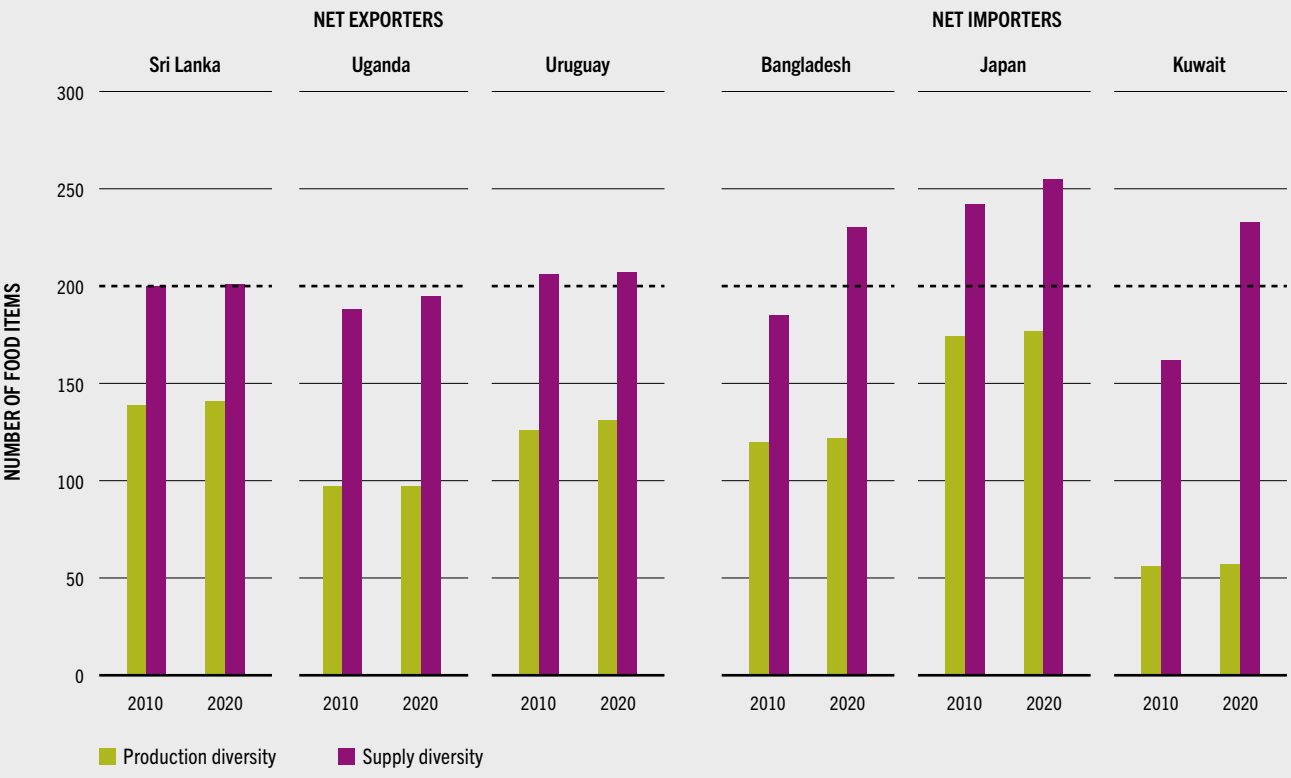
Large net exporters of food can have slightly lower levels of food supply diversity relative to food net importers.

For example, in 2020, the net food importing countries Bangladesh, Japan and Kuwait consistently featured a higher diversity of food supply than the net exporters of food and agricultural products (in value terms) Sri Lanka, Uganda and Uruguay (Figure 3.6). In all three net importing countries, and especially in Bangladesh and Kuwait both with rapidly growing food imports, the diversity of food supply increased strongly between 2010 and 2020, while those of the net exporters remained relatively unchanged.

Sri Lanka, Uganda and Uruguay strongly focus on the export of agricultural raw commodities. The main agricultural export products of Sri Lanka are tea and spices, Uganda exports coffee, cocoa and tea, and Uruguay is a major exporter of beef and soybeans.

These patterns suggest that, irrespective of production diversity, countries that focus on food imports achieve higher levels of supply diversity, while this is not a priority in export-oriented countries, especially major net exporting countries in Latin America and the Caribbean, which experienced fast growth of their agricultural exports in the last decades and exhibit relatively low levels of food supply diversity as compared with other countries.

FIGURE 3.6 DIVERSITY OF FOOD PRODUCTION AND SUPPLY IN SELECTED COUNTRIES, 2010 AND 2020



SOURCE: Authors' own elaboration based on Engemann, H., Jafari, Y. & Zimmermann, A. (forthcoming). *Diversity of food supply across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.06

BOX 3.2 DATA ON TRADE, PRODUCTION AND SUPPLY OF FOOD

The quantitative analyses in this report draw on a multitude of data sources, with the main one being FAOSTAT. To express trade in macronutrients and micronutrients, FAOSTAT's bilateral trade data of the years 2000–2021 have been converted into energy and nutrient values using a newly developed global nutrient conversion table.[158] Trade flows have been aggregated into eight food categories (see Box 2.1) and four processing levels (see Box 2.2). The same conversions have been applied to FAOSTAT's Supply Utilization Accounts in the years 2010–2020.

FAOSTAT includes detailed trade, production and supply data for terrestrially produced foods, while similar data for aquatic products are provided by FAO's FishStat database. This report focuses on terrestrially produced foods. Stylized facts on trade in aquatic products are provided in Box 2.3.*

Although only items qualifying as foods are considered in the analyses, it is not possible to separate import/export flows and domestic production in terms of use such as food, animal feed, industry, biofuels and other non-food uses.** Overall food trade, as well as the shares of specific food categories and processing levels,*** should therefore be interpreted as upper bounds in **Part 2**. As prices of non-food items are usually lower than those of foods, average import prices of the same categories can be understood as lower bounds in **Part 3**.

NOTES: * Limitations in data availability and compatibility at the time of preparing this report precluded the full consideration of aquatic products in the quantitative analyses. ** A current FAO work programme aims to disentangle the shares of domestic production and trade flows by their end uses. *** This effect may apply to various categories, notably to staple foods and pulses, seeds, and nuts, and processing levels, notably unprocessed and minimally processed foods.

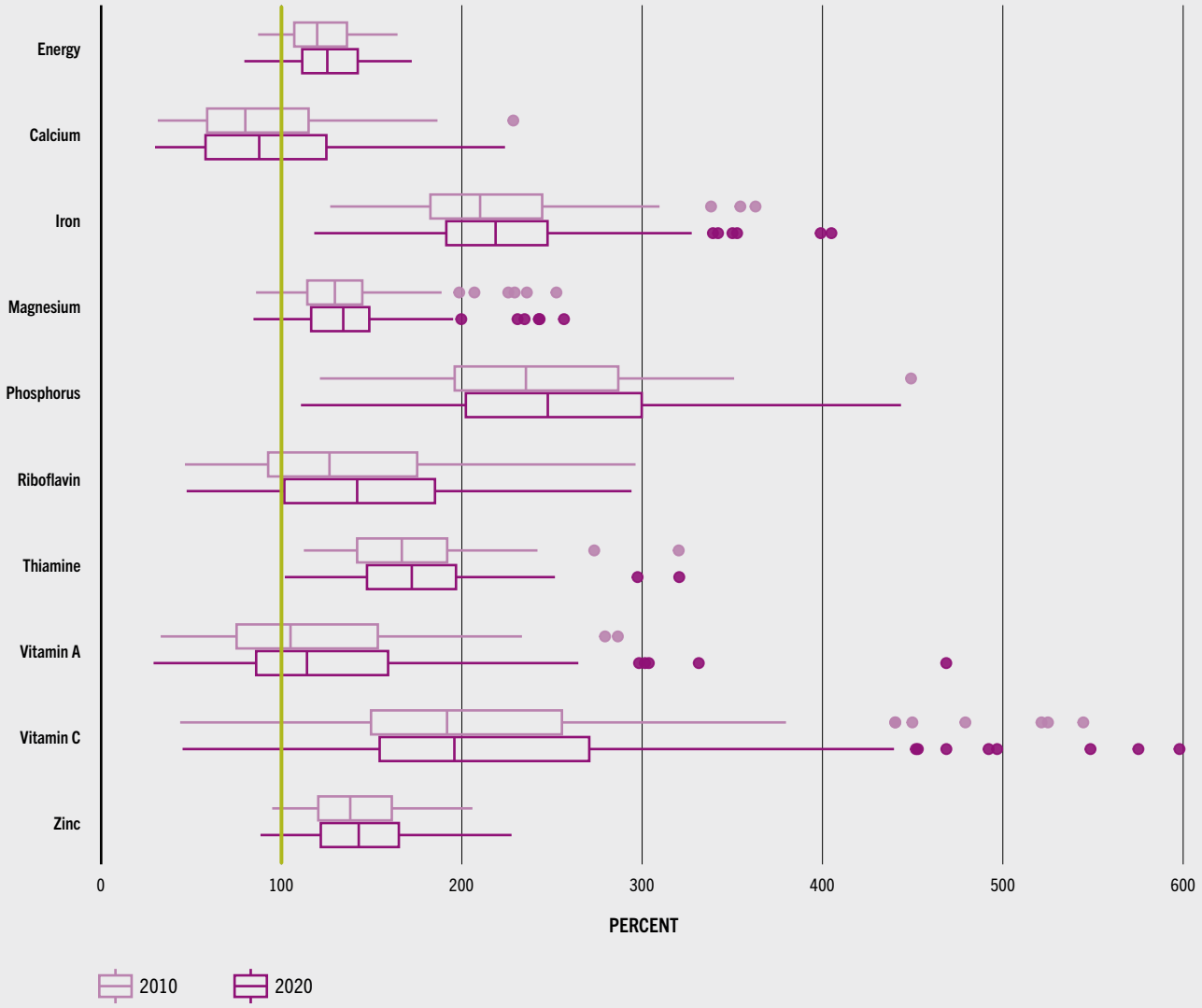
THE ROLE OF TRADE IN CLOSING NUTRIENT GAPS

Beyond improving energy availability, trade can contribute to increasing the availability of micronutrients such as vitamins and minerals. Many countries cannot produce a wide range of foods in sufficient quantities to meet the population's average nutrient requirements. For example, a study suggests that the domestic food production of 120 countries out of 177 countries included in the analysis does not meet the nutrient requirements of their populations.[125] Imports would allow countries to complement domestic food production in a way that all nutrients can be available to meet average nutrient requirements.

Globally, food production provides an adequate supply of most nutrients. Nevertheless, nutrients are not distributed equally, and at the population level nutrient gaps have been identified for several micronutrients in many countries as, for example, for vitamin A, calcium and zinc.[s, 126, 127, 128, 129, 130] Nutrient gaps are often observed for countries in sub-Saharan Africa, which are also among the least-integrated in global markets and, therefore, cannot benefit from trade's effects on nutrient redistribution across the world.[131] Trade can contribute towards bridging nutrient gaps through increasing the availability of nutrients, especially in countries that are well-integrated in global markets.[132, 133] A study conducted for this report suggests that, between 2010 and 2020, the average supply per capita of all considered micronutrients increased (Figure 3.7). As the diversity of food production remained almost stable in all countries, this development can be largely attributed to the expansion of trade. Indeed, underlining the contribution of trade to micronutrient availability, the quantity of micronutrients traded per capita increased

s Nutrient gaps describe the difference between recommended and actual nutrient intake. Nutrient adequacy is achieved if actual nutrient intake at the individual or population level meets the nutrient requirements.

FIGURE 3.7 ADEQUACY OF NUTRIENT SUPPLY: DISTRIBUTION OF ENERGY AND SELECTED MICRONUTRIENTS ACROSS COUNTRIES, 2010 AND 2020



NOTES: The green vertical line at 100 percent denotes the nutrient requirement. The boxplots describe the distribution of nutrient adequacy across countries worldwide. The vertical line in each of the boxes indicates the level of nutrient adequacy on average across countries.

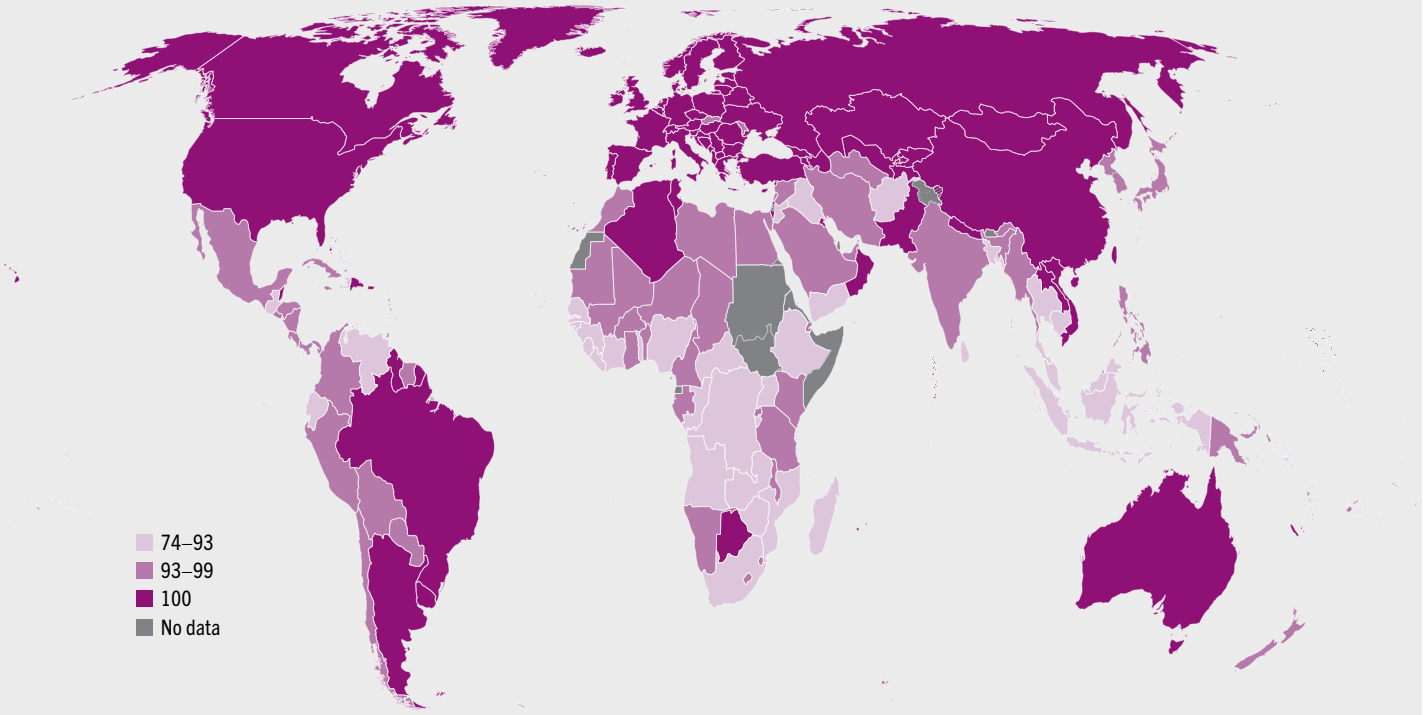
SOURCE: Authors' own elaboration based on Jafari, Y., Engemann, H. & Zimmermann, A. (forthcoming). *Nutrient adequacy across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.07

steadily between 2010 and 2020. For example, during this period, the per capita trade of the B-vitamins riboflavin and thiamine and the minerals calcium and zinc increased by around 40 percent.[134]

Nevertheless, despite increases in the trade of calcium-rich foods in most countries in the world, in 2020, the average supply of calcium per capita remained below the dietary reference intakes (based on estimated average requirements)

FIGURE 3.8 ADEQUACY OF NUTRIENT SUPPLY ACROSS COUNTRIES: NUTRIENT BALANCE SCORE, 2020



NOTES: Countries coloured in magenta have, on average, an adequate supply of nutrients considered in the analysis. In the remaining countries, the average supply of one or more micronutrients is below the estimated average requirement. The lighter the colour, the greater the nutrient gap. Refer to the disclaimer on the copyright page for the names and boundaries used in this map. 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 Republic of Sudan and the Republic of South Sudan has not yet been determined.

SOURCES: Authors' own elaboration based on Jafari, Y., Engemann, H. & Zimmermann, A. (forthcoming). *Nutrient adequacy across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.08

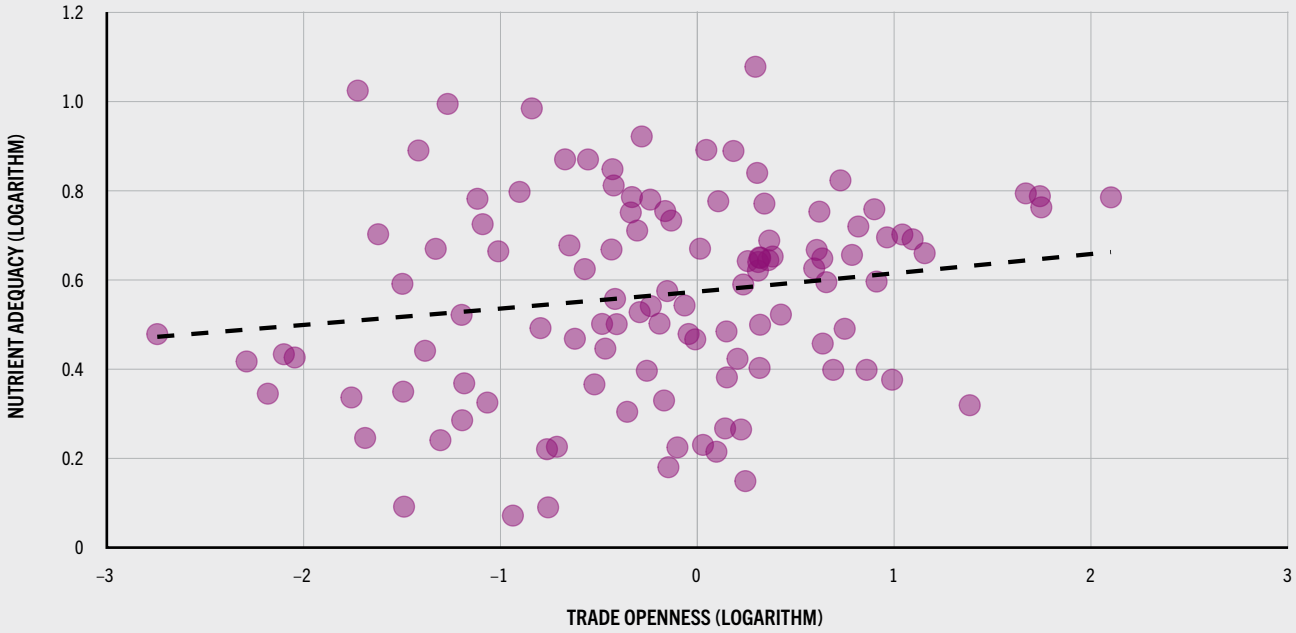
(Figure 3.7). In addition, in many countries the average per capita supply of vitamin A remained below the average requirements, while some countries featured nutrient gaps in riboflavin and vitamin C.

Composite measures of nutrient adequacy such as the nutrient balance score can provide a more comprehensive picture of availability and adequacy of nutrients within a country.[t, 135, 136, 137] For a country, the nutrient balance score shows the extent to which the food available for consumption can satisfy average daily requirements per capita for all or several nutrients. If food supplies meet the daily requirement for every nutrient, the nutrient balance score assumes its maximum value of 100.

In 2020, many countries in the world had, on average, an adequate supply of the nutrients considered in the analysis, with a nutrient balance score of 100 (Figure 3.8). However, some countries in Latin America and the Caribbean, Africa, Western Asia, Southern and South-eastern Asia were shown to have a nutrient balance score below 100 pointing to a shortage of supply of one or more micronutrients. Between 2010 and 2020, along with the average supply per capita of energy and micronutrients, the nutrient balance score

t Alternative measures such as the disqualifying nutrient score are sometimes used to identify substances for which maximum reference daily intakes or supply are surpassed. Examples for disqualifying substances can be sugar, cholesterol, and saturated and total fats.

FIGURE 3.9 RELATIONSHIP BETWEEN TRADE OPENNESS AND ADEQUACY OF NUTRIENT SUPPLY, 2020



NOTES: Each dot denotes one country. Nutrient adequacy is defined as the average ratio of nutrient supply over estimated average requirements across several nutrients at country level. Trade openness is defined as the ratio of food and agricultural trade over the size of the food and agricultural sector in a country.

