Food and Agriculture Organization of the United Nations

unicef for every child

WFP World Food Programme

World Health Organization

2022

ASIA AND THE PACIFIC
REGIONAL OVERVIEW OF FOOD SECURITY AND NUTRITION

URBAN FOOD SECURITY AND NUTRITION

COVER PHOTOGRAPH © FAO/Jack Taylor

Khlong Toei fresh food market in Bangkok, Thailand.

2022
ASIA AND THE PACIFIC
REGIONAL OVERVIEW OF FOOD SECURITY AND NUTRITION

URBAN FOOD SECURITY AND NUTRITION

CONTENTS

FIGURES

BOXES

FOREWORD

This is the fifth annual report jointly written by United Nations agencies on the Asia and the Pacific region's progress towards the Sustainable Development Goals (in particular SDG 2 – Zero Hunger) and the World Health Assembly (WHA) 2030 targets on food security and nutrition in the region. Unfortunately, the findings of this report are not encouraging. But there is hope.

In each of these flagship reports, we highlight the region's progress towards these key indicators. In recent years, we reported that progress was stalling, then regressing and then pushing us further off track. This reverse was evident even before the COVID-19 pandemic took hold in 2020. But as the pandemic continued, albeit in a milder form in most parts of the region in 2022, the 5F crisis– lack of food, feed, fuel, fertilizer and finance – emerged. Aggravated by the war in Ukraine, we have witnessed during the past year unprecedented food and energy price rises that have hit households and livelihoods hard and pushed additional millions more into hunger and poverty. Many of those numbers, including the impact on women and children, will be most likely captured in the 2023 edition of this report.

In March 2022, the FAO Food Price Index (FPI) capped a steady rise through the previous two years of the COVID-19 pandemic and rose to the highest level since its inception. Since then the FPI has fallen somewhat but remains significantly higher by 28 percent over 2020. High agricultural input prices, concerns about the weather and climate, and increased market uncertainties stemming from the continuing war in Ukraine, are leading to a tightening of food markets. Food import bills are likely to touch a new record of USD1.94 trillion this year, according to FAO's latest Food Outlook published in November. Without doubt, this will exacerbate hunger and poverty in the Asia and the Pacific, the world's most populous region.

The first four chapters in this report describe the statistics and indicators for the Asia and the Pacific region. The numbers are a call for urgent action. In 2021, 396 million people in the region were undernourished and an estimated 1.05 billion people in Asia and the Pacific suffered from moderate or severe food insecurity. Nearly 75 million children under five years of age are stunted, amounting to half of the world's total, while almost paradoxically, the overall percentage of child obesity continues to rise. The share of the region under five years of age affected by wasting in Asia and the Pacific was nearly 10 percent in 2020.

Among older children and adults, obesity continues to rise in every country of this region. The Pacific Island Countries have the highest prevalence of overweight and obesity in the World. Obesity is a risk factor for many non-communicable chronic diseases (NCDs) and it has a major impact on national economies by reducing productivity and life expectancy and increasing disability and health care costs. No country in Asia and the Pacific is on track to meet the WHA target of no increase in adult obesity. Making the situation worse is the cost of attaining a healthy diet. A healthy diet is unaffordable in most countries of Asia and the Pacific for nearly two billion inhabitants (1.9 billion persons, which is 44.5 percent of the region's population). The combined impacts of the pandemic and ongoing inflation have pushed up the average cost of a healthy diet to nearly USD 4 per day (USD 3.98 per person, per day).

Chapters 5–9 of the report focus on urban food security and nutrition. Asia's cities, in particular, are growing at a fast pace and nearly 55 percent of the population is expected to reside in urban areas by 2030. That rapid rate of migration into cities has enormous consequences for food security and nutrition.

Increasingly, food security and nutrition in the urban context will determine progress (or increasing lack thereof) towards SDG2 and WHA nutrition targets.

The convergence of an increase in low-income settlements, the rising costs of food and the need for developing an urban food agenda that takes into account infrastructure, transport, clean water and waste management are posing new challenges to planners and national policymakers. This report captures the challenges and system-level determinants of unhealthy diets in urban areas, both with regard to undernutrition and overweight and obesity. It profiles various urban environments, interventions, experiences and the opportunities to innovate at multiple levels to transform urban areas into sustainable cities. We trust that this part of the report will inform urban food policies and governance and stimulate further development programming.

During the year, as the 5F crisis intensified, our agencies took the initiative to join hands at regional and country level to deliver coordinated technical support to countries and actions. We called upon all country representatives and directors to synergize their efforts to address the short-term effects as well as the medium- to long-term impacts, the crisis will have on the economies, households and individuals, particularly on women and children in the region. At the same time, the crisis is an opportunity to build on the momentum of the UN Food Systems Summit of 2021 and we are intensifying efforts with countries to reshape and reimagine food systems across the region to make them more efficient, inclusive, resilient and sustainable, leaving no one behind.

Governments, civil society, the private sectors, funding agencies and development agencies will need to continue to demonstrate leadership and partnership. Only then, would this region be able to bring about transformative change in agrifood systems and show improved figures in this flagship report in the years to come.

Jong-Jin Kim
**Assistant Director General and Regional
Representative for Asia and the Pacific
Food and Agriculture Organization of
the United Nations**
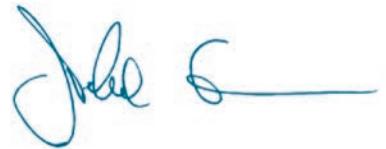
Debora Comini
**Regional Director for East Asia and
the Pacific
United Nations Children's Fund**

George Laryea-Adjei
**Regional Director for South Asia
United Nations Children's Fund**
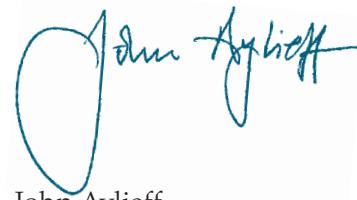
John Aylieff
**Regional Director for Asia and the Pacific
World Food Programme**

Zsuzsanna Jakab
**Deputy Director-General and
Officer-in-Charge of the
Western Pacific Region
World Health Organization**

Poonam Khetrapal Singh
**Regional Director for South East Asia
World Health Organization**

ACKNOWLEDGEMENTS

ACRONYMS

BMS	breastmilk substitutes
EBF	exclusive breastfeeding
EED	environmental enteric dysfunction
FAO	Food and Agriculture Organization of the United Nations
FIES	Food Insecurity Experience Scale
GAIN	Global Alliance for Improved Nutrition
GHSL	Global Human Settlements Layer
HH	household
IFAD	International Fund for Agricultural Development
IPC	WHO and UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MDD-W	Minimum Dietary Diversity for Women
NCD	non-communicable chronic disease
NGO	non-governmental organization
PoU	prevalence of undernourishment
SDFU	Status and Determinants of Food Insecurity and Undernutrition
SDG	Sustainable Development Goal
SSB	sugar-sweetened beverage
TBM	triple burden of malnutrition
UN	United Nations
UNICEF	United Nations Children's Emergency Fund

UN-HABITAT	United Nations Human Settlements Programme
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization
WRA	Women of Reproductive Age

EXECUTIVE SUMMARY

The world is almost at the halfway point since the SDGs were announced in 2015 and their target year of achievement of 2030. Successive editions of this report have shown that progress towards ending hunger and malnutrition has stalled and is indeed reversing. The picture in Asia and the Pacific continues to deteriorate and the region is significantly off track towards achievement of the Targets 2.1 and 2.2 of the Sustainable Development Goals (SDGs). Urgent systemic and sectoral actions are needed.

This year's report presents the latest updates of the food security and nutrition situation around the region, including updated estimates on the cost and affordability of a healthy diet. Reducing the cost of a healthy diet and making it more affordable is a critical element for achieving ending hunger (SDG2) and also the other SDGs. The report then takes a deep dive into urban food security and nutrition which will increasingly contribute to the progress in SDG indicators in the coming years as the percentage of the population in urban areas across countries in the region is set to cross 50 percent in this decade.

Of the 767.9 million undernourished in the world, 52 percent are in the region and 83 percent of them are in Southern Asia. The estimates of PoU almost halved from 14.3 percent in 2000 to 7.3 percent in 2019, reflecting almost two decades of rapid economic growth. However, challenged by climate change, conflict and other factors, the rate of decline in PoU was already slowing down before the COVID-19 pandemic took hold. In the wake of the COVID-19 pandemic, the number of undernourished in the Asia-Pacific region increased from 370 million in 2020 to 396 million in 2021 and the PoU rose to 9.1 percent. This is a clear message that food systems in the region are not sufficiently resilient and are unable to recover robustly from shocks.

Asia and the Pacific accounts for half the people facing moderate or severe food insecurity in the world. A quarter of the population in the region suffered from moderate or severe food insecurity as measured by the FIES scale. The Food and Agriculture Organization of the United Nations (FAO) estimates that this number is more than a billion people in 2021. 460 million people in the region suffered from severe food insecurity, while an additional 586 million suffered moderate food insecurity. These figures are a result of pre-existing economic shocks and the lingering impacts of the COVID-19 pandemic. The effects of the war in Ukraine on global food, energy and fertilizer prices and supplies are not captured but it is significantly impacting economies and poses further threats to food security, nutrition and livelihoods. Many households are experiencing a continuous and relentless succession of these shocks, which heighten the severity and magnitude of their acute food insecurity over time.

Progress towards multiple global nutrition targets have also significantly slowed down or stalled. These include stunting and wasting in children under five years of age and child overweight. The region is home to nearly 75 million stunted children and almost 10 percent of children under five years of age are wasted. Both stunting and wasting undermine physical and cognitive development of children due to insufficient nutrient intake and absorption. They risk dying from common infections due to low immunity and they demonstrate an increased predisposition to overweight and non-communicable diseases later in life. These numbers therefore will have a significant impact on the productivity of populations and economies in the future. The magnitude of the problem is such that responses at scale such as the global action plan on child wasting are needed to accelerate progress in their prevention and management. These estimates are based primarily on data collected prior to 2020 and do not account for the impacts of the COVID-19 pandemic.

Concomitantly, childhood overweight is rising in the Asia and Pacific region, as in the rest of the world and was at 5 percent in 2020. The most striking change has been in South-eastern Asia, where the prevalence of overweight children doubled from 3.7 percent to 7.5 percent in between 2000 and 2020. In Southern Asia, the rise is relatively small but it is adding another burden to stunting and wasting.

Food insecurity and malnutrition severely affect women as exemplified by the prevalence of anaemia. It continues to be uniformly high (greater than 10 percent) across the region in women between 15 and 49 years of age. In Southern Asia, almost half the women (48 percent) have anemia and relatively richer countries are also struggling to reach the target of a 50 percent reduction by 2025, as set by the WHA. The prevalence of adult obesity in Asia and the Pacific (6.1 percent) was lower than the global prevalence of 13.1 percent, but adult obesity has been rising in every country in the region. No country in Asia and the Pacific is on track to meet the WHA target of no increase in adult obesity.

The lone bright spot is the progress made on exclusive breastfeeding which is when a child receives nothing but breastmilk from birth until 6 months. In 2020, the average prevalence was almost 46 percent in the region which means it is on track to achieve the WHA target of 50 percent by 2025. The region also made progress since 2000 in reducing the average prevalence of low birthweight (<2.5 kg at birth) to 22 percent in 2015 with several countries reducing the prevalence by more than 3 percentage points. The WHA target is to achieve a 30 percent reduction by 2025.

The estimates of PoU and FIES and the figures on child malnutrition and obesity show that the region is way off-track from achieving SDG2 targets by 2030. The data on adult obesity, anaemia among women and prevalence of low birthweight show up the urgent need for increased access to a healthy diet and reducing the heavy marketing of unhealthy options. A balanced diet is one that provides different kinds and amounts of nutrients required for good nutrition and health. However, a healthy diet is unaffordable in the region based on 2020 data. The average cost is USD 3.98 per person per day. Almost 1.9 billion people or 44.5 percent of the population in Asia and the Pacific could not afford a healthy diet in 2020 due to the increased cost. Between 2019 and 2020, Asia and the Pacific experienced the highest surge in the cost of a healthy diet (4.5 percent). Overall, the average cost has risen 9.3 percent since 2017.

Given the setbacks over the last two years and that the decline in progress in the fight against hunger precedes the pandemic, it is important to reshape our agrifood systems such that they are efficient, inclusive, resilient and sustainable, and leave no one behind. Transformative pathways through the process fostered by the UN Food Systems Summit 2021 and the Nutrition for Growth Summit 2021 (N4G) need to be implemented. Investment, in agriculture, both public and private, with a focus on small holders and family farmers needs to be stepped up. Persisting with and expanding social protection programmes especially for women and children and repurposing policies to reduce the cost of healthy diets and enhance their affordability for consumers are critically needed measures.

Urban food security and nutrition will increasingly contribute a bigger component to the achievement of SDG2 and WHA indicators as more than 50 percent of the Asia and the Pacific region's population is expected to live in urban areas by 2030. Cities across the region will need to accommodate an almost a billion more people by 2050. Urban populations are usually portrayed as being better off than rural populations with better access to health services, food and education. However, this hides urban inequalities. Studies show that malnutrition and health deprivation levels among the urban poor are often as high as among the rural poor.

About 40 percent of the region's current urban population, 500 million, lives in informal settlements. Slums typically lack governance, planning and investment in infrastructure, leading to conditions, which perpetuate poor food security and nutrition outcomes. Migration to cities brings both challenges and opportunities for food security and nutrition. The urban poor are also among the most vulnerable to shocks such as the COVID-19 pandemic and the impacts of climate change in cities. MICS and DHS data reflect this urban disadvantage.

Urbanization has is contributing to changing food environments and the modernization of supply chains. A sign of that change in a region still dominated by traditional fresh food markets, is the increase in number of supermarkets by 55 percent in the five years from 2013 to 2018. This expansion has occurred in large and small cities as well as market towns. Trends also show that eating away from home and the share of income spent on of food prepared away from home is clearly increasing in urban areas. Moreover, there is a rise in sales and promotion of highly processed foods and drinks with high energy density and low nutritional value which do not contribute to healthy diets. Status and Determinants of Food Insecurity and Undernutrition (SDFU) surveys in some countries show the shift in dietary habits.

Nutrition, food systems, health, WASH, and social protection systems are important determinants of urban food insecurity and malnutrition. The cost of healthy diets and food environments, including street foods, play important roles in meeting the energy needs of urban residents in a nutrition transition context. The report covers examples of cities and local governments as key enablers in building inclusive and resilient food systems during the period of disruption by the pandemic and ensuring access to food by the most vulnerable.

Government policies are essential to promote urban food security and nutrition. To achieve cost-effective improvements, data, planning mechanisms and innovation are needed. Examples exist of city-level interventions to establish multi-stakeholder food governance mechanisms, integration of food systems in urban and territorial planning, innovative food system actions and increased access to food to illustrate opportunities for strengthening urban food security and nutrition. Targeted support for urban poor households, and key social interventions that local governments and communities have promoted, provide meaningful lessons across Asia and the Pacific, including from the COVID-19 pandemic.

CHAPTER 1
SUSTAINABLE DEVELOPMENT GOAL 2.1: UNDERNOURISHMENT AND FOOD INSECURITY

Key messages

■ The continued impacts of the COVID-19 pandemic and the war in Ukraine on the affordability of food are exacerbating hunger and food insecurity.

■ Progress in eliminating hunger in Asia and the Pacific[i] has continuously slowed during the past few years, as undernourished people increased by 26 million between 2020 and 2021.

■ In 2021, 396 million people in Asia and the Pacific were undernourished, and most (331.6 million) were living in Southern Asia.

■ The Food and Agriculture Organization of the United Nations (FAO) estimates that 460 million people in the region suffered from severe food insecurity in 2021, while an additional 586 million suffered moderate food insecurity.

■

1.1 PREVALENCE OF UNDERNOURISHMENT

FAO derives its prevalence of undernourishment (PoU) indicator from country data on food supply, food consumption and energy needs, while considering demographic characteristics such as age, gender and levels of physical activity. Designed to capture a state of energy deprivation lasting over a year, the indicator does not reflect the short-lived effects of temporary crises or a temporarily inadequate intake of essential nutrients.

FAO always strives to improve the accuracy of the PoU estimates by taking into account new information; the entire historical series is updated for each report. For this reason, only the current series of estimates should be used, including for values in past years.[1]

---

i Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

FIGURE 1

Prevalence of undernourishment in the world
and in Asia and the Pacific, and the number
of undernourished in Asia and the Pacific

Prevalence of undernourishment (Asia and the Pacific)

Prevalence of undernourishment (World)

Number of undernourished (Asia and the Pacific)
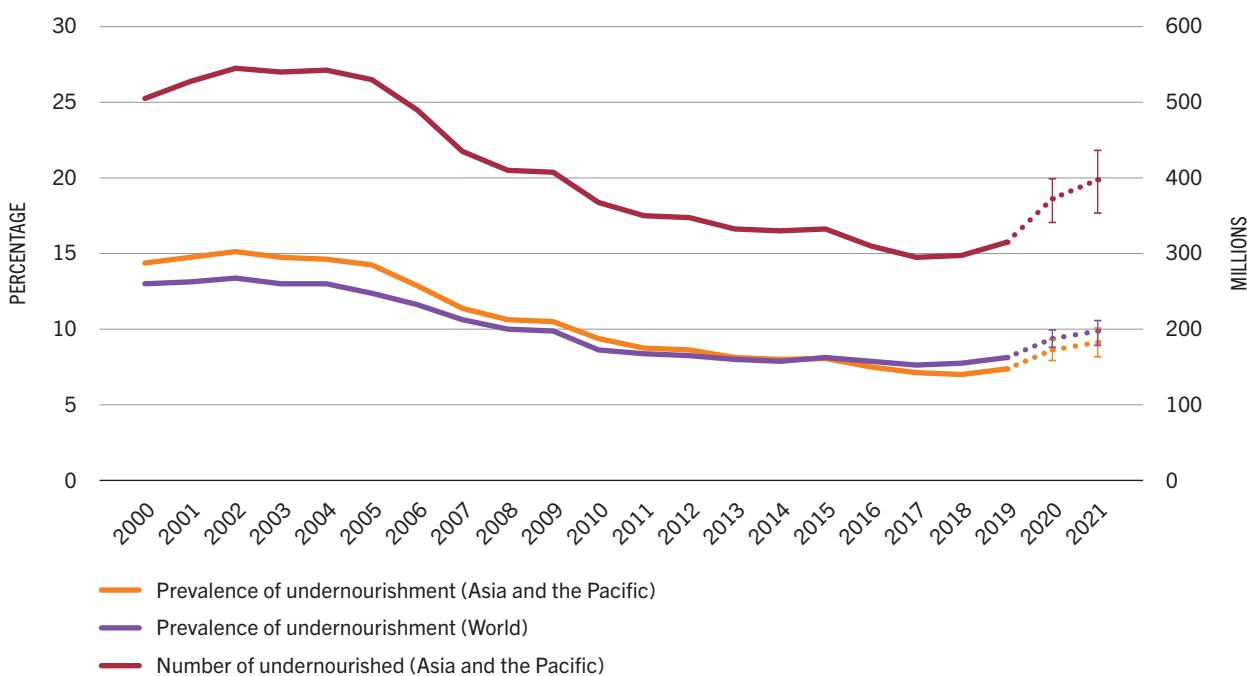
NOTE: Values for 2020 and 2021 are projections. The bars indicate the lower and upper bounds of the estimated range. Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

In the wake of the COVID-19 pandemic, the number of undernourished in the Asia and the Pacific region increased from 370 million in 2020 to 396 million in 2021 (FIGURE 1). Of the 767.9 million undernourished in the world, 52 percent are in the region and 83 percent of theme are in Southern Asia (TABLE 2).

The PoU in Asia and the Pacific was 9.1 percent in 2021 (TABLE 1). While this is a significant improvement from 14.3 percent in 2000, reflecting two decades of economic development, it is still an increase of 0.6 percentage point over 2020. This percentage is slightly below the world average of 9.8 percent. Notably, progress had slowed in recent years, even before the pandemic. The slowdown was already evident from 2010—2015, which was the period leading up to the Millennium Development Goals (MDGs). Between 2015 and 2019, after the adoption of the Sustainable Development Goals (SDGs), the PoU decreased marginally from 8.0 to 7.3 percent. During this period, South-eastern Asia showed a higher decrease in PoU measurements when compared to Southern Asia which showed marginal decreases. The absolute numbers also decreased significantly in South-eastern Asia (TABLE 2) but not by much in Southern Asia during this period.

In 2021, the prevalence was highest in Oceania excluding Australia and New Zealand (18.2 percent), followed by Southern Asia (16.9 percent), South-eastern Asia (6.3 percent) and Eastern Asia (less than 2.5 percent). The highest increase in the prevalence of undernourishment in 2021 was in Southern Asia, where the prevalence increased by one percentage point, from 15.9 percent in 2020 to 16.9 percent in 2021.

The estimates of the PoU show that the slowdown in the fight against hunger continues and the number of the hungry in the region will continue to rise. This trend is deeply concerning and points to the need to step up investment in agriculture, both public and private, particularly for smallholder and family farmers.

TABLE 1
Prevalence of undernourishment (percent)

	2000	2010	2015	2019	2020	2021
World	**13.0**	**8.6**	**8.0**	**8.0**	**9.3**	**9.8**
Asia and the Pacific	14.3	9.3	8.0	7.3	8.5	9.1
Eastern Asia	10.0	<2.5	<2.5	<2.5	<2.5	<2.5
East Asia (excluding China)	5.3	6.3	6.2	6.3	7.0	7.0
Oceania	6.9	6.2	5.7	5.6	5.4	5.8
Oceania (excluding Australia and New Zealand)	20.6	20.9	18.7	18.1	17.6	18.2
South-eastern Asia	20.6	10.9	7.8	5.6	5.8	6.3
Southern Asia	16.6	15.3	14.1	13.2	15.9	16.9
South Asia (excluding India)	17.6	13.7	11.3	11.3	13.5	14.6

NOTE: Projected values based on the middle of the projected range for 2020 and 2021. Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

TABLE 2
Number of undernourished people (millions)

	2000	2010	2015	2019	2020	2021
World	**796.2**	**601.3**	**588.6**	**618.4**	**721.7**	**767.9**
Asia and the Pacific	503.8	366.4	331.2	312.8	369.8	396.3
Eastern Asia	152.3	n.r.	n.r.	n.r.	n.r.	n.r.
East Asia (excluding China)	12.0	14.8	14.7	15.0	16.8	16.7
Oceania	2.2	2.3	2.3	2.3	2.3	2.5
South-eastern Asia	108.0	65.3	49.4	36.9	38.6	42.8
Southern Asia	241.3	262.3	258.0	254.1	307.6	331.6
South Asia (excluding India)	70.3	65.3	58.6	62.1	75.6	82.8

NOTE: The estimated PoU for Eastern Asia from 2010 onwards is below 2.5 percent of the population, which is the lowest value that can be reliably reported using the PoU methodology to calculate the number of undernourished people. Projected values based on the middle of the projected range for 2020 and 2021. Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

FIGURE 2
Prevalence of undernourishment in
Asia and the Pacific by country

2019−21 average   ● 2013−15 average
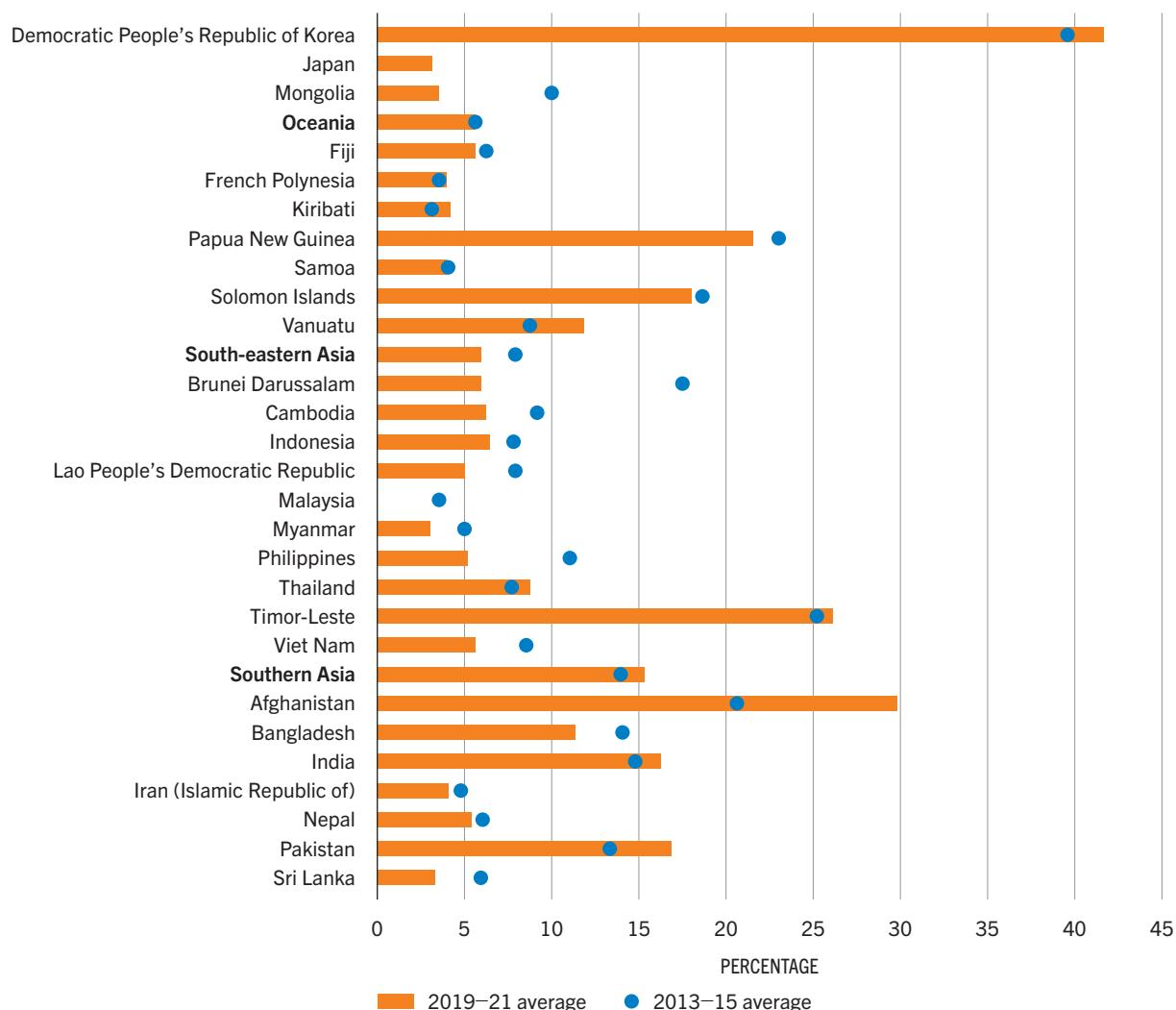
NOTE: The estimates referring to the middle of the projected ranges for the years 2020 and 2021 were used to calculate the three-year averages. The PoU is less than 2.5 percent for Japan in 2013−15, for Malaysia in 2019−21 and for Eastern Asia (not shown on the figure) in both periods. Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

FIGURE 2 shows that the PoU averages are highest for Afghanistan, the Democratic People's Republic of Korea and Timor-Leste (all higher than 30 percent) equivalent or higher than the 2013-15 averages. The *Global Report on Food Crises 2022* shows that populations in parts of Afghanistan, due to its protracted conflict face Catastrophe (IPC Phase 5) along with three other countries − Somalia, South Sudan and Yemen. The figure reflects the contributions of individual countries to the regional trends already observed since 2020, with an earlier slowdown in progress towards the Sustainable Development Goals (SDGs) further derailed by the COVID-19 pandemic.

■
1.2 PREVALENCE OF FOOD INSECURITY BASED ON THE FOOD INSECURITY EXPERIENCE SCALE

The worsening food security situation in the region is reflected not only in the prevalence of undernourishment but also in the prevalence of the moderate or severe food-security figures presented in TABLE 3.

The Food Insecurity Experience Scale (FIES)-based prevalence of moderate or severe food insecurity is an estimate of the proportion of the population facing moderate or severe constraints on their ability to obtain safe, nutritious and sufficient food over the course of a year. People face moderate food insecurity when they are uncertain of their ability to obtain food and have been forced to reduce, at times over the year, the quality or quantity of food they consume due to a lack of money or other resources. Severe food insecurity means that individuals have likely run out of food, experienced hunger and, at the most extreme, have gone for days without eating, putting their health and well-being at serious risk.

The FIES survey module is composed of eight yes/no questions along a scale that covers a range of severity of food insecurity. Respondents are asked question such as whether at any time during a certain reference period they have worried about their ability to obtain enough food; their household has run out of food; or they have been forced to compromise on the quantity of food because they ate due to limited availability of money or other resources. Based on their responses, and using proper statistical techniques based on the Rasch measurement model, FAO calculates the prevalence of severe and moderate food insecurity.

Moderate or severe food insecurity is much higher for Southern Asia (40.6 percent) than South-eastern Asia (20.7 percent) as shown in TABLE 3. This is followed by 13.0 percent in Oceania and 6.2 percent in Eastern Asia. Compared with 2019, 47 million people are more food-insecure in 2021 in the region (TABLE 4).

The prevalence of severe food insecurity in Asia and the Pacific in 2021 was 10.5 percent, up from 7.0 percent in 2014 and from 9.8 percent in 2020. Southern Asia has the highest estimates among sub regions at 21.0 percent. Severe food insecurity is much lower comparatively in South-eastern Asia at 4.1 percent. It is relatively high in Oceania at 4.5 percent and at 1.0 percent in Eastern Asia.

The estimates of moderate food insecurity are much closer than severe food insecurity between Southern Asia (19.6 percent) and South-eastern Asia (16.6). The estimates for Oceania decreased by more than a percentage point from 9.4 in 2020 to 8.5 in 2021 and is less than pre-pandemic levels, the difference is marginal when compared to 2014 (8.9 percent).

Eastern Asia is the subregion with the lowest levels of food insecurity and also appears to be one of the few subregions in Asia where progress was made and food insecurity fell below pre-pandemic levels in 2021. The prevalence of moderate or severe food insecurity decreased 1.6 percentage points to 6.2 percent, and severe food insecurity fell by half to 1.0 percent.