SOURCE: Adapted from Jafari, Y., Engemann, H. & Zimmermann, A. (forthcoming). *Nutrient adequacy across countries and the impact of international trade – Technical note for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.09

improved by around 1 point on global average, largely due to trade.

Statistical analysis suggests that there is a positive relationship between food trade openness and adequacy of nutrient supply across countries. Again, nutrient adequacy is affected by many factors such as natural resource endowments, climate and population density. Nevertheless, although nutrient adequacy of supply can be high in countries that are relatively less integrated in global markets, it is usually high at elevated levels of trade openness (Figure 3.9). ■

TRADE AND FOOD PRICES

Within a country, imports can increase food availability and can lower domestic food prices. This can result in gains for consumers for whom access to more diverse foods is improved, but could also result in reduced farm incomes for resource-poor farmers who cannot compete globally (see **Part 2**).

As with income, food price changes consist of an important pathway through which trade affects nutrition. Trade openness can affect the relative prices of different foods, which, in turn, shape food consumption and dietary patterns, depending on how consumers respond to these price changes. Consumer responsiveness to changes in relative prices is influenced by a multitude of factors and it is not easy to predict

BOX 3.3 WHAT IS A HEALTHY DIET?

Unhealthy diets are a major risk factor of multiple forms of malnutrition and poor health outcomes globally. Unhealthy diets are also a major cause of ill-health and premature death due to preventable non-communicable diseases.[159]

The topic of what is a healthy diet appears regularly in the public media and has been the source of debate in many communities. In 2024, FAO and the World Health Organization (WHO) will publish a joint statement on what constitutes a healthy diet, and the role of guidelines to support efforts to achieve them.

Healthy diets are those that are adequate in nutrients, diverse in foods consumed, balanced in intake of energy and sources of energy (macronutrients), and moderate in the consumption of foods and dietary components associated with non-communicable disease risk.[160]

The foods people eat that make up their diet are highly contextual, based on food access, culture, traditions, preferences and many other factors. So, while the four principles of healthy diets are universal, based on human biology, recommended dietary patterns must be local. Food-based dietary guidelines translate the concept of healthy diets into concrete contextually appropriate recommendations. These dietary guidelines are intended to establish a basis for public food and nutrition, health and agricultural policies and nutrition education programmes to foster healthy eating habits and lifestyles. Dietary guidelines offer advice on foods, food groups and dietary patterns to promote health and prevent all forms of malnutrition and related health outcomes. More than 100 countries worldwide have developed food-based dietary guidelines that are adapted to their nutrition situation, food availability, culinary cultures and eating habits.[161]

Increasingly countries are also taking into consideration the importance of sustainability within their dietary guidelines and in 2024, FAO will launch new guidance for the development of agrifood-systems-based dietary guidelines.

(see Box 3.4). For example, as incomes increase and people become more affluent, their responsiveness to food price changes declines. This is due to the decline in the share of food in total consumer expenditure but also due to shifts in preferences (see **Part 1**).[138, 139]

In a country, food prices are also determined by the cost of production, which, in turn, is influenced by a variety of inputs, as for example, land, labour, fertilizers, pesticides and animal feed. Technology, which determines how inputs are combined in the production process, as well as temperature and rainfall, also affect the cost of production. Countries engage in trade to export what they can produce at a lower cost relative to other countries, while importing what is more expensive to be produced domestically. This exchange mechanism results in significant gains and promotes food security globally (see **Part 2**).

For example, consumers in countries with low land endowments relative to their population, who would otherwise face high food prices, can have access through trade to lower-priced food.[140] In this way, trade can help narrow the differences between prices of similar foods across countries. Indeed, in theory, the law of one price states that trade, in the absence of frictions such as transport costs and distortions such as domestic support, trade policies and regulations, would result in the prices of similar food products across countries becoming equal.[u, 141]

Examining average import price levels per calorie for different food categories that are traded across the world can, in general, help understand how nutritional outcomes could be affected by relative food prices. For example, on average,

u The tendency of prices to equalize across countries through trade is referred to as the law of one price, according to which, once prices are converted to a common currency, the same product should sell for the same price in different countries. Trade costs but also trade policies always breach the letter of this law and prices are seldom equal. Nevertheless, the spirit of the law, that is the tendency of the prices of highly traded goods to converge towards similar levels, is frequently observed in the data.

BOX 3.4 CONSUMER RESPONSE TO CHANGES IN RELATIVE PRICES

Consumers respond differently to price changes of different foods, and this depends on many factors including income levels (see **Part 1**). A systematic review of global evidence on consumer response to changes in food prices in 2015 suggests that the responsiveness of the demand for different food categories to prices was relatively low.*, [162] However, in low-income countries, where a large share of household expenditure is dedicated to food, demand was found to be most responsive to food price changes, as these would affect poor consumers disproportionally. Substitution effects are also important. For example, increases in the price of one food can affect the demand for another food, as consumers substitute relatively more expensive foods for cheaper alternatives. Most foods can be seen as substitutes to each other, but the extent to which substitution takes place depends on preferences and on how foods meet different needs. For example, different types of cereals could be substitutes as they meet identical needs, and thus any of their combination would be equally valuable.[163]

A study found that a 10 percent increase in the price of cereals in low-income countries could lead to a 6.1 percent decline in the consumption of cereals, but also to an increase of 4.2 percent in the combined consumption of fruits and vegetables, fish, dairy, fats and oils, and sweets.[164] A review of 160 studies in 2010 suggests that, in general, food away from home such as soft drinks, fruit juice and meats are most responsive to price changes. For example, a 10 percent increase in the price of soft drinks would reduce their consumption by 8 to 10 percent. Again, consumers in low-income countries were found to be more sensitive to price changes as compared with those in richer countries.[165] In Chile, a study, using data between 2012 and 2013, suggests an increase of 10 percent in the price of soft drinks was associated with a 13.7 percent reduction in their consumption. This price increase also resulted in substitution effects, leading to an increased consumption of plain water by 6.3 percent.[166]

In the United Kingdom of Great Britain and Northern Ireland, between 2005 and 2011 the price of ready meals, pizza and packaged food declined by almost 7 percent relative to the price of all food. Nevertheless, changing consumer preferences led to a decline in the calories derived from consuming ready meals and an increase in the calories derived from the consumption of fruits.[167] Using household-level survey data for India for the period 1987–2012, a study suggests that, over time, the demand for cereals became more responsive to changes in their price, independently of changes in income and prices of other foods. This suggests a shift in household preferences away from cereals, matching nutrition transition trends.[168]

Consumer preferences are important in shaping the extent to which the demand for foods responds to relative price changes. Nevertheless, preferences are hard to observe and estimate. Thus, while consumers do respond to changes in relative prices of foods, the magnitude of the response and the exact response mechanisms depend on the interplay of various factors and may lead to unexpected outcomes. According to a study that attempted to assess why consumers prefer a particular food over another, price was one of many attributes. Other attributes included taste, safety, convenience, nutrition (for example the amount and type of fat, protein, vitamins and other nutrients), tradition (whether foods preserve traditional dietary patterns), origin (where the primary agricultural product was grown), fairness (the extent to which all parties involved in the food value chain equally benefit), appearance and environmental impact (effect of food production on the environment).[169]

NOTE: * The food groups included fruits and vegetables, meat, fish, dairy, cereals, fats and oils, and sweets.

prices are highest for vegetables, followed by fruits,[v] irrespective of country income level (Figure 3.10; see Box 2.1 for data definitions and Box 3.2 for information on data conversions and limitations).

Animal source foods are the third most expensive category of traded foods, followed by sweets and beverages. Staple foods, fats and

v Food categories are defined in Box 2.1 in **Part 2**. The categories vegetables and fruits include both unprocessed and processed foods.

oils, and pulses, seeds and nuts are, on average, much cheaper than all other food categories.[w] These foods are energy-dense, can be produced and transported in bulk, and can be stored easily for extended periods of time, making them relatively cheaper. Fruits and vegetables are rich in nutrients, fibre and water but less energy-dense, which makes them relatively costly when measured on a per calorie basis. In fact, the value of foods such as fruits and vegetables is less in their caloric content than in their nutrient content, and nutrient-density appears to be an important determinant of food prices (see Box 3.5).

Analysing average import prices per calorie according to food processing level shows that processed foods, followed by ultra-processed foods, are the most expensive foods across all country income levels. Unprocessed and minimally processed foods and processed culinary ingredients are relatively cheaper (Figure 3.11).[x]

Processed foods include many energy-dense high-value foods and beverages such as cheeses, cured meats, beer and wine (see Box 2.2). Processing requires additional resources, adding value to primary food products and is reflected in relatively higher prices, as compared to unprocessed and minimally processed foods. Ultra-processed foods are usually energy-dense and undergo an elaborate production process, which makes them relatively expensive. Processed culinary ingredients are often used as inputs in the food industry and, on average, are relatively less expensive.

Income effects on prices of non-intensively traded foods

In general, high-income countries appear to import more expensive foods while import prices of low- and middle-income countries are, on average, lower in all food categories and processing levels (Figure 3.10 and Figure 3.11, respectively). Higher prices can reflect quality differences in the foods traded, different food baskets, differences in transportation costs and more stringent product standards. However, depending on trade intensity, prices across countries also diverge systematically due to differences in income. For example, high productivity levels in countries that trade intensively raise the general wage level, which in turn increases incomes. Higher purchasing power results in all goods, especially those that are not traded intensely, being more expensive in these high-productive countries as compared to those in lower-income countries.[y] Food prices are not an exception, and across countries prices of foods that are not traded intensively in global markets such as fruits and vegetables tend to differ systematically with income levels (Figure 3.10).

Although in a country, trade openness in general lowers food prices, higher income levels can exert an upward pressure on foods that are not traded intensively. These forces work simultaneously as general trade openness results in higher incomes. To disentangle these effects from each other, economists adjust for purchasing power to reveal the undiluted trade effect when comparing high- and low-income countries (see next section).[142]

Trade barriers and food prices

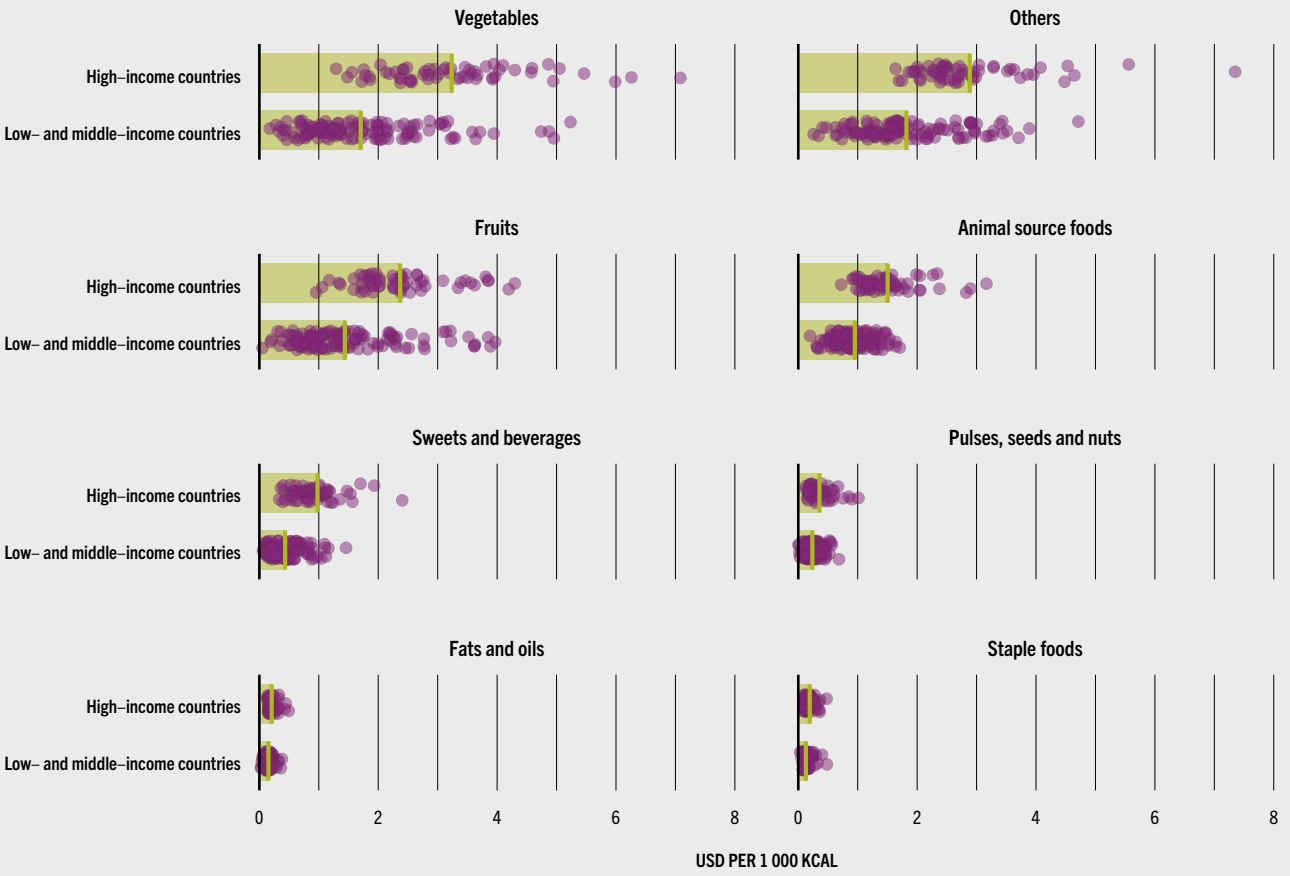
Lower trade barriers such as import tariffs and non-tariff barriers, which include standards and regulations, are associated with higher volumes of food trade. Trade liberalization including import tariff reductions would, in general, intensify competition and lower the food price level within the country leveraging the tariff, thus improving access to food. However, for different foods the magnitude and direction of the impact depends on a number of factors including the net-trade position of the country lifting the trade barrier and its importance in the global food market.[143]

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

x This pattern is largely consistent when prices are measured on a per kilogram basis.

y This relation between productivity and prices of non-tradable products is referred to as the Balassa-Samuelson hypothesis. See Balassa, B. 1964. The purchasing-power parity doctrine: A reappraisal. *Journal of Political Economy*, 72(6): 584–596. https://www.jstor.org/stable/1829464; Falvey, R. & Gemmell, N. 1999. Factor endowments, non-tradables prices and measures of 'openness'. *Journal of Development Economics*, 58(1): 101–122. https://doi.org/10.1016/S0304-3878(98)00105-9; and for differences in productivity see also FAO. 2022. *The State of Agricultural Commodity Markets 2022. The geography of food and agricultural trade: Policy approaches for sustainable development*. Rome. https://doi.org/10.4060/cc0471en

FIGURE 3.10 IMPORT PRICES OF FOOD CATEGORIES ACROSS COUNTRIES, 2021

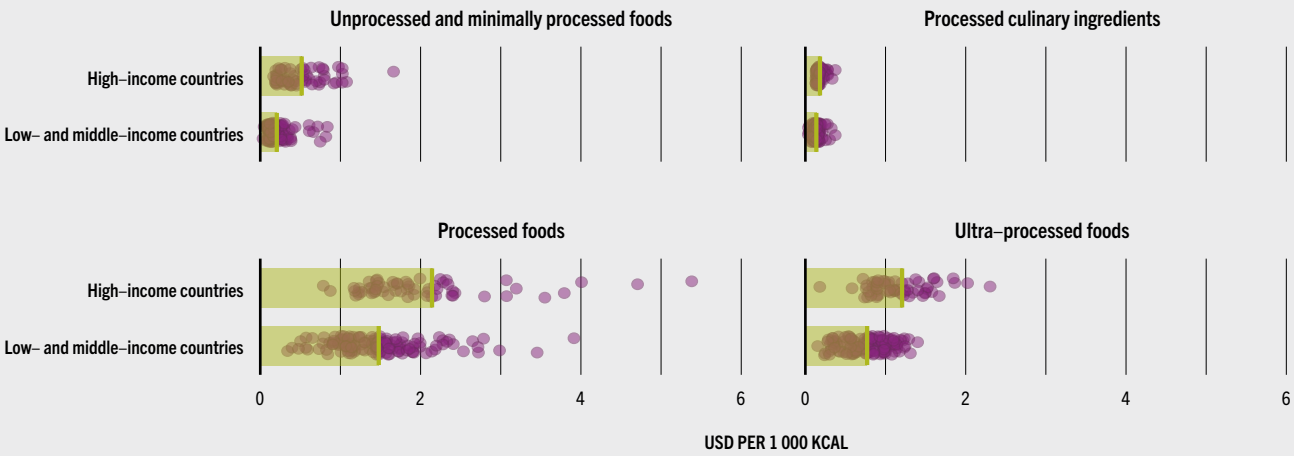


NOTES: Prices are based on food imports and include all costs related to transportation but without tariffs. Each circle denotes the average price for the respective food category in a country. For each category, the box denotes the part of the distribution where prices are lower. The vertical line on the right side of the box denotes the average across countries.

SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Cited 15 May 2023]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig3.10

FIGURE 3.11 PRICES OF TRADED FOODS BY PROCESSING LEVEL, 2021



NOTES: Prices are based on food imports and include all costs related to transportation but without tariffs. Each circle denotes the average price for the respective food category in a country. For each category, the box denotes the part of the distribution where prices are lower. The vertical line on the right side of the box denotes the average across countries.

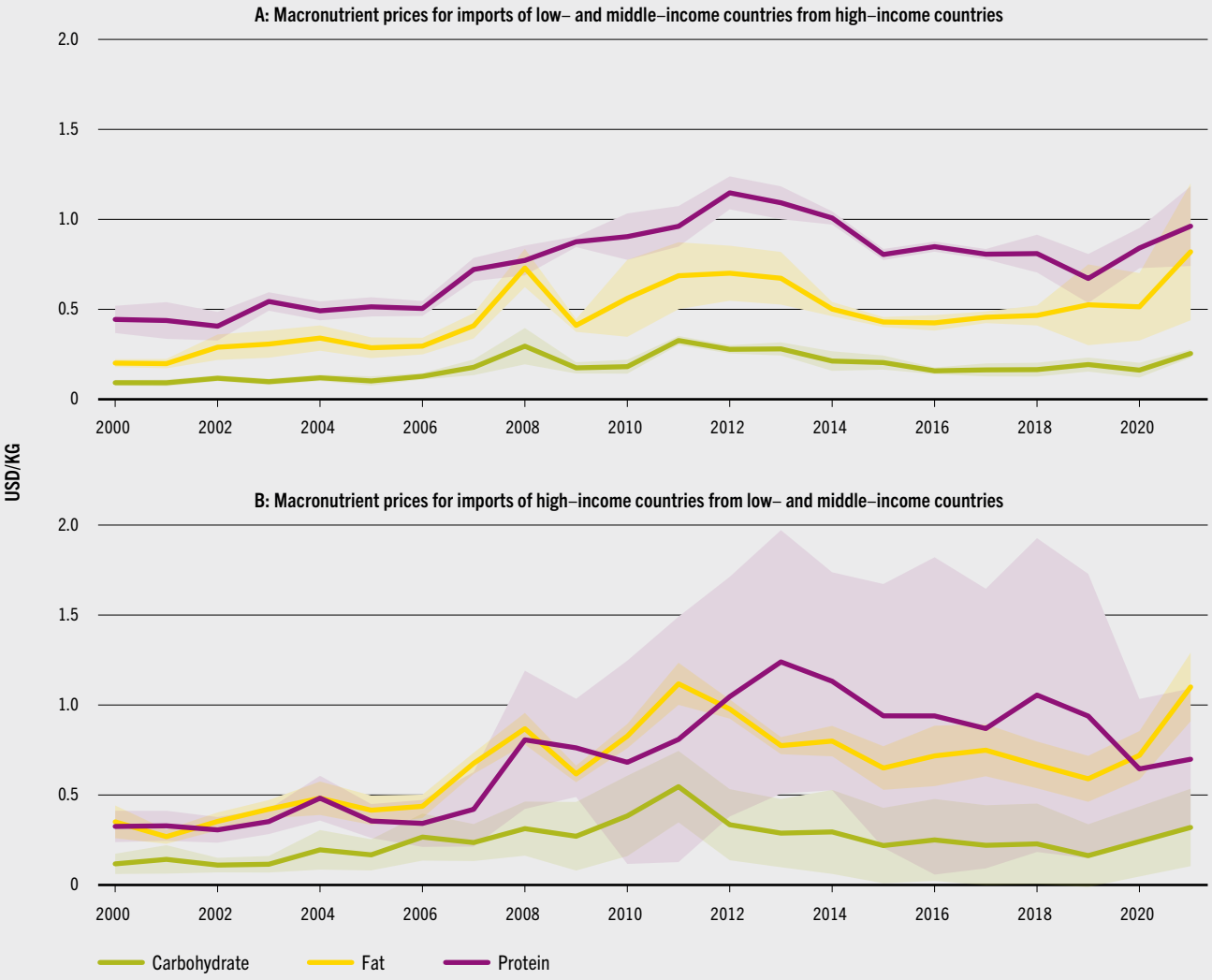
SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Cited 15 May 2023]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig3.11

BOX 3.5 PRICING NUTRIENTS

Trade prices can also be expressed for nutrients. An analysis conducted for this report estimated average trade prices of macronutrients and micronutrients based on a new dataset that reports the nutrient content of every food item traded. Consumers may not explicitly assess nutrient prices when they purchase food, and their preferences between nutrient content such as Vitamin A or iron are not well-defined.[170] Nevertheless, governments have to consider the adequacy of nutrients in the food available for consumption by their citizens, and they must also assess the relative underlying values to guide policy choices and regulation on how to ensure availability and diversity in foods and nutrients.

FIGURE 3.12 PRICES OF MACRONUTRIENTS BY TRADE BETWEEN COUNTRY INCOME GROUPS, 2000–2021



NOTES: Macronutrient prices are estimated based on food exports and do not include costs related to transportation. The shaded areas denote confidence intervals of the estimates.

SOURCE: Adapted from Traverso, S. (forthcoming). *Food trade, macronutrient prices, trade tariffs and the price of food imports – Background paper for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig3.12

BOX 3.5 (Continued)

Estimating the implicit trade prices of nutrients across countries with different levels of income reveals how global markets could help address the trade-offs between economic and nutrition objectives. Some studies underline the negative effect of exports from low- and middle-income countries on the availability of diverse foods in their domestic markets, which could result in hindering improvements on nutritional outcomes.* Nevertheless, implicit trade prices for nutrients suggest that low- and middle-income countries appear to benefit from international trade by exchanging high-priced for low-priced macronutrients (Figure 3.12). Low- and middle-income countries as a group export carbohydrates and fats at a higher price to high-income countries than they import, thus engaging in "nutritional arbitrage", similar to the trade in aquatic products (see Box 2.3).**, [171]

Along with macronutrients, the analysis carried out for this report also estimated the implicit trade prices of micronutrients (minerals and vitamins) embedded in food trade flows. Overall, the results suggest that the content of micronutrients significantly contributes to the price of foods, indicating the higher the micronutrient content in a food item, the higher its trade price.

More specifically, international consumers appear to be willing to pay a premium for foods rich in minerals and in vitamins A and C. Conversely, the content of B-group vitamins in foods exchanged on international markets is not significantly correlated with the price of foods.

However, there is a close relationship between the combined content of many of the macronutrients and micronutrients in a food and its price. For example, foods rich in one mineral usually include relevant amounts of many other minerals. Often, foods rich in one vitamin of the B-group also include relevant amounts of other B-group vitamins. Foods rich in protein also include high amounts of minerals and certain vitamins of the B-group. This makes it difficult to identify how the content of specific micronutrients in foods affects their prices. However, it strongly suggests that premiums are paid for foods that are rich in micronutrients in general.[172]

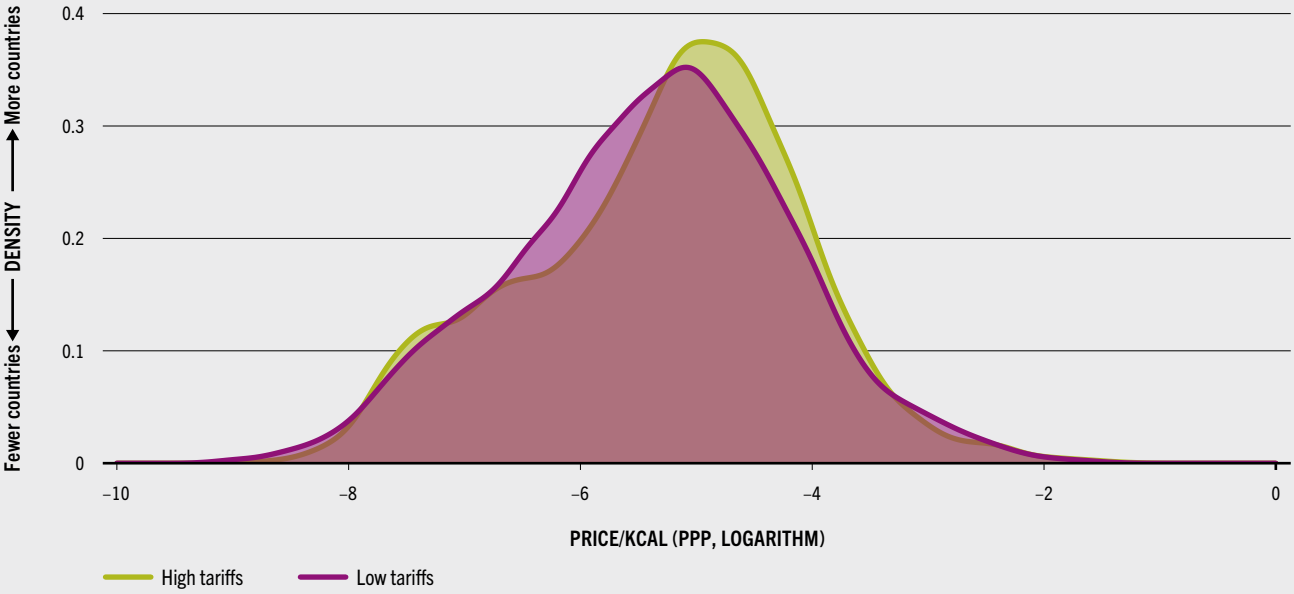
NOTES: * See for example, Gacitua, E.A. & Bello, R. 1991. Agricultural Exports, Food Production, and Food Security in Latin America. *Rural Sociology*, 56(3): 391–405. https://doi.org/10.1111/j.1549-0831.1991.tb00440.x. ** Exporting a higher share of high-quality foods is consistent with the Alchian-Allen effect that postulates that international transportation costs lead firms to ship high quality goods abroad while holding lower quality goods for domestic consumption. This effect is also known as "shipping the good apples out". See Alchian, A.A. & Allen, W.R. 1964. University Economics. Belmont, Wadsworth Publishing Company; Hummels, D. & Skiba, A. 2004. Shipping the Good Apples Out? An Empirical Confirmation of the Alchian-Allen Conjecture. *Journal of Political Economy*, 112(6): 1384–1402. https://doi.org/10.1086/422562; Miljkovic, D. & Gómez, M.I. 2019. Shipping the good coffee out: the Alchian–Allen theorem and relative demand for Brazilian Arabica and Robusta coffees. *European Review of Agricultural Economics*, 46(4): 697–712. https://doi.org/10.1093/erae/jby051

Evidence from China's trade liberalization in the early 2000s suggests that tariff reductions and lowering non-tariff barriers to trade were associated with an increase in prices for vegetables but also a significant decline in the price of meat. These changes in relative prices were in line with trade patterns, as at that time China was an exporter of vegetables but a major importer of meat and fats.[144] The final impact on nutritional outcomes would depend on how trade liberalization affects prices at the retail level and how consumers would respond to these changes and adjust their consumption.

Indeed, the retail price paid by consumers is influenced by a myriad of domestic factors other than import tariffs such as the efficiency of domestic value chains, national regulations, institutional quality, and the market structure that determines the nature of competition among producers, traders, food processors and retailers. Recent studies suggest that, on average, import tariffs may have a relatively modest effect on the relative prices of different foods and that import tariffs may contribute minimally to food prices at the retail level.[145, 146]

Analysis carried out for this report shows that, at the global level, lower import tariffs are

FIGURE 3.13 DISTRIBUTION OF FOOD PRICES ACCORDING TO AVERAGE TARIFF LEVEL, 2017



NOTES: Import tariffs are expressed as the weighted average applied tariff rate on primary agricultural products collected from the World Bank's World Development Indicators (https://databank.worldbank.org/source/world-development-indicators). Retail food prices are provided by the World Bank's International Comparison Program (2017 cycle, https://www.worldbank.org/en/programs/icp). These have been converted into prices per calorie, adjusted using purchasing power parities (PPP), and transformed into logarithms. The right-hand bell shows that food prices are higher in countries with high tariffs. The left-hand bell shows that food prices are lower in countries with low tariffs.

SOURCE: Adapted from Schiavo, S. (forthcoming). *The impact of trade openness on the cost and affordability of a healthy diet – Background paper for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

generally associated with lower food retail prices measured on a per calorie basis and adjusted for purchasing power (Figure 3.13).[147] Visualizing the price distributions of 547 food items across 170 countries, derived from the World Bank's International Comparison Programme, shows that foods tend to be more expensive in countries with a high level of tariffs on primary agricultural products than in countries with relatively lower tariffs.[z, aa]

Trade openness as reflected by lower import tariffs can result, on average, in a lower food price level and improve access for food. However, this average impact can mask different effects on different foods and across net exporting or net importing countries. Due to the various and, partly, counteracting factors and channels affecting the relationship between trade openness and food prices, any ad hoc predictions on price effects of trade policy changes on specific foods are difficult to make and would require a dedicated framework for scenario analysis.

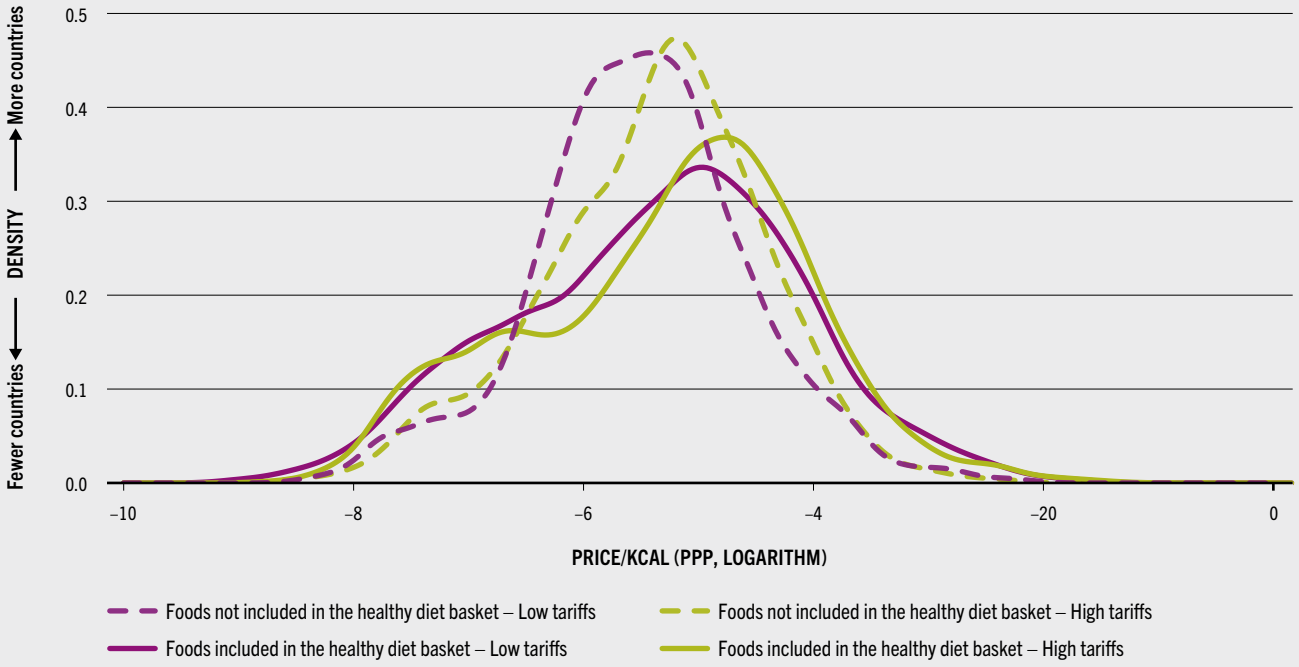
Trade and the cost of healthy diet food baskets

While the average impact of trade barriers on food prices is evident, there are concerns that trade openness may disproportionately lower prices for foods that are less conducive to healthy diets, leading to the displacement of higher-quality local foods with negative implications for nutrition.[148, 149, 150] An analysis carried out for this report, classifying foods in line with the cost and affordability of a healthy diet (CoAHD) indicator,[151] assessed whether lower prices observed in countries that apply

z The International Comparison Program (ICP) is a worldwide statistical initiative to collect comparative retail price data and detailed GDP expenditures to produce purchasing power parities (PPPs) for the world's economies (https://www.worldbank.org/en/programs/icp). Retail food prices have been collected from the 2017 cycle of ICP and have been adjusted using PPPs to isolate the effect of trade. See World Bank. 2020. *Purchasing Power Parities and the Size of World Economies: Results from the 2017 International Comparison Program.* Washington, DC.

aa The association between trade barriers and prices is robust across various measures of trade openness and trade barriers. See Schiavo, S. 2024. *The impact of trade openness on the cost and affordability of a healthy diet – Background paper for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

FIGURE 3.14 DISTRIBUTION OF PRICES OF FOODS ACCORDING TO THEIR INCLUSION IN HEALTHY DIET BASKETS, BY AVERAGE TARIFF LEVEL, 2017



NOTES: Import tariffs are expressed as the weighted average applied tariff rate on primary agricultural products collected from the World Bank's World Development Indicators (https://databank.worldbank.org/source/world-development-indicators). Retail food prices are provided by the World Bank's International Comparison Program (2017 cycle, https://www.worldbank.org/en/programs/icp). These have been converted into prices per calorie, adjusted using purchasing power parities (PPP) and transformed into logarithms. Foods within the healthy diet baskets tend to be more expensive than those outside as, in general, they contain fewer calories per kg. Prices tend to be higher in countries with high tariffs and lower in countries with low tariffs regardless of whether foods pertain to the healthy diets basket.

SOURCE: Adapted from Schiavo, S. (forthcoming). *The impact of trade openness on the cost and affordability of a healthy diet – Background paper for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

lower import tariffs are driven by low price levels of foods of high energy density and minimal nutritional value.[152]

Since 2020, FAO has been publishing the CoAHD to reflect the population's physical and economic access to the least expensive foods that meet the requirements for a healthy diet, as defined in food-based dietary guidelines (see Box 3.3). For each country, based on 422 foods that are part of a "healthy diet basket", the CoAHD indicator is composed of 11 least-cost food items from six food categories including starchy staples, animal source foods, legumes, nuts and seeds, vegetables, fruits, oils and fats.[153]

Differentiating foods between those included in healthy diet baskets and those that are not, the analysis points out that, along almost the entire price distribution, higher import tariffs are associated with higher prices irrespective of whether or not foods are included in the healthy diet basket (Figure 3.14). This suggests that trade liberalization and trade openness do not have a disproportionate effect on foods of high energy density and minimal nutritional value, on average, for all food items considered and across all countries.

The effects of the average tariff level on specific individual foods can vary widely. For example, around 50 percent of the cheapest foods included in the healthy diet basket (the ones used for the estimation of the CoAHD) are domestically sourced and possibly not intensively traded, further constraining the potential of trade liberalization to significantly influence prices.[154] At the same time, foods that are traded can, depending on many factors, be responsive to changes in trade barriers (see **Part 4** on the impact of trade agreements on the import demand for different foods). ■

GERMANY
A varied selection
of foods.
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PART 4
FOOD TRADE AND OBESITY

KEY MESSAGES

➔ Increased availability of foods of high energy density and minimal nutritional value, including ultra-processed foods, can be associated with an increasing prevalence of overweight and obesity. Trade can contribute to this availability.

➔ By lowering import tariffs and harmonizing sanitary and phytosanitary measures and technical barriers to trade, regional trade agreements have a significant impact on food trade because they reduce trade obstacles and increase consumer trust.

➔ Deep regional trade agreements with a focus on sanitary and phytosanitary measures and technical barriers to trade could facilitate imports of ultra-processed foods. These foods are generally subject to a larger number of regulatory measures than unprocessed or minimally processed foods.

➔ Income affects the demand for food imports. As incomes grow, a country would rapidly increase the demand for imports of ultra-processed foods. A 10 percent increase in income results in a 11 percent increase in the demand for imports of ultra-processed foods but only a 7 percent increase in the demand for imports of unprocessed and minimally processed foods.

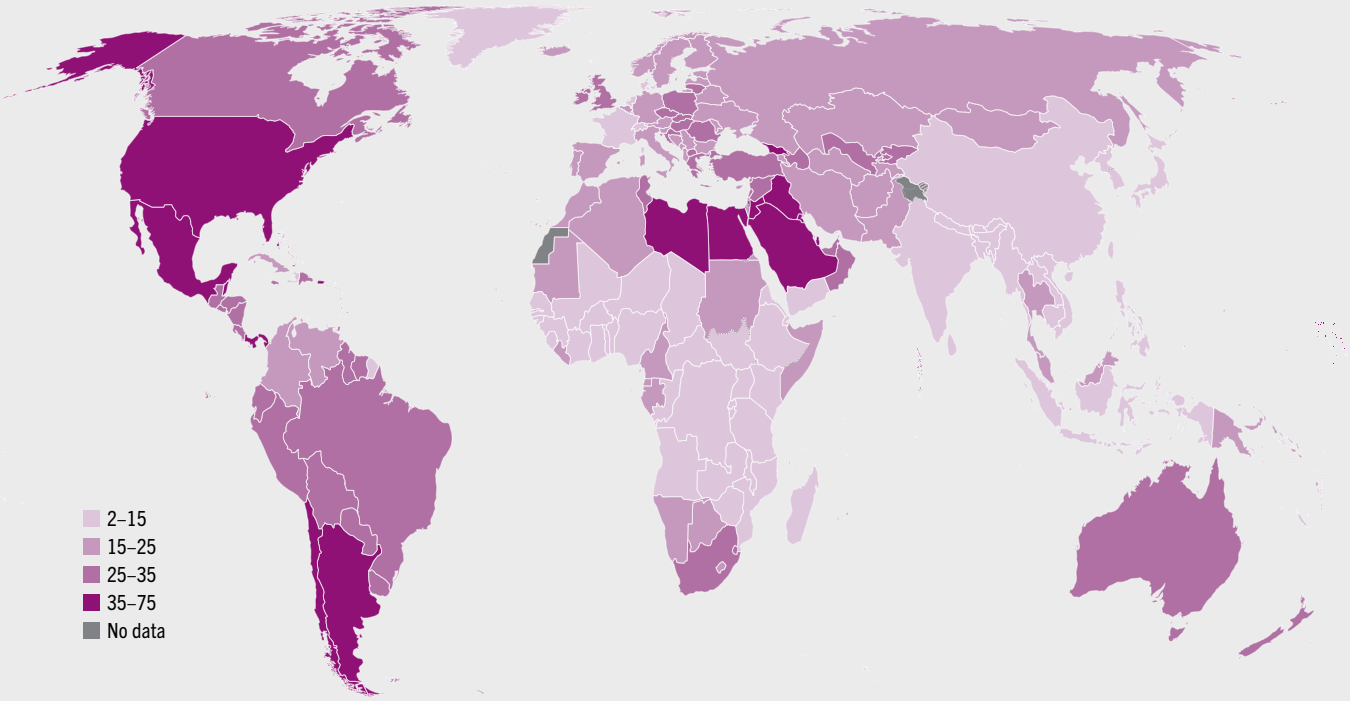
THE PREVALENCE OF OBESITY IN THE WORLD

While overweight is a condition of excessive fat deposits, obesity is a chronic complex disease defined by excessive fat deposits that can impair health. Obesity is associated with an increased risk of developing non-communicable diseases such as hypertension, type 2 diabetes mellitus and cardiovascular disease.[173] It can also affect bone health and reproduction and increases the risk of certain cancers. Since the 1990s, the World Health Organization (WHO) has strengthened the focus on obesity and on the impacts that rapid economic growth and social transition have on nutrition, considering the political, economic, cultural and physical factors that would give rise to obesogenic environments.

In 2022, 2.5 billion adults aged 18 years and older were overweight, including 890 million adults who were living with obesity, a share of 43 percent worldwide. Since the 1990s, the worldwide prevalence of obesity increased from 6.6 percent in 1990 to 15.8 percent in 2022.[174] Obesity has now reached epidemic proportions and it is estimated that by 2030 more than one billion adults globally will be obese.[175] Once associated with high-income countries, obesity is now also prevalent in low- and middle-income countries (see Figure 4.1 and the discussion on the multiple burdens of malnutrition in **Part 1**).