TABLE 3
Prevalence of food insecurity (percent)

	Moderate food insecurity				Severe food insecurity				Moderate or severe food insecurity			
	2014	2019	2020	2021	2014	2019	2020	2021	2014	2019	2020	2021
World	**13.5**	**16.1**	**18.6**	**17.6**	**7.7**	**9.3**	**10.9**	**11.7**	**21.2**	**25.4**	**29.5**	**29.3**
Asia and the Pacific	10.1	12.8	15.6	13.5	7.0	8.2	9.8	10.5	17.1	21.0	25.4	24.0
Eastern Asia	5.2	6.1	5.8	5.2	0.8	1.3	2.0	1.0	6.0	7.4	7.8	6.2
East Asia (excluding China)	3.3	3.6	4.0	3.9	0.6	0.8	0.8	1.2	3.9	4.4	4.8	5.1
Oceania	8.9	9.8	9.4	8.5	2.5	3.8	2.6	4.5	11.4	13.6	12.0	13.0
South-eastern Asia	13.0	14.2	15.5	16.6	2.4	2.6	3.4	4.1	15.4	16.8	18.9	20.7
Southern Asia	13.5	18.0	24.3	19.6	14.4	16.3	18.9	21.0	27.9	34.3	43.2	40.6
South Asia (excluding India)	19.9	22.1	28.5	26.8	7.2	6.8	10.6	12.6	27.1	28.9	39.1	39.4

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

TABLE 4
Number of moderately or severely food insecure people (millions)

	2014	2016	2019	2020	2021
World	**1 543.9**	**1 693.4**	**1 955.9**	**2 297.8**	**2 308.5**
Asia and the Pacific	702.6	722.9	899.8	1 099.7	1 046.1
Eastern Asia	98.0	104.1	124.6	130.8	104.2
East Asia (excluding China)	9.3	10.6	10.5	11.3	12.3
Oceania	4.5	4.8	5.7	5.1	5.6
South-eastern Asia	96.3	109.1	111	126.4	139.7
Southern Asia	503.9	505	658.6	837.5	796.8
South Asia (excluding India)	138.0	142.2	159.3	218.8	223.9

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

TABLE 5
Number of severely food insecure people (millions)

	2014	2016	2019	2020	2021
World	**564.9**	**588.5**	**716.9**	**850.1**	**923.7**
Asia and the Pacific	289.6	262.5	353.0	423.7	460.2
Eastern Asia	13.2	24.6	21.7	33.8	17.4
East Asia (excluding China)	1.4	1.3	1.8	2.0	2.9
Oceania	1.0	1.3	1.6	1.1	2.0
South-eastern Asia	15.2	16.1	16.9	22.4	28.0
Southern Asia	260.3	220.6	312.9	366.4	412.9
South Asia (excluding India)	36.7	38.7	37.6	59.5	71.9

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

Given the size of its population, Asia accounts for half the people facing moderate or severe food insecurity in the world (TABLE 4). An estimated 1.05 billion people in Asia and the Pacific experienced moderate or severe food insecurity in 2021, an increase of 343.5 million, or 48.9 percent, compared with 2014. The region accounted for 45.3 percent of the global total of 2.3 billion in 2021. Most of those people were residing in Southern Asia, which had 796.8 million moderately or severely food insecure people, compared with 139.7 million in Eastern Asia, 104.2 million in South-eastern Asia and 5.6 million in Oceania.

An estimated 460.2 million people in Asia and the Pacific experienced severe food insecurity in 2021, an increase of 170.6 million, or 58.9 percent, compared with 2014 (TABLE 5). The region accounted for 49.8 percent of the global total of 923.7 million in 2021. Southern Asia had 412.9 million severely food-insecure people, compared with 28.0 million in Eastern Asia, 17.4 million in South-eastern Asia and 2.0 million in Oceania.

This is reflected in individual country percentages (FIGURE 3). Many countries in Southern and South-eastern Asia show an increase in moderate or severe food insecurity. In Afghanistan, this increased dramatically to 70 percent, an increase of 150 percent over the 2014—16 average. These figures are a result of pre-existing economic shocks and the lingering impacts of the COVID-19 pandemic on global supply chains, food prices, incomes, inflation and purchasing power. While the effects of the war in Ukraine on global food, energy and fertilizer prices and supplies are not captured, it is significantly impacting economies and poses further threats to food security, nutrition and livelihoods. Many households are experiencing a continuous and relentless succession of these shocks, which heighten the severity and magnitude of their acute food insecurity over time.

FIGURE 3
Prevalence of moderate or severe food
insecurity in Asia and the Pacific
by country
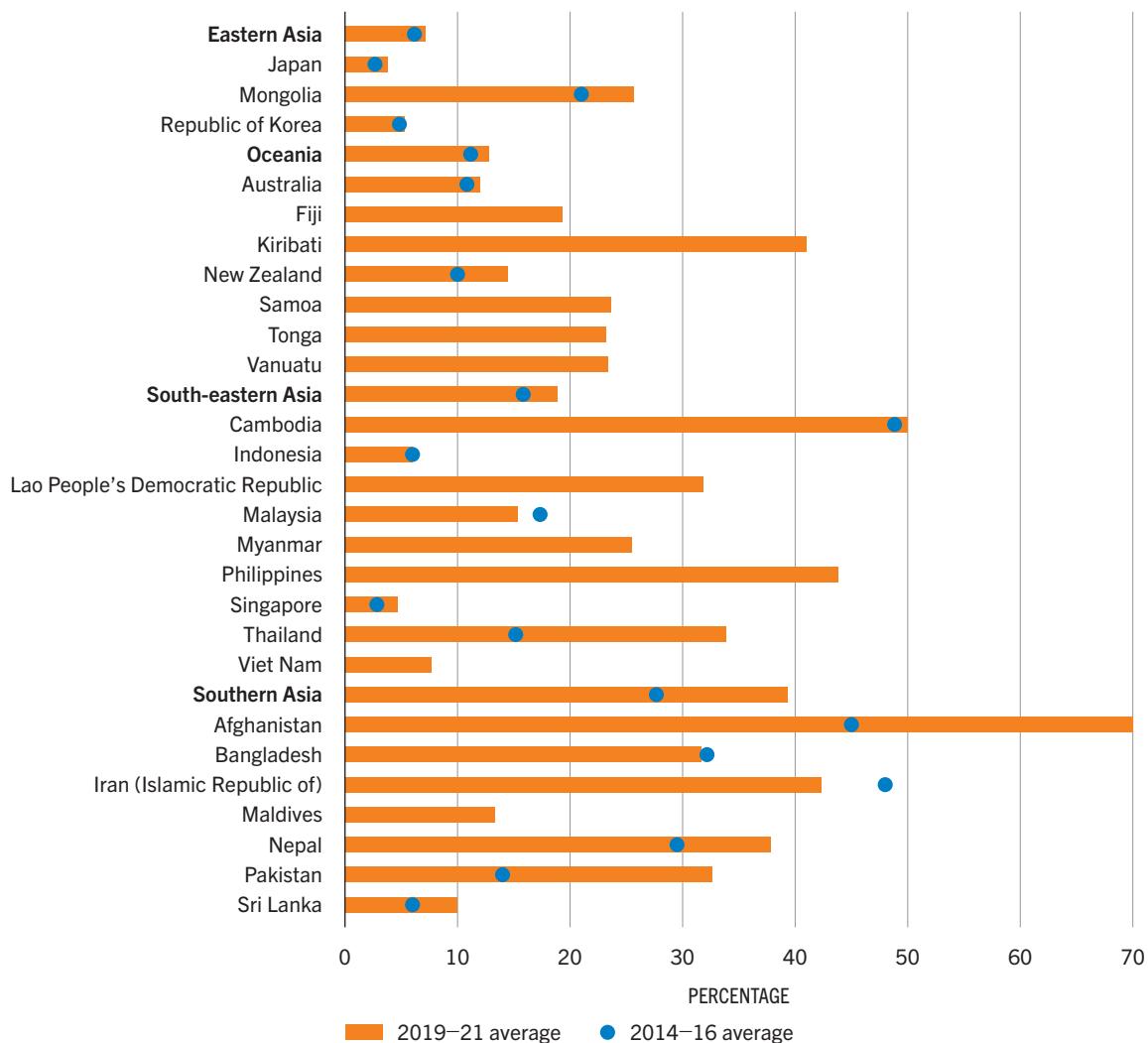
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

CHAPTER 2
SUSTAINABLE DEVELOPMENT GOAL 2.2: MALNUTRITION

Key messages

- Nearly 23 percent of children in the region are still stunted. Ten countries in the region have a "very high prevalence" of stunting, according to the World Health Organization (WHO) criteria (>30 percent). Another eight have a "high prevalence" of stunting (20−30 percent).

- The share of children under 5 years of age affected by wasting in Asia and the Pacific was 9.9 percent in 2020, higher than the global average of 6.7 percent.

- The overall percentage of overweight children in the region was lower than the global average of 5.7 percent, but increased from 4.2 percent to 5 percent between 2000 and 2020.

- The prevalence of anaemia in women aged 15 to 49 years in Asia and the Pacific was 32.9 percent in 2019. This is 1.3 percentage points lower than in 2000, indicating disappointingly slow progress during the past two decades.

■
2.1 STUNTING AMONG CHILDREN UNDER 5

Stunting (low height-for-age) is an effect of chronic malnutrition on child growth, with negative consequences for health and development.

Across Asia and the Pacific, 74.8 million children are stunted, amounting to half of the world's total. Despite a reduction from 38 percent in 2000, nearly 23 percent of children in the region are still stunted (TABLE 6). Oceania excluding Australia and New Zealand is the most affected subregion with 41.4 percent of children stunted, followed by Southern Asia (30.7 percent), South-eastern Asia (27.4 percent) and Eastern Asia (4.9 percent).

TABLE 6
Prevalence of stunting among children under 5 (percent)

	2000	2005	2010	2015	2020
World	**33.1**	**30.7**	**27.7**	**24.4**	**22.0**
Asia and the Pacific	38.0	34.9	31.3	26.5	22.9
Eastern Asia	19.5	13.0	8.8	6.3	4.9
Oceania (excluding Australia and New Zealand)	35.6	37.8	40.0	40.4	41.4
South-eastern Asia	38.0	34.4	31.6	29.1	27.4
Southern Asia	48.3	46.2	42.6	36.5	30.7

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition*. https://data.unicef.org/resources/jme-report-2021

Ten countries in the region have a "very high prevalence" of stunting, according to the World Health Organization (WHO) criteria (>30 percent — FIGURE 4). These are primarily in Southern Asia — Afghanistan, Bangladesh, India, Nepal and Pakistan — with two countries in South-eastern Asia (Indonesia and Timor-Leste) and two in the Pacific subregion (the Marshall Islands and Papua New Guinea). Another eight have a "high prevalence" of stunting (20–30 percent). These include four countries in South-eastern Asia — the Lao People's Democratic Republic, Malaysia, Myanmar and the Philippines — with two countries in the Pacific subregion (Solomon Islands and Vanuatu) and one in Southern Asia (Bhutan).

■

2.2 WASTING AMONG CHILDREN UNDER 5

Children suffering from this form of malnutrition are the most vulnerable to the severe impacts of the pandemic as their households deal with food insecurity and other shocks with the potential to negatively affect child health and nutrient intake.

The share of children under 5 years of age affected by wasting in Asia and the Pacific was 9.9 percent in 2020, higher than the global average of 6.7 percent (TABLE 7). The subregion with the highest proportion of children with wasting was Southern Asia (14.1 percent), followed by Oceania excluding Australia and New Zealand (9 percent), South-eastern Asia (8.2 percent) and Eastern Asia (1.7 percent).

FIGURE 4
Prevalence of stunting among children
under 5 in Asia and the Pacific by country
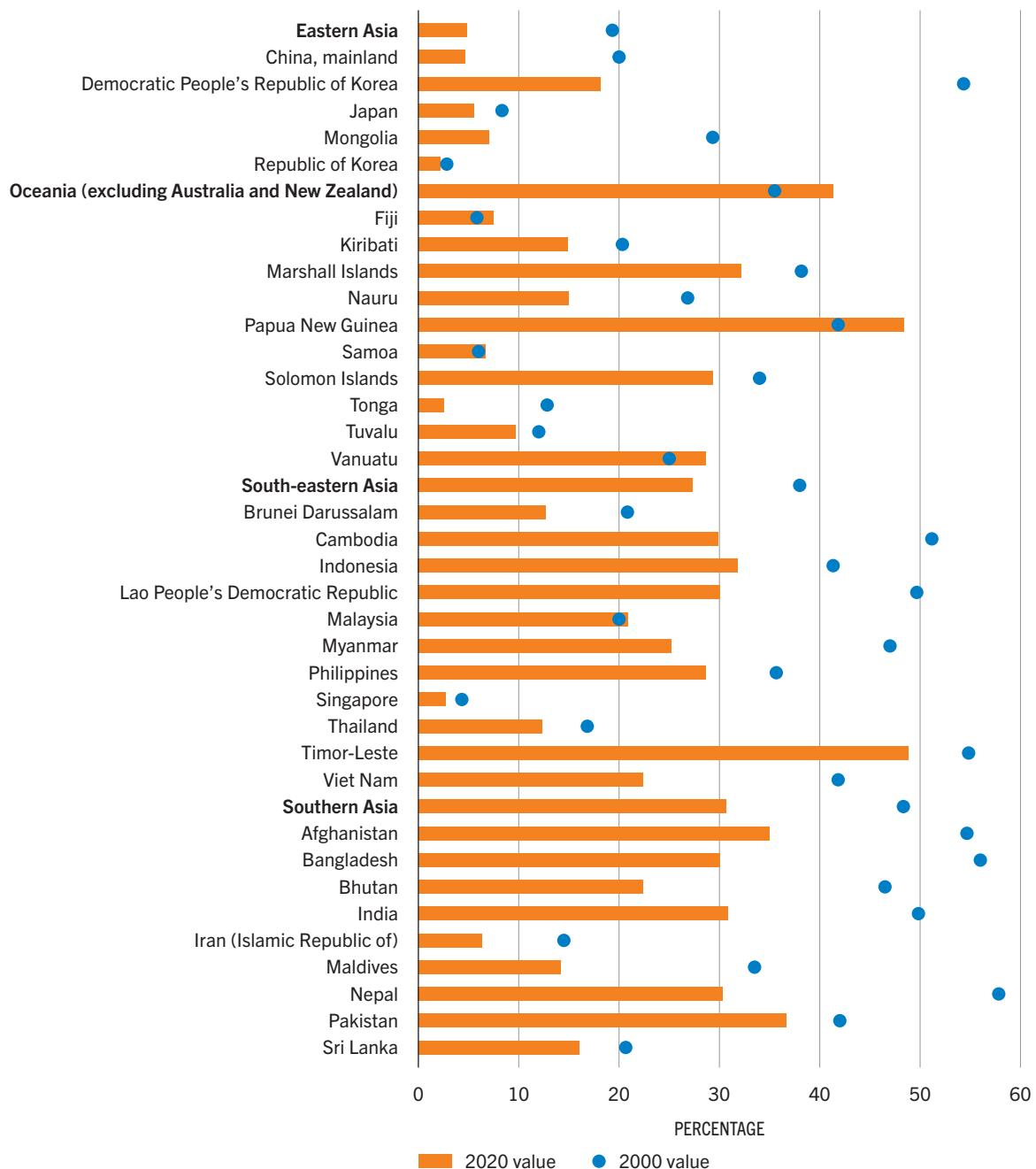
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition*. https://data.unicef.org/resources/jme-report-2021

TABLE 7
Prevalence of wasting among children under 5 (percent)

	World	Asia and the Pacific	Eastern Asia	Oceania (excluding Australia and New Zealand)	South-eastern Asia	Southern Asia
2020	**6.7**	9.9	1.7	9.0	8.2	14.1

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition.* https://data.unicef.org/resources/jme-report-2021

The significantly higher prevalences of wasting in Southern Asia and South-eastern Asia are reflected in data from individual countries (FIGURE 5). While most countries in the former subregion have a prevalence of wasting at 10 percent or below, three countries in the latter (India, Nepal and Sri Lanka) have a prevalence above 12 percent. In the Pacific region, the prevalence of wasting in Papua New Guinea is 14 percent. These concerning figures point to requirement of actions that need to be urgent, deep rooted and substantial if wasting is to be ended. The global action plan on child wasting provides such a framework for action to accelerate progress in preventing and managing child wasting.[2]

2.3 OVERWEIGHT AMONG CHILDREN UNDER 5

Childhood overweight is rising globally, primarily driven by insufficient physical activity and increased availability and consumption of highly processed foods that are often high in sugar, salt and fats. Asia and the Pacific is no exception to this global trend, with a regional increase in overweight children rising from 4.2 percent to 5 percent between 2000 and 2020 (FIGURE 6).

The most striking change has been in South-eastern Asia, where the prevalence of overweight children doubled from 3.7 percent in 2000 to 7.5 percent in 2020. This is reflected in the increase in eight of the ten countries of this subregion. The most affected subregion is Oceania excluding Australia and New Zealand with 8 percent, followed by Eastern Asia (7.9 percent), South-eastern Asia (7.5 percent) and Southern Asia (2.5 percent). Eight out of nine countries in Oceania showed an increase for this indicator. The rise in Southern Asia, albeit slower than other subregions, is concerning as this region already has the highest figures for PoU, stunting and wasting of children under 5 years of age.

FIGURE 5

Prevalence of wasting among children
under 5 in Asia and the Pacific by country
(latest year available)
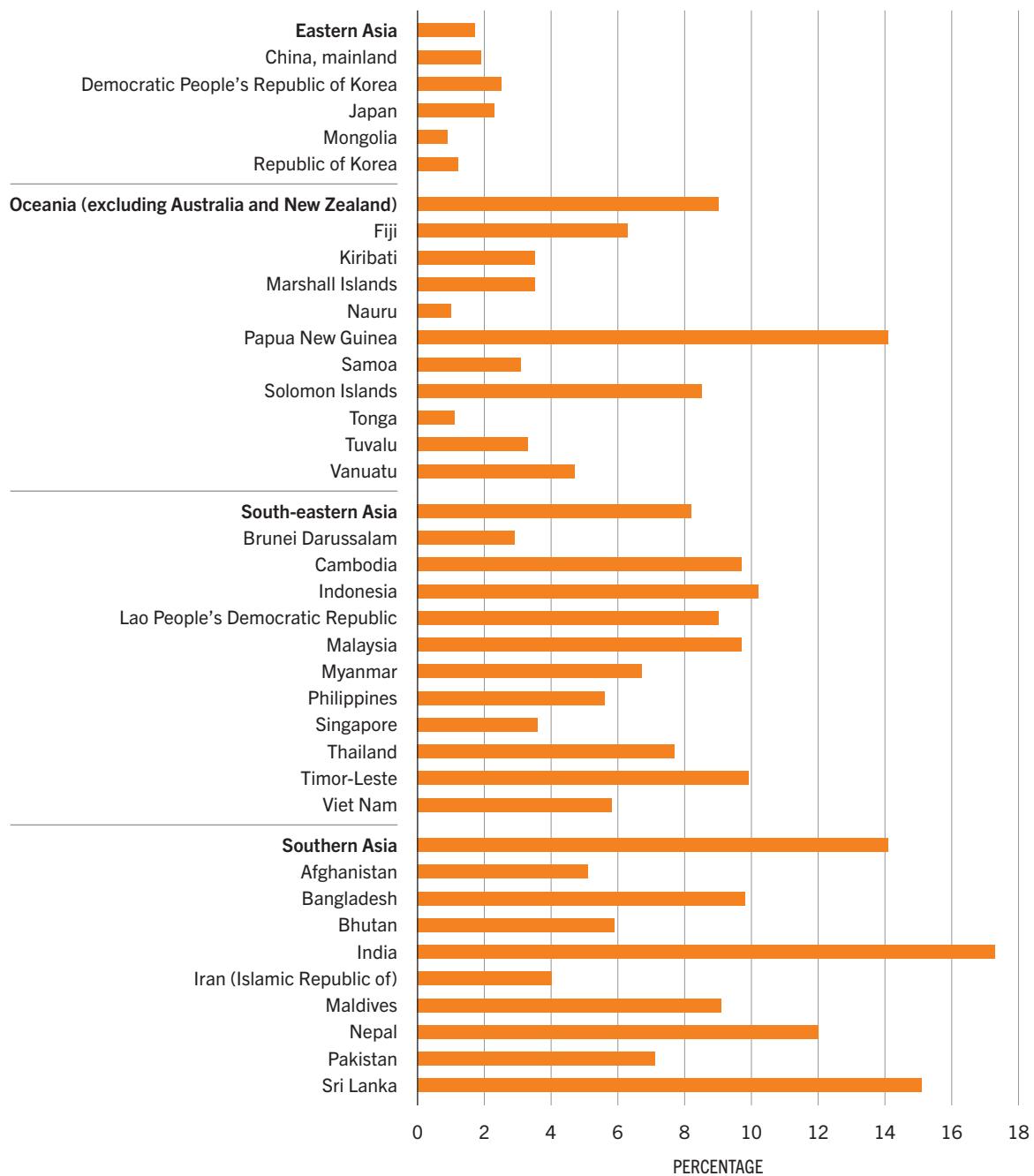
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition*. https://data.unicef.org/resources/jme-report-2021

FIGURE 6
Prevalence of overweight among children under 5 in Asia and the Pacific by country
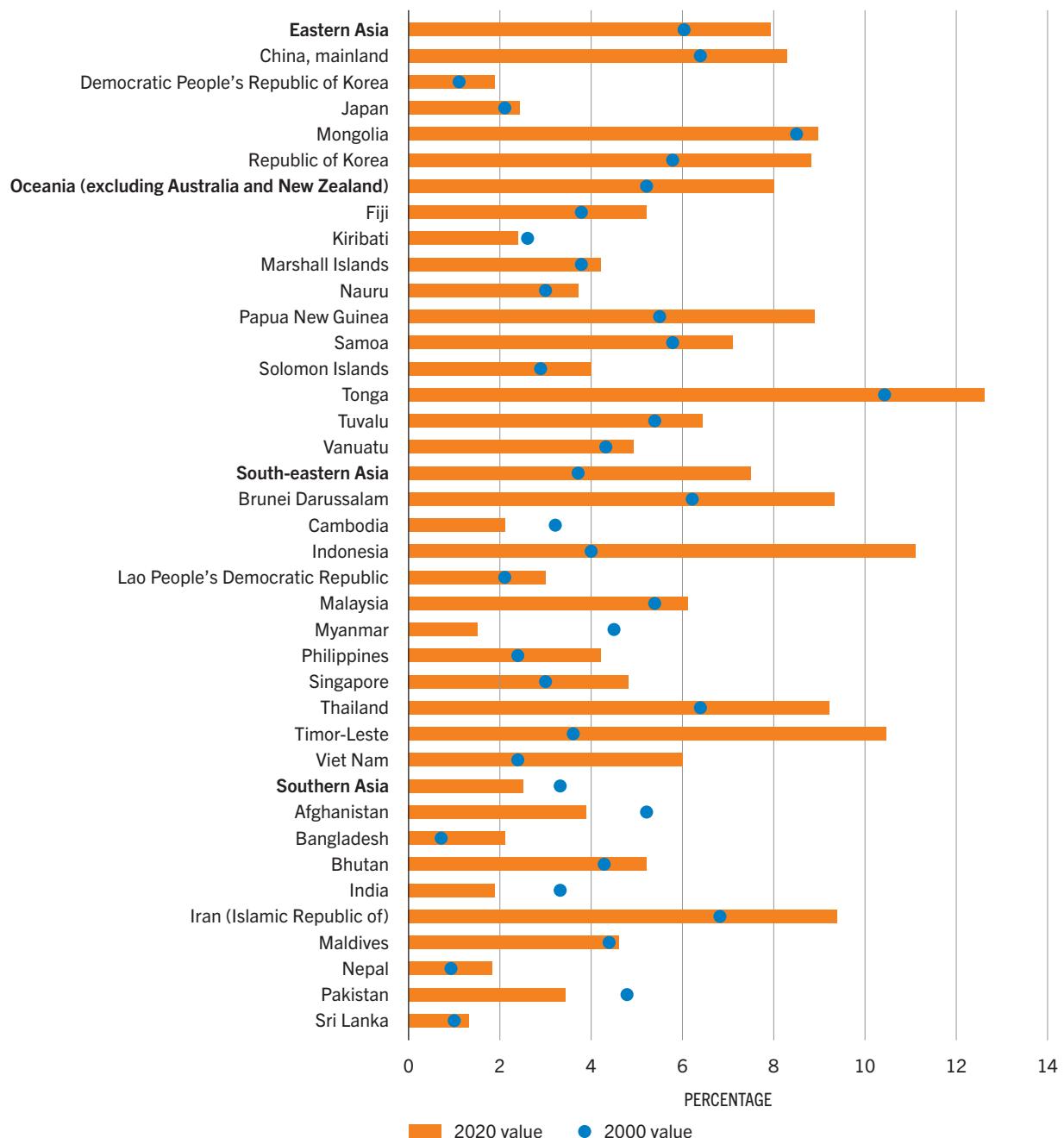
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition*. https://data.unicef.org/resources/jme-report-2021

■
2.4 ANAEMIA AMONG WOMEN AGED 15 TO 49 YEARS

Little progress has been made against the World Health Assembly (WHA) target to reduce anaemia in women aged 15 to 49 years by 50 percent (TABLE 8). No country in Asia and the Pacific is on course to meet the WHA target. The prevalence of anaemia among women aged 15 to 49 years (SDG Indicator 2.2.3) in Asia and the Pacific was 32.9 percent in 2019. The prevalence was highest in Southern Asia, where almost half of women aged 15 to 49 had anaemia (48.2 percent). This is a marginal fall from 49.4 percent in 2000 indicating a singular lack of progress. In Oceania excluding Australia and New Zealand, 33.9 percent of women aged 15 to 49 years were anaemic, followed by 27.2 percent in South-eastern Asia and 16.1 percent in Eastern Asia.

Across individual countries (FIGURE 7), the prevalence of anaemia among women continues to be uniformly high (>10 percent). The average for as many as four countries has climbed in the period from 2000 to 2019. The reduction in values for other countries is mostly in the zero to 25 percent range, which is far from the targeted 50 percent reduction. Relatively richer (high- and middle-income) and developed economies in the region are also struggling to reach this target.

TABLE 8
Prevalence of anaemia among women aged 15 to 49 years (percent)

	2000	2005	2010	2015	2019
World	**31.2**	**29.9**	**28.6**	**28.8**	**29.9**
Asia and the Pacific	34.2	32.5	31.2	31.6	32.9
Eastern Asia	22.2	18.7	16.0	15.6	16.1
Oceania (excluding Australia and New Zealand)	34.4	33.6	32.8	33.1	33.9
South-eastern Asia	31.4	27.9	25.3	25.6	27.2
Southern Asia	49.4	49.1	48.5	47.8	48.2

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: WHO. 2021. Global anaemia estimates, Edition 2021. In: *Global Health Observatory (GHO) data repository*. Geneva, Switzerland. Cited 25 May 2021. www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-anaemia-in-women-of-reproductive-age-(-)

FIGURE 7
Prevalence of anaemia among women
aged 15 to 49 years in Asia and the Pacific
by country
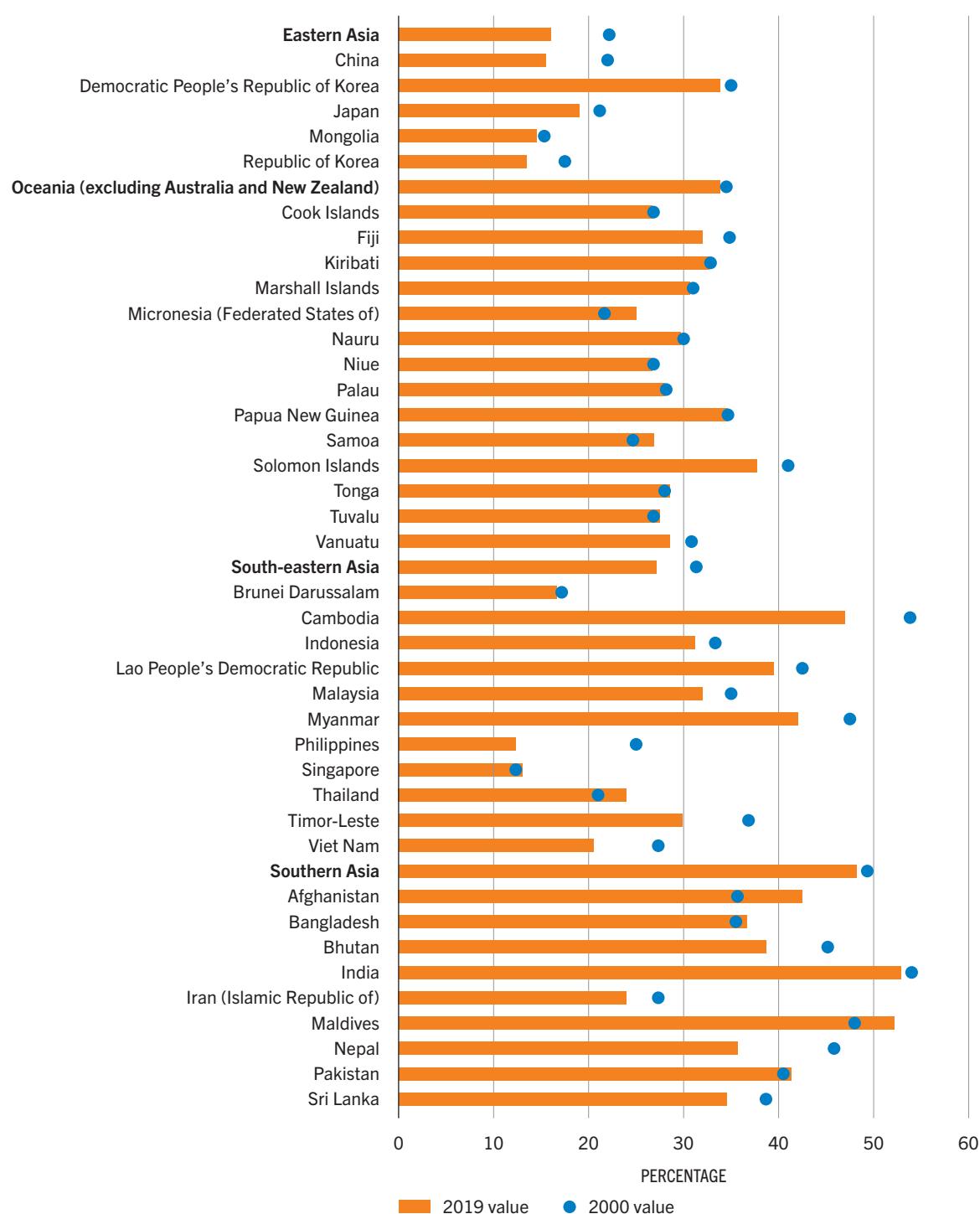
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: WHO. 2021. Global anaemia estimates, Edition 2021. In: *Global Health Observatory (GHO) data repository*. Geneva, Switzerland. Cited 25 May 2021.
www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-anaemia-in-women-of-reproductive-age-(-)

CHAPTER 3
ADDITIONAL WORLD HEALTH ASSEMBLY NUTRITION INDICATORS

Key messages

- The prevalence of adult obesity in Asia and the Pacific (6.1 percent) was lower than the global prevalence of 13.1 percent, but adult obesity has been rising in every country in the region. No country in Asia and the Pacific is on track to meet the WHA target of no increase in adult obesity.