The prevalence of obesity also grew in every region in the world and in most countries over the 1990–2022 period (Figure 4.2). In many high-income countries the prevalence of obesity more than

FIGURE 4.1 PREVALENCE OF OBESITY AMONG ADULTS IN THE WORLD, PERCENT, 2022



NOTE: Prevalence of obesity is defined as the percentage of adults whose body mass index (BMI) is equal to or greater than 30 kg/m^2.
Refer to the disclaimer on the copyright page for the names and boundaries used in this map. 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 Republic of Sudan and the Republic of South Sudan has not yet been determined.

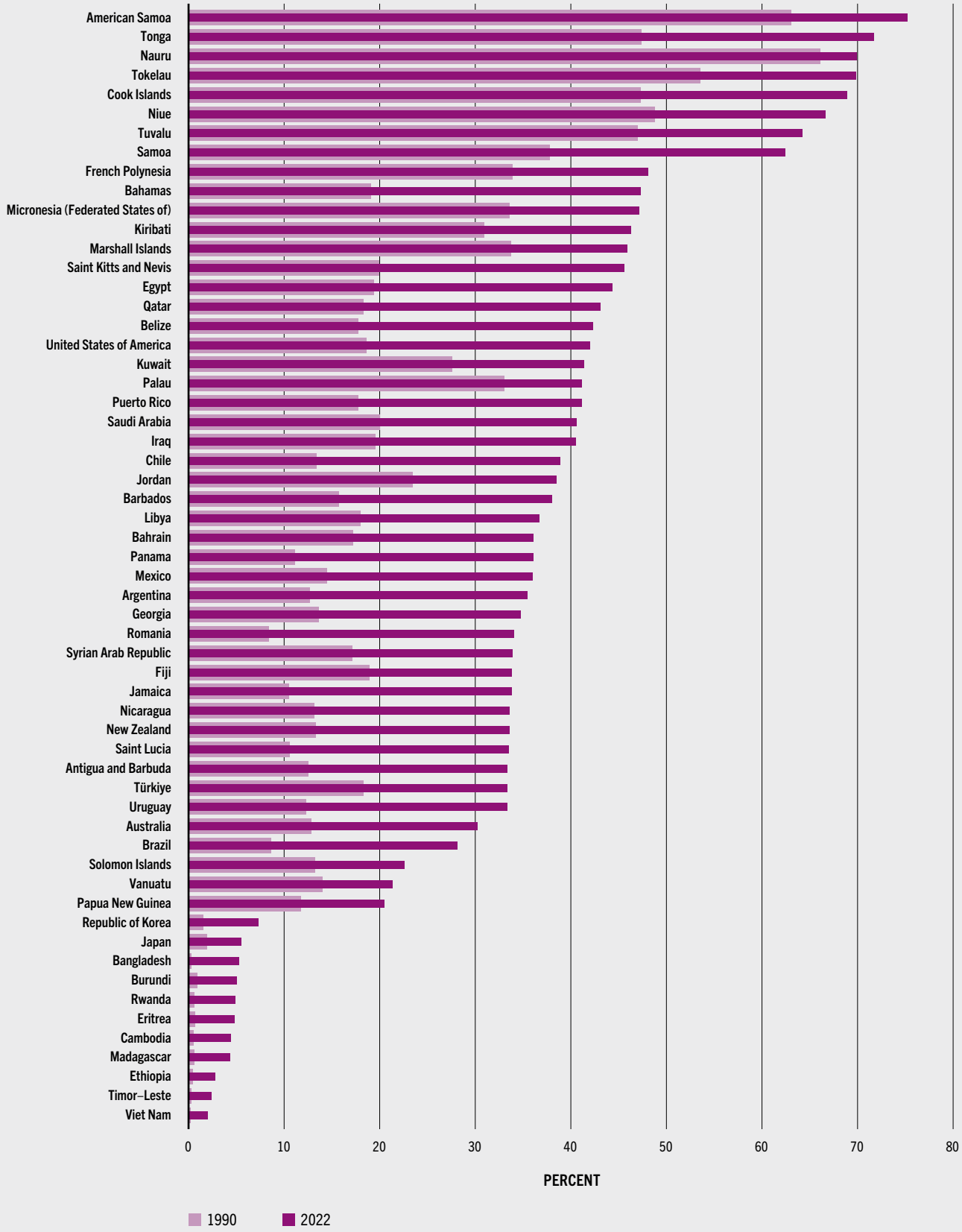
SOURCES: Adapted from WHO. 2024. The Global Health Observatory: Prevalence of obesity among adults. [Accessed on 27 May 2024].
https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-)

doubled. For example, in the United States, the prevalence of obesity increased from 18.6 percent in 1990 to 42.0 percent in 2022. In Australia in 1990, the prevalence was 12.7 percent, increasing to 30.2 percent in 2022. In the Republic of Korea, a country that experienced rapid economic growth and nutrition transition (see **Part 1**), although the prevalence of obesity more than quadrupled from 1.5 percent in 1990 to 7.3 percent in 2022, it remained at relatively low levels.

Middle-income countries and emerging economies also show significant increases. In Brazil, the prevalence of obesity more than tripled from 8.6 percent in 1990 to 28.1 percent in 2022. During the same period in Egypt, the prevalence of obesity increased from 19.4 percent to 44.3 percent.

The highest levels of obesity in the world are consistently found in the Small Island Developing States, especially in the Pacific region. In 2022, the prevalence of obesity in American Samoa and Tonga was 75.2 and 71.6 percent, respectively. In the same year, the prevalence of obesity in the Cook Islands, Nauru, Niue, Samoa, Tokelau and Tuvalu, was over 62 percent. Obesity is also prevalent in the Caribbean, for example in Saint Kitts and Nevis and Puerto Rico, the prevalence of obesity in 2022 was 45.6 and 41.1 percent, respectively. ■

FIGURE 4.2 PREVALENCE OF OBESITY AMONG ADULTS IN THE WORLD, SELECTED COUNTRIES, 1990 AND 2022



NOTE: Prevalence of obesity is defined as the percentage of adults whose body mass index (BMI) is equal to or greater than 30 kg/m^2.

SOURCE: Authors' own elaboration based on WHO. 2024. The Global Health Observatory: Prevalence of obesity among adults. [Accessed on 27 May 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-)

ARGENTINA
Workers performing quality control checks in an industrial bakery.
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THE RELATIONSHIP BETWEEN GLOBALIZATION, TRADE AND OBESITY

A number of studies have attempted to measure the impacts of the economic and social aspects of globalization upon obesity. In general, the findings indicate that political and social globalization affect obesity rates by influencing lifestyles through information flows and societal links, while the effects of economic globalization, which includes trade and FDI, were found to have negligible effects on obesity rates (see also Box 2.4).[176, 177]

A review of 28 studies suggests that increased trade liberalization alone was insufficient to drive overweight and obesity, and that FDI levels were more strongly associated with rising obesity in low- and middle-income countries.[178] Assessing the relationship between trade openness and obesity across 175 countries during the 1975–2016 period, one study suggested that the more open a country is to merchandise trade the higher the prevalence of obesity.[179]

Using a sample of 70 developing countries between 1990 and 2013 and considering only trade in food and agriculture, one study identified a negative relationship between agricultural trade openness and the prevalence of obesity and overweight among adults. The findings suggest that a 1 percent increase in agricultural trade openness would reduce the prevalence of obesity and overweight among adults by approximately 0.5 percent.[180] This effect of agricultural trade is found to be due to a decline in the share of fat in favour of carbohydrate.[ab] Nevertheless, the position of a country on the development path can also affect the relationship between trade and obesity. Estimates presented in this report suggest that for countries at the later stages of the nutrition transition, higher agricultural trade openness can be an important driver of obesity as it can increase the availability of foods high in sugars and/or fats (see Box 2.6, **Part 2**).

Focusing on the composition of agricultural trade, more particularly on specific foods such as those high in sugars or ultra-processed foods, provides stronger evidence of the relationship between trade and obesity. For example, analysis based on a sample of 116 developing countries between 2000 and 2016 points to obesity being driven by imports of ultra-processed foods with high sugar content rather than agricultural trade in general.[181] Another study, using data from 172 countries for the 1995–2010 period finds that, on average, a 50 percent increase in the imports of sugar and energy-dense (ultra-) processed foods would result in a 0.0007 increase in the average BMI.[182] At a country level, rapid import growth in South Africa contributed to an increase in the availability of processed foods. Between 1992 and 2010 imports of soft drinks and of (ultra-) processed snacks increased by 92 and 83 percent, respectively. Similar increases took place in countries that participate in the Southern African Development Community.[183]

The nutrition literature suggests a positive relationship between the high consumption of ultra-processed foods and obesity. Ultra-processed foods can contain large amounts of free sugars and saturated fats, which contribute to a high energy intake.[184] Studies indicate that individuals consuming higher shares of ultra-processed foods are more likely to be obese than individuals with low levels of consumption.[185, 186] This pattern also holds for children, indicating that a higher consumption of ultra-processed foods is associated with higher increases in adiposity in both children and youth.[187, 188] It is possible that the weight is affected by an overall higher intake, which may be facilitated by the combined characteristics of ultra-processed foods such as high palatability, energy density, marketing and convenience.[189] Nevertheless, there is no consensus among nutrition experts on the exact metabolic responses to ultra-processed food consumption. Further studies are needed to establish a causal relationship between ultra-processed food consumption and obesity.[190]

ab This finding contrasts with evidence provided by empirical work on the nutrition transition, where increases in the availability of fats and oils have resulted in a higher prevalence of overweight and obesity in developing countries. See **Part 1**.

Food trade and obesity in the Pacific islands

The disproportionately high prevalence of obesity in the Pacific islands could be due to a number of factors. Geographical remoteness and susceptibility to food shortages due to weather extremes could have enhanced the islanders' genetic predisposition to gain weight.[191] Nevertheless, anthropological research suggests that, prior to colonization, local technologies for food preservation such as drying and fermenting, and food storage were widespread enough to provide a buffer for production shocks. Instead, globalization, trade and rapid social change, especially in small, closely-knit societies, could provide an alternative explanation for the rise of obesity in the region. Indeed, researchers show that, as in other countries, obesity emerged in the Pacific, for example, in Nauru and the Cook Islands, during the second half of the twentieth century.[192]

Agriculture in the Pacific islands is under a number of constraints. Agricultural land endowments are limited, which translates into low levels of food production and a low diversity of foods produced that do not meet the needs of a growing population. In many cases, the per capita production of fruits, vegetables and staple foods decreased or remained more or less stable between 1965 and 2015.[193] High trade costs due to geographic remoteness add to low competitiveness, and exposure to natural disasters increases risks and hinders investments. For example, one study suggests that in Samoa during the early 1990s, the local food staples sectors of coconuts, fruit and taro were hit by a rapid succession of natural disasters and the spread of the taro leaf blight, resulting in a lasting decline in production capacity.[194]

As agriculture in the Pacific islands has limited production capacity, it is food trade that has a significant impact on the availability and diversity of food. For example, food imports in Samoa made up around 50 percent of total calories supplied, and only 31 out of the 122 unprocessed and minimally processed food items that were available for consumption in 2020 were produced domestically. In the same year, in Nauru, there were 95 unprocessed and minimally processed food items available while only 19 of those were domestically produced. For Nauru, in 2020 the share of food imports in total calories available for consumption amounted to 73 percent.

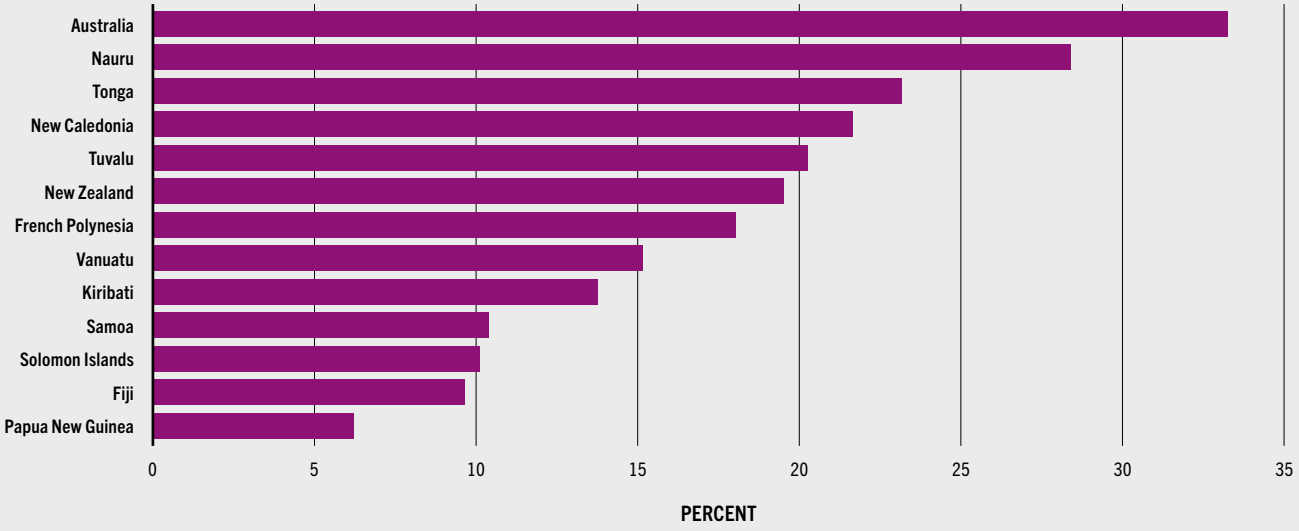
Food processing capacity is also low. Fiji is the only island state with a small food processing sector that serves the domestic market and exports processed foods to other neighbouring island states, while a large part of processed and ultra-processed foods available in local markets are almost entirely imported.[195] For example, out of 31 ultra-processed foods supplied in Samoa in 2020 only one was produced domestically.

While trade has contributed to increasing the availability and diversity of foods in the Pacific islands, it has also been cited as an important factor in the rapid increase in obesity and its disproportional high levels.[196, 197] Integration into global food markets has helped accelerate the nutrition transition with significant changes in local diets. Traditional local diets composed of mainly fruits, food staples, locally produced animal foods and fresh fish, gave way to increasing amounts of imported animal products of high fat content as well as processed and ultra-processed foods.[198]

Imports of mutton flaps and turkey tails – relatively inexpensive meats with very high fat content – into the islands and their role in the growing obesity rates have been discussed extensively in the literature.[199, 200] Analysts suggest that the low levels of income in many Pacific Small Island Developing States also play an important role in shaping consumption patterns.[201, 202] Fiji's ban on the sale of mutton flaps in 2000 served to raise awareness of the risks of frequent consumption of food items high in fats, but it did not lead to conclusive improvements in the overall local diet (also see **Part 5**).[203]

The high share of imported processed foods, processed culinary ingredients and ultra-processed foods in consumption expenditure is also receiving attention in the context of the high prevalence of obesity. For example, between 2014 and 2018 per capita sales of processed foods, soft drinks and vegetable oils increased in most Pacific islands, with Papua New Guinea showing the highest level of increase at 56 percent.[204]

FIGURE 4.3 ULTRA-PROCESSED FOOD IMPORTS AS SHARE IN ALL FOOD IMPORTS (BASED ON ENERGY CONTENT), SELECTED COUNTRIES IN OCEANIA, 2021



SOURCE: Authors' own elaboration based on FAO. 2024. FAOSTAT: Trade – Crops and livestock products. [Accessed 15 May 2023]. https://www.fao.org/faostat/en/#data/TCL. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd2144en-Fig4.03

Indeed, in Oceania the share of ultra-processed foods in total calories imported is very high relative to all other regions, making up 23 percent of all imports in terms of calories and close to 50 percent in terms of import value in 2021. Within Oceania, Australia features the highest share of ultra-processed food imports, followed by Nauru and Tonga (Figure 4.3).

Imports of ultra-processed foods by Oceanian countries in 2021 were made up of high shares of pastry, followed by food preparations. Margarine and shortening, sausages and similar products of meat, other meat preparations, and sugar confectionery also contributed to high levels of ultra-processed food imports. Compared with the most traded ultra-processed items at the global level, the high shares of imports of sausages and other meat preparations are striking in some of the Small Island Developing States of Oceania such as Kiribati, Nauru, New Caledonia, Samoa, Solomon Islands and Tonga.

Several studies have examined the impact of trade agreements and, especially, the impact of the accession of the Pacific Small Island Developing States to the WTO on the composition of food imports to assess the trade effects on obesity.[ac] For example, in Fiji, WTO accession in 1996 resulted in increasing the availability of fresh fruits, vegetables and whole-grain refined cereals, but also that of fats and oils, meat, processed dairy products, energy-dense beverages and processed and packaged foods. These impacts were the result of changes in import tariffs, but also of changes in non-tariff measures, as for example adjustments in the appropriate level of protection of sanitary and phytosanitary measures, which contributed to increasing import volumes.[ad, 205]

ac Fiji, Papua New Guinea and Solomon Islands became WTO members in 1996, Tonga in 2007, and Samoa and Vanuatu in 2012.

ad Under the Sanitary and Phytosanitary Measures Agreement, WTO members are entitled to maintain a level of protection they consider appropriate to protect human, animal or plant life or health within their territory. This is referred to as the Appropriate Level of Protection (ALOP). This level of protection must be technically justified and applied consistently among all the trade partners. ALOP must not restrict trade any more than it is necessary to achieve its intended objectives.

Similar impacts were reported for Vanuatu, which joined WTO in 2012.[206] Nevertheless, an analysis across 16 countries, including the United States, Australia, New Zealand and 13 Pacific Small Island Developing States in 2019, many of which are not signatories to WTO, points out that the trends in imports and consumption of processed and ultra-processed foods were dependent on income, suggesting that income growth is the underlying driver of processed food consumption in the region, while trade could be seen as an accelerator of the nutrition transition.[207]

Regional trade agreements and the composition of food trade

The debate on whether increased trade initiated by trade liberalization promotes the availability of ultra-processed foods and contributes to a high prevalence of obesity has expanded beyond the Pacific. A review of 17 studies on the impact of regional trade agreements (RTAs) on health outcomes, suggests that their implementation was associated with an increased consumption of processed food and sugar-sweetened beverages and correlated with a higher cardiovascular disease incidence and higher BMI, underlining, however, that these linkages were methodologically limited.[208]

By reducing barriers to trade and investment between signatories, RTAs in the Americas were found to increase the availability of calories, which could contribute to rising obesity.[209] By lowering or removing tariff and non-tariff barriers on energy-dense foods, including ultra-processed foods, RTAs in Northern America and Latin America and the Caribbean could influence the composition of traded foods and thus affect the food environment of the signatories.[210, 211] For example, a study on food trade impacts on obesity in the context of the United States–Mexico–Canada Agreement found that food imports from the United States to Mexico competed with domestic foods and exerted downward pressure on domestic prices. However, this price-reducing effect was limited to energy-dense foods with low nutritional value only, while the effect of competitive pressure on other "healthier" foods was insignificant.[212]

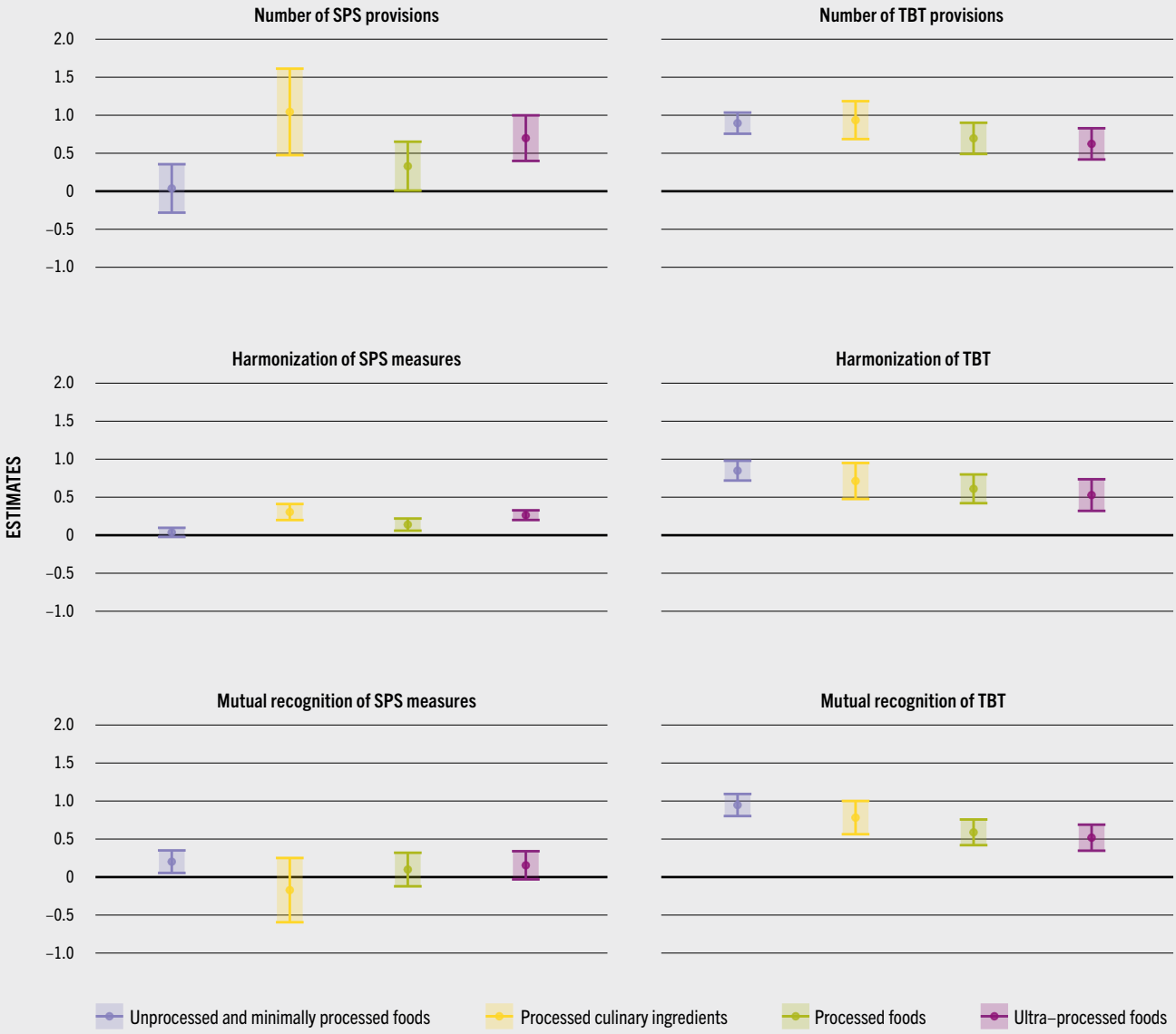
Analyses focusing on the impacts of RTAs on the composition of food imports and on obesity are, in general, haunted by several issues. First, as these trade agreements include provisions that lift barriers on both trade and investment flows between the signatories, studies tend to conflate the effect of trade and that of foreign direct investment on the availability and composition of foods in the domestic markets. Second, most studies do not take into consideration the impact of income on the demand for different food imports, thus disregarding income effects and the significant influence of the nutrition transition on dietary patterns. Third, the way foods are classified into "healthy" or "unhealthy", "obesity-prone" or not varies across studies, making comparisons difficult.

A study carried out for this report investigates the impact of RTAs on the composition of food imports, using the NOVA food classification (see **Part 2**, Box 2.2).[213] Analysing bilateral trade flows of approximately 400 food items across all countries from 1991 to 2017, the study suggests that RTAs have a significant impact on food imports that varies across foods at different processing levels. This variation stems from two sources: (i) the use of non-tariff measures such as sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBT) and their harmonization or mutual recognition across RTA signatories; and (ii) different income effects on food imports of different processing levels.

Regional trade agreements: Impact of sanitary and phytosanitary measures and technical barriers to trade provisions on the import demand for foods classified according to processing level

SPS measures include mandatory standards that focus on additives, contaminants, residues of pesticides or veterinary drugs in foods and beverages, as well as certification and labelling requirements directly related to food safety (for example, food allergens). Technical barriers to trade reflect technical regulations, conformity assessment procedures and standards such as nutrition labelling addressing risks not expressly referring to food safety (for example, information on nutritional content), packaging, grading and quality requirements (see **Part 5**).[214, 215] In fact, as both TBT and SPS measures are widespread in food and agriculture, their effects on food trade

FIGURE 4.4 REGIONAL TRADE AGREEMENTS: IMPACT OF NON-TARIFF MEASURES ON BILATERAL FOOD TRADE FLOWS ACROSS PROCESSING LEVELS

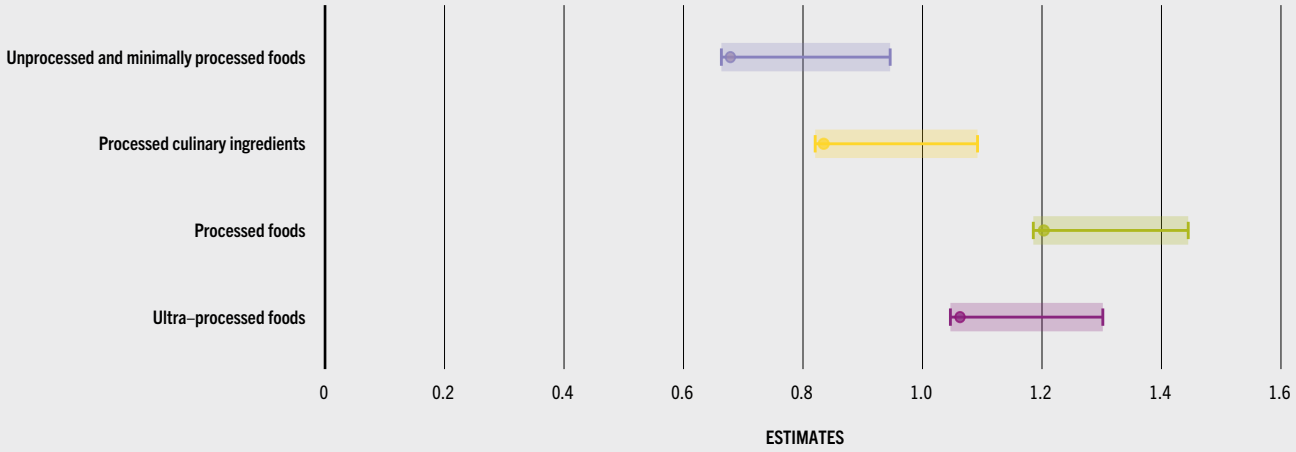


NOTES: The figure shows the estimated impact of provisions on sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBT) in regional trade agreements (RTAs) on bilateral food trade flows across processing levels. The number of SPS and TBT provisions is an indicator for the depth of integration in an RTA. The shaded areas denote confidence intervals of the estimates.

SOURCE: Adapted from Rotunno, L. (forthcoming). *Demand for processed foods and deep trade agreements – Background paper for The State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig4.04

FIGURE 4.5 INCOME RESPONSIVENESS OF BILATERAL FOOD TRADE FLOWS ACROSS PROCESSING LEVELS



NOTES: The figure shows the estimated effect of income changes on the import demand for foods across processing levels. On average, a 1 percent increase in income can result in a 1.2 percent and a 1.1 percent increase in the demand for processed and ultra-processed food imports, respectively. A 1 percent increase in income would result in a 0.7 percent and a 0.8 percent increase in imports of unprocessed and minimally processed products and of processed culinary ingredients, respectively. The shaded areas denote confidence intervals of the estimates.

SOURCE: Adapted from Rotunno, L. (forthcoming). *Demand for processed foods and deep trade agreements – Background paper for the State of Agricultural Commodity Markets 2024*. Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig4.05

can be much stronger than those of tariffs.[216] However, the effects of these non-tariff measures on trade can be mixed; food standards can be trade-enhancing, as well as trade-impeding, depending on the measures, food products and countries involved.[217] For example, both TBT and SPS measures may restrict trade as they increase trade costs related to compliance. At the same time, they can also expand trade, as they strengthen the demand for a product through better information on its safety and nutritional characteristics. Harmonization of standards and regulations generally promotes trade as higher trade costs associated with diverging requirements cease to exist.[218, 219]

Modern RTAs include provisions for deeper cooperation in regulation and standards to promote trade among their signatories and foresee a harmonization of TBT and SPS measures or provide for the mutual recognition of domestic measures. For example, the Deep and Comprehensive Free Trade Areas of the European Union with Georgia, the Republic of Moldova and Ukraine suggest that SPS measures by the three countries converge towards the European Union legislation.[220]

The analysis indicates that both SPS and TBT provisions have positive effects on food imports. RTAs including a high number of SPS provisions tend to increase imports of processed culinary ingredients and ultra-processed foods, while their impact on processed foods is relatively small and that on unprocessed and minimally processed foods insignificant. RTAs with a high number of TBT provisions have a stronger positive impact on food imports, as compared to SPS provisions, but their impact on food imports does not vary across processing levels (Figure 4.4). While mutual recognition of SPS measures has little impact on food imports, harmonization increases food trade, especially for ultra-processed foods and processed culinary ingredients. For TBT measures, both harmonization and mutual recognition increase food trade across processing levels (Figure 4.5).

If a country joined an RTA with the highest number of essential provisions in SPS, this

would triple bilateral imports of processed culinary ingredients and would increase imports of ultra-processed foods by 70 percent. Joining a trade agreement with a clause on the harmonization of SPS measures would increase trade in ultra-processed foods by 30 percent. These differing trade impacts arise because foods that are ready to be consumed or used in the food processing industry such as fruits, oils and fats, and ultra-processed products are generally subject to a larger number of regulatory measures than unprocessed or minimally processed foods, of which the largest part is made up of staple foods that need to be cooked.[221]

TBT effects can be even larger. Joining an RTA with the highest coverage of TBT provisions would increase imports of processed culinary ingredients by 146 percent, imports of unprocessed foods by 140 percent and imports of ultra-processed foods by 90 percent. Such effects reveal the broad reach of TBT provisions, which include nutrition information labelling, across foods (see **Part 5**).

Recent trade agreements go beyond import tariff reductions and market access and aim at deeper trade integration, focusing on harmonizing non-tariff measures and domestic regulations. Indeed, such deeper trade agreements reduce trade costs related to compliance with multiple and different standards and expand trade between the signatories, especially for products that are subject to a high number of standards and measures.[222, 223]

Regional trade agreements: Income effects on import demand for foods classified according to processing level

Income effects on the import demand for foods of different processing levels can conflate with the impact RTAs have on the composition of food imports. Income growth is an important driver of the nutrition transition and of the demand for animal source foods, fats and oils, and processed and ultra-processed foods such as meat preparations and soft drinks. These high-value foods tend to be more responsive to income changes as compared to food staples (see **Part 1**).

Such income effects add to the impact of non-tariff barriers on import demand for foods in the context of RTAs. Indeed, the analysis suggests that the responsiveness of processed and ultra-processed foods to income changes is much higher than that for unprocessed and minimally processed foods. For example, on average, across all countries, food products and RTAs, a 1 percent increase in income can result in a 1.2 percent and a 1.1 percent increase in the demand for processed and ultra-processed food imports, respectively. A 1 percent increase in income would result in a 0.7 percent and 0.8 percent increase in imports of unprocessed and minimally processed products and of processed culinary ingredients, respectively.

The differences in income effects across food imports of different processing levels are important and relevant in the context of nutrition. For a given change in income, the responsiveness of processed and ultra-processed food imports is estimated to be proportionately higher, while that of unprocessed and minimally processed foods is shown to be proportionately lower. On the one hand, as incomes grow, the demand for processed and ultra-processed food imports will be stronger than the increase in income as consumers switch away from staple foods, which make up most of the unprocessed and minimally processed foods. On the other hand, imports of unprocessed and minimally processed foods, as well as processed culinary ingredients that are used as inputs in the food industry, are less responsive to income changes. This behaviour of food import demand, estimated at the aggregated level using bilateral trade flows in the global food market, is entirely consistent with the concept of nutrition transition.

Although the demand for ultra-processed food imports responds strongly to income, a separate RTA effect can be identified through the impact of depth and treatment of non-tariff measures. SPS measures appear to facilitate imports of ultra-processed foods relative to other foods. TBT measures, including nutrition labelling, may affect import demand, leading to a relatively lower expansion of trade in ultra-processed foods compared with the other processing levels. This can have implications for trade policymakers who negotiate RTAs that are increasingly found in the spotlight of the public discourse surrounding nutrition (see **Part 5**). ■

SENEGAL
A conference room: Stakeholder engagement is key for addressing food security.
© Clement Tardif/ iStock.com

PART 5
STRENGTHENING POLICY COHERENCE FOR TRADE AND NUTRITION

KEY MESSAGES

➔ Governments can implement trade policy measures to address nutrition objectives. WTO rules do not constrain the policy space to pursue these objectives, but they influence the choice of the policy instrument, including ensuring that there is no discrimination between like products of different foreign and domestic origin.

➔ Policy instruments, as for example excise taxes on sugar-sweetened beverages, can be effective in addressing nutrition objectives. They apply to both imported and domestically produced foods and beverages.

➔ Food labelling conveys the nutritional characteristics and attributes of food products to consumers and can improve diets and health. Discussion in the WTO Committee on Technical Barriers to Trade can ensure that food labelling promotes healthier food choices and facilitates trade.

➔ Strengthening policy coherence between trade and nutrition can address the economic, social and health dimensions of sustainable development. Building capacities among trade policymakers and nutrition officials is key to prioritizing nutrition and fostering collaboration.

➔ Promoting the engagement of all stakeholders, especially those related to nutrition and public health, and increasing transparency in negotiations for deeper trade agreements can ensure that increased trade will address food security, economic and nutrition objectives.

DOMESTIC SUPPORT, TRADE POLICIES AND NUTRITION

Agricultural policies address a broad array of issues, but ensuring food security and nutrition sustainably, and maintaining a level of farm income that keeps pace with the income trends in other economic sectors, are key objectives across both developed and developing countries. In a country, agricultural trade policy and domestic support create a set of incentives and disincentives that can affect food production and consumption, food prices and thus farm incomes and consumer expenditure on food.

Countries provide various types of domestic support to farmers, ranging from direct payments that contribute towards maintaining farm incomes, to subsidies for inputs such as fertilizers, electricity and water. Other forms of domestic support include the provision of services on research and development, and extension, which often address market failures such as constraints faced by farmers in adopting new technologies. Market price support measures create a gap between domestic market prices and border prices of a specific agricultural product. For example, public stockholding programmes combined with trade measures use domestic procurement to stabilize prices within a predetermined range, constituting market price support.[224]

Trade policies include import tariffs and non-tariff measures (NTMs) as well as export restrictions and export taxes. For example,

tariffs can be used to protect local farmers from international competition to promote domestic food production. NTMs include SPS measures that ensure food safety and protect animal or plant health and TBT measures such as labelling that relate to objectives such as nutrient content, environmental protection, labour health and safety, and prevention of deceptive practices.

Both domestic support and trade policy instruments are subject to the WTO rules and disciplines. For example, the WTO Agreement on Agriculture (AoA) places a limit on the use of several domestic support measures while regulating import tariffs that are subject to maximum binding levels that cannot be exceeded by applied tariffs. The Agreement on Technical Barriers to Trade and the Agreement on the Application of Sanitary and Phytosanitary Measures, many of which apply to food, ensure that while the need to constrain trade may arise, any measures taken should not be applied in an arbitrary or discriminatory manner or act as a disguised restriction on international trade.

The WTO disciplines create a transparent and predictable system of international trade rules that promotes competition by minimizing trade distortions and discouraging unfair practices. The AoA includes provisions on market access, domestic support and export competition, and it has encouraged the use of less distorting measures, including the use of support measures with no, or at most minimal, trade-distorting effects such as payments decoupled from production or non-targeted subsidies and a reduction in agricultural import tariff rates (see Box 5.1).

Central to WTO agreements is the principle of non-discrimination, aimed at ensuring the fair and equitable treatment of all trade partners. This prohibits discrimination between like products of different foreign origins (Article I of the General Agreement on Tariffs and Trade [GATT]), as well as between like products of foreign and domestic origin (Article III of GATT). Often, WTO rules, and especially the principle of non-discrimination, are seen by many public health experts as constraining the policy space that is available to address nutrition objectives, especially through the use of trade policy instruments.[225, 226]

Domestic support and nutrition

Domestic support measures can impact nutrition directly, through their effects on food production. In a country, distortive domestic support can affect the quantities of foods produced, the diversity of production and food prices and, therefore, is an important determinant of how much and what foods are available for consumption. Market price support, which together with border measures, create a gap between domestic market prices and border prices of a specific agricultural product, payments based on output, and payments based on the unconstrained use of variable inputs are among the most distortive types of domestic support.

On average, distortive forms of support are also prevalent in emerging economies. Data from the Organisation for Economic Co-operation and Development (OECD) suggest that, in 2020–2022, for 11 emerging non-OECD economies included in the estimation of support, 10 percent of gross farm receipts were generated by distorting policies, as compared to 7 percent in OECD countries (Figure 5.1).

Countries differ in how support is provided. Some high-income countries such as European Union Members and the United States, provide a large part of domestic support through direct payments that result in minimal distortions on production. Other high-income and middle-income countries such as Norway, the Republic of Korea and the Philippines implement market price support measures and payments based on production output (Figure 5.1).

At the same time, many emerging economies tax agriculture. For example, while India provides high levels of payments to farmers for the use of inputs, national and state-level agencies operating on behalf of the Food Corporation of India can procure wheat, rice and coarse grains at minimum support prices, which suppresses the domestic prices of these foods relative to global market levels, resulting in negative market support to the benefit of the consumers (Figure 5.1). China provides almost all its support to the sector in the form of positive market price support.[227]

BOX 5.1 THE AGREEMENT ON AGRICULTURE

The World Trade Organization (WTO) Agreement on Agriculture (AoA) is the main legally binding document regulating food and agricultural trade globally and contains disciplines in three main policy areas:

- Market Access, setting the conditions under which food and agricultural products can access the markets of WTO members;
- Domestic Support, referring to the support provided to farmers under government programmes; and
- Export Competition, referring to subsidies and other payments that serve to expand exports.

Other provisions in the AoA deal, *inter alia*, with the institution of export prohibitions and restrictions on foodstuffs.

Market Access, as per the AoA, prohibits border measures other than ordinary customs duties. According to Article 4.2 of the Agreement, the measures that are prohibited include quantitative trade restrictions, variable import levies, minimum import prices, discretionary import licensing, non-tariff measures maintained by state trading enterprises, voluntary export restraints and similar border measures other than ordinary customs duty. However, Article 4.2 of the AoA does not forbid the use of import restrictions, consistent with the WTO agreements, which are applicable to general trade in goods, including food and agricultural products. Such measures include those falling under the WTO Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) Agreements.

Domestic Support provisions of the AoA seek to limit the trade distortions caused by domestic agricultural support policies. While the AoA allows WTO members to use subsidies, in derogation from the WTO Agreement on Subsidies and Countervailing Measures, it also introduces commitments intended to curb these policies. In this regard, the AoA classifies the support measures into two basic categories: those that can be used without any limitation; and those that are subject to ceiling commitments and can be used provided that upper support limits are respected. The first category includes:

- measures that are considered to have no or minimal impact on trade and production and are included in Annex 2 of the AoA (also known as Green Box measures). These include public expenditures on general services (such as research and development, or marketing and promotion services), government spending on public stockholding for food security purposes and on domestic food aid, and direct payments to producers such as income support that is decoupled from production.
- specific measures taken by developing countries that are an integral part of their development programmes and encourage rural development. These are outlined in Article 6.2 of the AoA (the so-called, "Development Box") and include, for example, agricultural input subsidies generally available to low-income or resource-poor producers.
- measures that require farmers to limit their production, thus limiting production distortions. These are included in Article 6.5 of the AoA (the so-called Blue Box).