- The prevalence of exclusive breastfeeding has been increasing in nearly all countries in the region.

- Most countries have also made progress since 2000 in reducing the prevalence of low birthweight. However, for many countries, progress has been insufficient to meet the WHA targets.

3.1 ADULT OBESITY

Obesity among adults is a risk factor for many non-communicable chronic diseases (NCDs). Obesity among adults 18 years and above increased in all countries between 2000 and 2016.The prevalence increased from 2.6 percent in 2000 to 6.1 percent in 2016 (TABLE 9). Oceania (excluding Australia and New Zealand) had the highest prevalence of adult obesity, with 23.6 percent, followed by South-eastern Asia (6.7 percent), Eastern Asia (6 percent) and Southern Asia (5.4 percent).

By 2016, the prevalence of obesity was above 45 percent in ten countries: the Cook Islands, Kiribati, the Marshall Islands, Micronesia (Federated States of), Nauru, Niue, Palau, Samoa, Tonga and Tuvalu (FIGURE 8). The lowest is 21 percent in Papua New Guinea and the highest is 61 percent in Nauru. These countries face growing challenges to meet SDG 3 target 3.4 to reduce premature mortality from NCDs.

TABLE 9
Prevalence of obesity among adults (percent)

	2000	2005	2010	2014	2015	2016
World	**8.7**	**9.9**	**11.2**	**12.5**	**12.8**	**13.1**
Asia and the Pacific	2.6	3.4	4.5	5.5	5.8	6.1
Eastern Asia	2.4	3.2	4.3	5.4	5.7	6.0
Oceania (excluding Australia and New Zealand)	15.6	17.8	20.2	22.4	23.0	23.6
South-eastern Asia	2.7	3.6	4.8	6.0	6.4	6.7
Southern Asia	2.5	3.2	4.1	4.9	5.2	5.4

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: WHO. 2020. Global Health Observatory (GHO) data repository. In: *World Health Organization*. Geneva, Switzerland. Cited 28 April 2020.
https://apps.who.int/gho/data/node.main.A900A?lang=en

■

3.2 PREVALENCE OF EXCLUSIVE BREASTFEEDING DURING THE FIRST SIX MONTHS OF LIFE

Exclusive breastfeeding is essential to optimal infant and young child feeding and gives children the best start in life. Exclusive breastfeeding (EBF) is when a child receives nothing but breastmilk from birth until 6 months. EBF is one of the WHA's six global nutrition targets – expecting countries to increase EBF to at least 50 percent by 2025. Nearly all countries in the region have made progress on this indicator, with the prevalence of EBF rising over time (TABLE 10). However, Oceania has the highest prevalence of EBF. The interpretation should be that Oceania and Southern Asia are currently on track to achieve the WHA target of at least 50 percent EBF. Progress is being made in South-eastern Asia and Eastern Asia but the rate of EBF improvement needs to increase in order to meet the WHA target by 2025. Eastern Asia is off track to meet the WHA target for EBF, as the prevalence in that subregion is decreasing. Prevalence of exclusive breastfeeding among infants 0–5 months of age (percent).

In Asia and the Pacific, 21 countries are currently above the target of 50 percent, including eight in Southern Asia, four in South-eastern Asia, seven in Oceania and two in Eastern Asia. (Not every country is shown in FIGURE 9, as some of them have only one observation.).

TABLE 10
Prevalence of exclusive breastfeeding among infants 0–5 months of age (percent)

	World	Asia and the Pacific	Eastern Asia	Oceania (excluding Australia and New Zealand)	South-eastern Asia	Southern Asia
2012	**37.1**	39.7	28.5	56.9	33.5	47.4
2020	**43.8**	45.8	22.0	61.1	45.1	57.0

NOTE: 2020 values for aggregates are based on the latest data available from 2014 to 2020, except for China where the latest data are from 2013.
Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: UNICEF. 2021. Infant and young child feeding. In: *UNICEF*. New York, USA. Cited 6 April 2022.
https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding

FIGURE 8
Prevalence of obesity among adults in
Asia and the Pacific by country

Eastern Asia	
China	
Democratic People's Republic of Korea	
Japan	
Mongolia	
Republic of Korea	
Oceania (excluding Australia and New Zealand)	
Cook Islands	
Fiji	
Kiribati	
Marshall Islands	
Micronesia (Federated States of)	
Nauru	
Niue	
Palau	
Papua New Guinea	
Samoa	
Solomon Islands	
Tonga	
Tuvalu	
Vanuatu	
South-eastern Asia	
Brunei Darussalam	
Cambodia	
Indonesia	
Lao People's Democratic Republic	
Malaysia	
Myanmar	
Philippines	
Singapore	
Thailand	
Timor-Leste	
Viet Nam	
Southern Asia	
Afghanistan	
Bangladesh	
Bhutan	
India	
Iran (Islamic Republic of)	
Maldives	
Nepal	
Pakistan	
Sri Lanka	

PERCENTAGE

■ 2016 value   ● 2000 value

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: WHO. 2020. Global Health Observatory (GHO) data repository. In: *World Health Organization*. Geneva, Switzerland. Cited 28 April 2020.
https://apps.who.int/gho/data/node.main.A900A?lang=en

FIGURE 9
Prevalence of exclusive breastfeeding among infants 0−5 months
of age in Asia and the Pacific by country
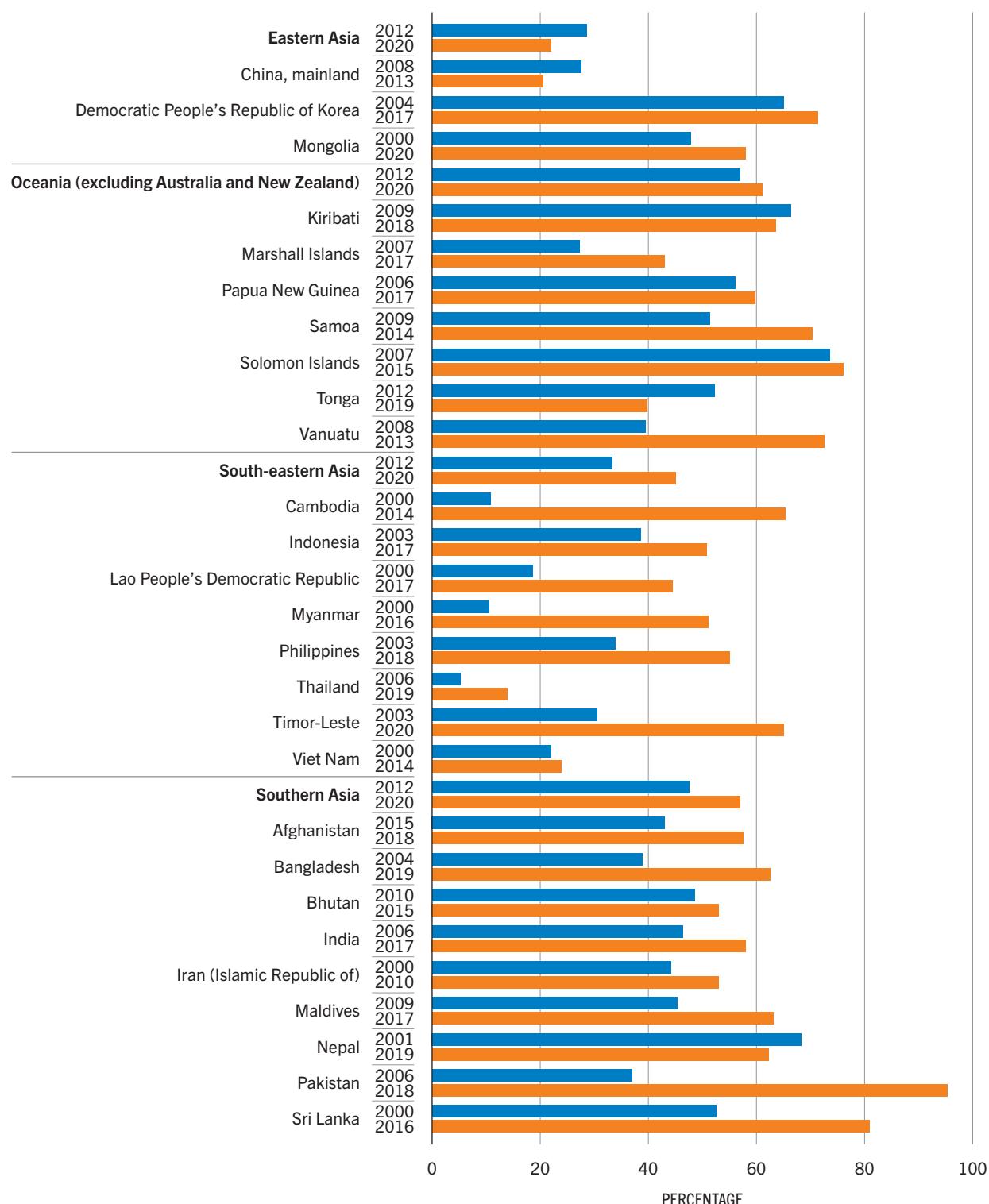
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF. 2021. Infant and young child feeding. In: *UNICEF*. New York, USA. Cited 6 April 2022.
https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding

■

3.3 PREVALENCE OF LOW BIRTHWEIGHT

Low birthweight is defined as a baby who weighs less than 2.5 kilograms at birth — and can refer to babies born at term or pre-term. Low birthweight is a risk factor for neonatal mortality, stunting and illness, with more than 80 percent of neonatal deaths occurring in low-birth-weight infants. The prevalence of low birthweight in Asia and the Pacific was 17.8 percent in 2015, higher than the global average of 14.6 percent. The prevalence of low birthweight was highest in Southern Asia (TABLE 11), with 26.4 percent, followed by South-eastern Asia at 12.3 percent, Oceania excluding Australia and New Zealand at 9.9 percent, and Eastern Asia at 5.1 percent. The WHA target is to achieve a 30 percent reduction in the number of infants born with a weight lover than 2 500 gram by the year 2025.[3] Most countries have made progress since 2000, with several countries reducing the prevalence by more than 3 percentage points, notably, Bangladesh, Cambodia, the Lao People's Democratic Republic, Maldives, Nepal and Thailand (FIGURE 10).

The estimates of PoU and FIES and the figures on child malnutrition and obesity show that the region is way off-track from achieving SDG2 targets by 2030. The data on adult obesity, anaemia among women and prevalence of low birthweight show up the urgent need for increased access to a healthy diet and reducing the heavy marketing of unhealthy options. A balanced diet is one that provides different kinds and amounts of nutrients required for good nutrition and health. A healthy diet is the same for all people although its exact make-up will vary across countries and societies based on traditional and cultural characteristics. The cost and affordability of a healthy diet are and remain critical factors in determining if the Asia and the Pacific region can improve its nutritional indicators.

TABLE 11
Prevalence of low birthweight (percent)

	2000	2005	2010	2012	2014	2015
World	**17.5**	**16.4**	**15.3**	**15.0**	**14.7**	**14.6**
Asia and the Pacific	27.0	25.0	23.4	22.8	22.3	22.1
Eastern Asia	5.8	5.4	5.2	5.1	5.1	5.1
Oceania (excluding Australia and New Zealand)	10.4	10.2	10.1	10.0	9.9	9.9
South-eastern Asia	13.7	13.0	12.5	12.4	12.3	12.3
Southern Asia	32.3	29.9	27.9	27.2	26.6	26.4

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF and WHO. 2019. UNICEF-WHO joint low birthweight estimates. In: *United Nations Children's Fund*. New York, USA and Geneva, Switzerland. Cited 28 April 2020. www.unicef.org/reports/UNICEF-WHO-low-birthweight-estimates-2019

FIGURE 10
Prevalence of low birthweight in Asia and
the Pacific by country
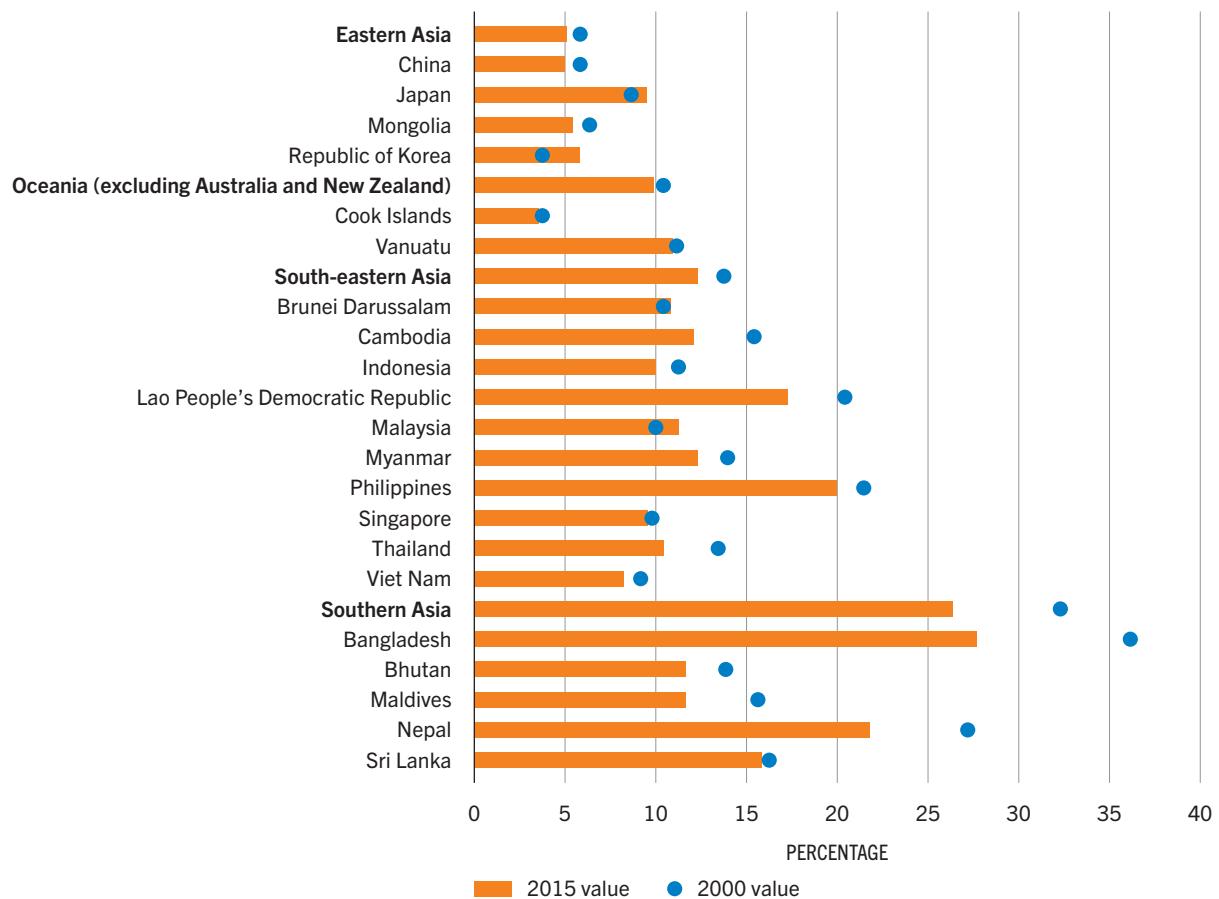
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF and WHO. 2019. UNICEF-WHO joint low birthweight estimates. In: *United Nations Children's Fund*. New York, USA and Geneva, Switzerland. Cited 28 April 2020. www.unicef.org/reports/UNICEF-WHO-low-birthweight-estimates-2019

CHAPTER 4
COST AND AFFORDABILITY OF A HEALTHY DIET

Key messages

■ The effects of inflation in consumer food prices stemming from the economic impacts of the COVID-19 pandemic and the measures put in place to contain it, have increased the costs and the unaffordability of a healthy diet around the world.

■ Between 2019 and 2020, Asia witnessed the highest surge in the cost of a healthy diet (4.0 percent), followed by Oceania (3.6 percent). This surge pushed up the average cost of a healthy diet to USD 3.98 per person per day.

■ Almost 1.9 billion people or nearly 44.5 percent of the population in the Asia and the Pacific region cannot afford a healthy diet.

Diet quality is a critical link between food security and nutrition. Poor diet quality can lead to different forms of malnutrition, including undernutrition, micronutrient deficiencies, overweight and obesity. For the first time, the *State of Food Security and Nutrition in the World 2020* report included global, regional and country estimates of the cost and affordability of a healthy diet. These are useful indicators of economic access to nutritious foods and healthy diets, one of the core principles embedded in the definition of food security. Around the world, the costs and the unaffordability of a healthy diet have increased because of the combined effects of inflation in consumer food prices and income losses, stemming from the economic impacts of the COVID-19 pandemic and the war in Ukraine.

The cost of a healthy diet in the region was already unaffordable for vast numbers of people before the onset of the COVID-19 pandemic.[4] This is despite Asia and the Pacific having some of the highest producers of multiple commodities such as rice, millet, oilseeds, fruits and vegetables, fish, pork, milk and many others. Vulnerable populations such as those below the poverty line (earning less than USD 1.9 per day) are particularly at risk of poor nutritional outcomes as these high costs steer them towards cheaper and calorie-rich foods with high salt and sugar or fat content. The region, as reported in the earlier chapters, has some of the highest rates of stunting and wasting in the world, as well as rising childhood and adult obesity, which clearly point to poor diets and the unaffordability of healthy foods.

FIGURE 11

Change in the cost of a healthy diet
compared to the previous year in Asia and
the Pacific by subregion
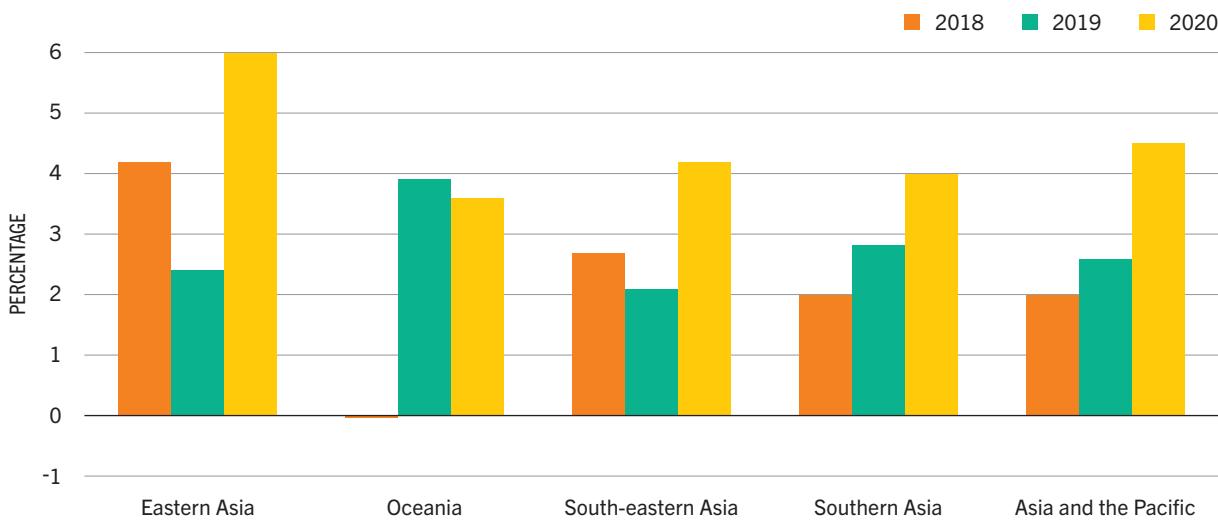
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. Rome, FAO. https://doi.org/10.4060/cc0639en

The cost of a healthy diet is defined as the minimum cost of foods, using the least expensive available items in each country, that meet a set of dietary recommendations based on ten national Food Based Dietary Guidelines (FBDGs). It takes into account food preferences that are consistent with local cultural norms and the existing consumption patterns.[5]

Between 2019 and 2020, Asia and the Pacific experienced the highest surge in the cost of a healthy diet (4.5 percent). The cost in the Oceania subregion increased by 3.6 percent (FIGURE 12). This surge pushed up the average cost of a healthy diet to USD 3.98 per person per day (ANNEX TABLE A11). Overall, the average cost has risen 9.3 percent since 2017. In Eastern Asia, the cost in 2020 was the highest at USD 4.71 per person per day. This represents a 6.0 percent increase over the previous year and is higher than the average rise for the region between 2019 (FIGURE 11). This also represents a 13 percent rise since 2017 in a subregion dominated by richer and developed economies. By comparison, the rise in costs for Southern Asia and South-eastern Asia were 9.1 percent and 9.3 percent respectively over the same four-year period.

The cost of a healthy diet could continue to rise. Food prices surged in 2021 and 2022, but data are not fully available to provide updated estimates. The trend in the affordability of healthy diets in 2021 and 2022 is less clear due to differences in income growth.

FIGURE 12
Change in the number of people unable to
afford a healthy diet compared to the previous
year in Asia and the Pacific by subregion
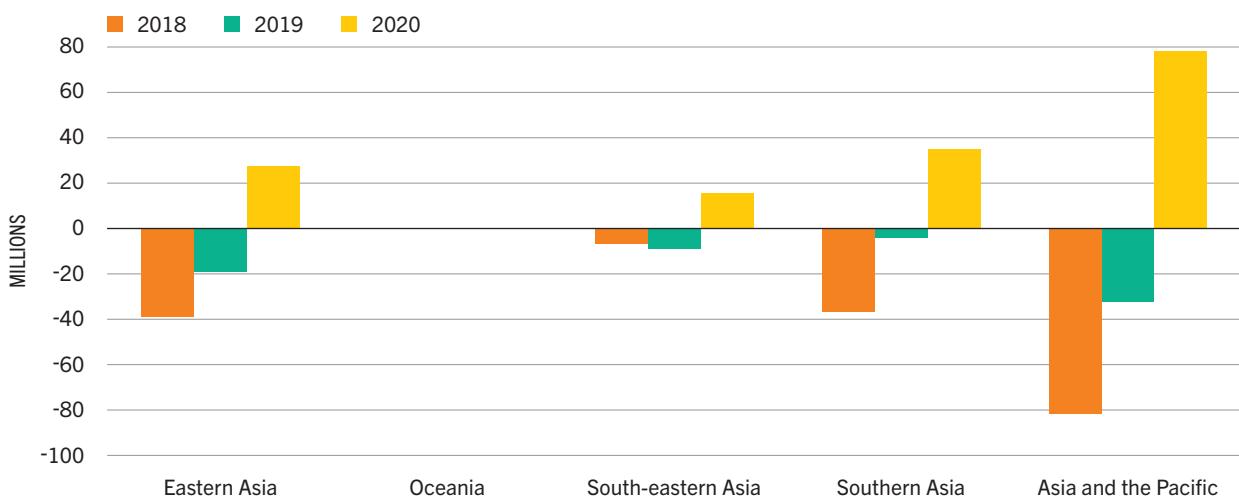
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. Rome, FAO. https://doi.org/10.4060/cc0639en

Almost 1.9 billion people or 44.5 percent of the population in Asia and the Pacific could not afford a healthy diet in 2020 due to the increased cost. The region experienced an overall increase of 78 million in the number of people unable to afford a healthy diet between 2019 and 2020 (FIGURE 12).

The largest proportion of people, globally, who cannot afford a healthy diet live in Southern Asia with more than 1.3 billion. This represents nearly 70 percent of the total population of the subregion (1.88 billion). Almost 54 percent of the population South-eastern Asia (nearly 347 million) cannot afford a healthy diet. In the subregion of Oceania, 2.7 percent of the population cannot afford a healthy diet reflecting a relatively small increase of 0.2 percent since 2017 and a decrease of 0.1 percent from 2019. However, given the trends in PoU, overweight and obesity discussed in the previous chapters, the average cost of USD 3.06 per person per day, the lowest among all subregions, remains prohibitively high (ANNEX TABLE A11).

At least 50 percent of the population cannot afford healthy diet in 10 of the 21 countries shown in FIGURE 13. There are relatively small increases in the majority of countries over 2019 and 2020 but given that Asia is the world's most populous continent (4.5 billion), these increases and those in countries not shown in the figure, add up to 78 million. The region had seen improvements in affordability between 2018 and 2019, particularly in the Eastern Asia, Southern Asia and the South-eastern Asia subregions. However, these have been cancelled by the price surge of 2019-20 (ANNEX TABLE A12).

FIGURE 13
Percentage of people unable to afford
a healthy diet in Asia and
the Pacific by country
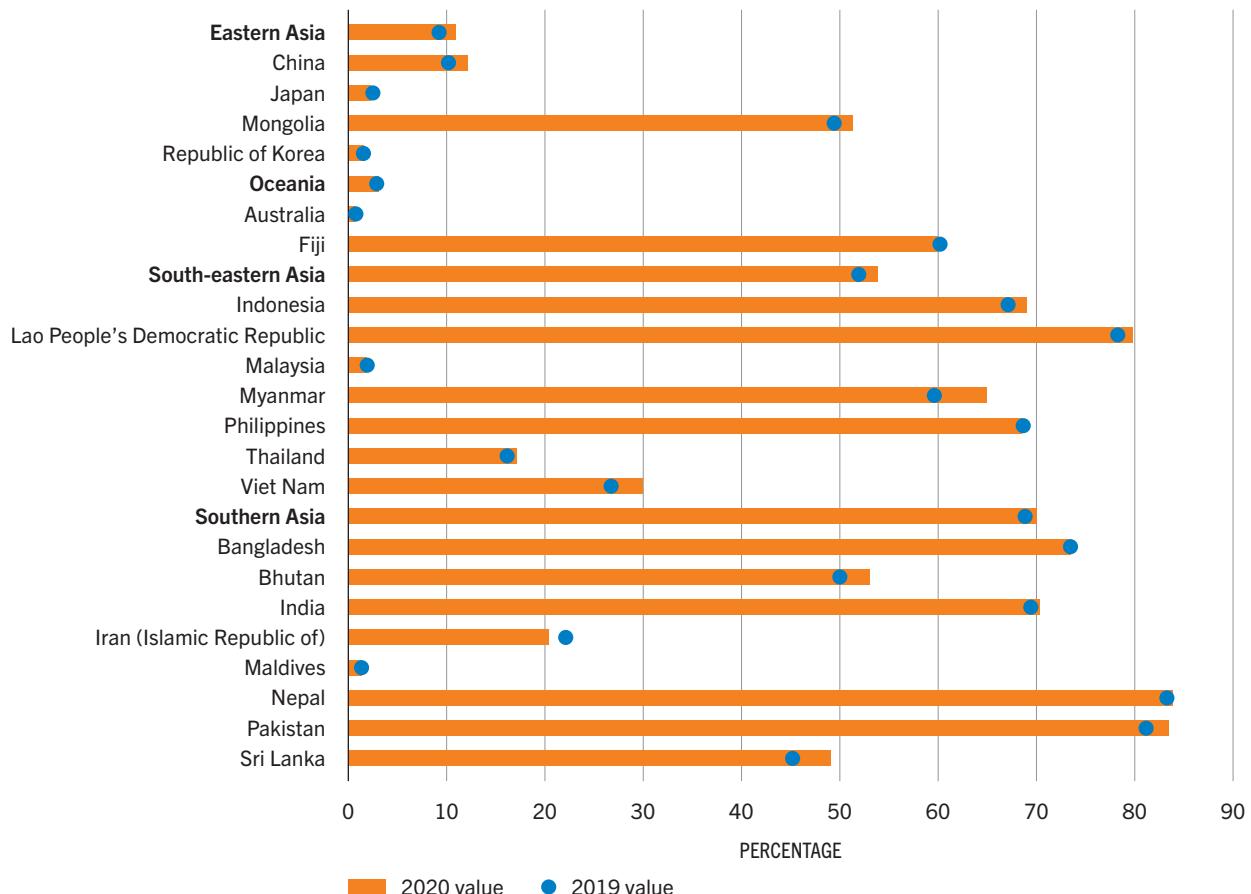
NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable.* Rome, FAO. https://doi.org/10.4060/cc0639en

The lack of affordability of healthy diets is a major driver of food insecurity and malnutrition in all its forms in the Asia and Pacific region. Immediate responses to the overlapping crises of the COVID-19 pandemic and the war in Ukraine included the provision of social safety nets, cash transfers and subsidies on food. Transformative steps need to be implemented through agrifood systems-based approach to bring healthy diets within reach of the poor. These include, among others, social protection measures, agricultural diversification, strategic trade measures to address gaps in local availability of nutritious foods and investment in rural infrastructure to stabilize supply and ensure affordability.

CHAPTER 5
FOOD SECURITY AND NUTRITION IN URBAN AREAS

Countries in Asia and the Pacific are experiencing rapid urbanization[6] with complex and disparate effects on food security and nutrition, including improvements for some urban residents and increased vulnerability for others. Slum living conditions, rising costs of food, unhealthy food environments and susceptibility to climate change are threats to food security and nutrition in cities. The increased prevalence of overweight and obesity alongside persistent undernutrition and micronutrient deficiencies resulting from these threats mark the double burden of malnutrition in transition contexts. Responding to these challenges and protecting the most vulnerable groups of people in urban areas requires innovative policies and committed governance. This edition of the Asia and the Pacific Regional Overview of Food Security and Nutrition 2022 focuses on diets for poor urban populations within a complex urban environment.

Data have historically portrayed urban populations as better off than rural populations. This suggests that these populations benefited from an "urban advantage" and had better access to health services, food and education. Global analyses using the typical rural-versus-urban disaggregation can be misleading because they usually hide urban inequalities. Surveys can expose these inequalities when conducted in urban slums or when data are disaggregated according to wealth, major health disparities, and nutrition and food security. They reveal that malnutrition and health deprivation levels among the most disadvantaged urban communities are often as high as among poor rural populations. Under the new Urban Agenda adopted at Habitat III in 2016, efforts were accelerated to achieve SDG 11: "Make cities and human settlements inclusive, safe, resilient and sustainable." The FAO's Framework on Urban Food Systems launched in 2019, the Green Cities Initiative in 2020, and the Milan Urban Food Policy Pact[7] have been deployed to strengthen and improve urban agrifood systems. These moves come as projections show that 68 percent of the world's population will be living in urban areas by 2050.[8] The severe impact of the pandemic on urban populations has reinforced the need for an urban food system transformation.

Countries in Asia and the Pacific are facing the triple burden of malnutrition (TBM): rates of undernutrition and micronutrient deficiencies (also known as hidden hunger) persist while rates of overweight and obesity among children are rising faster than in any other region in the world.[9] As the prevalence of people with overweight and obesity is rapidly increasing in urban areas, in particular,[10] preventing and treating malnutrition in all its forms in poor urban areas offers enormous opportunities for positive impact, especially for millions of children and women.

Rural and urban food systems are not necessarily distinct. They encompass a continuum from large agglomerations to small cities through to rural markets and spaces.[11] While differences exist between rural and urban agrifood systems, largely food is produced in the former and transported to and sold in the latter. Urban food insecurity has distinct characteristics than its rural counterpart due to diverse drivers operating in urban areas. The role of such drivers and their effects have to be then considered. Urban food insecurity and malnutrition is a growing problem, in large part due to particular challenges operating in urban food environments but also factors which operate differently in urban as opposed to rural environments. Examples are access to cash to secure food purchases, reliance on the informal sector for food and work, insufficient formal and informal safety nets, and limited access to health, safe water, sanitation and many other factors such as governance and efficiency in food supply chains, export-import policies and price policies.[12]

Historically, data have portrayed populations as being better off in cities compared to rural areas, suggesting that populations benefited from an "urban advantage" and had better access to health, food and education, as well as higher incomes and improved infrastructure.[13] However, the portrait is misleading because a large part of the urban population is being left behind. Official statistics that compare rural and urban areas usually understate both the scale and depth of urban poverty in two main ways. The first stems from an over-reliance on poverty lines and a lack of consideration of living conditions in urban areas, particularly around housing, infrastructure and services. The second is the use of asset-based indices of wealth that were originally developed for use in rural environments, such as land and livestock, and that often do not capture the subtleties of wealth in urban contexts that could include among other things, housing conditions, access to services, and the rule of law.[14] A lack of data often results in a lack of consideration of poverty as a multidimensional concept in analyses of poor urban areas.

One important difference between urban and rural areas is demographics. Urban areas tend to have a higher proportion of prime working-age people (defined as from 15 to 49 years of age) than rural areas. In all countries in the Asia and the Pacific region, regardless of income levels, the ratio of people of prime working age to the rest of the population is greater in urban than in rural areas (FIGURE 14).[15]

In the Asian region, the share of agriculture in nation's GDP has steadily declined over the last few decades. In Southern and South-eastern Asia this share averaged about 17 percent in 2016, squeezing farm incomes as the vast majority of the population hitherto depended on agriculture for their livelihoods (average of 42 percent in 2016).[16] As a result, rural men migrate to urban areas in search of jobs, which in turn has left more women in rural areas in some countries in Southern Asia. In 17 out of 21 countries in Eastern Asia, South-eastern Asia and the Pacific, among prime working-age people, urban areas have a higher percentage of women compared to rural areas (FIGURE 15 shows some of these countries). The exceptions are China (where the difference is small), Timor-Leste, the Solomon Islands and Vanuatu.

FIGURE 14
Ratio of number of people of prime working age
(15 to 49 years old) to number of people
not of prime working age
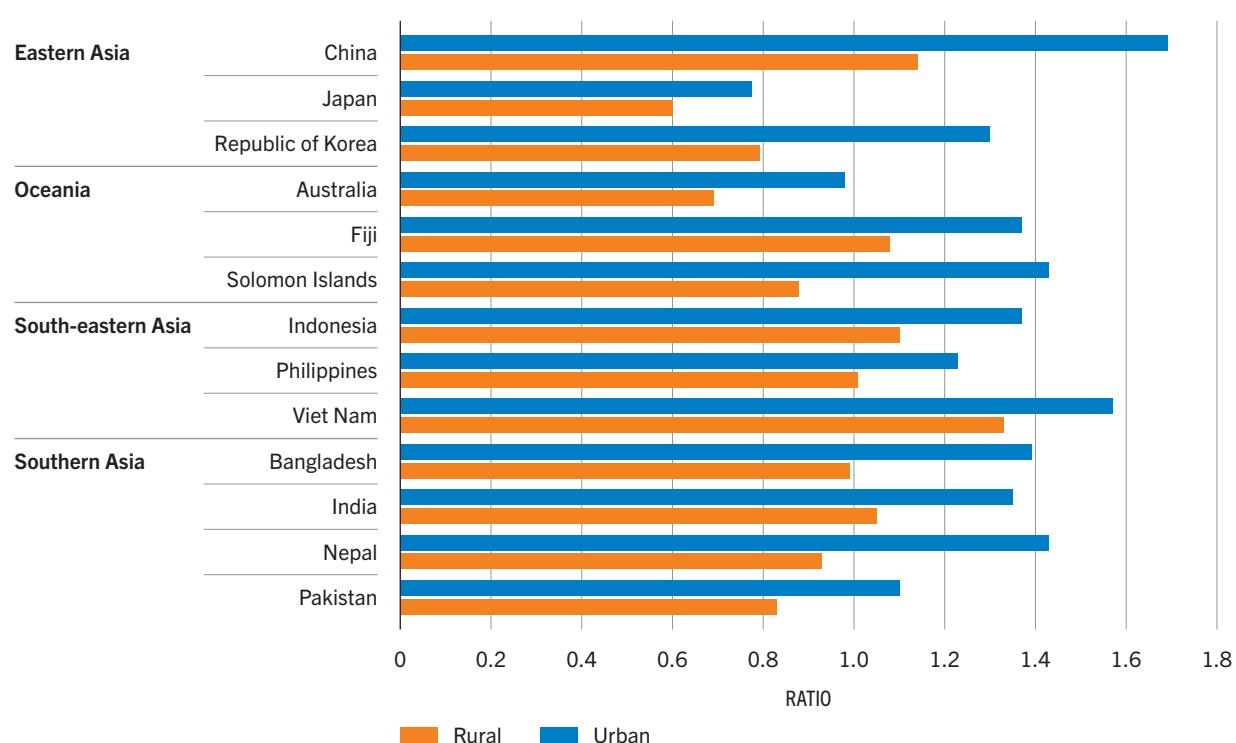
SOURCE: UNDESA. 2017. *World population prospects: The 2017 revision, key findings and advance tables. Working Paper No. ESA/P/WP/248*. New York, UNDESA. Cited 23 December 2022. https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html

Another important difference between urban and rural food systems relates to consumption of certain foods. Urbanization can contribute to increased consumption of perishable foods, such as animal-source foods, as well as pre-cooked and convenience processed foods, and this varies in different contexts. In Indonesia, after controlling for income, urbanization is associated with increased demand for chicken and eggs, but reduced demand for staples (rice and wheat), suggesting that increased demand for these animal-source foods is independent of income.[17]

There are several likely reasons for the impact of urbanization on the types of food eaten. Greater availability of refrigeration in urban areas, at the household level (**FIGURE 16**) and in value chains, may be a factor, as many of the foods whose consumption has tended to increase are perishable. Easier access to refrigeration also reduces store visits and ensures long shelf-life at home, which in turn reduces food waste and the cost of food. Several studies have found a correlation between meat consumption and refrigerator ownership after income is accounted for.[18]

FIGURE 15
Ratio of women to men in urban and rural areas for
people in the age group 15 to 49 years old,
in selected countries
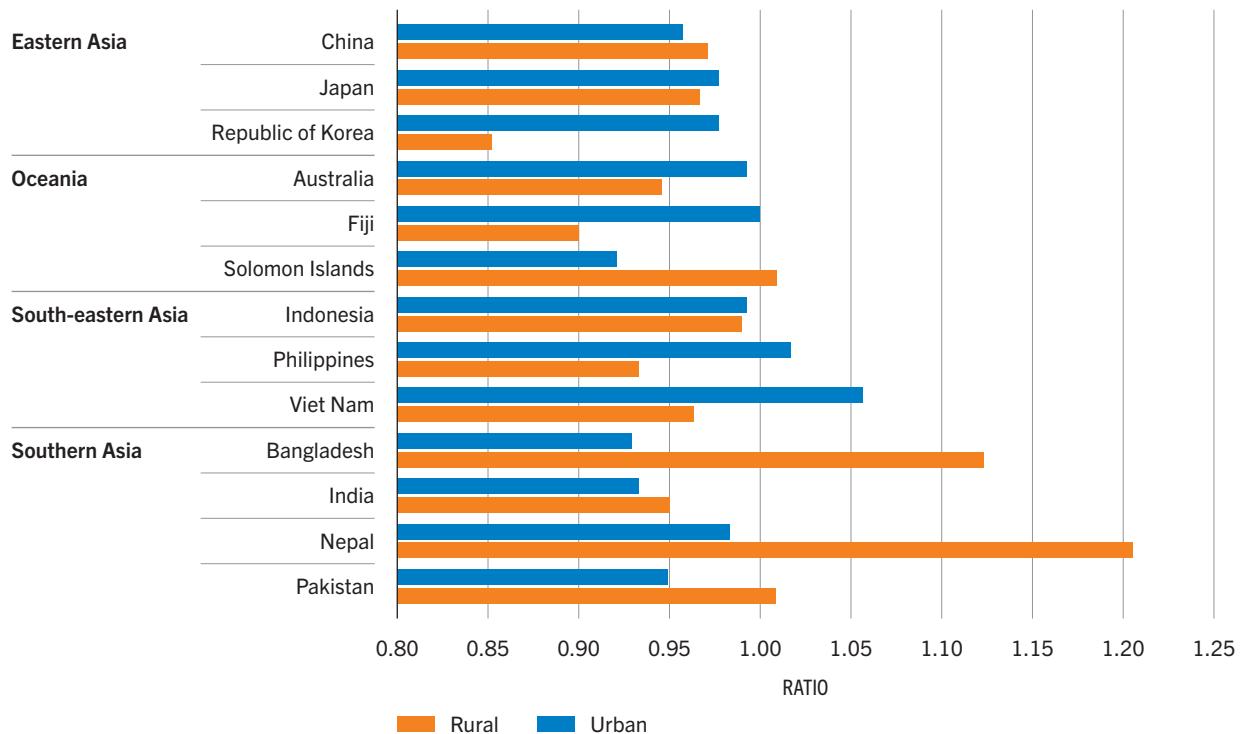
SOURCE: UNDESA. 2017. *World population prospects: The 2017 revision, key findings and advance tables. Working Paper No. ESA/P/WP/248*. New York, UNDESA.
Cited 23 December 2022. https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html

Refrigerator ownership across the 12 surveys varied from 12 percent in Kiribati
(MICS 2018/2019) to 85 percent in Mongolia (MICS 2018). Refrigerator ownership in
four countries was less than 50 percent, meaning these households were unable to safely
store food that is reliant on cold-chain storage at home.

Traffic congestion, long work hours, more women working outside the home, and more
formal work structures mean that people in urban environments typically place a high
value on convenient access to food, leading to increased spending on processed foods.
FIGURE 4 depicts the national household level LSMS to analyse food budget shares of
Nepal and Bangladesh from Southern Asia and Viet Nam and Indonesia from
South-eastern Asia.[19] It shows that, contrary to conventional thinking, households
producing their own food do not consume all of it. Rural households are reliant on the
food market, with the countries represented consuming 20 percent of their own
production and buying 15 to 40 percent of unprocessed and processed food.
Furthermore, because of high land prices in urban areas, it is becoming more common
for housing to devote less space to kitchens to conserve room for other functions.
In tropical cities, the high cost of air-conditioning has encouraged people to eat out more
often.[20] These characteristics of urban areas are powerful driving forces leading people
to demand more convenient food preparation. The increased opportunity cost of time
that leads to demand for more convenience can also encourage greater food waste,
with people purchasing more food than is needed to avoid running out.

FIGURE 16
Household ownership of refrigerators,
urban and rural
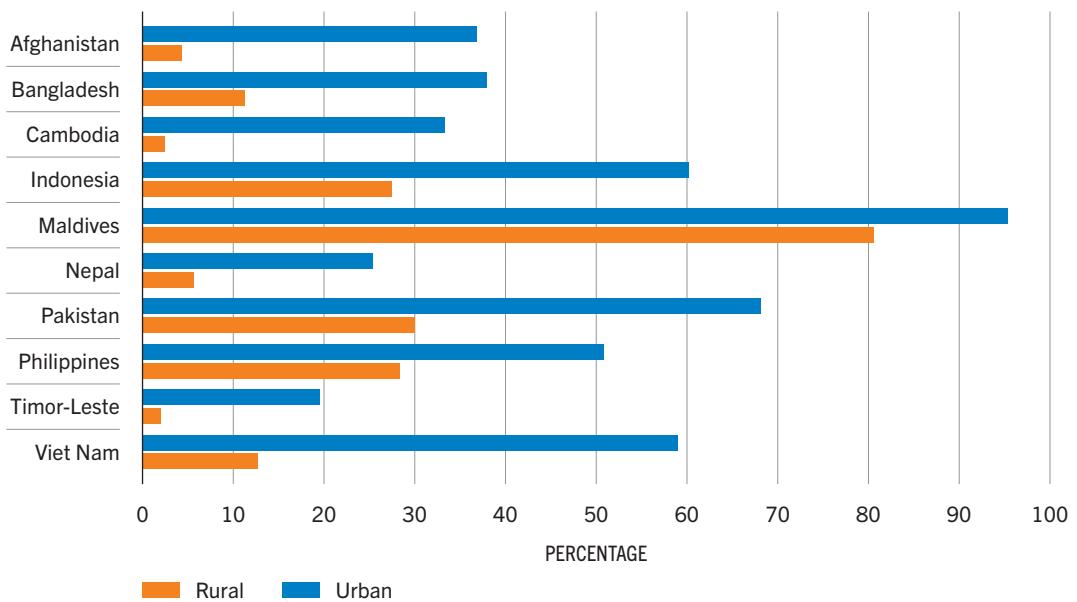
SOURCE: FAO. 2018. *Dynamic Development, Shifting Demographics, Changing Diets*. Bangkok, FAO. https://www.fao.org/3/I8499EN/i8499en.pdf

Demand for more convenient food access includes eating more meals prepared outside the home. This includes meals that are consumed at full-service restaurants, fast-food outlets or street stalls, or those purchased in these outlets (or at supermarkets) and consumed at home. The share of food spending on food prepared outside the home has grown rapidly over the past 10 to 15 years in Eastern and South-eastern Asia. Eating away from home is much more common in urban areas than in rural areas in these regions (see FIGURE 19 for the situation in Viet Nam, which has similar patterns to China, Indonesia, Philippines and Thailand). Eating food prepared away from home has been slower to take hold in Southern Asia, with such food accounting for a much lower share of total food spending (FIGURE 18; no data are available for any Pacific countries).

The increased importance of eating food prepared away from home, at least in parts of the region, has significant implications for nutrition, as consumers may be less aware of the ingredients and energy values of the food. This diet pattern can lead to overconsumption of energy and underconsumption of important nutrients.

FIGURE 17

Sources of food in urban and rural areas of
Bangladesh, Indonesia, Nepal
and Viet Nam
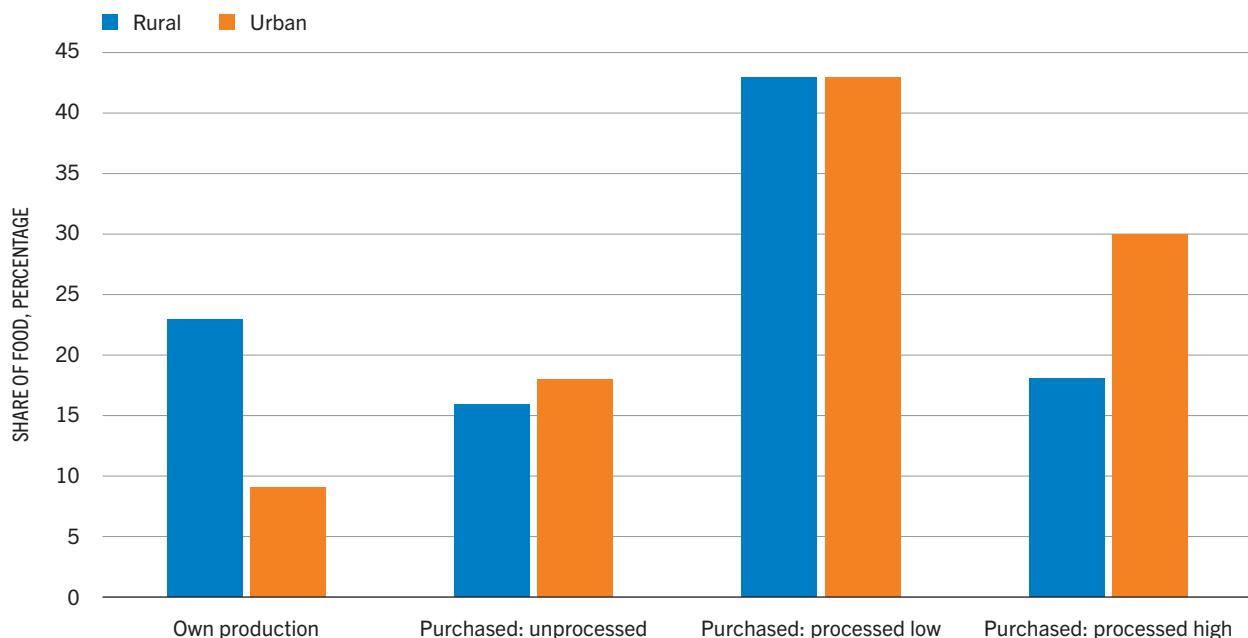
SOURCE: Reardon, T., Tschirley, D., Dolislager, M., Snyder, J., Hu, C. and White, S. 2014. *Urbanization, diet change, and transformation of food supply chains in Asia. (May)*. https://www.fao.org/fileadmin/templates/ags/docs/MUFN/DOCUMENTS/MUS_Reardon_2014.pdf

Unique challenges of urban poor contexts

The COVID-19 pandemic highlighted a general lack of coordination and communication between central and local/municipal governments when intervening in the supply and distribution of food.[21] There is often a dearth of policy coherence on urban food systems and gaps in governance. Limited functional and fiscal devolution to cities is cited as a reason for restricting their power and resources to intervene in food systems.[22] Numerous urban food policies are based on achieving specific goals, such as addressing stunting, wasting, obesity, micronutrient deficiencies or on addressing environmental concerns about food waste, which may reflect or inform urban food policies at the national, regional, or even global levels. Many problems associated with food systems are linked to national and international activities that impose limitations on urban food policies at the city level, such as trade, agriculture and health policies.[23] National safety net programmes implemented in cities often focus on distributing food, cash and food vouchers to the most food-vulnerable households. In some cases, these interventions may only address short-term challenges. In other cases, when integrated into long-term urban food security frameworks, they have the potential to deliver predictable, regular support over a relatively extended period. Reaching the urban poor is often challenging due to overcrowded conditions, the informal nature of their settlements, and their high levels of mobility.[24] The UN's Food Systems Summit process recognized that more can be done to support better integration between central and lower levels of government in urban food systems planning. This includes support from FAO and others to ensure the mobilization of resources to integrate food into urban policies, planning and investments.[25]

FIGURE 18
Percentage of total food spending on food prepared away from home in urban and rural areas of Viet Nam (2002 and 2014), by expenditure quintile
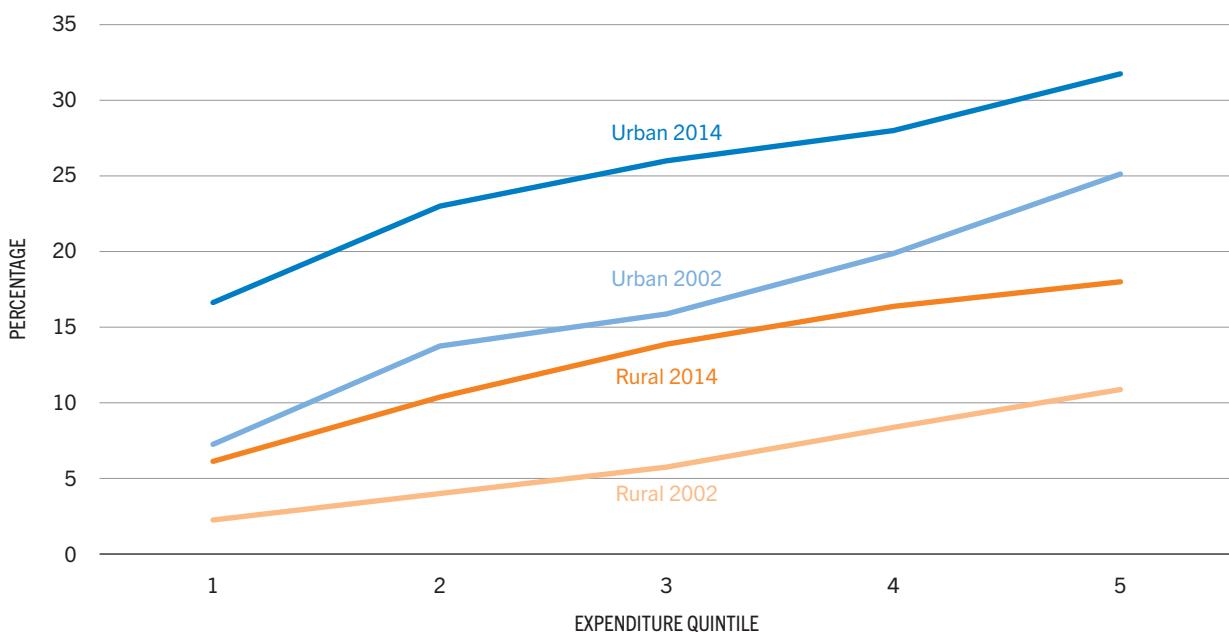
SOURCE: FAO. 2018. *Dynamic Development, Shifting Demographics, Changing Diets*. Bangkok, FAO. https://www.fao.org/3/I8499EN/i8499en.pdf

The network of urban stakeholders is complex and dense, relative to rural areas, given the high concentration in the number of suppliers and institutions at the city and national levels. In urban settings, there are a number of overlaps in governance and administrative jurisdiction, in market networks and in food-related formal and informal businesses. Many food businesses and entrepreneurs, including street vendors, are not registered and operate informally. Street vendors, in particular, play a vital role in supplying communities with food. There is a need to balance improving the safety, quality and nutritional value of the food they serve with implementing realistic initiatives to facilitate this that do not compromise their livelihoods.

Reaching vulnerable populations who depend on the food system with appropriate interventions can prove complex for a variety of reasons. This complexity may arise from the migratory nature of individuals and communities, in addition to the presence of hidden groups, such as internally displaced people and refugees. There are also sensitivities around accessing slum populations and improving living conditions. In informal settlements where residents do not have secure tenure, land may be unclaimed, municipal or undesirable (prone to flooding). Because relatively less attention has been paid to urban poverty than rural poverty, fewer programmes and less evidence have focused on the appropriate design of impactful interventions.[26]

FIGURE 19
Percentage of total food spending on food prepared away from home in urban areas by expenditure
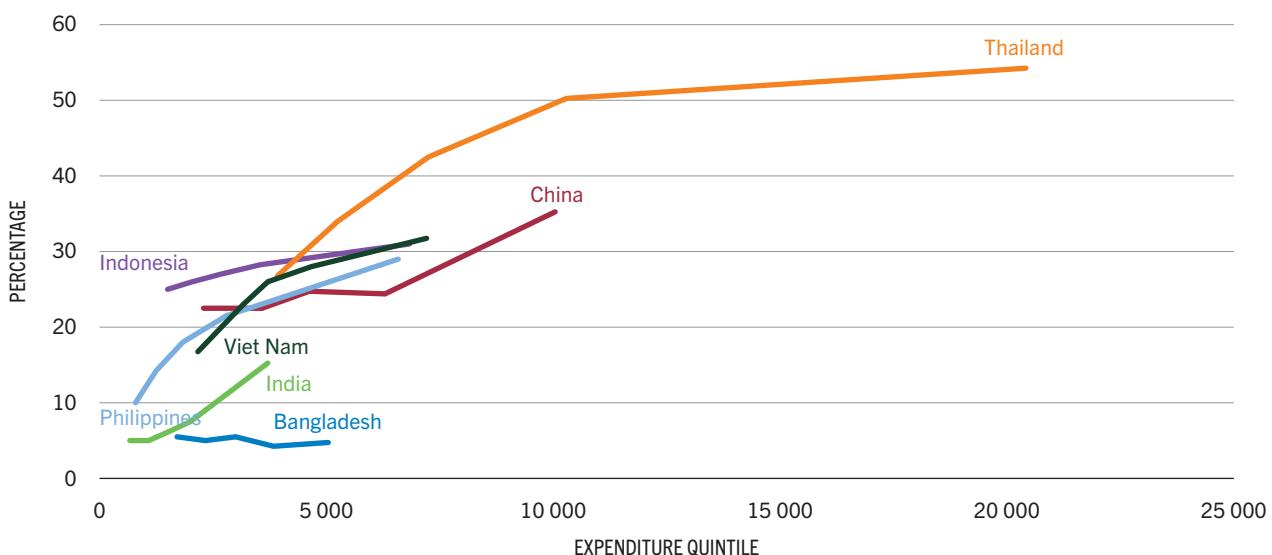
SOURCE: FAO. 2018. *Dynamic Development, Shifting Demographics, Changing Diets*. Bangkok, FAO. https://www.fao.org/3/I8499EN/i8499en.pdf

Low-income, working women are a subset of vulnerable, urban populations. In many cases women work long hours outside the home in addition to their responsibilities within the home. "Time poverty," or unequal distribution of unpaid, often burdensome domestic and care work between genders leaves women with less time for paid work or rest. Time poverty is particularly a problem in slums and informal settlements where access to infrastructure is poor. Women who work in low-paying jobs, which may not cover the cost of childcare, face difficult choices, particularly if the women are migrants and do not have family in the local area or a strong social network to care for their child while they go to work. They may not be able to perform recommended childcare and feeding practices, such as exclusive breastfeeding for the first six months, depending on the demands of their job. Even if maternity policies are in place nationally, women in the informal sector may not benefit from those policies. Because of the informality of slums, service delivery of health, nutrition and WASH are often challenging, with overlapping actors at national and city levels. Basic services may not be operating in slums, meaning that people take more time to seek these services. This may be challenging if they have to take time away from work that is paid by the hour.

The theme of urban food security and nutrition is further explored in this report in the following chapters:

- **Why focus on food security and nutrition in urban areas (Chapter 6)?** The rationale for focusing on urban food security and nutrition in the context of a food systems approach highlights the scale of the problem and the unique challenges faced in urban areas. Considerable opportunities exist for tackling food insecurity and malnutrition in urban areas, and they support meeting SDGs/WHAs targets for achieving change at a low cost, considering the economies of scale that urban programming offers.

- **Urban profile of food security and nutrition (Chapter 7)** Recent events have affected the food security and nutrition situation of the population living in poor areas of the region's cities, including children and women. The COVID-19 pandemic has impacted people's diets and food consumption, especially in the already poor food environments and nutrition situations for working women in urban areas.

- **System-level determinants of urban food insecurity and malnutrition (Chapter 8)** Urban food, health, WASH, social protection, energy and transportation systems play a role in poor nutritional outcomes, including those related to the effects of overnutrition and undernutrition — specifically water, sanitation and health. Communities play an important part in addressing malnutrition. Cities and local governments are also key players in this effort. The cost of healthy diets and the role that the food environment can play, including street food and easy access to food, are crucial factors in meeting dietary needs in a nutrition-transition context.

- **Innovation and opportunity for change to improve urban food security and nutrition (Chapter 9)** Governments can adopt policies presented here to promote food security and nutrition in urban areas. Policymakers need to recognize the importance of data, food governance and planning mechanisms, and the social, technological and financial innovations needed to achieve cost-effective improvements. Examples of city-level interventions are offered using deep-dive case studies to illustrate opportunities for strengthening urban food systems. The section examines targeted support for poor urban households and presents key social interventions that local governments and communities can implement. Finally, the report concludes with recommendations to improve nutrition and food security in urban areas of Asia and the Pacific.

CHAPTER 6
WHY FOCUS ON FOOD SECURITY AND NUTRITION IN URBAN AREAS?

◼

6.1 THE SPECIFIC CHALLENGES OF URBAN FOOD INSECURITY AND MALNUTRITION

Approximately 2.3 billion people live in urban areas across Asia and the Pacific. These people represent 43 percent of the region's total population and 60 percent of the world's urban population.[27] The urbanization of poverty is characteristic of the growth of cities across the region, particularly as the rural poor migrate to cities in search of economic opportunity. Urban poverty is often marked by a lack of fundamental economic, cultural, and social human rights, including poor health, a low standard of living, a lack of formal work opportunities, poor housing standards, and a lack of food. These lead to an increased risk of poor nutrition outcomes, including stunting, micronutrient deficiencies, overweight and obesity.[28] The prevalence of overweight and obesity, in particular, is growing rapidly in urban areas of the Asia and the Pacific region.[29]

The sheer scope of urbanization in the region, and the distinct characteristics related to it — high concentrations of diverse individuals and physical proximity to markets and services — present a series of challenges and complexities. At the same time, this phenomenon represents an enormous opportunity to leverage urban food systems to achieve positive food security and nutrition outcomes among the vulnerable at scale.