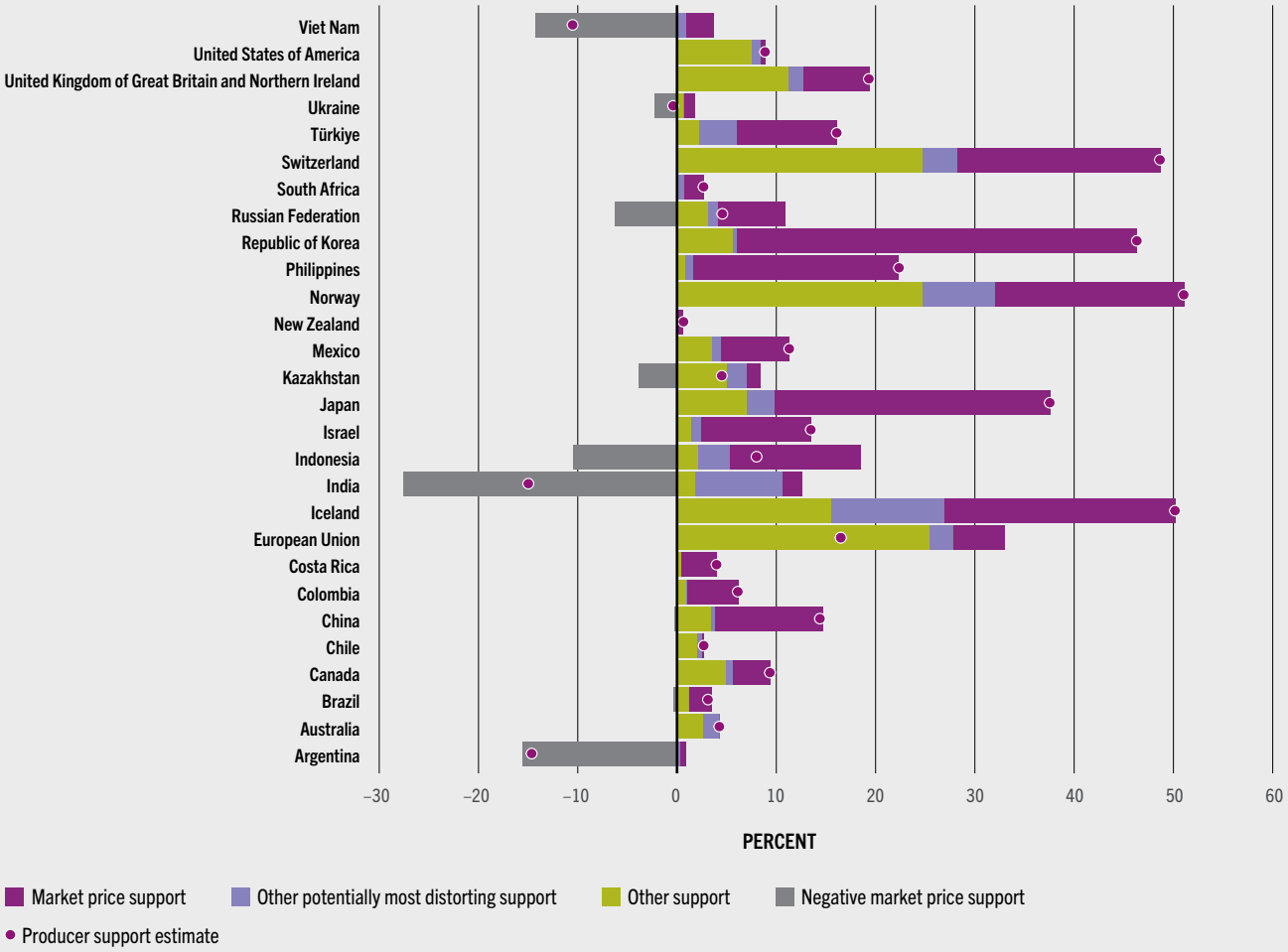
The second category includes all the measures that do not meet the exception criteria as above and are often referred to as Amber Box (Article 6 of the AoA). The ceiling commitments are based on the Aggregate Measurement of Support (AMS) concept, which is calculated for each basic agricultural product (product-specific AMS) as well as for support in favour of producers in general (non-product-specific AMS). Support, measured in terms of the share of the Value of Production that is below a specific threshold, either product-specific or non-product-specific, is excluded from the AMS calculation under the *de minimis* rule (Article 6.4 of the AoA).

The Export Competition pillar refers to subsidies that serve to expand exports. The 10th WTO Ministerial Conference, held in Nairobi, Kenya in December 2015, agreed on a Decision on Export Competition that foresaw the elimination of export subsidies in different timeframes for developed and developing countries. Prior to the Nairobi Decision, the AoA did not totally ban export subsidies but did introduce constraints on such policies by imposing ceilings both on expenditures and on the quantities of agricultural exports subsidized.

Finally, Article 12 of the AoA, contains provisions concerning the use of export prohibitions and restrictions on foodstuffs. The AoA requires members who consider imposing new export restrictions to give due consideration to the effects of these measures on the food security of importing members. The AoA also requires members to give an advance notice to the Committee on Agriculture and to consult with affected members if so required. These rules apply to developing countries only in so far as they are net exporters of the foodstuff in question.

NOTE: See The Agreement on Agriculture. https://www.wto.org/english/docs_e/legal_e/14-ag_01_e.htm

FIGURE 5.1 POTENTIALLY MOST DISTORTING TRANSFERS AND OTHER SUPPORT BY COUNTRY, 2020–2022 (PERCENT OF GROSS FARM INCOME)



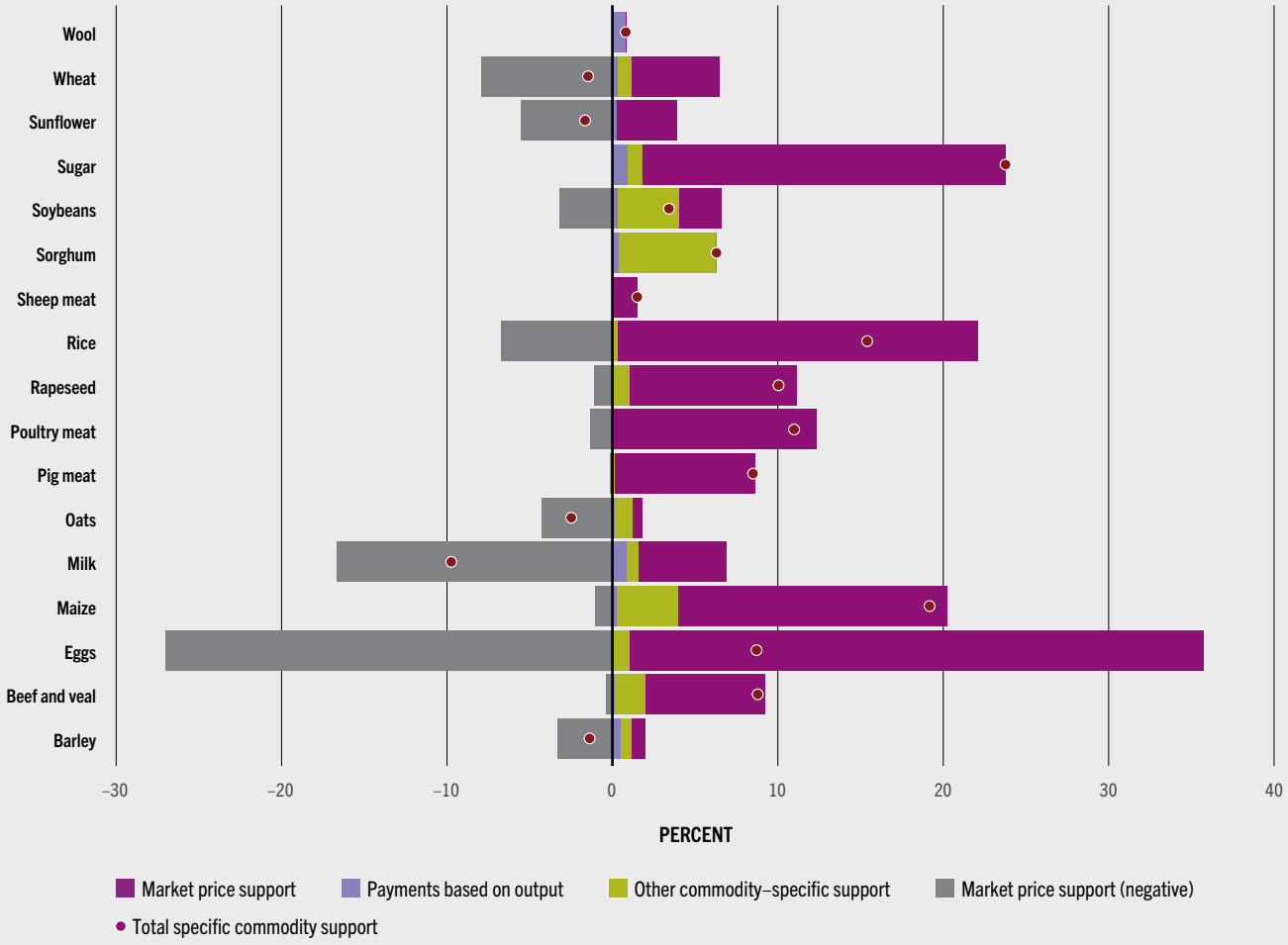
NOTES: The graph shows policy-induced transfers to farmers from taxpayers and consumers as a percentage of gross farm receipts. It includes all Organisation for Economic Co-operation and Development (OECD) countries, non-OECD European Union Member States, and the emerging economies. The producer support estimate measures all transfers to agricultural producers. Market price support arises as a result of domestic or trade policies that raise or lower domestic market prices such as border tariffs, export taxes and price ceilings or floors. Other potentially most distorting support includes payments based on output, are payments made to farmers per unit of production and payments based on use of variable inputs such as subsidies on the use of fertilizer, electricity, animal feed or credit. Other support includes a range of policies that varies across countries such as payments made to subsidize the acquisition of farm equipment, land or breeding stock, payments to reduce the cost of on-farm services such as technical, accounting, commercial, training and sanitary or phytosanitary assistance, or payments can be based on variable input use, but with constraints, limits or restrictions.

SOURCE: Adapted from OECD. 2023. *Agricultural Policy Monitoring and Evaluation 2023: Adapting Agriculture to Climate Change*. Paris, OECD Publishing. https://doi.org/10.1787/b14de474-en

Domestic support measures are often food specific and can promote the production of certain foods relative to others. Globally, the highest levels of support are observed for rice, maize, sugar and meats (Figure 5.2).[228] Such food-specific support can lead to increased production and lower prices of these foods relative to others, aiming at increasing availability and ensuring food security. For example, in China, the combined production of rice, wheat and maize grew by nearly 38 percent between 2005 and 2015 as a result of support.[229]

Domestic support can have significant economic impacts on agricultural markets, altering prices and production levels, thus affecting incentives for farmers and consumers and leading to market distortions. Food-specific support can result in a misallocation of resources, as farmers may choose to produce supported foods instead of those for which they have a comparative advantage. This may affect the composition of food production towards the foods that are supported, reducing food diversity and impacting relative

FIGURE 5.2 SUPPORT TO SPECIFIC COMMODITIES, 2020–2022 (PERCENT OF GROSS FARM INCOME)



NOTES: The graph shows policy-induced transfers to farmers from taxpayers and consumers as a percentage of gross farm receipts. It includes all Organisation for Economic Co-operation and Development (OECD) countries, non-OECD European Union Member States, and the emerging economies shown on Figure 5.1.

SOURCE: Adapted from OECD. 2023. *Agricultural Policy Monitoring and Evaluation 2023: Adapting Agriculture to Climate Change*. Paris, OECD Publishing. https://doi.org/10.1787/b14de474-en

prices. As distortive support is mainly targeted on food staples, meat and sugar and not on fruits and vegetables, it is often seen as having negative implications for nutrition (see Figure 5.2 and Box 5.2 on repurposing support to food and agriculture).

Input subsidies, especially in low- and lower-middle-income countries, can lead to lower production costs and subsequently lower prices could benefit consumers by making food more affordable and accessible. There is some evidence that, in low- and lower-middle-income countries, subsidies for fertilizers and seeds have been shown to have a positive impact on nutrition. The key pathway of impact appears to be increased food production and, in some cases, food production diversity. If targeted to nutrient-rich foods, subsidies can support improvements in nutrition by increasing food availability and promoting dietary diversity.

In sub-Saharan African countries, input subsidies for fertilizer and seeds have increased the volume and diversity of agricultural production, and subsidies for legume seeds, in turn, increased dietary diversity.[230, 231] For example, in Malawi, the input subsidy programme, which provided farmers with vouchers for seeds and fertilizer, resulted in an increased consumption of maize and legumes, leading to improvements in dietary diversity and child nutrition.[232] The Mali fertilizer programme, targeting rice, maize,

BOX 5.2 REPURPOSING SUPPORT TO FOOD AND AGRICULTURE

Some agricultural support policies have increased global food production, particularly of staple crops, contributing towards food security. However, there are serious concerns about their role in promoting sustainable, healthy and efficient agrifood systems. Agricultural support largely targets staple foods, dairy and other animal source protein-rich foods, especially in high- and upper-middle-income countries, while fruits and vegetables are less supported overall or even penalized in some low-income countries.[287]

Several recent studies have recommended that "repurposing" agricultural support towards investments and incentives that encourage the sustainable production of more diverse and traditional crops that are rich in nutrients and better adapted to environments can significantly contribute towards the economic, environmental and social dimensions of sustainable development. Repurposing existing fiscal subsidies to producers, which are based on factors of production, and other subsidies decoupled from production towards nutritious foods could have nutritional benefits. That is because under-investment in agricultural research and development has been particularly significant for non-staple nutritious crops such as fruit and vegetables, and under-investment in rural infrastructure, particularly transport and storage, differentially impacts perishable nutritious foods.

A recent simulation exercise indicated that if existing global subsidy budgets (USD 233 billion globally in 2017) were more evenly distributed across countries and directed towards nutrition-sensitive and low-greenhouse gas emitting food commodities (vegetables, fruits, legumes and nuts), the consumption of fruits and vegetables could increase by 10 percent in the Organisation for Economic Co-operation and Development (OECD) countries and 5 percent in non-OECD countries, resulting in health benefits.[288]

Similarly, an analysis undertaken by FAO and other international organizations that estimated the impact of repurposing price incentives through border measures and market price support to promote healthy diets, found that there would be a 0.64 percentage point increase in the proportion of the global population for whom a healthy diet is affordable. The move towards less costly and more affordable healthy diets is accompanied by a decline in global agricultural production that, in turn, is reflected in lower greenhouse gas emissions in agriculture. However, it is critical that repurposing is also accompanied by investments in resources (including skills and human capital) to ensure that farmers, particularly small-scale farmers, women and youth, can switch to specialize in these more nutrient-rich and environmentally appropriate crops.[289]

SOURCE: Adapted from Thow, A.M. (forthcoming). *Note on the impacts of domestic support and trade policy instruments on nutrition – Background paper for The State for Agricultural Commodity Markets 2024.* Rome, FAO.

millet and sorghum, was associated with a higher likelihood of an adequate diet among women plot managers.[233] However, household consumption is influenced by multiple factors. For example, fertilizer subsidies in Mali were positively associated with dietary diversity in one region, but negatively associated in another region where fertilizer use for cash cropping has been suggested to result in less fertilizer use for food, thus undermining food security.[234]

The combination of public stockholding and public distribution to support the food price stability of staple foods has been analysed in Ghana and India, as well as more broadly for developing countries.[235, 236] These programmes can promote food security where there are high rates of malnutrition, as a complement to social welfare measures. Their nutrition impacts could depend on which foods are targeted. For instance, in India, the public distribution system has been expanded under the 2013 Food Security Act to include the administered prices and distribution of other crops, including legumes. This expansion has had positive implications for dietary diversity and nutrition.[237]

Tariffs, non-tariff measures and nutrition

Over the past two decades, tariffs have declined substantially.[238] Tariff reductions are associated with decreases in consumer prices, which can contribute to increased food consumption and improved nutritional outcomes depending on which foods are subject to these tariff reductions and on how consumers respond to them.[239, 240] For instance, additional trade costs associated with Brexit in the United Kingdom of Great Britain and Northern Ireland were estimated to increase the price of foods, leading to a decrease in energy intake from fruit and vegetable consumption of 15 kcal per person, per week. However, analysis suggests that eliminating tariffs on fruits and vegetables could mitigate this effect.[241] In the Pacific, tariffs on fruits and vegetables not grown in Fiji were reduced in 2012 from 32 percent to 5 percent specifically to promote healthier diets.[242]

Nevertheless, in Canada, during the period 1976–2006, tariff reductions and changes in non-tariff measures due to the North American Free Trade Agreement (NAFTA) led to an increased supply of caloric sweeteners, particularly high-fructose corn syrup, equivalent to over 40 kcal per capita per day.[243] Another study suggests that, for low- and middle-income countries, a 1 percent reduction in tariff rates on sugar, confectionery products, fats and oils was correlated with an increase of 0.3 in BMI.[244] In 2012, Fiji increased the tariff on palm oil from 15 to 32 percent to reduce consumption and lower the population's saturated fat intake, however, there are no studies assessing the impact.[245]

In general, there is limited evidence to date for nutritional benefits from tariff changes. It is difficult to identify the impact of import tariff changes on nutrition. Most of the studies report association rather than causality between tariff changes, food availability and nutritional outcomes without taking into consideration other nutrition transition drivers or the context within which tariff changes are applied. For example, if primary products such as sugar are subject to a tariff increase, the likely direct effect on nutrition may be limited. A large part of the sugar supply is used as an input in the production of processed and ultra-processed foods, and the impact of the tariff increase on their retail prices will be proportional to the sugar content (see **Part 3** on the impact of trade barriers on food prices). At the same time, a tariff increase on soft drink imports may benefit the domestic industry, which can scale up soft-drink production, lower domestic prices and contain the effect of the tariff on consumption.

NTMs are policy measures, other than ordinary customs tariffs, that can potentially have an economic effect on trade in goods by changing quantities traded, or prices or both. NTMs relevant to nutrition include standards and technical regulations that place requirements on traded foods. For example, fresh fruit and vegetables but also ultra-processed foods are often subject to NTMs in the form of SPS measures, which can act as barriers to trade due to high compliance costs. However, SPS measures are vital in providing appropriate information on the sanitary characteristics of a product and ensuring food safety, which is critical for nutrition.[246] Other NTMs relevant to nutrition include TBT measures such as food labelling that provides information on nutritional characteristics and attributes of food products (see next section on nutrition labelling).

The impact of NTMs on the food trade is context-dependent. They can either facilitate or impede trade.[247] NTMs can limit food trade through increased trade costs resulting from compliance, affecting diet affordability and diversity. At the same time, they can also expand trade as they strengthen the demand for a product through better information (see also **Part 4**). Regulations on NTMs under the Agreement on Technical Barriers to Trade and the Agreement on the Application of Sanitary and Phytosanitary Measures, many of which apply to food products, must be supported by scientific evidence and should follow good regulatory practices.

To ensure that regulations do not create unnecessary barriers to trade, both agreements strongly encourage WTO members to use international standards, guidelines and recommendations as the basis for their measures. Modern RTAs go beyond market access and tariff reductions and aim at deeper trade integration, focusing on harmonizing NTMs and domestic regulations. Deeper trade agreements can reduce

trade costs related to compliance with multiple and different standards and facilitate trade among signatories (see also **Part 4** on the impact of SPS and TBT measures and their harmonization on food trade).[248]

Recent RTAs include extended TBT and other provisions related to nutrition labelling. In 2018, the agreements between the United States, Mexico and Canada, which replaced the North American Free Trade Agreement, and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, both include extended coherence provisions for TBT measures.[249, 250] Among trading partners, there have been important efforts toward harmonization in labelling. For example, European Union Members have harmonized their labels by adopting Regulation 1169/2011 on the provision of food information to consumers. In Latin America, MERCOSUR, a common market including Argentina, Brazil, Chile, Paraguay, the Plurinational State of Bolivia and Uruguay, developed a joint regulation on food labelling that is included in each country's national law.[251]

WTO agreements, which discipline domestic support and trade barriers, as well as RTA provisions, which include tariff reductions and NTM-related provisions, promote trade by making it freer and more predictable. One of the most fundamental rules of the WTO, the principle of non-discrimination, results in less distorted global markets. However, there are concerns that WTO rules and RTA provisions impose potential constraints on the ability of a government to pursue nutrition policies to achieve its own national goals – the policy space available for nutrition. These constraints are seen to arise from the application of WTO trade rules and principles, including that of non-discrimination, but also from the regulatory coherence provisions in RTAs with respect to the policy instruments that are applied to achieve nutrition objectives.[252, 253]

Samoa: Quantitative import restriction on turkey tails to excise tax and import tariffs

For instance, in 2007 Samoa implemented a ban on imported turkey tails – an inexpensive fatty meat – in response to concerns regarding high rates of NCDs. A 2008 survey found that in response to the ban, less than half of consumers switched to other more affordable meats such as chicken cuts, sausage or mutton about a quarter opted for healthier options such as fish, and some reduced their consumption of meat.[254]

During the accession process of Samoa to the WTO, some members raised concerns regarding the compliance of this measure with the WTO Agreement on Agriculture, which prohibits the use of import restrictions, including import bans. Moreover, its compliance with GATT Article XX was also raised. Some members argued that while this article allows for measures to protect human health to be taken as an exception, its preamble stipulates that this should not be a disguised restriction to international trade. They argued that the import ban only on turkey tails is discriminatory as it does not apply to all foods with high-fat content.[255]

As part of the Government of Samoa's WTO accession agreement, implemented in 2011, the ban was removed and replaced with a 300 percent import duty as an interim measure. The Agreement also included the commitment to conduct a study on policy options that aim at improving nutrition. Following the study, in 2018, Samoa imposed a 10 percent excise tax on fresh and chilled turkey tails. The import duty was set at 20 percent, in addition to the 15 percent value added goods and services tax. In 2019, the tariff on frozen turkey tails imports was set at 100 percent.[ae, 256]

Tonga: Sugar-sweetened beverages import tariffs to excise tax

In 2013, Tonga replaced a 15 percent import tariff on sugar-sweetened beverages with an excise tax at TOP 0.50 per litre, a rate that increased to TOP 1.50 in 2017 (see Box 5.3 on fiscal measures such as taxes on saturated fats and sugar-sweetened beverages). According to one study, import volumes of sugar-sweetened beverages declined, perhaps due to the need to develop capacity in the implementation of the tax. The excise revenue collection did not start for domestically manufactured sugar-sweetened beverages until later.[257] As a result, local soft drinks sales increased by 20 percent in 2016.[258]

ae See Meeting Minutes of the Trade Policy Review Body: https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/TPR/M386A1.pdf&Open=True

Although the share of the domestic industry in sugar-sweetened beverages was very small, about 5 percent of total sales, this demonstrates that trade policy instruments, in this case the excise tax that was applied only on imports, although aimed at improving nutrition provided protection to the local food processing sector to scale up production, thus weakening the effectiveness of the policy.