Urban food access inequalities

Urban areas generally face fewer challenges with physical food access than rural areas.[30] However, increased physical food access in urban areas is not a blanket advantage experienced by all urban dwellers. Physical access guarantees neither economic access nor consumption of nutritious food. Unlike many rural populations that produce their own food or live close to producers, urban residents buy most of their food. That means that many slum dwellers who work in the informal sector are highly vulnerable to fluctuations in the availability of work and the cost of food.[31] This is particularly relevant in Asia and the Pacific, where informal employment makes up the majority (68.2 percent) of employment opportunities.[32] Those with lower incomes consequently have limited access to healthy diets rich in nutritious foods and rely more on processed and highly processed foods. In most cases, those foods are higher in salt, sugar, saturated and trans-fats and lower in dietary fibre and other beneficial nutrients.[33] Although low in nutritional value, those foods are attractive to low-income consumers because they are often readily available, accessible, cheaper, have a longer shelf-life, and require minimal preparation. These prepared and affordable food options are convenient for many poor households with limited access to cooking facilities, safe drinking water, and sanitation services.[34]

The last three editions of The State of Food Security and Nutrition in the World reports have highlighted the high cost of healthy diets that are out of reach of the poor and unobtainable to many who are not poor in Asia and the Pacific. The average cost of a healthy diet in Asia is USD 3.98 per person per day. Almost 1.9 billion people, or 44.5 percent of the population, cannot afford nutritious meals. In Southern Asia the cost of a healthy diet is USD 3.81 and in South-eastern Asia it is USD 4.02 per person per day). 70 percent and 54 percent of the population in these subregions, respectively, cannot afford healthy diets. A healthy diet costs five times more than one based on basic energy needs.[35] This poses a significant challenge to accessing nutritious foods integral to healthy diets, which are known to protect against malnutrition in all its forms.

Nutritional disadvantage of slum dwellers

People who live in slums are at a nutritional disadvantage compared to other urban residents, often relying on pre-cooked food from street vendors.[36] Foods that are high in energy but have minimal nutritional value are more affordable and convenient. Those foods most available and accessible may satisfy or even exceed the body's energy requirements but not adequately nourish the body, leading to the TBM paradox — overweight/obesity and undernutrition alongside hidden hunger (micronutrient deficiencies).

In addition to challenges in accessing affordable, nutritious food, people living in slums are surrounded by conditions that contribute to malnutrition. The 2016 Lancet series on health in slum populations reinforced evidence that people living in slums are at increased risk of poor nutrition and ill health due to poor sanitation and hygiene, and inadequate water supply, drainage and rubbish collection, all of which increase the risk of illness and disease. In fact, child health in slums is often worse than in poor rural areas in the same country. Children in slums are particularly vulnerable due to low breastfeeding rates, undernutrition, and poor sanitation. All of those predispose them to stunting, wasting, environmental enteric dysfunction, chronic diarrhoea, and impaired cognitive development.[37] It is, however, well recognized that the urban poor do also reside outside slums and urban poverty is pervasive.[38]

■

6.2 SUSTAINABLE AGRIFOOD SYSTEMS FOR URBAN FOOD SECURITY AND NUTRITION

Urbanization has been increasing rapidly over the past few decades in the region, and Asia and the Pacific is now approaching a 50 percent urban population. Given the scope and pace of growth of urban areas, achieving urban food security and nutrition will only be possible by building a sustainable agrifood system. These are impacted by many external drivers, including rapid urbanization, economic transformation and climate change.

The region's rapid economic growth accelerated its urbanization. Significant progress has been made on the Sustainable Development Goal (SDG) 1 target of halving global poverty. Urban investments to support food security and nutrition (SDG2) also offers opportunities to target other SDGs. These include SDG 6 − clean water and sanitation for all; SDG 8 − decent work and economic growth; and SDG 11 − the development of sustainable cities and communities. The FAO's Urban Food Agenda identifies a range of policies, programmes and initiatives developed and implemented by national and sub-national governments to enhance food security and nutrition and sustainable development in urban areas. Its comprehensive areas of support (CAS) and approach focus on the 3Es: 1) enabling improved policy environments, 2) executing context-specific actions decided at the local level, and 3) expanding good practices.[39]

In addition to the fundamental determinants of access to food (such as real income), urban food security and nutrition are influenced by a range of factors, including:

- food supply chains;

- national food environments;

- national infrastructure and services, including water, sanitation, hygiene, health systems and social protection services; and

- underlying individual and household determinants, including consumer behaviour guided by education and information knowledge.

The conceptual framework (Figure 20) depicts the determinants of urban food security and nutrition that will be considered in this report with a focus on the urban food, water, sanitation and hygiene, and social protection systems.

■
6.3 RAPID URBANIZATION

Global demand for food is expected to rise by 47 percent by 2050, with most of this growth occurring in low-income and lower-middle-income countries.[40] This demand will need to be met by a combination of expanding agricultural production area, raising productivity, improving food quality, reducing overall consumption of animal-based foods, and cutting food losses and waste.[41] Cities across the region will need to accommodate an estimated 985 million extra people by 2050. Accommodating nearly a billion people will have huge resource implications, impacting water, energy and food systems. As urban food systems in the region continue to grow and adapt, it will be increasingly important for those actors that shape the food system to find ways to be inclusive and supportive of vulnerable groups, including female-owned enterprises, informal vendors, migrant workers, the very poor and slum dwellers.

Urbanization has not occurred uniformly across Asia and the Pacific. There is wide variation in the level and rate of urbanization (FIGURE 21) in the region, but most countries are still less than 50 percent urbanized. In several countries with big cities, urban populations are growing by more than 2 percent per year, including Bangladesh, China, the Lao People's Democratic Republic, Nepal, Thailand, and Viet Nam.

FIGURE 20
A conceptual framework showing determinants of urban food security and nutrition

Determinants of urban food security and nutrition

EXPANDING good practices

ENABLING improved policy environment

EXECUTING context-specific actions environment

Scaling up beneficial practices that improve global urban food governance through outreach to governments and diverse stakeholders.

- Integrated food system planning
- Inclusive local food governance

Urban transformation/Urban dynamics
- Population and migration
- Urbanization of rural areas
- Income
- Shocks (climate, pandemics, natural disasters etc).

- National urban and territorial policies
- Transformative institutions

- **Globalization and trade**
- **Technology infrastructure development**
- **Sociocultural context**
- **Equalising inequalities**
- **Enabling policies and urban governance**

Urban food systems

Food supply chains
- Optimized supply chains and circular bioeconomy
- Short food supply and public food procurement
- Agri-food innovation across small towns
- Storage and distribution
- Processing and packaging
- Retail and marketing
- Employment

Food environments
- Food and green environments for healthy cities
- Food availability, type and diversity
- Food affordability
- Product properties
- Food messaging
- Food repurposing and recycling
- Marketing
- Food safety
- Pollution, contamination and storage
- Community social/food networks enhancing the food environment
- Regulations
- Food labelling
- Accessibility

Other systems

Water and sanitation systems
- WASH education, SBCC for household and community hygiene practice, environmental hygiene
- WASH infrastructure, waste management system

Heath systems
- Health infrastructure
- Nutrition education, counselling and mobilization
- Micronutrient supplements
- Treatment of infections

Social protection systems
- Existence of pro-urban poor social safety nets
- Social safety nets include food security, nutrition and other measures of non-income based poverty as inclusion criteria
- Employment

Education system
- School infrastructure
- Daycare — availability of centres, staff training in support for the development and adequate nutrition and adequate governance structures for daycare

Transportation and energy system

Individual factors and consumer behaviour
- Food acquisition
- Food preparation, meal practices and storage
- Food preferences
- Food-spending behaviours

Individual factors and key nutrition and other behaviours
- Breastfeeding
- Complimentary feeding
- Caring practices
- Food acquisition
- Food preparation, meal practices and storage
- Behaviours related to spending, hygiene and management of finances

Urban food security and nutrition

SOURCE OF RAW INFORMATION: FAO. 2019. *FAO framework for the Urban Food Agenda*. Rome. https://doi.org/10.4060/ca3151en

FIGURE 21

Urbanization rates (X axis) and percentage of the population
living in urban areas (Y axis) across the Asia and
the Pacific region (2019–2020)

NOTE: Pacific refers to Oceania excluding Australia and New Zealand.

SOURCE: UN Department of Economic and Social Affairs (UNDESA). 2019. World Population Prospects. In: *United Nations*. New York, USA, UN.
Cited 15 November 2022. https://population.un.org/wpp/

In 2020, the Asia and the Pacific region was home to 18 megacities (populations exceeding 10 million). This includes the world's two largest cities: Shanghai and New Delhi. About 19.3 percent of the region's urban population live in megacities, while cities with populations under 300 000 host the largest proportion of the region's urban population at 35.7 percent.[42] Many smaller towns and cities across the region are growing rapidly and will have a larger share of the urban population in the future. This presents a unique challenge for policymakers because smaller towns are typically less well-resourced. They have weaker enabling conditions: less effective urban governance, lower levels of infrastructure investment, poorer civic amenities and a lack of comprehensive urban policy. And smaller towns generally have lower levels of economic development to accommodate and feed their citizens sustainably.

The impact of urbanization on food insecurity is affected by how well the growth of cities is managed and how evenly economic growth linked to urbanization is distributed. Rapid urbanization is occurring amid economic growth or lack thereof, poor urban planning and fragmented governance. This results in the inefficient use of land, inadequate or overcrowded infrastructure, and informal housing and jobs, which may lead to increases in urban income poverty and all other forms of inequality. Poverty and inequality are risk factors for food insecurity, poor health and negative nutrition outcomes among the city's vulnerable populations.

FIGURE 22
Estimated population of urban residents living
in slum areas across the Asia and
the Pacific region

a) Percentage of urban population living
   in slum areas in 2018

PERCENTAGE
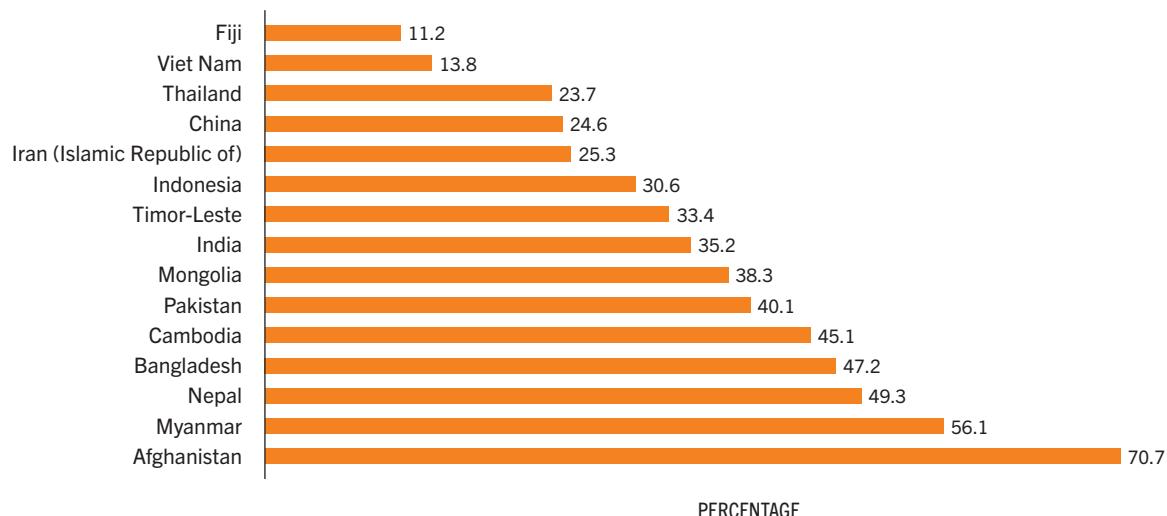
b) Total population living in slum areas in 2018

POPULATION (MILLION)
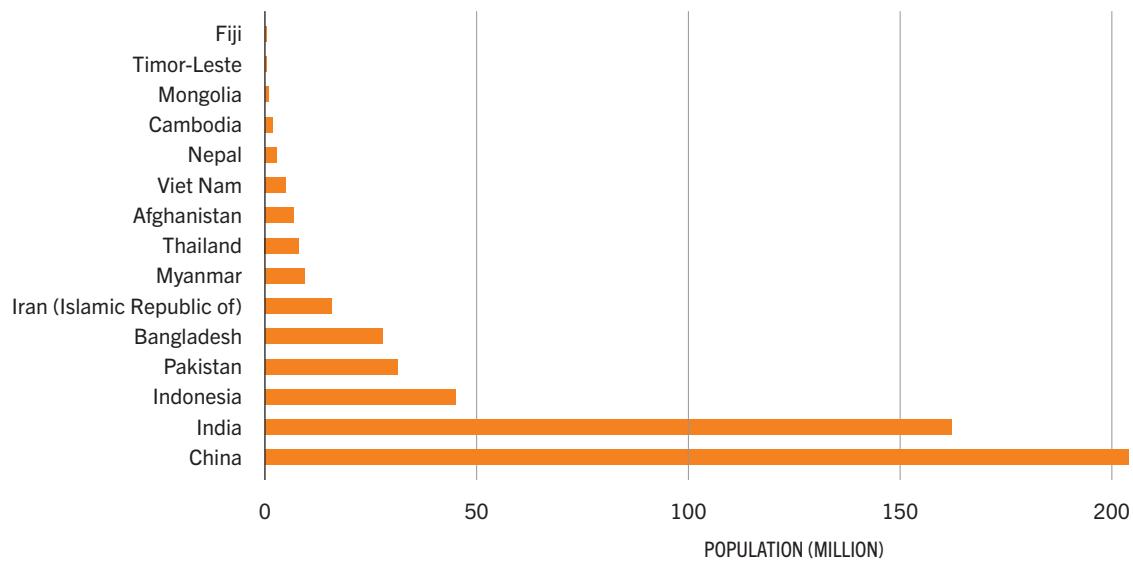
SOURCE: World Bank. 2022. World Development Indicators: Population living in slums (percent of urban population). In: *World Bank*. Washington, DC.
Cited 23 December 2022. https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS/

■

6.4 INFORMAL SETTLEMENTS

The region hosts some of the world's largest urban slums, and about 40 percent of the region's urban population lives in informal settlements.[43] In absolute terms, an estimated 500 million people live in informal settlements across Asia and the Pacific (FIGURE 22). Although slum settlements may be sanctioned, they typically lack governance, planning and investment in infrastructure, leading to the creation of conditions which perpetuate poor food security and nutrition outcomes.

The urban poor often live in crowded conditions that exacerbate the spread of disease. The COVID-19 pandemic showed that overcrowding and poor housing conditions are more likely to increase the risk of disease transmission.[44] Many slums occupy marginal land on the edges of cities and often have inadequate physical access to infrastructure, markets and job opportunities. This lack of access impacts food security, particularly as slum dwellers spend more time and resources meeting their basic needs than those living in more central or accessible neighbourhoods. The land on which slum dwellers live may be prone to flooding or other natural hazards, which increases their vulnerability and ability to grow food safely and risks pushing people further into poverty.[45] Children in slums experience worse nutrition and health outcomes than children living in better conditions, which puts children in slums at a disadvantage early on in life.

Impact of urbanization on land

Urbanization shapes how land is used, either directly to accommodate urban growth or indirectly to provide food for the expanding cities. Urban expansion in Asia and the Pacific is estimated to have consumed 90 000 km^2 of land between 1975 and 2015 (FIGURE 23). The influence of cities and urban markets on food systems extends well beyond the limits of cities. Areas once far away from the cities become part of the larger catchment areas to provide food.[46]

Asia and the Pacific lost about 18 500 km^2 of cropland between 2000 and 2019 to accommodate urban expansion, with China accounting for at least 80 percent of that figure.[47] Sixty percent of future global cropland losses through 2030 are projected to occur in the region.[48] These losses will be partly offset by the global agrifood system through the intensification of existing production and expanding cropland elsewhere. Although there is limited evidence, food production in cities has been found to contribute relatively little — somewhere between 5 and 15 percent — to the overall food supply.[49]

FIGURE 24 shows the proportion of cropland and other types of land cover lost to urban expansion in countries in the Asia and the Pacific region from 2000 to 2019. When cities expand and encroach into cropland on their peripheries, the opportunity to sustain local food production and peri-urban agriculture is constrained or eventually lost in the adjoining peri-urban and catchment areas. Over 75 percent of urban expansion in Cambodia and Nepal took place on cropland, and at least 50 percent in China, India, Indonesia, Myanmar and Sri Lanka. Other countries lost more natural land cover, such as savannahs, grasslands or shrublands. Rising land values in cities for construction drive up the cost of urban and peri-urban agriculture and make it sustainable. Therefore, urban development can be sustainable if cities can negotiate with stakeholders competing for land and other resources.

FIGURE 23
Urban expansion and urban population
growth over the period 1975–2015
by subregion
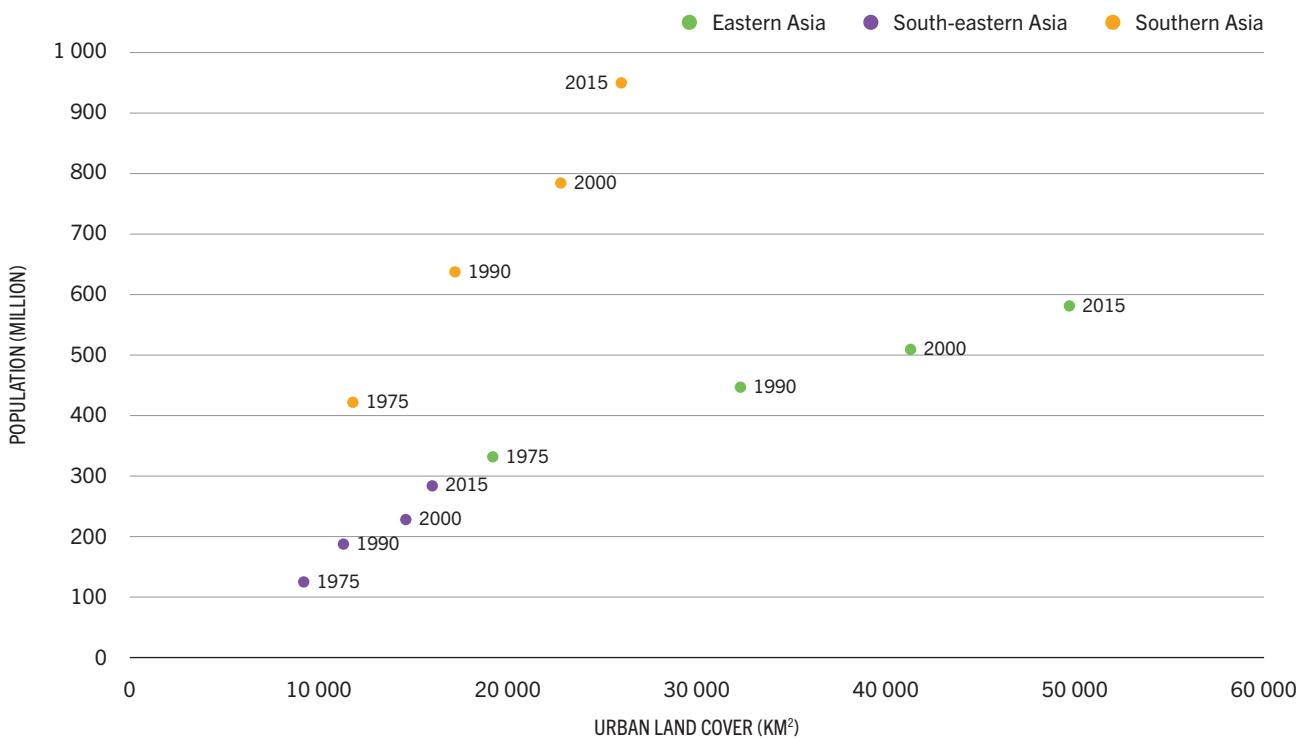
NOTE: Data analysed by Dikoda, using MODIS landcover.

SOURCE: Friedl, M. and Sulla-Menashe, D. 2019. MCD12Q1 MODIS/Terra+Aqua Land Cover Type Yearly L3 Global 500m SIN Grid V006 [Data set]. NASA EOSDIS Land Processes DAAC. In: *United States Geological Survey (USGS)*. Virginia, USA. Cited 15 November 2022. https://doi.org/10.5067/MODIS/MCD12Q1.006

Urban expansion (FIGURE 25) often results in a growing inequality in which those who can afford to consume more land do so. This restricts supply for others who must live on smaller plots, often in marginal locations and in overcrowded conditions.[50] This high density, particularly in large cities with populations above 5 million, leads to diseconomies of scale for the urban poor, including greater exposure to congestion, contamination and contagion. The COVID-19 pandemic, therefore, has largely been an urban problem, with the urban poor disproportionately affected.[51] In smaller cities, the increase in population keeps relative pace with land expansion, most likely because these cities have fewer civic amenities and job opportunities that, in turn, encourage migration to the larger cities.

FIGURE 24
Proportion of total land by land cover type lost to urban expansion across the Asia and the Pacific region (2000–2019)
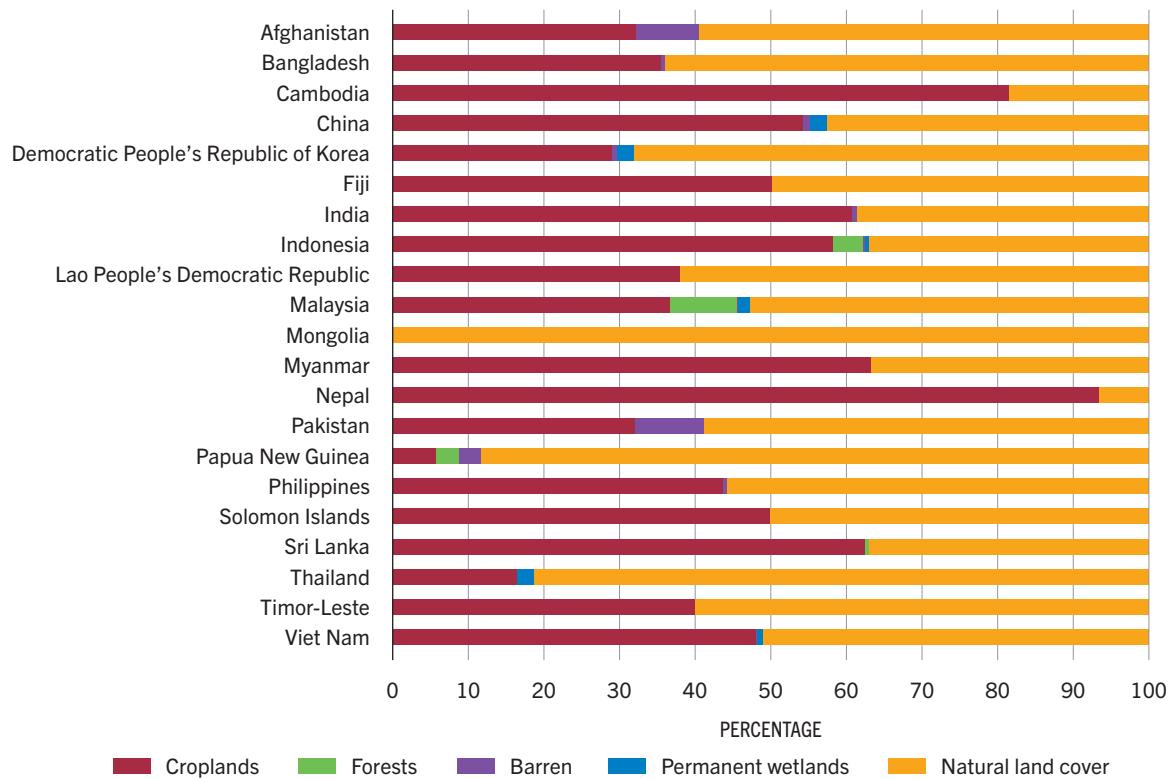
NOTE: Data analysed by Dikoda, using MODIS landcover.

SOURCE OF RAW DATA: Friedl, M. and Sulla-Menashe, D. 2019. MCD12Q1 MODIS/Terra+Aqua Land Cover Type Yearly L3 Global 500m SIN Grid V006 [Data set]. NASA EOSDIS Land Processes DAAC. In: *United States Geological Survey (USGS)*. Virginia, USA. Cited 15 November 2022. https://doi.org/10.5067/MODIS/MCD12Q1.006

6.5 URBANIZATION AND THE TRANSFORMING RETAIL LANDSCAPE

While urbanization can create or exacerbate poverty, it also has the potential to reduce poverty by creating economic opportunities. Economic growth in cities drives rural-to-urban migration, with rural migrants moving in search of economic opportunity. In turn, urbanization can lead to job creation. High rates of population growth in urban areas in Beijing, Chongqing and Jakarta have created more than 2 million new jobs in each city.[52] In the last two decades, urban economic growth has lifted 758 million people out of poverty.[53] This increase in wealth was accompanied by an overall decline in hunger and undernutrition across the region from 550 million to just above 300 million between 2005 and 2017, a reduction of 45 percent.

The benefits of urbanization for most emerging economies still outweigh its inequality-widening effects.[54]

FIGURE 25
Average rates of urban land expansion and average annual population growth rates of cities in the Asia and the Pacific region 2000—2015 by city size

RATE OF CHANGE 2000—2015 (PERCENTAGE)

■ Population growth ■ Land expansion
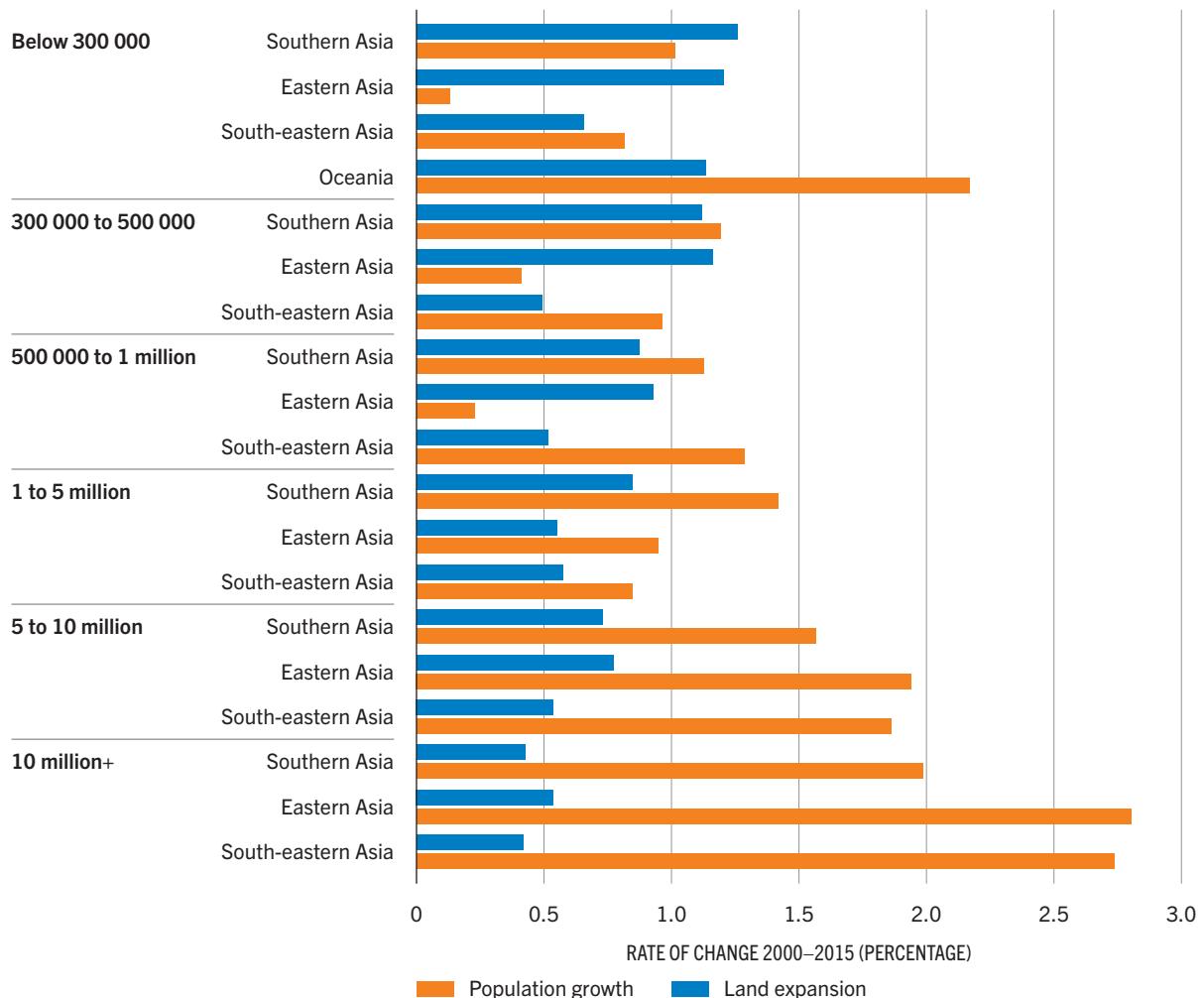
NOTE: Data analysed by Dikoda.

SOURCE OF RAW DATA: Florczyk, A., Corbane, C., Schiavina, M., Pesaresi, M., Maffenini, L., Melchiorri, M., Politis, P., Sabo, F., Freire, S., Ehrlich, D., Kemper, T., Tommasi, P., Airaghi, D. and Zanchetta, L. 2019. GHS Urban Centre Database 2015, multitemporal and multidimensional attributes, R2019A. In: *European Commission, Joint Research Centre (JRC)*. Ispra, Italy, JRC. Cited 14 November 2022. https://data.jrc.ec.europa.eu/dataset/53473144-b88c-44bc-b4a3-4583ed1f547e

Along with urban population growth and rising incomes, demand for food has dramatically increased. At the same time, urbanization, along with globalization and international trade, has changed the food environment, shaping and modernizing supply chains. Perhaps the most obvious change has occurred in food retail in cities. Although traditional markets still predominate in many countries, supermarkets have become ubiquitous in cities across the region. The total number of supermarkets increased by 55 percent in the five years from 2013 to 2018. Figure 13 shows the variation between subregions. The expansion of supermarkets has proliferated from larger cities to small cities and market towns.[55] Nonetheless, this modernization of the retail food environment has also led to increased availability of highly processed foods and drinks with high energy density and low nutritional value.