Ghana: Using food standards to curb the availability of fatty meats

In the 1990s, Ghana – a WTO member since 1995 – as a response to concerns about the low quality and high fat content of imported meats, particularly turkey tails, introduced food standards mandating maximum percentages for fat in meat cuts such as poultry, beef, mutton and pork. Such standards do not violate the WTO principle of non-discrimination as they do not discriminate between imports and domestically produced meats and apply to the main types of meat available.[259] The measure has been reported in WTO Trade Policy Reviews as both a TBT and SPS measure, likely since it employs food standards but with an objective to address NCDs rather than food safety.[260]

Mexico: Tax on sugar-sweetened beverages

Taxes on sugar-sweetened beverages have been widely adopted and have been found to be effective in reducing consumption.[261] A tax on sugar-sweetened beverages proposed by Mexico in 2006 was challenged at the WTO on the basis of discrimination, as it was limited to only beverages containing sweeteners other than cane sugar (which include beet sugar and high-fructose corn syrup, both of which are largely imported). The selection of this limited target was deemed inconsistent with the evidence regarding the impact of sugar and sugar-sweetened beverage consumption on health. The dispute was upheld and the tax was removed.[262]

Policy space for nutrition measures

In general, WTO rules do not constrain the policy space of countries to pursue nutrition objectives. Within this policy space, WTO's trade rules have resulted in the evolution of policy instruments, as for example from import quantitative restrictions to import tariffs or from border measures to excise taxes or food standards. The WTO agreements recognize the importance of non-economic objectives, notably through Article XX of GATT on General Exceptions, which allows members to take all necessary measures "to protect human, animal or plant life or health."[af] However, these measures may not be applied "in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade."[ag]

Ghana's policy choice to implement food standards related to fat in meat is compliant with the principle of non-discrimination, as these standards are applied uniformly to domestically produced and imported cuts of meat containing high levels of fats, while at the same time address concerns about human health.

The standards were developed by the Ghana Standards Authority, while the Ministry of Health played a key role in identifying their need. The percentages of fat given in the standards were based on the association of high-fat meat consumption with NCDs, particularly cardiovascular disease, and the threshold levels for what constitutes "high-fat" were derived from an analysis of the fat content of local and imported meats (carcasses and cuts of pork and beef shall contain no more than 25 percent fat, poultry no more than 15 percent fat and lamb no more than 30 percent fat).[263] ■

NUTRITION LABELLING

Food labelling was introduced as a safety measure for consumers due to foodborne illness outbreaks in the 1850s. The United States became the first country to enact mandatory food labelling in 1913 when it passed the Gould Net Weight Amendment to the Pure Food and Drug Act of 1906, paving the way for the adoption of mandatory nutrition labelling later

af See paragraph (b) of the Article XX of the GATT. https://www.wto.org/english/res_e/booksp_e/gatt_ai_e/art20_e.pdf

ag See the Chapeau of Article XX of the GATT. https://www.wto.org/english/res_e/booksp_e/gatt_ai_e/art20_e.pdf

BOX 5.3 FISCAL MEASURES: TAXES AND SUBSIDIES TO PROMOTE HEALTHIER FOOD CHOICES

The affordability of food is crucial in influencing nutritional choices. Fiscal policies such as taxes on energy-dense foods high in fats, sugars and/or salt and subsidies for nutritious foods are recommended to encourage healthy diets. These policies aim to enable the consumer to opt for the consumption of healthy diets by making energy-dense foods high in fats, sugars and/or salt more expensive through taxes and making nutritious foods more affordable through subsidies.[290]

From a public health standpoint, excise taxes are generally preferred over sales taxes and value-added tax (VAT). This is because excise taxes are specifically applied to certain products, making them less affordable compared to other products. On the other hand, VAT and sales taxes typically apply to a wide range of goods and services and do not impact the relative pricing of the product.[291]

Imposing taxes on energy-dense foods and drinks high in fats, sugars and/or salt could lead to positive changes in dietary habits. Health-related food taxes are relatively rare, primarily due to the political and administrative challenges of implementing them, as well as the difficulty in predicting consumer behaviour changes. In 2011, Denmark introduced the world's first tax on saturated fat. After the policy was implemented, there were significant price changes such as a 20 percent increase in the price of a standard pack of butter. Despite being in effect for only 15 months, the tax led to a 4 percent reduction in saturated fat consumption and increases of 7.9 percent and 3.7 percent in the consumption of vegetables and fibre, respectively.[292]

However, in recent years, there has been a growing momentum in favour of implementing taxes on sugar-sweetened beverages with the goal of reducing their consumption. Between 2017 and 2019, the percentage of World Health Organization (WHO) members implementing such taxes rose from 23 percent to 38 percent. A systematic review revealed that a tax on sugar-sweetened beverages could effectively reduce their consumption, as well as decrease the prevalence of overweight and obesity. The impact of such a tax would be greater if it were higher, applied per beverage volume, and covered all types of sugar-sweetened drinks.[293]

Implementing fiscal policies to promote healthy diets – whether through introducing a new tax or subsidy or increasing the rate of an existing tax – can be challenging. However, monitoring and evaluation are crucial for understanding the effectiveness of fiscal policies in promoting healthy diets.

in the twentieth century.[ah, ai, 264] By the 1960s, food labels did not provide any information regarding the nutrient content of the food, as there was little demand for nutritional information. Although humans have been processing food ever since learning how to cook, preserve, ferment, freeze, dry or extract, the influx of modern processed foods entering the marketplace since the 1960s has led consumers to seek information to better understand the products they purchase.

Food labelling is one of the primary means of communication between actors along the value chain from the producer to the consumer.[265] Nutrition labelling is used to convey the nutritional characteristics and attributes of food products to consumers, enabling them to make informed food choices.[266] In 1987, the American Heart Association created the Heart Guide symbol, the first food label that aimed to provide consumers with a single symbol that would indicate whether a food was "heart-friendly".[267] Since then, systems and symbols used in food labelling have proliferated. A variety of systems have been developed by food manufacturers, retailers, non-industry experts, nonprofit organizations, industry and non-industry consortia, and government agencies.

In 2004, WHO first proposed nutrition front-of-package-labelling (FoPL) as a policy

ah The Pure Food and Drug Act of 1906 prohibited the sale of misbranded or adulterated food and drugs in interstate commerce and laid a foundation for the first consumer protection agency, the Food and Drug Administration (FDA).

ai The Gould Amendment required all packaged foods to have the "quantity of their contents plainly and conspicuously marked on the outside of the package in terms of weight, measure or numerical count."

TABLE 5.1 EXAMPLES OF INTERPRETIVE AND NON-INTERPRETIVE FRONT-OF-PACKAGE LABELLING

Type	Description	Examples	Countries	Nutrients included	Mandatory
Interpretative	Includes symbols, colour codes and graphic representations that facilitate interpretation by the consumer	Traffic lights (red, amber, green for each critical nutrient)	United Kingdom of Great Britain and Northern Ireland, and Ecuador	United Kingdom: Total fat, saturated fat, total sugar, sodium Ecuador: Fat, sugar, salt	United Kingdom: No Ecuador: Yes
		Health star ratings	Australia, New Zealand	Energy, saturated fat, sodium, total sugar, sodium, proteins	No
		Warning labels	Chile	Energy, saturated fat, sodium, total sugar	Yes
		Warning labels	Canada	Saturated fat, total sugar, sodium	Yes
Non-interpretative	Includes some or all the information through a logo considered relevant from the nutrient declaration, without any guidance on the interpretation of the label	Keyhole (logo)	Norway, Sweden, Denmark, Iceland, Lithuania	Saturated fat, total sugar, sodium	No
		Healthier choices (logo)	Singapore	Total fat, saturated fat, trans fat, sodium, total sugar, calcium	No
		Choices programme (logo)	Netherlands (Kingdom of the), Belgium, Poland, Czechia, Mexico	Saturated fat, trans fatty acids, added sugar, sodium, energy	No
		25% percent reduced logo	Thailand	Sugar, fat, sodium	No

NOTE: Non-exhaustive list.
SOURCE: Authors' own elaboration based on Croker, H., Packer, J., Russell, S.J., Stansfield, C. & Viner, R.M. 2020. Front of pack nutritional labelling schemes: a systematic review and meta-analysis of recent evidence relating to objectively measured consumption and purchasing. *Journal of Human Nutrition and Dietetics*, 33(4): 518–537. https://doi.org/10.1111/jhn.12758

measure to improve diets and health.[268] The objective of FoPL is twofold: (i) to provide consumers with additional information for healthier food choices; and (ii) to encourage the industry to reformulate products for healthier options.[269] Globally, FoPL has been implemented through government policies in a myriad of ways utilizing different terminology.

There are two main approaches to characterize FoPL, which are the level of interpretation and the type of information provided (see examples in Table 5.1). Non-interpretive schemes only include the transfer of some or all the nutrition information through a logo considered relevant from the nutrient declaration, without any guidance on the interpretation of the label. Interpretive schemes such as warning labels, multiple traffic lights and Nutri-Score appear to lead to better consumer understanding and support healthier food purchases. FoPL effectiveness depends on intrinsic factors (e.g. food taste) and extrinsic factors (e.g. price, food category, culture, politics and economics). Lack of availability of similar alternatives, low understanding of FoPL importance, and lower income and education levels also impair FoPL effectiveness.[270]

Policies that require simplified FoPL are becoming increasingly common across the globe to contribute to a healthy food environment

BOX 5.4 NUTRITION LABELLING AND THE WORLD TRADE ORGANIZATION AGREEMENTS ON TECHNICAL BARRIERS TO TRADE AND SANITARY AND PHYTOSANITARY MEASURES

The World Trade Organization (WTO) was founded in 1995. Two agreements that were established at this time, the Agreement on Technical Barriers to Trade (TBT) and the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS), are relevant to food labelling standards. The scope of measures covered by the two agreements is wide. These agreements aim to strike a balance between legitimate objectives such as consumer and human health promotion without creating unnecessary obstacles to international trade. It is important to refer to both agreements when developing a labelling policy. According to the SPS Agreement, sanitary or phytosanitary measures include all relevant laws, decrees, regulations, requirements and procedures, as well as packaging and labelling requirements directly related to food safety. In this context, the Agreement would cover labels that provide health warnings, information on product usage, and food additive dosages as well as labelling that includes information on food additives, contaminants, pesticides and veterinary drug residues.

The TBT Agreement encompasses most other types of food labelling. The primary objective of the TBT Agreement is to ensure that technical regulations and standards, and conformity assessment procedures do not create unnecessary barriers to international trade. This includes packaging, marketing and labelling requirements. The TBT Agreement acknowledges that members have the right to take necessary measures to ensure the quality of their exports, protect human, animal, or plant life or health, safeguard the environment, or prevent deceptive practices. However, these measures should not be applied in a way that discriminates between countries where the same conditions exist or restricts trade in a disguised manner.

The Agreement on the Application of Sanitary and Phytosanitary Measures, the Agreement on Technical Barriers to Trade and trade concerns

Both the SPS and TBT Agreements require members to provide notifications of draft regulations on SPS and TBT measures that affect trade and provide sufficient information before it enters into force so that trading partners have the opportunity to provide comments when a draft regulation raises concerns, or to even use the formal dispute settlement mechanism of the WTO. Overall, the WTO provisions offer a comprehensive framework for addressing trade concerns and promoting cooperation among its members to facilitate smooth and predictable international trade relations.

and enable consumers to make more nutritious food choices. This is because a more simplified nutrition labelling scheme provides supplementary nutritional information in the form of an easy-to-understand label displayed on food products on the front of the pack, providing the content of foods, drawing consumer attention to the benefits and risks of particular nutrients or ingredients of public health concern, and motivating manufacturers to produce foods that have healthier nutrition profiles. As of 2022, 44 countries had introduced simplified nutrition labelling systems. The protection of public health is the driving factor behind the proliferation of such schemes.[271]

Labelling policies within the World Trade Organization framework

There has been increasing global interest in nutrition labelling as a policy tool through which governments can guide consumers to make informed food purchases and shift demand towards healthy diets. This interest comes as countries contend with an emerging epidemic of diet-related NCDs. Nutrition labelling includes nutritional specifications, which could be mandatory for pre-packaged foods and defined nutrients, and supplementary nutrition information including FoPLs.

Mandatory FoPL initiatives have been raised several times as specific trade concerns in the WTO TBT Committee (see Box 5.4). Although nutrition labelling has been consistently

considered as a legitimate policy objective in a TBT context, queries are being raised regarding the potential trade restrictiveness of the measures, as well as the scientific evidence for their effectiveness and consistency with international standards. Under Article 2.5 of the Agreement on Technical Barriers to Trade, WTO members can request justifications for another member's measure if it significantly impacted trade. The reasoning should be based specifically on Articles 2.2 and 2.3, including the ''necessity test'' of the policy in relation to its impact on trade, its effectiveness in achieving the objective of the measure, its proportionality to the impact involved, and whether there are alternative measures that could address the objective with less impact on trade.[aj]

A quantitative dataset was created to assess the extent of specific trade concerns and their impact on food and beverage regulations from 1995 to 2016.[ak, 272] This study elucidated a systematic understanding of the frequency and scope of trade rules being appealed to influence the regulations. For this report, this dataset has been updated to cover the period from 1995 to 2023. The expanded dataset examines the challenges related to food and beverages only and includes an analysis of the scope, frequency and content of specific trade concerns. It also illustrates how specific trade concerns can be used to influence regulations that target products central to preventing NCDs such as ultra-processed foods, soft drinks and energy drinks within the TBT framework.

The analysis of specific trade concerns at the TBT Committee demonstrates that a growing number of food and beverage regulations are extensively scrutinized and contested on the basis of a purported violation of trade rules. Between 1995 and 2023, 77 specific trade concerns were raised by 37 WTO members concerning regulations aimed at protecting individuals from the risks associated with food and beverage products (Figure 5.3).

aj See Articles 2.2, 2.3, 2.4 and 2.5 of the Agreement on Technical Barriers to Trade.

ak This dataset covered specific trade concerns for food, beverage and tobacco regulations among 122 WTO members from 1 January 1995 to 31 December 2016.

The number of specific trade concerns for food and beverage regulations per year increased significantly over time, rising from one in 1996 to a high of eight challenges in 2016 and 2017, respectively. In total, 77 specific trade concerns were raised 375 times in the TBT Committee, suggesting that policymakers are under significant pressure to design food and beverage regulations that comply with WTO rules and regulations. However, some of these concerns were resolved bilaterally without resorting to the formal WTO TBT Committee process.

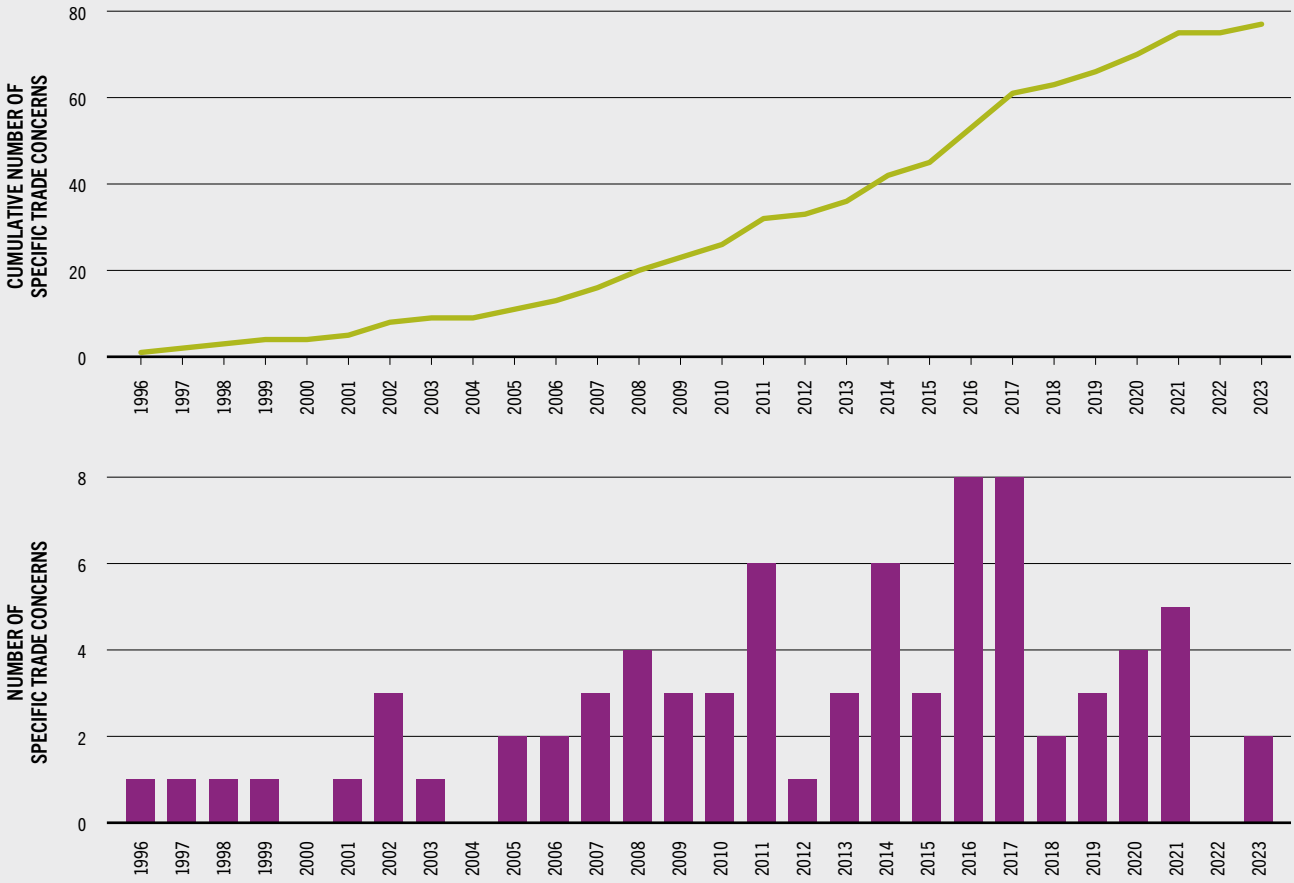
The most frequently contested measures were labelling requirements (52 specific trade concerns), which pertain to regulations for product packaging and labelling. In this process, the most frequent argument was that the regulations posed an "unnecessary barrier to trade", suggesting that the objective of the regulation could be achieved through an alternative policy that would pose fewer restrictions on trade. Often, countries requested "further information and clarification", meaning that more details and information were needed to understand the regulation and determine its impact (see Box 5.5 for case studies on specific trade concerns).

Codex Alimentarius guidance regarding FoPL was published in 2021 and provides an important reference point for trade-related discussions.[273] The guidelines provide general principles for establishing FoPL systems, which should be aligned with the national dietary guidance or health and nutrition policy of the country or region of implementation. Therefore, countries can still recommend specific FoPL systems, indicating that there is no global harmonization on a unique FoPL system.

While the SPS Agreement explicitly cites Codex standards as benchmarks for food safety and encourages harmonization with Codex standards, the WTO TBT Agreement does not explicitly mandate international harmonization with Codex, however, members use the Codex guidelines as benchmarks to guide the design of their national regulations (see Box 5.6).