FIGURE 26

Number of supermarkets per 100 000 inhabitants (top axis)
and growth in the number of supermarkets
2013−2018 (bottom axis)
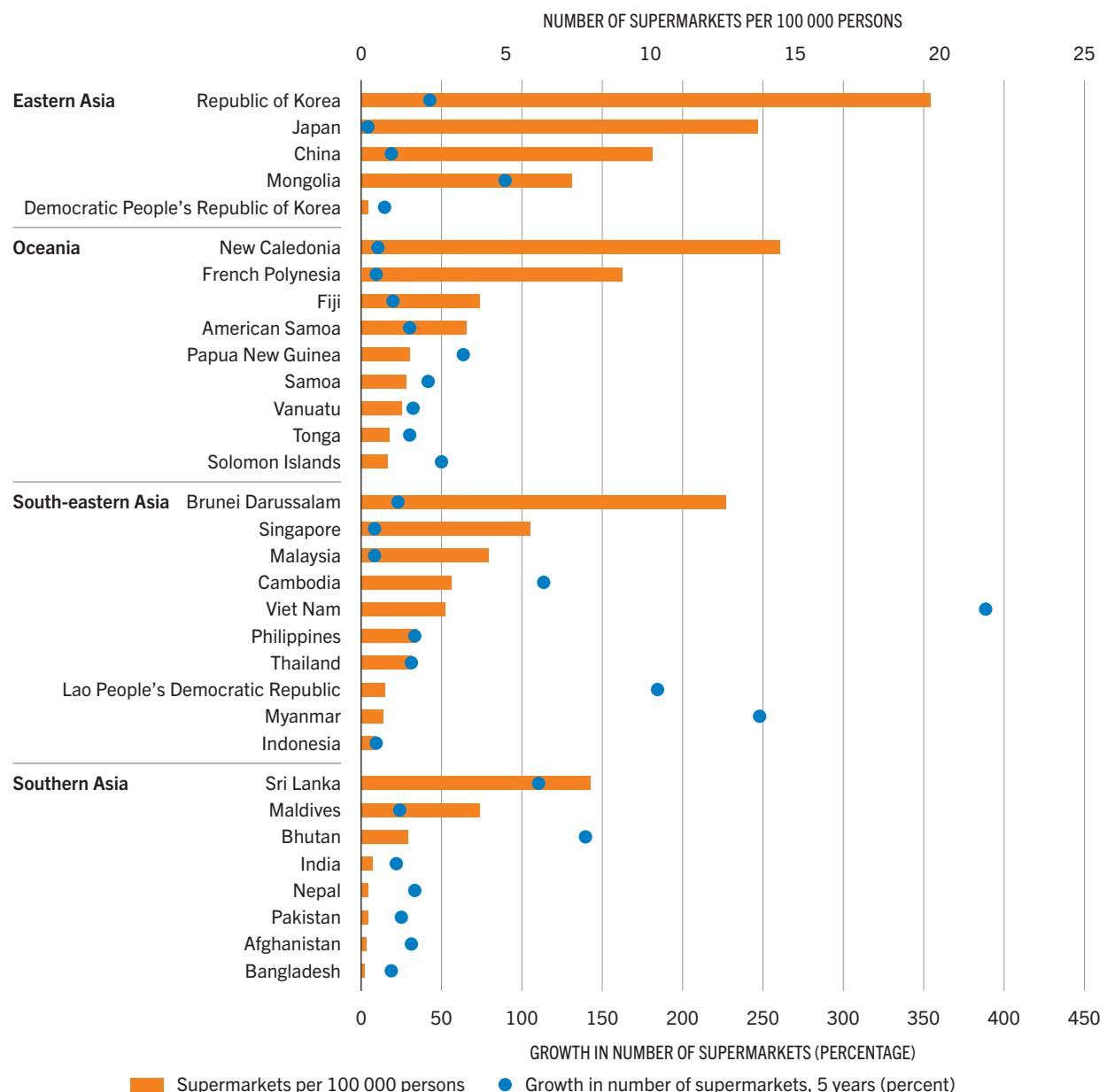
NOTE: Data analysed by Dikoda.

SOURCE OF RAW DATA: Global Alliance for Improved Nutrition (GAIN) and Johns Hopkins University. 2020. About Food Systems. In: *Food Systems Dashboard*. Geneva, Switzerland. Cited 4 November 2022. https://www.foodsystemsdashboard.org/information/about-food-systems

■

6.6 THE INFLUENCE OF CLIMATE CHANGE

In addition to creating economic opportunities, urbanization is a powerful driver of climate change. Urbanization and the increasing build-up of cities and towns lead to encroachment on natural areas. This process may harm biodiversity and habitats and have implications for a city's capacity to adapt to climate change and other natural hazards. Moreover, cities are major contributors to the emissions that drive climate change and are also vulnerable to its impacts. Cities generate the majority of carbon emissions. CO_2 emissions throughout Asia increased by an estimated 175 to 200 percent during the economic boom from 1990 to 2010.[56] The highest emitting cities in the Asia and the Pacific region are Hyderabad, Jakarta, Manila, Mumbai, and New Delhi.[57] Carbon footprints are often highly correlated with income, meaning that poor, vulnerable populations who contribute the least to the problem suffer the greatest consequences. The urban poor, who have very limited adaptive capacity, are especially vulnerable to the impacts of climate change.[58]

Food systems challenges

Urban food systems present a particular challenge because most of the food must be transported from far away—often using fossil fuels. Localizing food supply through greater urban and peri-urban agriculture could reduce emissions from food transport. The rise of animal protein-based diets driven by income growth in cities also presents a significant concern, as livestock production contributes 46 to 74 percent of agricultural greenhouse gas emissions.[59] While there would certainly be benefits to an overall reduction in the consumption of animal source foods at the population level, this reduction must also be balanced with the added nutritional value that animal source foods bring to nutritionally vulnerable populations, including young children, pregnant and breastfeeding women, and adolescents. Increased demand for these nutritious foods will require improved efficiencies. Food systems should contribute to improving the accessibility and affordability of animal source foods in poor urban communities.[60]

Food waste management is another major challenge for the food system. Improvements to food waste management can reduce emissions and improve urban health. The United Nations Environment Programme (UNEP) estimates that about 17 percent of food is wasted at the retail and consumption stages, resulting in an estimated 8–10 percent of global greenhouse gas emissions.[61] While high-income households tend to generate more food waste than low-income households, according to available evidence, food waste in low-income populations and countries is not well understood. Moreover, food packaging is not included in food waste estimates. Packaging also contributes to the consumption of fossil fuels, greenhouse gas emissions and overburdened waste management systems. In slums where solid waste management systems are poor, germs and bacteria can pollute soil, contaminate drinking water sources, and lead to disease transmission — including Environmental Enteric Dysfunction (EED) — ultimately resulting in malnutrition.[62]

Impacts on urban food systems and food security

Climate change will have increasingly profound impacts on food security and nutrition over time. Temperatures in Asia and the Pacific have trended higher in the past 40 years, in both averages and extremes. Mean annual temperatures have risen in Southern Asia, with the highest increase in Bangladesh (0.75 °C). Asia and the Pacific is highly vulnerable to natural hazards, and it is widely forecast that climate change will lead to more frequent floods, droughts, cyclones and other extreme weather events (FIGURE 14). Cities in the region are considered high-risk locations for the combined effects of climate change and extreme events due to poor urban planning and the expansion of informal settlements.[63] Pre-existing stresses related to poverty and informality will be amplified, resulting in increased vulnerability among urban slum populations.

An increase in climate change-related extreme weather events can impact the entire food supply chain.[64] Agricultural production in rural areas can be adversely affected by floods, storms, shifting seasonal patterns, droughts and water scarcity. These, in turn, may reduce food supplies or increase prices, as well as reduce farming incomes, producing a knock-on effect on the demand for urban goods and services.[65] Increased temperatures and flooding may damage road and rail infrastructure, disrupt supply chains and impact urban mobility.[66] Coastal infrastructure, including ports and key nodes in international (and sometimes national) supply chains, are particularly vulnerable to sea-level rises, storm surges and river floods.[67] Heat stress can also directly affect human health and impact industrial or agricultural activity that relies on manual labour. The resulting reduction in working hours can disrupt manufacturing, service provision and food production or be a barrier to devoting time and resources to agricultural activities.[68]

Indeed, climate change is no longer a future problem facing the region's food system, but one that must be treated as an urgent priority.

Climate vulnerability in cities

An estimated 742 million urban residents across the region face multiple high or extreme exposures to hazards, and this is predicted to increase to 1 billion by 2030.[69] Urban flooding, extreme heat, drought, coastal storms and floods are prevalent across the region and already impact residents' health, nutritional status and well-being, infrastructure, energy and food systems. Climate change risks, vulnerabilities, and impacts are increasing across Asia and the Pacific in urban centres of all sizes, economic conditions, and site characteristics.[70] Population density, economic activity and built-up environments in urban areas can change a city's exposure to climate and weather events.

Flooding has become one of the most significant natural hazards in urban areas due to a combination of climate change and rapid urban growth with insufficient drainage.[71] Flooding has a downward spiralling impact on vulnerable people and increases vulnerability to outcomes such as malnutrition in affected populations. Limiting factors and barriers to optimal infant and young children feeding practices escalate during flooding resulting in poor nutritional health in slums.[72] An estimated 195.2 million urban residents across the region are at high risk of floods (TABLE 12 – no data was available for the Pacific). Urban areas in low-elevation coastal zones face the combined threat of sea-level rise and storm surges. In the Pacific, except for Papua New Guinea, urban centres are concentrated in coastal zones and are threatened by sea-level rises.

FIGURE 27
Share of the world's natural hazards
by region between 1970 and 2020
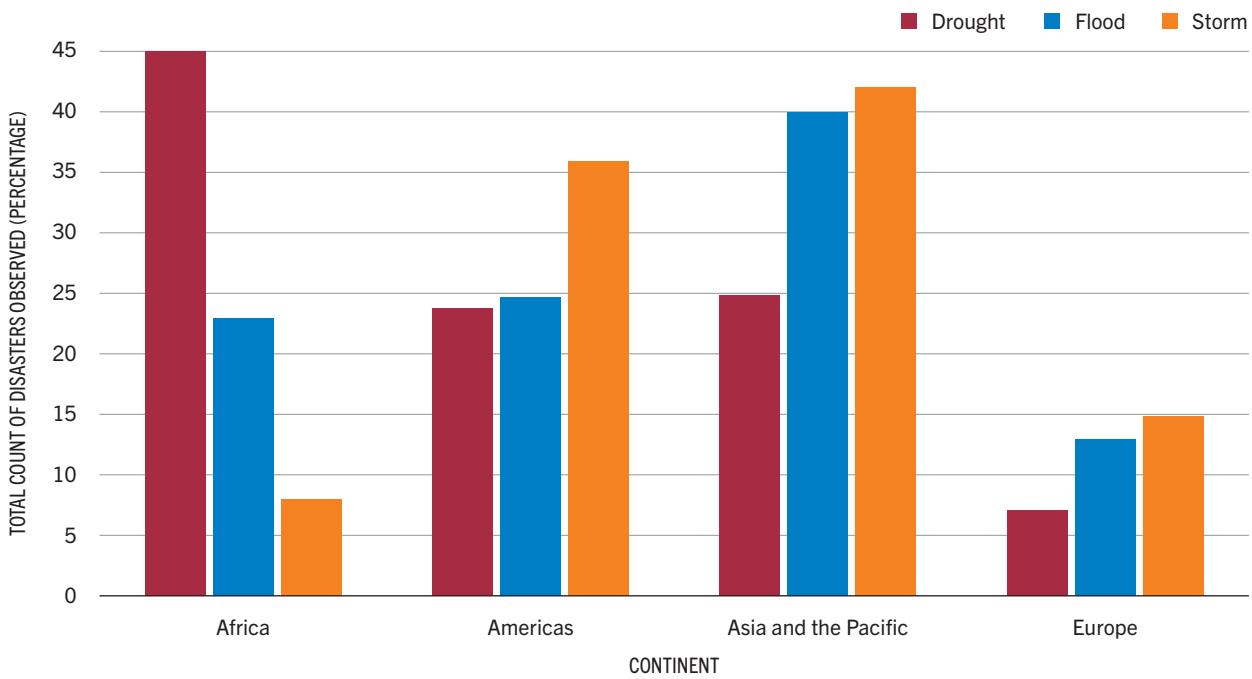
NOTE: Estimated, based on the CRED International Disaster Database. Americas include Caribbean, Southern America, Central America, Northern America.
SOURCE OF RAW DATA: Centre for Research on the Epidemiology of Disasters (CRED). 2022. *CRED*. Brussels. Cited 15 November 2022. https://www.cred.be/

The small size of Pacific Island Countries and their geographic isolation increase the costs of providing services. Their high exposure to climate change and natural hazards, together with a narrow economic base, make them extremely vulnerable to shocks.[73]

Climate-induced migration

A sudden influx of migrants — whether due to conflict or climate — can also lead to increases in food, transportation and fuel costs. In areas where markets are competitive, large-scale migration may lead to suppressed wages.

The impacts of climate change have affected and will continue to affect the poor disproportionately. While climate change is a critical driver in the recent rise of hunger and food crises, the induced migrations — seasonal or permanent — mean an increasing number of communities are forced to find food in complex urban environments.[74] About 81 percent (or 198 million) of the world's population displaced by disasters live in Asia and the Pacific. More than 95 percent of this displacement is the result of climate- and weather-related sudden-onset disasters such as storms and floods. Cities across the region are likely to experience climate-induced migration as rural populations, particularly those in low-lying coastal areas, are pushed towards cities when extreme weather events destroy homes, assets, and livelihoods. Extreme weather events displaced over 19 million people in Asia and the Pacific in 2019 alone.[75] These migrants are often not counted in statistics or not registered in administrative systems and can be overlooked in city-level plans for food security and nutrition.

TABLE 12
Pluvial flood risk in urban areas, Asia (return period of 10 years)

	Total urban area (km²)	Urban area at high risk of pluvial flooding (km²)	Percentage of urban areas at high risk from pluvial floods	Estimated urban population at high risk of pluvial floods
Eastern Asia	**785 201**	**34 696**	**4.4**	**64 381 604**
China	784 761	34 690	4.4	64 370 221
Mongolia	440	7	1.5	11 383
Southern Asia	**801 624**	**32 805**	**4.1**	**109 756 143**
Afghanistan	4 029	164	4.1	440 431
Bangladesh	17 332	3 320	19.2	23 373 200
India	757 973	28 411	3.7	41 409 625
Nepal	2 076	78	3.8	782 484
Pakistan	20 214	832	4.1	43 750 403
South-eastern Asia	**130 684**	**10 974**	**8.4**	**21 053 892**
Cambodia	2 885	487	16.9	3 915 200
Indonesia	50 993	1 955	3.8	3 314 205
Lao People's Democratic Republic	1 094	310	28.3	1 307 701
Malaysia	11 400	302	2.6	789 661
Myanmar	8 134	997	12.3	1 583 266
Philippines	9 578	137	1.4	0
Thailand	24 734	2 533	10.2	308 019
Viet Nam	21 866	4 253	19.5	9 835 840

NOTE: Data analysed by Dikoda.
SOURCE OF RAW DATA: WorldPop. 2022. School of Geography and Environmental Science, University of Southampton. Southampton.
Cited 15 November 2022. https://www.worldpop.org/; Dottori, F; Alfieri, L., Salamon, P., Bianchi, A., Feyen, L. and Hirpa, F. 2016. Flood hazard map of the World-10-year return period. In: *European Commission, Joint Research Centre (JRC)*. Ispra, Italy. Cited 15 November 2022.
http://data.europa.eu/89h/jrc-floods-floodmapgl_rp10y-tif

Migration to cities brings both challenges and opportunities for food security and nutrition.[76] It puts further pressure on cities to ensure food security for newcomers and host communities, and to accommodate and provide basic services. Often, the existing food security and healthcare support systems are not accessible for most unregistered migrants. Large-scale migration can potentially add additional stress to urban destination areas through increases in consumption, waste production and land-use changes. It can accelerate demand for housing and basic social and health services in destination areas, putting pressure on already strained infrastructure and facilities.

Migration to cities can represent opportunities for vulnerable people to find employment, shelter, and access markets that can continue providing food during disasters. Cities have an opportunity to develop migrant-inclusive policies that foster the participation of migrants in the labour market, ensuring their food security and supporting cities' economic growth.

CHAPTER 7
URBAN PROFILE OF FOOD SECURITY AND NUTRITION

Evidence on the food security and nutrition situation in Asia and the Pacific makes the case for why further intervention is needed. Diets have changed. The link between socio-demographic factors and diet and nutrition outcomes in the region raises issues around the affordability of healthy diets. The COVID-19 pandemic has impacted nutrition at the individual and population levels, as indicated by recent data (2018–2020) from the Status and Determinants of Food Insecurity and Undernutrition (SDFU) surveys conducted before the pandemic in Yangon, Myanmar, and during the pandemic in Jakarta, Indonesia, Yangon, Myanmar, and Quezon City, Philippines (see also ANNEX 7).

■

7.1 URBAN TRENDS IN THE REGION'S NUTRITION TRANSITION

Changes in diet and lifestyle

A shift in dietary patterns across Asia and the Pacific has been influenced by increases in incomes and urbanization.[77] This shift has been accompanied by other transitions, including more sedentary lifestyles and fewer opportunities for physical activity, resulting in increased risks for overweight and obesity (see CHAPTER 5). Another result has been a greater supply of and demand for a more diverse range of foods. Diversification of diets across urbanized Asia has been characterized by reduced consumption of staple foods, such as rice,[78] and increased consumption of fruits, vegetables, animal-source foods and arguably, of most concern, highly processed products high in fats, sugar and salt.[79]

Although the general transition in urban diets suggests an urban advantage when compared with rural areas regarding access to a diverse range of foods, variations exist between different socioeconomic status groups within urban communities.[80] The urban poor generally do not benefit from such advantage. Their access to nutritious foods, including fruits and vegetables, is limited, while their access to foods of high energy density and minimal nutritional value is comparatively greater.[81] Furthermore, food storage in an urban poor setting can be challenging, with limited access to refrigerators.[82]

Across Asia and the Pacific, the proportion of dietary energy derived from oils and fats has replaced complex carbohydrate sources.[83] Indeed, when using sales data as a proxy for consumption, the sale of vegetable oils (including palm, coconut and vegetable blends) has increased at a rate that they are becoming the primary source of fat within the diets of those living in Pacific Island countries.[84] While this is observed nationally across Asia and the Pacific, this increased consumption of fats and oils is disproportionately driven by urban rather than rural diets.[85]

In addition, a growing body of evidence draws attention to the increased consumption of highly processed foods and beverages, which generally do not contribute to healthy diets, among urban populations in Asia and the Pacific.[86] This is exacerbated among the urban population by the convenience and accessibility of these products. Of particular concern is the high consumption of sugar-sweetened beverages in urban areas. These troubling increases in the consumption of sugar-sweetened beverages and foods high in energy density with minimal nutritional value are filtering through to infants, children and adolescents in urban centres in the region.

Food purchase and preparation

Household accessibility to food storage and preparation are important for consumers' dietary choices and preferences. Analysis of DHS (Demographic and Health Surveys) and MICS (Multiple Indicator Cluster Surveys) data from countries in Asia and the Pacific indicates that those living in urban slums and from the poorest groups have less access to appropriate facilities for food storage, such as refrigerators (see CHAPTER 5). Lack of adequate space in a household prevents the storage of large quantities of food. This can affect food purchases because the urban poor are unlikely to be able to buy in bulk from supermarkets and instead rely on smaller quantities that can be obtained from markets and street vendors. Limited access to kitchen facilities and equipment, as well as limited time, means that food prepared outside the home is increasingly being purchased. This can also lead to more food packaging waste, which when hygiene and sanitation infrastructure and services are inadequate contributes to unsanitary living conditions.

Box 1
Changing retail food environments in Asia and the Pacific region[87]

Growth of modern food retail outlets[88]
Food retailers exert a powerful influence on food choices through their decisions about stocking, pricing, marketing, and promotional practices.[89]

Modern food retail outlets such as hypermarkets, supermarkets and convenience stores, selling a range of packaged food and drinks, are becoming increasingly prominent in urban areas of Asia and the Pacific. During the past 15 years, their number has risen significantly (FIGURE 28). In Myanmar and Viet Nam, for example, modern food retail outlets grew by 1 243 percent and 1 217 percent, respectively.

FIGURE 28
Percentage increase in modern food outlets, 2007–2021
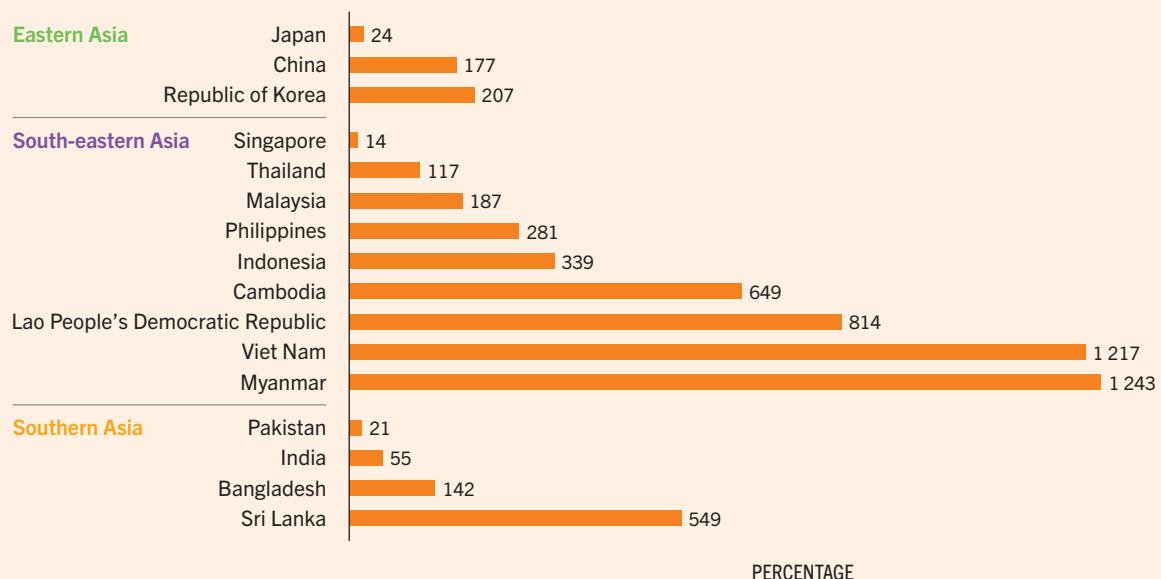
SOURCE: Euromonitor International Passport. 2021. Global Market Information Database. London, UK. Cited 3 January 2023.
https://www.euromonitor.com/our-expertise/passport

The number and density of convenience stores are rising fast. In the past ten years throughout Asia, convenience stores have grown by 171 percent and supermarkets by 50 percent. In Jakarta, for example, there are six convenience stores per 1 million inhabitants. These stores are increasingly present in poorer areas of the city (FIGURE 29).

Rise in sales and promotion of food and drinks that do not contribute to healthy diets
Although modern food retail stores, such as supermarkets and convenience stores, offer benefits to consumers, the growth of these outlets throughout Asia and the Pacific is linked to higher sales and consumption of ultra-processed food and drinks which are high in saturated fats, trans-fatty acid, free sugars or salt and damaging to health. Lower-and middle-income countries are experiencing particularly rapid increases in the sale of food and drinks that do not contribute to healthy diets, with growth over the last 15 years of 257 percent in Viet Nam, 160 percent in India, 136 percent in the Lao People's Democratic Republic and 129 percent in Nepal (FIGURE 30).

FIGURE 29
Density of convenience stores in Jakarta by subdistrict and
poverty classification, 2021

Legend:
● Convenience stores

Percentage of people
below national
poverty line

■ 6.6–7.8
■ 5.3–6.5
■ 4.1–5.2
■ 2.6–4.0
■ 0–2.5
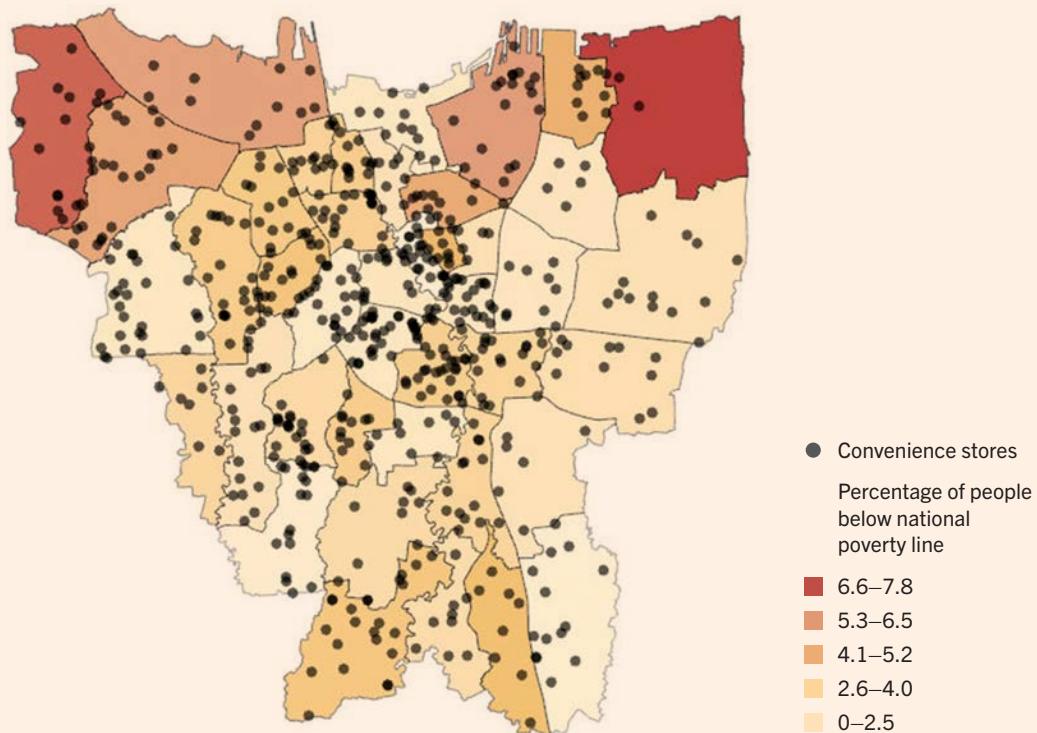
NOTE: Geospatial distribution of convenience stores (from the three leading companies) in Jakarta, by subdistrict and poverty rate.

SOURCE: Google. 2021. Google Maps convenience stores in Jakarta. Cited 20 December 2022. SMERU Research Institute. 2022. Regional Database, Poverty Rate. In: SEMRU Research Institute. Jakarta.

Online sales

Online ordering has helped boost sales of ultra-processed food and drink, particularly during the COVID-19 pandemic (FIGURE 31). In 2013, only 6 percent of fast food and takeaway restaurant sales were online. By 2021, they had risen to 41 percent with some countries showing greater increases. In Malaysia, for example, online orders for fast and takeaway food and drinks jumped from 6 percent to 64 percent between 2018 and 2021, and in Indonesia orders increased from 15 percent to 66 percent over the same period.

FIGURE 30
Increase in sales of ultra-processed food and drink,* 2007–2021

Eastern Asia	Republic of Korea	28.2
	Democratic People's Republic of Korea	36.5
	China	52.2
Oceania (excluding Australia and New Zealand)	Samoa	10.9
	French Polynesia	13.8
	Papua New Guinea	19.0
	Fiji	36.1
South-eastern Asia	Brunei Darussalam	10.1
	Malaysia	18.4
	Thailand	24.1
	Philippines	25.3
	Myanmar	58.9
	Indonesia	79.2
	Cambodia	89.2
	Lao People's Democratic Republic	136.5
	Viet Nam	257.1
Southern Asia	Afghanistan	57.7
	Sri Lanka	62.2
	Pakistan	77.8
	Bangladesh	78.9
	Nepal	128.6
	India	160.5

PERCENTAGE

NOTE: *Food and beverages categories included: savoury snacks; confectionery; ready-to-eat meals; processed sauces and dressings; ready-to-heat soups; sweet spreads; breakfast cereal; sweet biscuits, snack bars and fruit snacks; soda; juice drinks (up to 24 percent juice); nectars; ready-to-drink coffee; ready-to-drink tea.
SOURCE: Euromonitor International Passport. 2021. Global Market Information Database. London, UK. Cited 3 January 2023.
https://www.euromonitor.com/our-expertise/passport

FIGURE 31
Online sales of fast food and takeaway restaurants in Asia and Pacific, 2013–2021
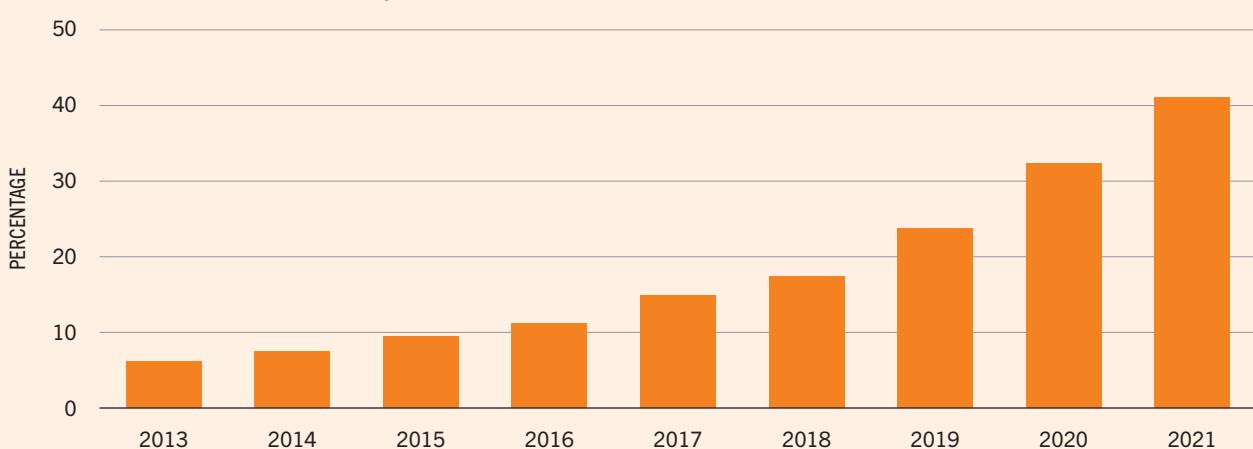
NOTE: The figure presents data for China, India, Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Singapore, Thailand and Viet Nam.
SOURCE: Euromonitor International Passport. 2021. Global Market Information Database. London, UK. Cited 3 January 2023.
https://www.euromonitor.com/our-expertise/passport

Opportunities and challenges of working mothers

An increase in female participation in the workforce that often accompanies urbanization partly explains the dietary shift from traditional food preparation to a reliance on pre-cooked, convenience and processed foods.[90] Urbanization has given more women the opportunities and the need to work away from home. While women and their households benefit from the income they earn in the paid workforce, there has not been a corresponding shift towards more equitable sharing of domestic tasks, including responsibility for food preparation, nutrition and childcare, that are typically and disproportionately incurred by women in the home. The resulting time constraint for working women creates greater demand for pre-cooked, convenience and processed foods, instead of more traditional and time-intensive food preparations.[91]

The impact of employment on food insecurity and malnutrition among poor urban households is complex. Although unemployment has been associated with higher levels of food insecurity,[92] employment, in particular of mothers, poses different challenges to food insecurity and malnutrition. Women, especially those with low education, often rely on low-paid jobs in the informal sector that provide an income but do not eliminate food insecurity. Studies of urban poor women working in the informal ready-made garment sector in Bangladesh and Myanmar have shown a high prevalence of undernutrition (underweight and micronutrient deficiencies such as iron-deficiency anaemia, vitamin A deficiency, and calcium deficiency),[93] poor dietary quality and restricted food intake.[94] Migration patterns, employment, food insecurity and living conditions all influence the inadequate dietary diversity among these women. The pandemic also impacted the ready-made garment industry: several factories closed temporarily or permanently, and workers' lost income contributed to their food insecurity and inadequate nutrition. In some factories in Myanmar, workplace lunch programmes ended, and salaries were reduced due to financial constraints.[95]

Evidence from an urban low-income community in Surabaya, Indonesia, highlighted the impact of maternal employment on the nutritional status of children under 5 years of age.[96] The children of non-working mothers had significantly higher height-for-age z-scores (HAZ) than those of working mothers. HAZ and weight-for-age z-scores of the children of informal workers were significantly lower than those of formal workers. Time constraints due to work have also been associated with poorer infant and young child feeding and caring practices, such as low rates of exclusive breastfeeding among working urban poor mothers,[97] and also with less time to cook food and buy fresh food at markets.

Employers and workplaces have a role to play in creating working conditions that support childbearing, breastfeeding and infant nutrition. Additionally, broader supportive legislation, such as maternity protections and breastfeeding support in the workplace, are necessary to create an enabling environment that protects working women and their young children's nutrition. For example, workforce nutrition interventions targeting the garment sector through (a) maternity protection and breastfeeding support, such as a UNICEF-led intervention in Dhaka (see case study 2), (b) micronutrient supplementation, or (c) social and behaviour change communications (SBCC) with cash transfers, as in Myan Ku in Yangon, hold tremendous potential for improving the nutrition situation of both women and their children.[98]

Overall, workplace interventions can reduce absenteeism and generate improved worker health and nutrition[99] and greater productivity.[100]

Box 2
UNICEF workforce intervention in Dhaka, Bangladesh

The garment sector in Bangladesh directly employs 4.4 million people, 80 percent of whom are female. Many of these women are mothers and absenteeism can be high, as workplace policies typically do not support breastfeeding of infants and young children. To address this, UNICEF developed the Mothers Work programme.[101] It focused on implementing seven minimum standards for maternity protection and breastfeeding support in the workplace. All participating factories showed improvement in implementing these minimum standards, and there was a positive shift in knowledge and breastfeeding practices among working mothers, as well as increased factory productivity. The Mothers@Work programme has expanded and now reaches about 160 000 workers and their young children. Factories often found it challenging to create a dedicated space for breastfeeding because of infrastructure and financial constraints. To ensure sustainability, a wide range of implementation strategies are being developed from the factory level to the policy level. Upgrades of factory policies and the legal framework based on Mothers@Work have been completed but successful rollout is dependent on ongoing funding and collaborations and could be hampered by space issues.

Infant nutrition in urban contexts

One reason why focusing on nutrition and food security in poor urban areas is important is because population-based survey and surveillance data from Asia and the Pacific highlight an increase in the number of stunted children in cities of low- and middle-income countries. The data show that one in three stunted children live in an urban area.[102]

Dietary practices are important, starting from birth. The WHO recommends appropriate breastfeeding practices for all infants, including immediate, exclusive and continued breastfeeding. For children up to six months old, exclusive breastfeeding is the safest, healthiest, and most accessible method of infant feeding.[103] The prevalence of exclusive breastfeeding varies across Asia, from 14 percent in Thailand to 80.9 percent in Sri Lanka, and in the Pacific it ranges from 39.8 percent in Fiji to 76.2 percent in the Solomon Islands.[104] Slum populations often display a lower prevalence of exclusive breastfeeding compared to national figures. Among multiples reasons, this could be attributed to a lack of exposure to promotional messages and initiatives aimed at improving breastfeeding practices.[105]

Marketing of breastmilk substitutes
Use of breastmilk substitutes (BMS) is on the rise in Asia and the Pacific.[106] Highly targeted marketing of BMS to mothers in urban areas has contributed to the increase in their use among poor, urban populations (see case study 3). This is very important: The use of BMS means that infants are not receiving the nutritional benefits of breastmilk, households spend money on BMS that could be used to buy other food, and BMS are associated with risk of obesity.[107] Targeted marketing undermines women's confidence in their ability to breastfeed, while aspirational and emotional appeals delivered through television, social media, in supermarkets and by health professionals portray BMS as a way to achieve a modern lifestyle that it is optimal for children's physical and intellectual development.

In Cambodia, an analysis of the DHS between 2000 and 2010 found that one-fifth of urban infants under 6 months old were being given BMS. The greatest increase in bottle use happened among the urban poor (from 5.8 percent to 21.7 percent).[108] As a result, Cambodia rolled out a monitoring and enforcement system (Sub-Decree 133), which restricts the promotion of BMS marketed for children under 2 years of age, unless approved by the Ministry of Health.[109] Companies not complying have been fined.[110] In urban Indonesia (Bandung city), maternal employment outside the home and the perception of insufficient breastmilk production were the primary motivating factors for BMS feeding, rather than breastfeeding.[111] Women who work outside the home face particular challenges in breastfeeding, particularly those working long hours and in low-paid, informal job settings with no maternity protections. They may face logistical or other constraints to breastfeeding their child related to time poverty, maternity leave, nursing breaks and a lack of refrigeration for storage of expressed breastmilk.

Despite its common use, there are several dangers in marketing BMS, particularly infant formula, and this marketing can be particularly problematic for those living in low-income populations. Access to clean water and facilities for proper cleaning and storage of bottles is difficult in slums, where housing and WASH infrastructure is often inadequate. A child living in unhygienic conditions and without access to safe water who is not breastfed is significantly more likely to die from diarrhoea or pneumonia than a breastfed child.[112] Additionally, formula feeding requires continued access to cash to finance sufficient quantities of the product for a sustained period. Ultimately, failures of the urban food system, including aggressive marketing and unregulated practices of BMS companies, limited health system support and weak maternity protections, contribute to the rising use of BMS in the region.

Box 3
Intense exposure to BMS marketing among urban women

A recent WHO and UNICEF publication documented the USD 55 billion industry's marketing efforts among urban populations across multiple regions in the world as focusing on being "Westernized," modern, premium, supporting growth and intelligence, and being close in formulation to breastmilk.[113]

A repeated and high level of exposure to BMS marketing among women in urban areas is common in several countries, including many in Asia and the Pacific. Most women in urban China (97 percent) and in Viet Nam (92 percent) self-reported exposure to BMS marketing. Additionally, 46 and 35 percent of women, respectively, reported having received a free sample of milk formula.[114] In Indonesia, although legislation exists to restrict BMS marketing within and outside the health system, a study in Bandung City found that 93 percent of mothers reported observing a BMS promotion outside the health system through television, social media and newspapers, among other outlets. At the same time, 43 percent reported observed a BMS promotion within the health system, including recommendations from health workers.[115] Cross promotion of products, including maternal milk products, and efforts to establish brand loyalty early on in pregnancy are common. Most women surveyed in China and Viet Nam (93 percent and 96 percent, respectively) had not only heard of maternal milk products but could establish brand loyalty and familiarity with BMS products during pregnancy.[116]

Of particular concern in many countries, including Bangladesh, China and Viet Nam, is the scope and impact of digital marketing strategies for the promotion of BMS. This form of marketing dramatically increases the reach and impact of BMS promotions, particularly through the dissemination of persuasive, highly targeted content.[117]

Understanding inequalities through DHS and MICS data

For this report, data from MICS and DHS have been analysed for 13 countries where data were publicly available with no access fees and published since 2015.[ii] These data are based on highly resource-intensive cross-sectional surveys and do not provide a picture of how things are changing in the region over time. The data were either designed to be nationally representative or, in the case of some MICS surveys, representative of one region within a country. The data are not representative at the city level and the focus on census-based sampling frames often makes these types of data more likely to miss the urban poor, particularly those living in informal settlements. These datasets also focus on women of reproductive age and their children (often aged under 5 years) but are limited by a lack of detail about the diets and nutritional status of older adults, men or school-aged children. Nevertheless, the scope of the studies and their uniform methodology provide insights on several standard nutrition outcomes across the region.

The 13 MICS and DHS datasets used in this report include urban populations ranging from 22 percent in Bangladesh to 68 percent in Nepal (ANNEX 5). In the urban populations of Asia and the Pacific that have been studied by MICS and DHS since 2015, the proportion of the surveyed populations living in slums varies from 1 percent in Thailand to 66 percent in Kiribati. Of the 12 surveys analysed, 50 percent collected data from urban samples that included a quarter or less of the sample defined as living in slums based on the UN-HABITAT definition,[118] which highlights the lack of data on which to base an understanding of slum drivers of diets and nutritional outcomes in the region using publicly available large survey datasets.

Contributing factors to urban food security

The urban populations studied in the Asia and the Pacific region had highly variable levels of ownership of agricultural land ranging from 3 percent in Mongolia to 66 percent in Nepal, with 8 out of the 13 countries surveyed having less than 25 percent of the urban households owning agricultural land. Animal ownership was also exceptionally varied in these urban populations from 6 percent in Thailand to 82 percent in Kiribati, although in 10 out of the 13 available surveys less than 25 percent of urban households owned any animals. Combined, the lack of ownership of agricultural land and livestock shows that these urban populations are predominantly reliant on sources outside of the household for food (ANNEX 5).

Refrigerator ownership across the 13 surveys varied from 12 percent in Kiribati to 85 percent in Mongolia. Refrigerator ownership in four countries was less than 50 percent, meaning these households were unable to safely store food that is reliant on cold chain storage at home. Access to refrigerators also varies considerably by those living in poverty versus those living in urban areas that are relatively wealthier. For example, 83 percent of non-slum households in the Philippines urban survey owned a refrigerator versus only 12 percent of those in urban slums. In other countries such as Kiribati, access to a refrigerator is universally low for all urban populations although disparities still exist between slum and non-slum residents. Only 7 percent of slum dwellers have a refrigerator while 16 percent of non-slum dwellers do. Mongolia is an exception to this pattern with over 80 percent for both slum and non-slum-dwellers owning refrigerators. Refrigerator access also varies by maternal education.

---

ii   Please refer to Annex 5 for details of DHS and MICS data of the 13 countries.

In Bangladesh, large inequalities exist: Only 26 percent of families have a refrigerator when the mother has no formal education, with ownership increasing to 90 percent for those with the highest level of maternal education.

Key DHS data related to nutrition and child feeding
The majority of urban children in the 13 surveys from the region were breastfed within 24 hours of birth, with rates ranging from 66 percent in Pakistan to 95 percent in Mongolia. In the urban samples of the 11 countries for which MICS and DHS data were available to calculate a minimum acceptable diet (MAD) indicator for infants and young children, the proportion achieving a MAD varies from 20 percent in Pakistan to 83 percent in Indonesia. Achieving minimum dietary diversity (MDD) is more problematic in urban areas across the countries than achieving a minimum acceptable meal frequency (MMF). At least 60 percent of children were achieving MMF in urban areas across countries, while the percent achieving MDD across the 11 surveys varies from as low as 12 percent in Kiribati to 64 percent in Indonesia. Nine out of the 11 countries have less than 50 percent of infants and young children achieving MDD in urban areas.

Of the nine surveys that collected anthropometric data, rates of stunting in the urban population among children under 5 years of age varied from 5 percent in Tuvalu to 30 percent in India. Rates of wasting in the urban population varied from 2 percent in Mongolia to 24 percent in Nepal. Only three of the surveys (India, Myanmar and Pakistan) contained information on maternal body mass index (BMI) for urban populations, with Pakistan displaying the highest rates of overweight and obesity (63 percent) and India the highest rates of underweight (15 percent). Only two of the surveys collected information on iron-deficiency anaemia in the urban population (India and Myanmar), with both countries' data showing very high levels of anaemia at 51 percent and 46 percent, respectively.

Using data to unpack the 'urban advantage'
Historically, data have portrayed populations as being better off in cities compared to rural areas, suggesting that populations benefited from an 'urban advantage' and had better access to health, food and education, as well as higher incomes and improved infrastructure.[119] However, these views are misleading because a large part of the urban population is being left behind. Official statistics which compare rural and urban areas usually understate both the scale and depth of urban poverty in two main ways. The first is due to an over-reliance on poverty lines and a lack of consideration of living conditions in urban areas, particularly around housing, infrastructure and services. The second is the use of asset-based indices of wealth that were originally developed for use in rural environments and often do not capture the subtleties of wealth in urban contexts.[120] A lack of data often results in a lack of consideration of poverty as a multidimensional concept in analyses of poor urban areas.

When surveys are conducted in urban slums, or when data are disaggregated according to wealth or maternal education, major disparities in health, nutrition and food security are observed for those living in poor urban areas.[121] This is evident from secondary analysis of DHS/MICS data within the region where, for example in Mongolia, 93 percent of children in the families in the lowest wealth quintile do not meet the standards of a minimum acceptable diet (MAD) versus 55 percent of those in the wealthiest quintile (see FIGURE 32). Similarly, all of the indicators of infant and young child urban malnutrition

FIGURE 32
Minimum acceptable diet by wealth quintiles — proportion not
meeting minimum acceptable diet, sample from
slum areas (percent)
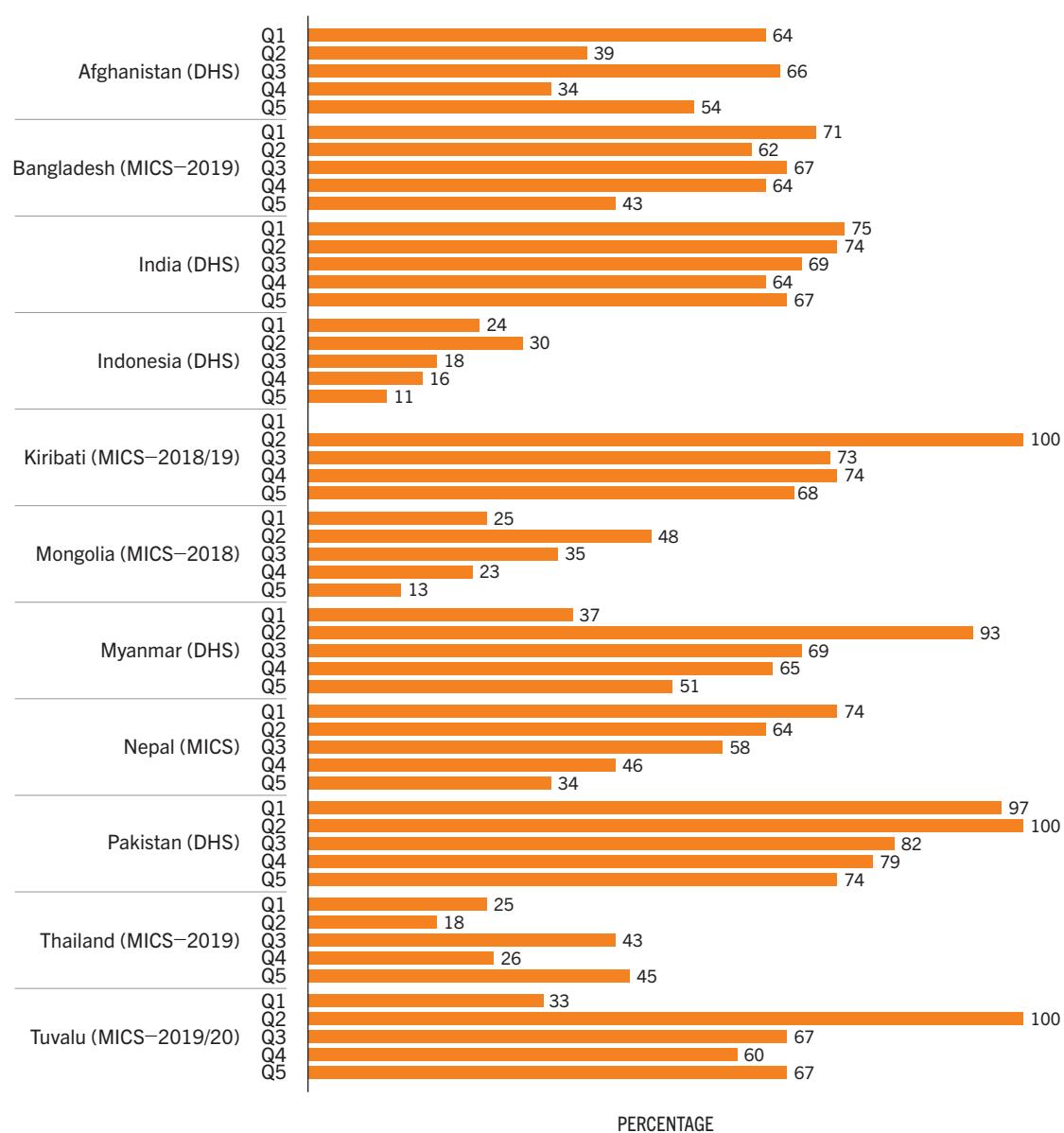
NOTE: Data analysed by Dikoda (11 out of 13 countries).

SOURCE OF RAW DATA: UNICEF. 2022. Multiple Indicator Cluster Surveys (MICS). In: *UNICEF*. New York, NY. Cited 9 January 2023. https://mics.unicef.org/;
USAID. 2022. Demographic and Health Surveys (DHS). In: *USAID*. Washington, D.C. Cited 9 January 2023. https://dhsprogram.com/Data/

in the available DHS/MICS samples are worse in those from households situated in
slums compared to non-slum areas. The largest disparities are seen in Pakistan where
40 percent of infants and young children in non-slum residences were classified as
stunted compared to 25 percent in slum areas (see FIGURE 33).

FIGURE 33
Stunting by wealth quintiles
— sample from slum areas (percent)

Bangladesh (MICS−2019)
Q1 26
Q2 22
Q3 17
Q4 18
Q5 13

India (DHS)
Q1 24
Q2 25
Q3 23
Q4 18
Q5 13

Kiribati (MICS−2018/19)
Q1
Q2 36
Q3 11
Q4 8
Q5 7

Mongolia (MICS−2018)
Q1 11
Q2 11
Q3 6
Q4 5
Q5 3

Myanmar (DHS)
Q1 24
Q2 16
Q3 12
Q4 18
Q5 10

Nepal (MICS)
Q1 22
Q2 19
Q3 20
Q4 18
Q5 12

Pakistan (DHS)
Q1 21
Q2 26
Q3 23
Q4 18
Q5 14

Thailand (MICS−2019)
Q1 8
Q2 11
Q3 8
Q4 7
Q5 10

Tuvalu (MICS−2019/20)
Q1 10
Q2 2
Q3 2
Q4 1
Q5 5

PERCENTAGE
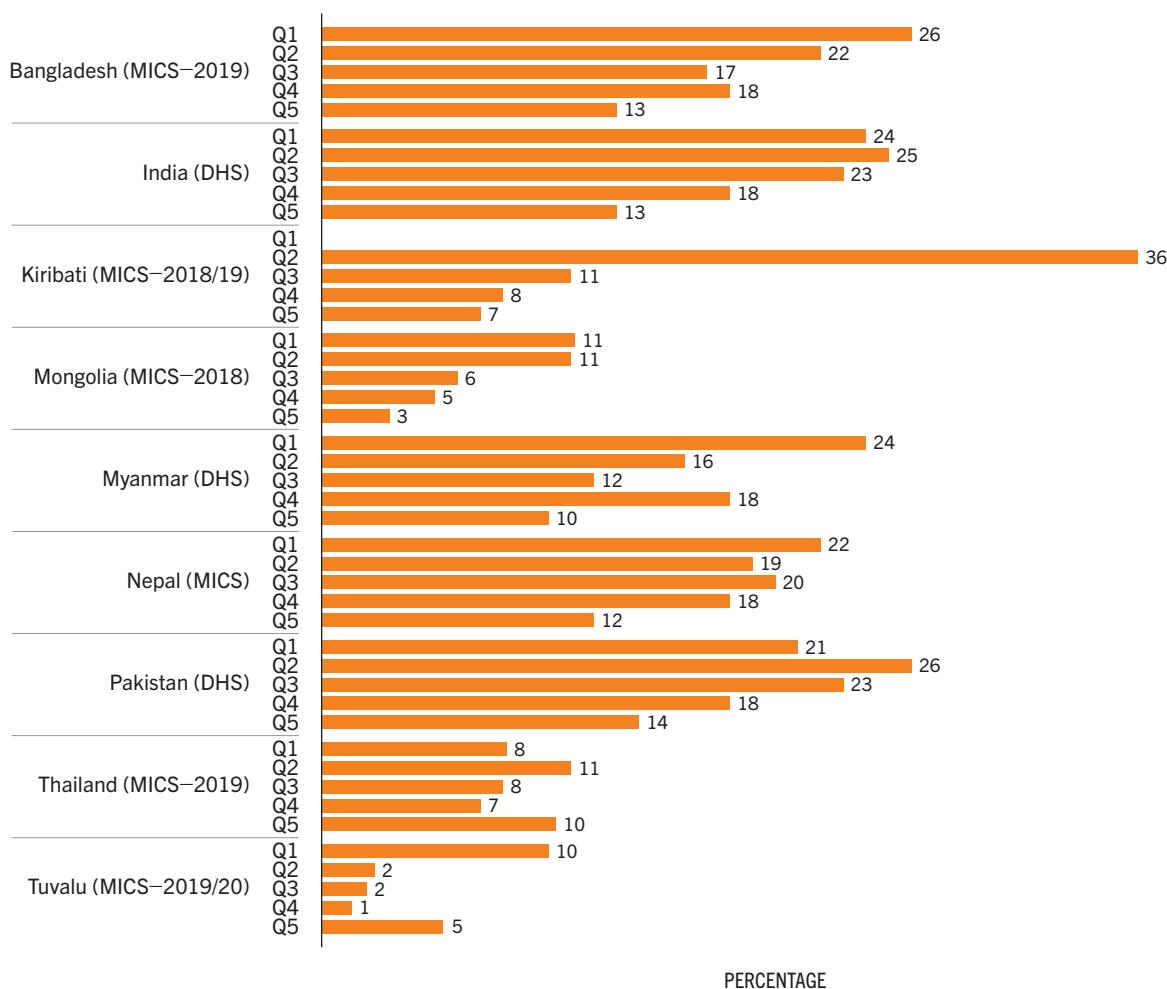
NOTE: Data analysed by Dikoda (9 out of 13 countries).

SOURCE OF RAW DATA: UNICEF. 2022. Multiple Indicator Cluster Surveys (MICS). In: *UNICEF*. New York, NY. Cited 9 January 2023. https://mics.unicef.org/;
USAID. 2022. Demographic and Health Surveys (DHS). In: *USAID*. Washington, D.C. Cited 9 January 2023. https://dhsprogram.com/Data/

All the countries that collected maternal body mass index (BMI) data revealed inequalities in urban maternal BMI, with the poorest group having the highest prevalence of underweight and iron deficiency anaemia and the richest groups having the highest prevalence of overweight and obesity (FIGURES 34 AND 35). This reinforces the need for double-duty actions to tackle malnutrition equally in urban populations in the region.

Such findings reinforce the need to explore inequalities within slums rather than simply comparing rural versus urban outcomes. Although inequalities exist there are also opportunities to support food security. However, strategies to improve food security and nutrition in the region need to recognize the different needs between and within countries by the levels of poverty to be successful. For instance, livestock ownership is consistently either similar in slum and non-slum residences, or higher for those living in slum areas across the 12 surveys. This shows the potential to further support slum dwellers rearing their own livestock as a source of nutritious food and potential income.

FIGURE 34
Maternal BMI by wealth quintiles — sample
from slum areas (percent)
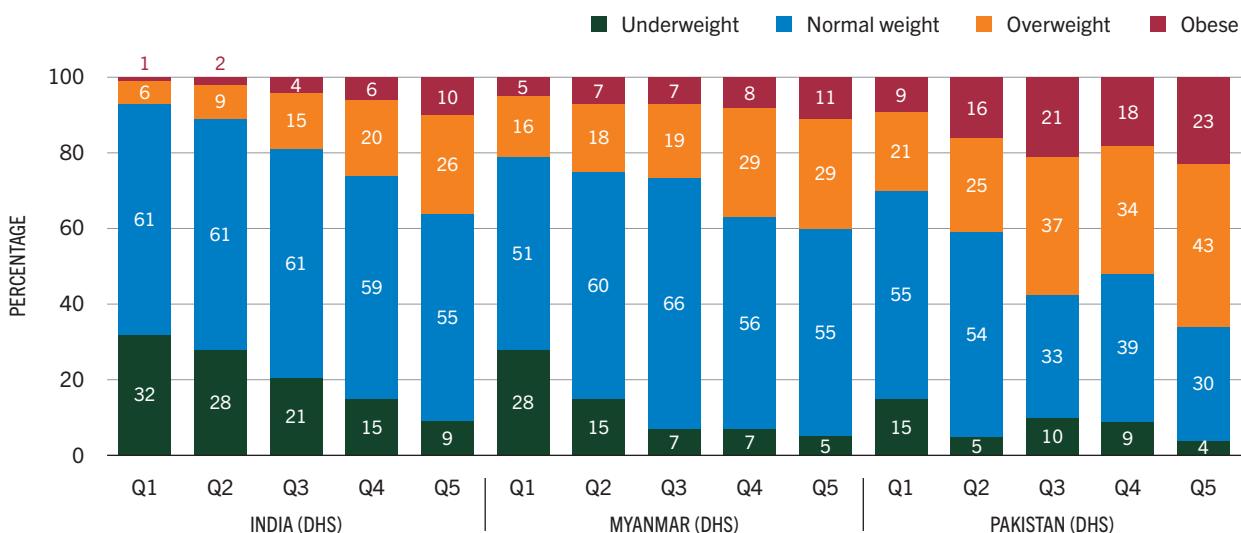
NOTE: Data analysed by Dikoda.

SOURCE OF RAW DATA: UNICEF. 2022. Multiple Indicator Cluster Surveys (MICS). In: *UNICEF*. New York, NY. Cited 9 January 2023. https://mics.unicef.org/;
USAID. 2022. Demographic and Health Surveys (DHS). In: *USAID*. Washington, D.C. Cited 9 January 2023. https://dhsprogram.com/Data/

FIGURE 35
Maternal iron deficiency by wealth quintiles
— sample from slum areas (percent)
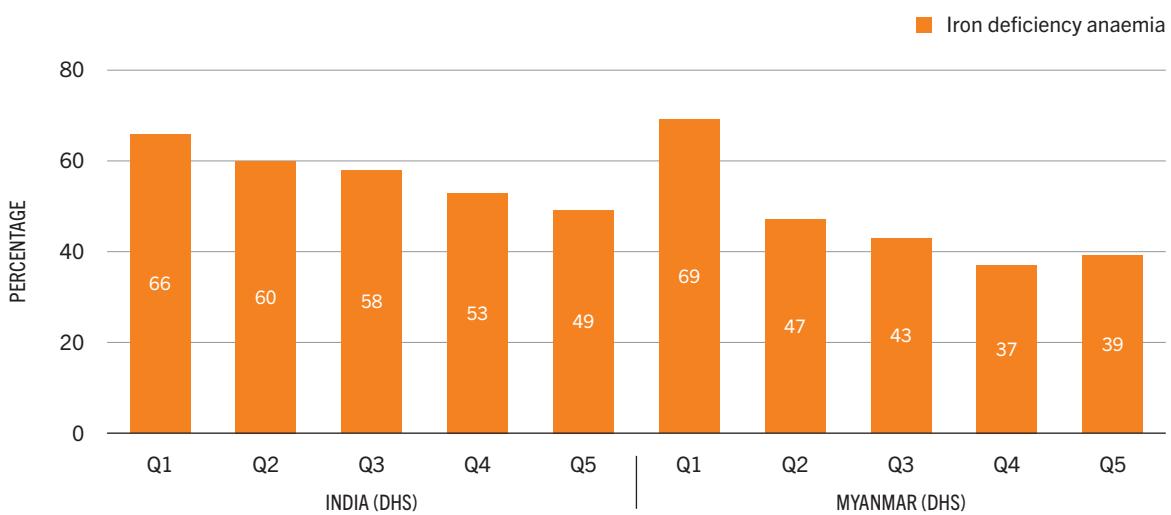
NOTE: Data analysed by Dikoda.