The variation in labelling and health warning regulations between countries may necessitate

FIGURE 5.3 TECHNICAL BARRIERS TO TRADE COMMITTEE SPECIFIC TRADE CONCERNS RELATED TO NUTRITION LABELLING, 1995–2023



SOURCE: Dervisholli, E. (forthcoming). *Assessing nutrition policies through specific trade concerns lenses – Background paper for The State of Agricultural Commodity Markets 2024.* Rome, FAO.

https://doi.org/10.4060/cd2144en-Fig5.03

food exporters incurring additional costs while adjusting their exports or labels according to the country to which they are exporting. The costs of mandatory food labelling may include higher production costs related to the reformulation of the food product to avoid the label or the health warning, or costs associated with redesigning the packaging. Therefore, nutrition labelling regulations could potentially restrict trade. However, the discussions among countries at the TBT Committee may influence or could shape a country's final nutrition policies related to labelling. ■

INTERACTION AND COHERENCE BETWEEN TRADE AND NUTRITION POLICY

Trade is an integral part of our agrifood systems. It promotes the availability and diversity of foods in a country and, therefore, plays a crucial role in influencing diets and affecting nutritional outcomes. The impact of trade can be positive for foods essential for healthy diets; however, trade

BOX 5.5 TECHNICAL BARRIERS TO TRADE SPECIFIC TRADE CONCERNS

Chile: Front-of-package nutrition labelling for foods and drinks high in calories, sugars, sodium and saturated fat

To combat the rising rates of obesity and chronic diseases, Chile began the process of drafting a law on mandatory nutrition labelling in 2006. After an intense legislative, academic and social debate, the Food Labelling and Advertising Law (Law 20 606/2012) was approved and published in July 2012 and took effect in January 2016.

The law has four key features.[294] Firstly, foods and drinks considered high in calories, sugars, sodium and saturated fat must be marked with front-of-package labelling (FoPL). The warnings would need to be placed in the middle of an icon – a black octagonal STOP sign – which must occupy not less than 20 percent of the main face of the packaging, be located in the upper right corner and be at least four square centimetres in size. The limits for these critical nutrients were lowered in three stages. Thus, while in 2016 a food product had to carry the warning sign for "high sugar content" when it contained more than 22.5 g of sugar per 100 g, this limit dropped to 10 g in the third stage in 2019. Secondly, products with FoPL are subject to restricted advertising and marketing requirements such as a prohibition on targeting children who are younger than 14 years old. Thirdly, products high in the above-mentioned critical nutrients may not be sold in schools, whether packaged or not. Lastly, schools must provide nutritional education and promote physical activity.[295]

Specific trade concerns were raised over the law in 12 meetings in the World Trade Organization (WTO) Technical Barriers to Trade (TBT) Committee from 2013 to 2016. Eleven countries raised specific trade concerns over Chile's initial proposal and sought further information and clarification on the legislation's content. Eight countries contested the criteria for determining the size and colour of the stop sign in light of the principle of proportionality and required further scientific and technical support that allowed the proposed label to be used.[i] Others noted that such legislation would create unnecessary barriers to trade, resulting in increased costs related to a redesign of the packaging for some categories of products.[296, ii] Between 2013 and 2016, Chile reported to the TBT Committee that it had significantly modified the labelling requirements, reducing the required size of the warning label to 4 to 7 percent of the package surface.[iii, 297]

Research indicates that the policy has been effective. For instance, one study using longitudinal data on food and beverage purchases from 2 381 Chilean households from 2015 to 2017 examined the mean nutrient content (overall calories, sugar, saturated fat and sodium) of purchases in the post-policy period compared to a counterfactual scenario based on pre-policy trends. The overall findings were that calories purchased declined by 3.5 percent, sugar declined by 10.2 percent and saturated fat declined by 3.9 percent.[298] The policy has also influenced food manufacturers to reformulate products to avoid the negative impact of FoPL on consumer purchasing behaviour.

Indonesia: Mandatory health warning message

In 2013, Indonesia introduced a legislation draft on mandatory health warning messages on sugar, salt and fat content on labels of all foods.[iv] The labelling requirements were based on guidelines related to the 2008 World Health Organization (WHO) recommendations, as well as data from a 2013 nutrition survey conducted by the Ministry of Health. The policy entailed that food that has claims on the labels and advertising must meet an intake per serving of not more than: 13 g total fat; 4 g saturated fat; 60 mg cholesterol; and 480 mg sodium. Food that makes such claims must provide information such as nutrition facts, designation, information for use, warning of usage of substances and other information such as maximum consumption and indications of the group of people who need to avoid the product.

Between 2013 and 2016, specific trade concerns were raised in 11 WTO TBT Committee meetings regarding Indonesia's proposed mandatory labelling. Eight countries that raised concerns requested further clarification related to how the nutrition information and health warnings would be placed on the label, for example, as well as the testing methods for nutrition levels and the conduct of risk assessments related to non-communicable diseases.[v]

Others expressed concerns that the policy diverged from international standards and would create unnecessary barriers to trade. For instance, it was noted that the proposed policy deviated from the Codex Guidelines on Nutrition Labelling (CAC/GL 2- 1985, Rev. 1 – 1993) that states that labelling should not lead consumers to believe that there was an exact quantitative knowledge of what individuals should eat to maintain good health.[vi] In 2016, Indonesia reported to the WTO TBT Committee that the implementation was postponed until 2019, and noted that it would reevaluate the regulation and consider alternative approaches.[vii]

BOX 5.5 (Continued)

In 2019, Indonesia launched another legislation piece on the optional Healthier Choice Logo to help consumers identify products that are healthier within specific categories, for example, ready-to-consume drinks or instant pasta and noodles, and was updated to include 20 food categories, including bakery products, ice cream, ready-to-eat snacks, peanut products and ready-to-eat cereals.[299]

Mexico: Health warning specific trade concerns

As of 2021, more than 35 percent of children and adolescents in Mexico were considered overweight, one of the highest rates in the Americas. A study suggests that, for school-age children, ultra-processed products represented more than 30 percent of their total calories consumed.[300] In 2020, Mexico enacted a law requiring mandatory warning labels on the front of food packages that contain "excess" sugar, calories, sodium or saturated fat. These warning labels would replace an earlier measure, the 2014 front-of-pack Guideline Daily Amount nutrition labels, which were hard to understand and ineffective at conveying health risks.[301]

Between 2020 and 2023, specific trade concerns were raised in 12 WTO TBT Committee meetings regarding Mexico's mandatory labelling law. Ten countries requested more information and further clarification on the law, for example, related to whether the policy had considered international standards or the scientific evidence on "excess" levels of sugar, calories, sodium or saturated fat.[viii]

To date, Mexico's warning label law is still being discussed in the WTO TBT Committee. However, some studies have been conducted to examine its impact. One study suggests that the warning labels increased awareness of sweeteners and caffeine among Mexican adults and youth. Consumers also modified their perceptions regarding beverages for children. Such findings may help decision-makers improve the regulation and better target communication strategies.[302]

Peru: Warning labels on foods and non-alcoholic beverages

In 2013, Peru introduced Law No 30,021 – Law to Promote Healthy Eating among Children and Adolescents – aimed to reduce obesity-associated health problems by discouraging the advertisement, sale and consumption of certain foods and beverages.

More specifically, Article 10 of the law requires that warning labels be placed on foods and non-alcoholic beverages with certain levels of sugar, salt, saturated fat or trans fat.[303] The warning labels developed under the law advise consumers to "avoid excessive consumption" or, in the case of trans fat, to "avoid consumption" entirely.

Additionally, Peru issued the warning label manual for food labelling under the Law on the Promotion of a Healthy Diet in 2017. The manual establishes detailed specifications for including the warnings on the front-of-package labels of products that exceed the limits for salt, sugar, saturated fat and trans fat established in the Law on the Promotion of a Healthy Diet.

The law and the manual were both discussed in the WTO TBT Committee. Between 2013 and 2017, specific trade concerns were raised in 14 WTO TBT Committee meetings, where members requested additional clarifications of the law with respect to the TBT Agreement and the General Guidelines on Claims of the Codex Alimentarius (CAC/GL 1 1979, point 3.5).[ix] There were also concerns that the manual's stringent requirements for stickers and adhesive labels on food and beverages would create unnecessary trade barriers.[x]

The effectiveness of the policy has already been significant. One study examined the changes in sugar, sodium, saturated fat and trans fat content in ultra-processed foods and beverages, as well as the percentage of products that would carry a front-of-package warning label before and after the labels were required. Among beverages, it found significant decreases in median sugar content accompanied by an increase in the use of non-nutritive sweeteners. Given this reformulation, the percentage of beverages that would be required to carry a warning label dropped from 59 percent of the total before the law to 31 percent after. The percentage of foods that would carry a warning label also declined from 82 percent to 62 percent, primarily due to reductions in saturated fat and trans-fat content among those products.[304]

NOTES: [i]See Meeting Minutes of the TBT Committee: [G/TBT/W/428]. [ii]See Meeting Minutes of the TBT Committee: [G/TBT/M/59]. [iii]See Meeting Minutes of the TBT Committee: [G/TBT/W/62]. [iv]See Regulation of the Health Minister No. 30/2013: The Inclusion of Sugar, Salt and Fat Contents as well as Health Message on Processed Foods and Fast Foods. 2013. https://faolex.fao.org/docs/pdf/ins139271.pdf. [v]See Meeting Minutes of the TBT Committee: [G/TBT/M/69]. [vi]See Meeting Minutes of the TBT Committee: [G/TBT/M/63]. [vii]See Meeting Minutes of the TBT Committee: [G/TBT/M/70]. [viii] See Meeting Minutes of the TBT Committee: [G/TBT/M/80]. [ix]See Meeting Minutes of the TBT Committee: [G/TBT/M/68]. [x]See Meeting Minutes of the TBT Committee: [G/TBT/M/81].

BOX 5.6 CODEX ALIMENTARIUS COMMISSION AND FOOD LABELLING

The Codex Alimentarius Commission was established by FAO and the World Health Organization (WHO) in 1963 as part of the Joint FAO/WHO International Food Standards Programme. It is considered the most important international reference point for food standards. Codex texts are developed jointly by 189 Codex members and independent experts with the aim of protecting consumer health and promoting fair practices in food trade.[305] The Codex Alimentarius Commission was created with the objective of developing and publishing food standards in a "food code" that would protect public health and ensure fair practices in the food trade. In accordance with Codex General Principles, the food code is intended to guide and promote the elaboration and establishment of definitions and requirements for foods so they can be harmonized and thereby facilitate international trade. Therefore, Codex standards play a key role under the World Trade Organization (WTO) Sanitary or Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT) Agreements. For instance, the Codex text on commodity standards defines the physical and chemical characteristics of nearly 200 traded products from apples and wheat to frozen fish and bottled water.[306]

Codex framework on nutrition labelling

The Codex Alimentarius Commission established the Codex Committee on Food Labelling in 1964 to determine the food labelling provisions for the commodity standards being developed. In 1969, the Codex General Standard for Labelling Pre-packaged Foods was approved as the first international standard by the newly created commission. This standard is identified as "Codex-Stan 1", highlighting its importance as the principal Codex standard for consumer protection and ensuring fair practices in the food trade. In 1985, the standard underwent extensive revision and expansion and since then numerous amendments and additions have been made to ensure that it remains the key Codex instrument for delivering information about food to consumers with the latest guidelines being published in 2021.[307]

The Codex Committee on Food Labelling is the subsidiary body responsible for preparing general labelling texts. The Codex Committee on Food Labelling interacts with other Codex committees such as the Codex Committee on Nutrition and Foods for Special Dietary Purposes, which ensure that any food labelling or related texts they develop follow the general standard and other general labelling texts. Codex standards are used by countries as guidance for harmonization and have also been used as the basis for new food labelling policies.[308]

The role of Codex in nutrition and labelling

Codex provides guidance on the compositional requirements of foods so they are nutritionally safe. Codex also provides guidance on general labelling of foods and the health or nutrient claims producers make on labels, with terms such as "low fat", "high fat" among others. Codex guidance ensures that consumers understand what they are buying and that the product is accurately labelled.

The purpose of the guidelines is to ensure that nutrition labelling is effective in providing consumers with information about a food so they can make informed choices about the food they buy; in providing a means for conveying information about the nutrient content of a food on the label; in encouraging the use of sound nutrition principles in the formulation of foods that would benefit public health; and in providing the opportunity to include supplementary nutrition information on the label. The guidelines also ensure that nutrition labelling does not describe a product or present information about it that is in any way "false, misleading, deceptive or insignificant in any manner" and that no nutrition claim is made without nutrition labelling.

The Codex General Standard, initially designed as a trading standard, has evolved to include guidelines aimed at preventing the misuse of specific claims related to health and nutrition or regarding the "organic" and "Halal" nature of food. The Codex Alimentarius Commission has made various revisions and added interpretative texts to improve the information provided on food labelling, particularly in areas such as date-marking and nutrition labelling. In recent years, various front-of-pack nutrition labelling systems have been developed and used as supplementary nutrition information in different countries. Guidelines on front-of-pack nutrition labelling in Annex 2 of the latest Codex Guideline on Nutrition Labelling provide general principles to help countries develop FoPL that aligns with their national dietary guidance or health and nutrition policy.[309]

Codex standards and guidance are voluntary; however, they often serve as a reference point for countries to develop national policies. As the WTO recognizes Codex as an international standards-setting body, the Codex guidance plays an important role in international trade discussions (see also Box 5.4).

can also increase access to energy-dense foods of low nutritional value, particularly ultra-processed foods, which could worsen nutritional outcomes. This mixed scenario emphasizes the importance of developing trade policies coherent with nutrition measures and improving diet quality while considering potential adverse effects.[274]

To address all forms of malnutrition with an agrifood-system approach, policies should provide a set of incentives that target producers, traders, food processors, retailers and consumers. These incentives range from domestic support and trade policies to taxes for sugar or fat content, labelling requirements and measures to protect children from the harmful effects of food marketing, most of which overlap with trade. Therefore, it is critical for policymakers to consider policy coherence when designing and implementing trade policies and nutrition measures, taking into account all stakeholders, especially the most vulnerable in low- and middle-income countries.

World Trade Organization rules-compliant policies

From a trade policy perspective, WTO agreements recognize non-economic objectives under Article XX of GATT, allowing members to protect human health and provide countries with the flexibility to pursue nutrition objectives, as long as measures do not discriminate between imported and domestically produced foods. In the context of the Pacific Small Island Developing States, WTO rules have led to the evolution of policy instruments, from import quantitative restrictions to tariffs and to taxes or food standards to comply with the principle of non-discrimination.

The Samoa and Ghana examples offer significant insights for policymakers aiming to develop trade-compliant policies that support healthy diets. In both cases, transparent and scientific processes were utilized to ensure the necessity of policy interventions. A comprehensive approach was also applied to incorporate both imported and domestically produced foods, ensuring non-discriminatory policy measures.

More specifically, in Ghana, the introduction of food standards mandating maximum percentages for fat in meat cuts, which were reported as SPS and TBT measures in the country's WTO Trade Policy Reviews, is an approach that has potential in enhancing coherence between trade and nutrition measures. From the nutrition point of view, such food standards result in a ban on fatty meat cuts, thus improving nutritional outcomes. From the trade point of view and based on **Part 4** findings, SPS and TBT measures, on average, facilitate food trade between trade partners. For example, joining an RTA with the highest coverage of TBT provisions would increase imports of unprocessed and minimally processed foods, which include meat cuts, by 140 percent. Although this is an average result across countries, foods and provisions, it highlights the potential of using TBT measures such as nutrition labelling for increasing the coherence between trade and nutrition policies.

Understanding the interface between trade and nutrition policies can inform the design of policies that are effective and consistent with WTO rules. In addition to Ghana's food standards, Chile has navigated WTO agreements on nutritional information to develop the mandatory front-of-package nutrition labelling for NCD prevention.

Regional trade agreements increase awareness and understanding between trade and health sectors

In the context of regional trade agreements, it is important to consider the impact of increased trade on nutrition during the negotiation process. As trade can have heterogeneous impacts on nutrition, depending on the position of a country on the development path, the structure of its economy and agricultural sector and its demographic characteristics, nutrition impact assessments based on international dietary guidance can inform the negotiation process. Indeed, evidence suggests that a health impact assessment carried out in Australia in the context of the Trans-Pacific Partnership Agreement was useful in engaging the public and informing the negotiations.[275]

At the same time, the trade–nutrition policy nexus must be strengthened; specifically, there is an opportunity for nutrition to be included in the set of objectives of a trade agreement. Countries need to identify the level of coherence between trade

policies and health and nutrition goals within their specific national settings. For example, in Samoa, the inclusion of a key government nutritionist in the WTO accession committee enabled consideration of the nutritional implications of removing the ban on turkey tails and supported the decision to commit to undertaking a study to replace the ban.[276]

To date, studies indicate there is scope to strengthen policy coherence between trade and nutrition. At the national level, establishing mechanisms to enable engagement between the health and trade actors in the negotiation and implementation of trade agreements and the design of nutrition measures further supports and fosters policy coherence between trade and nutrition.

In Thailand, efforts to support policy coherence between trade and health has highlighted the importance of building capacities among trade policymakers over time, to strengthen an understanding of the interface between trade and health. For example, in 1998, the Ministry of Public Health established the Ministerial Committee on Health Impact from International Trade, with subcommittees on SPS, TBT and other agreements, to focus on health issues arising from trade negotiations and to increase coordination with the Ministry of Commerce and Ministry of Industry. Transparency was strengthened through the National Health Assembly, established in 2008, as a forum for government, non-government stakeholders, civil society and the knowledge community to discuss health issues arising from wider policies, including trade policies.[277]

In Australia, recent research highlighted an opportunity to increase awareness and understanding of trade and nutrition linkages among trade policymakers, negotiators and politicians by framing nutrition effectively in an economic context, to increase consideration and priority.[278] Similarly, with reference to the Common Agricultural Policy in the European Union, clear communication of nutrition guidelines and a mandate to address nutrition-related health concerns were found to aid policy action for nutrition in the agricultural trade space.[279]

For deep trade agreements, policy coherence between trade and nutrition objectives, stakeholder engagement and transparency are critical. In general, there is little evidence of the welfare impacts of deeper trade agreements in food and agriculture globally. However, when deep trade agreements promote the convergence of standards and regulations, the results could depend on whether special interests in signatory countries are aligned or in conflict. For example, while trade agreements that focus on market access tend to dilute the influence of special interests, as lobbies for exporters act as counterweights to import-competing lobbies, in deeper agreements, industry interests may be aligned across countries as firms would benefit from lower trade costs.[280, 281]

International guidance

A major challenge faced by the Government of Ghana when establishing agrifood standards for fat content in meat cuts was the lack of international guidance.[282] Although WHO provides guidelines on healthy diets, and on fat, carbohydrate and sugar intake, these are difficult to translate into SPS or TBT provisions to apply to single foods.[283, 284] There is not only a need for scientific evidence linking the intake to NDCs, but also information on NDC trends in the country, specific food consumption patterns and diets that would provide the necessary justification for applying the measure. International guidance and advice on how to set up and manage this process will be important. Experts believe there is already potential to develop nutrition-related TBT provisions for ultra-processed foods.[285]

More broadly, there is an opportunity for guidance relevant to agrifood systems and nutrition based on the policy space as this is shaped by WTO rules, with the objective of presenting good practices and innovative solutions for the trade–nutrition policy nexus.[286] This would strengthen the interface between trade and nutrition and contribute to building agrifood-system approaches towards healthy diets. In this context, the FAO elearning Academy capacity development initiatives and elearning courses can contribute towards building capacity in the trade–nutrition policy nexus, ensuring that new competencies are transferred to policymakers, embedded in national institutions and tailored to country-specific development and nutrition needs. ■

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THE STATE OF THE WORLD

2024

THE STATE OF AGRICULTURAL COMMODITY MARKETS

TRADE AND NUTRITION: POLICY COHERENCE FOR HEALTHY DIETS

Trade is integral to our agrifood systems as it fulfils the fundamental role of moving food from surplus to deficit regions, thus contributing to food security. Global food markets connect people and countries around the world, shape the availability, diversity and prices of foods and thus can affect diets and nutrition outcomes. These effects can be widely heterogeneous across countries both in direction and magnitude. The 2024 edition of *The State of Agricultural Commodity Markets* explores the complex linkages between food trade and nutrition and generates evidence to show how trade can affect dietary patterns and nutritional outcomes. The report examines the intersection of trade policies and nutrition measures and provides policymakers with an understanding of how to pursue nutrition objectives in the context of trade agreements and within the changing landscape of global agrifood systems.

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