SOURCE OF RAW DATA: UNICEF. 2022. Multiple Indicator Cluster Surveys (MICS). In: *UNICEF*. New York, NY. Cited 9 January 2023. https://mics.unicef.org/;
USAID. 2022. Demographic and Health Surveys (DHS). In: *USAID*. Washington, D.C. Cited 9 January 2023. https://dhsprogram.com/Data/

What is clear is that data collected to date on food security and nutrition is variable and often sparse, limited by inconsistent measurement approaches and a failure to explore different sub-groups of the population. These weaknesses limit our ability to have a complete understanding of the profile of nutrition and food (in) security among different groups in urban areas. FAO's Urban Food System Assessments for Nutrition (UFSAN) Tool[121] is one way to foster progress in this area, and by providing standard guidelines for existing tools, methodologies and approaches to systematically track the performance of food systems, with the ultimate aim of improving diets among vulnerable groups.

■
7.2 CURRENT FOOD SECURITY AND NUTRITION SITUATIONS IN SLUMS

Slum dwellers and those living in informal settlements are under-represented in both nationally representative surveys such as DHS and MICS, and in smaller-scale analyses. Many surveys completely omit slum populations that are considered transient or officially do not exist in census registers used for survey sampling. This presents a significant oversight given the need to assess and better understand the nutrition and food security situation of the most vulnerable urban populations.

When surveys are conducted in urban slums, or when data are disaggregated according to wealth or maternal education, major disparities are exposed in health, nutrition and food security for those living in poor urban areas.[123] This is evident from secondary analysis of DHS/MICS data within the region. In Nepal, for example, 74 percent of children in families in the poorest quintile do not meet the standards of a minimum acceptable diet (MAD) versus 34 percent of those in the wealthiest quintile (see FIGURE 32). Similarly, all the indicators of infant and young child urban malnutrition in the available DHS/MICS samples are worse among those from households in slums compared to those in non-slum areas. The largest disparities are in India where 25 percent of infants and young children in non-slum residences were classified as stunted compared to 31 percent in slum areas (see FIGURE 33).

Across Asia and the Pacific, only four countries (India, Indonesia, Myanmar and Philippines) had recent data with the geographical granularity and sample size required to assess the situation of those living in slums (refer to the summary table in ANNEX 6, which showcases the results of a scoping review of accessible databases conducted in September–November 2021). The inclusion of slum populations is far from systematic when conducting surveys in urban areas. In part, this relates to challenges in defining, and therefore identifying, slums. For India, an analysis based on Indian National Family Health Survey data from 2006 and 2016 calculated slum level estimates from data that was not originally representative of that geographical unit. The study categorized an urban household as being part of a slum if it met a minimum of two of the following four criteria: (1) overcrowding or insufficient living space, defined by three or more people sharing a room; (2) non-durable housing, which means the wall, roof or floor is built with unimproved materials; (3) no access to improved and adequate safe drinking water; and (4) no access to adequate sanitation facilities.[124] This method could be a way around some of the constraints faced by big national surveys.[125]

Status and Determinants of Food Insecurity and Undernutrition in poor urban areas surveys (SDFUs) in three cities

SDFU surveys conducted between 2018 and 2021 among the urban poor in three cities — Jakarta in Indonesia, Yangon in Myanmar, and Quezon City in the Philippines — highlighted the food security and nutrition situation in their respective areas. The Myanmar SDFU was carried out in 2018, and the Philippines and Indonesia SDFUs were conducted in 2020 during the COVID-19 pandemic. Details of these surveys are in ANNEX 7.

The COVID-19 pandemic significantly impacted these surveys as data collection was undertaken during the height of the first wave of outbreaks and so much of it was collected by telephone interview. At least 60 percent of surveyed households in all three cities reported being worried about food in the year preceding the SDFU surveys. In Jakarta and Quezon City, food insecurity was highest among households that were most severely impacted by the pandemic, those using emergency coping strategies and those experiencing extreme poverty. In Yangon, data indicate that the effects of the pandemic (and the political crisis) have pushed an already vulnerable urban poor population further into food insecurity.

There were changes in food-buying and consumption patterns, including reduced purchases of nutritious foods such as animal source foods, eggs and pulses due to rising prices. Consumption of nutrient-dense, diverse foods among women and children declined, and although the consumption of foods high in energy density and minimal nutritional value also decreased, they were still bought and were consumed by over 50 percent of children under 5 years of age. Consumption of foods high in energy density but with minimal nutritional value remains a serious problem for both mothers and children in slums in all three cities. The pandemic has exacerbated vulnerabilities and reinforced poor practices.

■

7.3 IMPACT OF THE COVID-19 PANDEMIC ON FOOD SECURITY, NUTRITION AND DIETS

The crisis is estimated to have pushed as many as 45 million people into acute food insecurity since early 2020, of whom nearly three-quarters (33 million) are in Southern and South-eastern Asia.[126] Estimates indicate that the COVID-19 pandemic could result in an additional 9.3 million wasted children under 5 years of age and 2.6 million stunted children under 5 years of age by 2022.[127] The effects of the pandemic on food insecurity and nutrition have varied across countries depending on the duration of restriction measures and on factors associated with the food value chain, both domestic and international.[128] The effect in the Pacific, including the Pacific Small Island Developing States (SIDS), is still being evaluated, as some of these countries have only recently been exposed to the pandemic. However, given that most of these countries are dependent on tourism and trade, the economic contractions make them vulnerable to food insecurity.[129]

In urban contexts, some of the most affected groups have been individuals with low socio-economic status, informal workers, young adults reliant on daily wages, and women.[130] FIGURE 36 shows that the prevalence of household food insecurity during

FIGURE 36

Prevalence of household food insecurity in 2020–2021 based on
the FIES among surveyed households in Jakarta (777),
Quezon city (2 468) and Yangon (2 201)
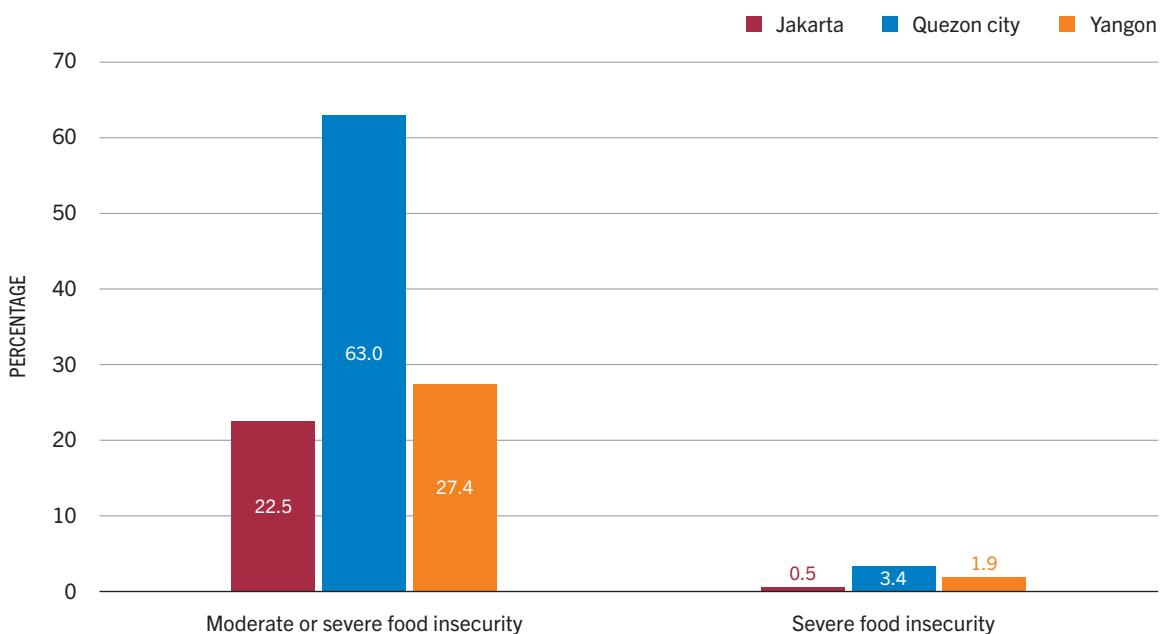
SOURCE: Auma, C., Pradeilles, R., Ohly, H., Eymard-Duvernay, S., Brizendine, K., Blankenship, J., Singhkumarwong, A. and Goudet, S. (forthcoming). Urban nutrition situation in the slums of three cities in Asia during the COVID-19 pandemic. *Maternal and Child Nutrition Journal*.

the pandemic in urban slums, assessed using the Food Insecurity Experience Scale (FIES), was 22.5 percent in Jakarta, 63.0 percent in Quezon City, and 27.4 percent in Yangon.[131] The same survey found that households with reduced purchasing power dramatically altered the way they bought foods, with reduced purchases of nutritious foods such as meat, poultry, fish, eggs, fruits and vegetables. Other nutritional consequences of the pandemic were a result of physical and financial barriers to accessing food (see BOX 4). In Yangon, 69.7 percent of households in peri-urban slums were living below the national poverty line, and 58.6 percent of households reported borrowing money to buy food.[132]

Women's nutrition status

Although food insecurity impacts males and females of all ages, the pandemic's nutritional impacts are particularly concerning for women of reproductive age who have increased nutritional needs for reproduction and lactation. Women's autonomy and empowerment are known to be important for improving nutrition outcomes,[133] yet they are often low in Asia and the Pacific. Standardized dietary indicators, such as dietary diversity, are most commonly available for women and young children, meaning that we know more about the influence of the pandemic on these indicators than about nutrition across the spectrum of the different age and sex groups within the population. The minimum dietary diversity of women (MDD-W) captures the proportion of women consuming at least five out of ten pre-defined food groups in the previous day or night. This dietary diversity indicator has worsened due to a reduction in nutritious food

FIGURE 37

Maternal nutrition indicators among surveyed women
in Jakarta (772), Quezon city (2 469) and
Yangon (2 140) in 2020–2021
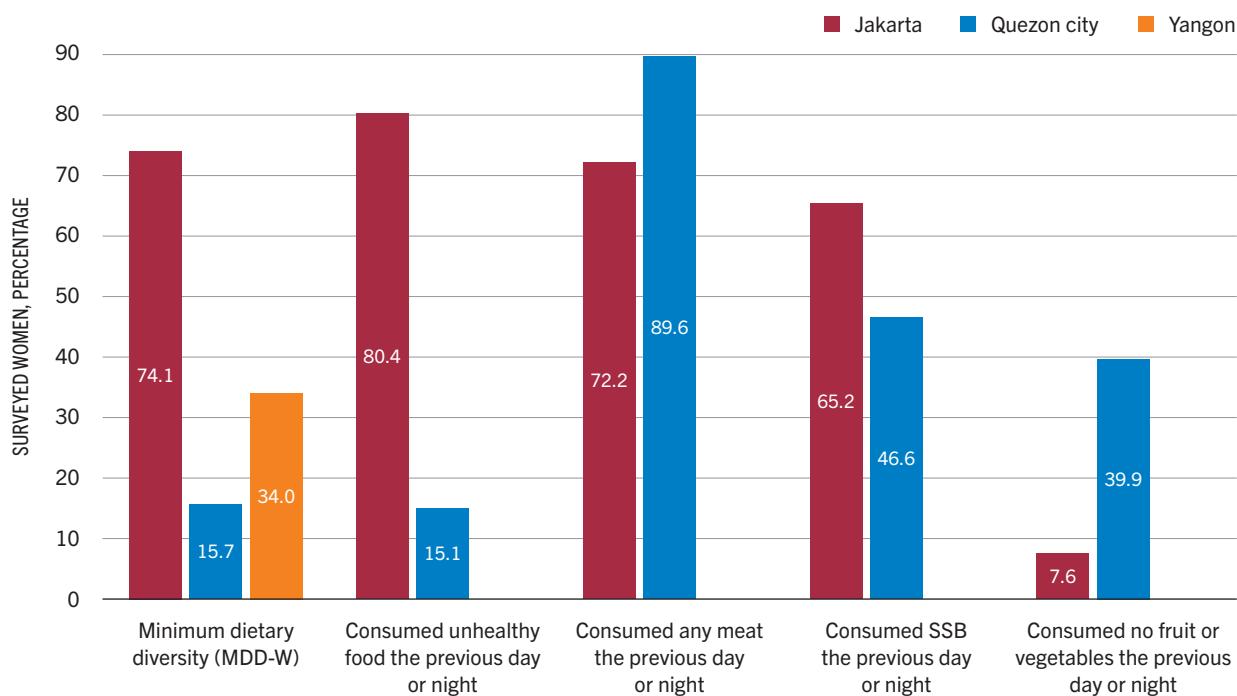
NOTE: SSB = sugar-sweetened beverages; this figure provides a snapshot of key nutrition indicators before and during the pandemic (Annex 7), for a better standing of the direction the indicators are heading.
SOURCE: Auma, C., Pradeilles, R., Ohly, H., Eymard-Duvernay, S., Brizendine, K., Blankenship, J., Singhkumarwong, A. and Goudet, S. (forthcoming). Urban nutrition situation in the slums of three cities in Asia during the COVID-19 pandemic. *Maternal and Child Nutrition Journal*.

consumption and increased consumption of foods high in energy density but with minimal nutritional value in some urban settings. The SDFU surveys in Jakarta, Quezon City and Yangon revealed a decline in the quality and diversity of maternal diets, with the proportion of women achieving MDD-W in Yangon and Jakarta falling by more than 30 percent compared with baseline values (FIGURE 37).[134]

Children's nutrition status

Among children aged 6 to 23 months there has been a decline in the proportion of those who achieved appropriate complementary feeding indicators (TABLE 13). The consumption of nutrient-dense, diverse foods among children declined, particularly the mean dietary diversity score. The consumption of energy-dense foods with minimal nutritional value also declined, but these were still purchased and consumed with concerning regularity by children under 5 years of age. Consumption of energy-dense foods with minimal nutritional value remains a serious problem for both mothers and children in slums in all three SDFU cities. Although children's diets were not necessarily nutritious before the pandemic, it has exacerbated vulnerabilities and reinforced poor practices, leading to declining nutrition and food security. Data suggest that the pandemic (and political crisis in Yangon), and the resulting effects, have pushed an already vulnerable urban poor population further into food insecurity.

TABLE 13
Key indicators for infant and young child nutrition during baseline surveys
(pre-pandemic) and in SDFU surveys (during the pandemic) for
a) those aged 0–23 months and b) aged 24–59 months

a) Children 0 to 23 months

City	Jakarta		Quezon city		Yangon	
Key indicators	**Baseline**	**SDFU (2020)**	**Baseline**	**SDFU (2020)**	**Baseline**	**SDFU (2020)**
Children 0–5 months who are exclusively breastfed	–	35.6	46.4	41.6	51.3	50.3
Children who started breastfeeding within 1 day of birth	–	78.9	82.6	94.8	83.5	28.5
Children who started breastfeeding within 1 hour of birth	71.9	67.1	55.6	85.4	72.7	58.4
Children 6–23 months fed the minimum dietary diversity (MDD)	80.5	38.0	25.1	7.7	36.1	18.7
Children 6–23 months fed the minimum meal frequency (MMF)	94.2	78.5	82.2	70.0	–	57.0
Children 6–23 months fed the minimum acceptable diet (MAD)	75.8	31.6	14.6	6.6	–	12.0
Children 6–23 months fed any commercially fortified baby food	9.6	14.6	–	9.6	–	–
Children 6–23 months fed zero vegetable or fruit	9.6	12.7	–	69.0	–	57.9
Children 6–23 months fed food high in energy density but low in nutritional value	93.3	86.7	–	46.2	–	–
Children 6–23 months fed a sugar-sweetened beverage	53.1	40.5	–	5.5	6.7	5.2
Children 6–23 months fed savoury and fried snacks	62.7	41.1	–	1.6	–	13.0
Food prepared for the child the previous day (12–23 months)	86.9	73.4	–	–	–	–

NOTE: – indicates data not available; this table provides a snapshot of key nutrition indicators before and during the pandemic (Annex 7), for a better understanding of the direction the indicators are heading.

SOURCE: Dikoda. 2021. Status and Determinants of Food Insecurity and Undernutrition in Urban Areas (SDFU).

SURVEY: A Report Brief on the Urban Poor in Jakarta, Quezon city and Yangon.

TABLE 13
(Continued)

b) Children 24 to 59 months

City	Jakarta		Quezon city		Yangon	
Key indicators	**Baseline**	**SDFU (2020)**	**Baseline**	**SDFU (2020)**	**Baseline**	**SDFU (2020)**
Children 24–59 months fed minimum dietary diversity (MDD)	–	65.5	–	12.6	–	42.9
Children fed egg or any flesh foods	–	–	–	–	–	86.3
Children 24–59 months fed zero vegetable or fruit	–	21.5	–	57.2	–	–
Children 24–59 months fed food high in energy density but low in nutritional value	–	92.4	–	52.3	–	62.1
Children 24-59 months fed a sugar-sweetened beverage	–	–	–	13.5	–	–
Children 24-59 months fed savoury and fried snacks	–	–	–	6.5	–	41.0
Children with diarrhoea the last two weeks (0–59 months)	13.0	6.4	–	10.3	7.6	5.5

NOTE: – indicates data not available; this table provides a snapshot of key nutrition indicators before and during the pandemic (Annex 7), for a better understanding of the direction the indicators are heading.

SOURCE: Dikoda. 2021. Status and Determinants of Food Insecurity and Undernutrition in Urban Areas (SDFU).

SURVEY: A Report Brief on the Urban Poor in Jakarta, Quezon city and Yangon.

Box 4
Reduced physical and financial capacities during the COVID-19 pandemic and impact on diets in three cities (SDFUs 2020–2021)

The decline in incomes during the pandemic adversely affected already-vulnerable urban poor households, who resorted to stress and emergency coping strategies, including begging, spending savings and selling household assets. At the same time, food prices increased in response to panic buying, coupled with supply, transportation and logistical challenges resulting from lockdown measures. These shifts in financial and physical access were reflected in the proportion of households in all three cities reporting an outright reduction in the nutritious foods they consumed. In Jakarta, purchases of meat, poultry and fish declined by 61.6 percent, eggs by 46.8 percent, fruit by 49.4 percent, organ meats by 23 percent, and beans, pulses and tofu by 30.2 percent. In Quezon city, purchases of corn fell by 33 percent, animal foods by 16 percent, organ meats by 23 percent and seafood by 40 percent. In Yangon, purchases of beans, pulses, lentils, chickpeas and tofu decreased by 44 percent, meat, poultry, fish and shrimp by 75.2 percent, eggs by 72.8 percent and vegetables by 39.4 percent. The most affected households also reported consuming cheaper high energy density foods with minimal nutritional value as substitutes for more nutritious foods, such as beans, peas, lentils, tofu, animal meat, eggs, fruits and vegetables. Pandemic relief measures, including cash transfers in Yangon, provided a financial and physical buffer for households that reduced the likelihood of children under 5 years of age not consuming fruits and vegetables by nearly 50 percent.

CHAPTER 8
SYSTEM-LEVEL DETERMINANTS OF URBAN FOOD INSECURITY AND MALNUTRITION

Urban nutrition and food systems — and health, WASH, and social protection systems — are important determinants of urban food insecurity and malnutrition (see conceptual framework/FIGURE 20). Cities, local governments and community-level factors are key to addressing malnutrition. The cost of healthy diets and food environments, including street foods, play important roles in meeting residents' energy needs in a nutrition transition context.

■
8.1 DETERMINANTS OF URBAN FOOD INSECURITY AND MALNUTRITION

Food supply chains

Food supply chains refer to producing food and transporting it to where it is consumed, and include agricultural production, storage and distribution, processing and packaging, retail and marketing.[135] The COVID-19 pandemic affected the food security and nutrition of urban populations by disrupting food supply chains within food systems, particularly the food distribution and food retail sectors. The pandemic was also a wake-up call for food supply chains in Asia and the Pacific for exposing structural weaknesses, inequalities and vulnerabilities present long before the COVID-19 pandemic. The disruption to food supply chains it caused, disproportionately affected urban food systems because they typically have longer and more complex supply chains than rural areas, making them more susceptible to shocks.

City and local governments have taken major steps in mitigating the disruptions caused by the pandemic and any negative effects on vulnerable populations. However, an analysis of food systems in eight cities (Chittagong, Cox's Bazar and Dhaka in Bangladesh; Jakarta, Indonesia; Kabul, Afghanistan; Peshawar, Pakistan; Phnom Penh, Cambodia; and Quezon City, Philippines) revealed low resilience to the impacts of the pandemic (see ANNEX 8).[136]

The disruption to food supply chains added to the challenge of making healthy diets affordable and accessible in urban centres. Food prices are an important determinant of dietary intake for the urban poor, and high prices are a major barrier to healthy diets. Food affordability and changes in prices were assessed for key food items in three cities (Phnom Penh, Cambodia; Kabul, Afghanistan; and Peshawar, Pakistan) from March 2020 to March 2021 through surveys with representatives of local non-government organizations (see TABLE 14). Although only a relative measure of short supply, the table shows similarities between Kabul and Peshawar, which are in neighbouring countries, but highlights a significantly different situation in Phnom Penh, where there were no shortages of animal-source foods, fruits and vegetables, or nuts and seeds.

TABLE 14

Food reported in short supply by local non-government organizations
(as a percentage of all respondents) in three cities
during the COVID-19 pandemic

City	Phnom Penh	Kabul	Peshawar
Country	Cambodia	Afghanistan	Pakistan
Manufactured or processed foods	68%	28%	19%
Animal-source foods	4%	22%	21%
Fruits and vegetables	0%	17%	25%
Nuts and seeds	0%	14%	19%

SOURCE: WFP. 2021. Urban food system analysis – Covid-19 city food systems briefs: Phnom Penh; WFP. 2021. Urban food system analysis – Covid-19 city food systems briefs: Kabul; WFP. 2021. Urban food system analysis – Covid-19 city food systems briefs: Peshawar.

In some Pacific Island countries, urban communities developed a range of innovative responses to disrupted food supply systems. In Fiji, producers launched online sales of cooked and fresh products, including vegetables, fruits, root crops and seafood. A Fijian tradition of bartering goods to ease economic stress also emerged as an important adaptation to help affected families during the crisis. In the Solomon Islands, farmers and vendors mitigated the disruption of market closures by establishing informal roadside markets for fruits and vegetables.

Small and medium enterprises (SMEs) in the food industry play a pivotal role in making nutritious and safe foods available, accessible and affordable to urban populations.[137] SMEs comprise more than half of the food system, and so have the potential to bring about major transformation.[138] All stakeholders in the food system, including producers, processors, retailers and consumers, need to be involved in actions to improve nutrition. In many lower- and middle-income countries, SMEs are the backbone of food value chains, which include the processors, wholesalers, retailers and logistics.[139]

The COVID-19 pandemic imposed changes on the operation of SMEs in the food sector. The study of eight cities in Asia found that 1 181 respondents who operated SMEs in the food sector reported most supply chains were moderately (55 percent) or severely (24 percent) disrupted by the pandemic, and access to customers and markets was moderately (56 percent) or severely (27 percent) affected.[140] Some of the actions taken by SMEs to counter income loss and disruption to their businesses included changing to lower-quality food products and cheaper suppliers, reducing the number of products, shortening operating hours, using cheaper distribution methods, and downsizing staff. The SMEs also expressed a need for technical assistance, requesting support in business resilience planning (34 percent), marketing advice (30 percent) and advice on sales/distribution (28 percent). Seasonality has less impact on food availability in urban markets but affects food prices for many urban food vendors. For example, egg prices vary in Quezon city, where some vendors sell eggs during the season when they are cheap from March to June but stop selling when they are out of season and prices rise.[141]

Policy changes since the early stages of the pandemic resulted in some improvements in local food supply chains. These policies also brought benefits by accelerating the transition from traditional to modern supply chains in some countries. Cities and local governments have been key enablers in building inclusive and resilient food systems during the period of disruption and ensuring access to food by the most vulnerable.[142] In Bangladesh, a collaboration between to distribute food aid, prioritized the most vulnerable, including the disabled, elderly, single mothers and children. Taking part in the effort were the two city corporations in Dhaka (North and South), the Ministry of Food, the Ministry of Relief and Disaster Response, and community groups. This allowed the city government to distribute around 300 000 food baskets to the urban poor during a lockdown from March to June when food was scarce to help protect against food insecurity.[143]

Food environment

Food environment refers to the physical, economic, sociocultural and policy conditions that shape access, affordability, safety and food preferences.[144] Proximity, affordability, marketing, access to information, food quality, and safety can all influence dietary outcomes, food security and nutrition.[145] Urban food environments are characterized by increasing diversity of food choices – such as access to processed, packaged and ready-made, energy-dense food – and increased consumption of food that is produced, processed, and cooked by others.[146] The modernization of retail in urban communities is usually characterized by an increase in supermarkets and a concomitant reduction in the traditional markets on which the urban poor often rely to buy food.

Shifting away from traditional fresh-food markets
The urban food environment in Asia and the Pacific is changing with a shift away from traditional markets to supermarkets. This shift creates new challenges for the urban poor. Although supermarkets offer a greater variety of food items and safety guarantees, they are often not accessible for many of the urban poor who continue to shop at traditional formal and informal markets for a range of reasons, including cheaper, fresher products. There are often fewer supermarkets within or near poor urban neighbourhoods that, along with the reduction in traditional markets, can result in food deserts.[147] Fresh markets are the primary source of food for the vast majority of consumers in Asia. They are also important for the livelihoods of vendors who sell fresh food in these markets. Compared to supermarkets, fresh markets are cheaper and more affordable, easy to reach and contain a variety of fresh food. The COVID-19 crisis demonstrated that if fresh markets were not accessible, the price of all major food items would rise due to the disruptions in the supply chain. A key issue pertaining to fresh markets is the absence of good governance leading to lack of hygiene and food safety, food loss and waste, and a poor shopping experience for consumers. Supporting the revamp of fresh food markets through a One Health and community-based approach so that they offer safe and nutritious food to consumers in a congenial environment is necessary and a focus area of FAO's activities in Asia and the Pacific.

Food deserts and swamps
A food desert typically refers to an area where the availability of nutritious and affordable foods is limited; in low income, urban neighbourhoods they contribute to food insecurity and low dietary diversity. In low- and middle-income country (LMIC) contexts, food deserts may be found in neighbourhoods with high vulnerability to political,

environmental and socio-economic shocks. Food swamps, by contrast, refer to an abundance of ready-to-eat, cheap food typically found in poorer urban neighbourhoods that shape food consumption and diets. Urban dwellers are increasingly time-poor because of long working hours in the formal or informal sectors, which further influences food consumption. An abundance of low-cost, highly processed foods of high energy density and minimal nutritional value in poor urban neighbourhoods is contributing to increasing rates of overweight, obesity, micronutrient deficiencies, and other diet-related NCDs associated with the nutrition transition.

Street food vendors

Cities and towns in Asia and the Pacific are also characterized by ubiquitous street food vendors. Street foods are defined as a wide range of ready-to-eat foods and beverages that are sold or prepared in public spaces with easy access from the streets.[148] Street food outlets create employment, including for women and those without educational qualifications working in the informal economy, and play an important role in local culture. Street foods can also bring nutritional benefits by providing accessible, affordable foods with ready availability for time-poor workers, contributing to food security for the urban poor. The nutritional disadvantages of street foods include the risk of microbial contamination, poor hygiene in food preparation and handling, complex or non-existent licensing systems, and weak regulation and food safety inspections.

Unsafe food is a threat to adequate nutrition. Research on street food vendors carried out in 2021 in Dhaka (Bangladesh), Jakarta (Indonesia) and Quezon City (the Philippines) showed that street foods can vary in quality according to location and type of outlet. Street food vendors often operate in or close to urban poor neighbourhoods, on sidewalks or in crowded alleys with limited access to hygiene facilities. Street food vendors might use recycled water to wash dirty dishes, cook with low-quality or recycled cooking oil, or use untreated water to make ice cubes, all of which increase the risk of food-borne disease transmission. These vendors sell goods, including processed foods, that do not contribute to healthy diets or nutritious foods. Ready-made foods (prepared and packaged) were available from fewer than half of the vendors. During the COVID-19 pandemic, only 17 percent of food vendors in an area of Jakarta were observed using protective equipment, such as gloves or masks. This was despite the street food vendors' association instructing all informal food vendors and SMEs to implement the COVID-19 safety protocols from March 2020.[149] In Dhaka, food vendors were generally poorly equipped and virtually none were observed using protective equipment. In Quezon City, just over half (52 percent) of street vendors were observed wearing protective equipment, significantly higher than Dhaka and Jakarta. Vendors expressed a need for financial support during the pandemic to protect their businesses and retain staff.[150]

Recommendations to strengthen the resilience of urban food environments with a focus on street food vendors include promoting the hygienic preparation and sale of street foods, providing protective equipment and protocols for social distancing and the use of screens, using cold-chain equipment, avoiding sales spaces near latrines, sewers and garbage pits, making WASH facilities available and supporting health inspections and certification. The resilience of street food vendors could also be enhanced by assisting them to develop online sales in case of future infectious disease outbreaks or environmental shocks.[151]

Box 5
Market assessment and pandemic coping mechanisms in the slum areas of three cities
(Dhaka, Jakarta and Quezon city)

Rapid market assessments were conducted in three megacities (Jakarta, Dhaka and Quezon City) to understand the market environment and stakeholder perspectives of the COVID-19 pandemic. The methods were informed by the Emergency Market Mapping and Analysis (EMMA) toolkit and adapted to include: food walks in slums (238 outlets), photographic journeys of the egg supply chain from producer to consumer (18 actors), market maps, semi-structured interviews with food outlets (18 respondents), microfinance and financial institutions (5 respondents), a barrier analysis on buying nutritious foods by mothers with children aged under 5 (273 mothers), and urban stakeholder mapping.[152]

The assessments found that in Dhaka and Quezon City, informal street vendors were more adversely affected by the pandemic than formal small and medium food enterprises. The pandemic changed the food environment because of reduced sales of ready-to-eat foods due to the loss of customers from nearby workplaces, lower customer confidence in eating out and reduced household incomes. Few street vendors were able to adapt by using strategies such as online sales (FIGURE 38).

FIGURE 38
Quezon city street food vendor adaptations
and coping mechanisms during
the pandemic (61 vendors)
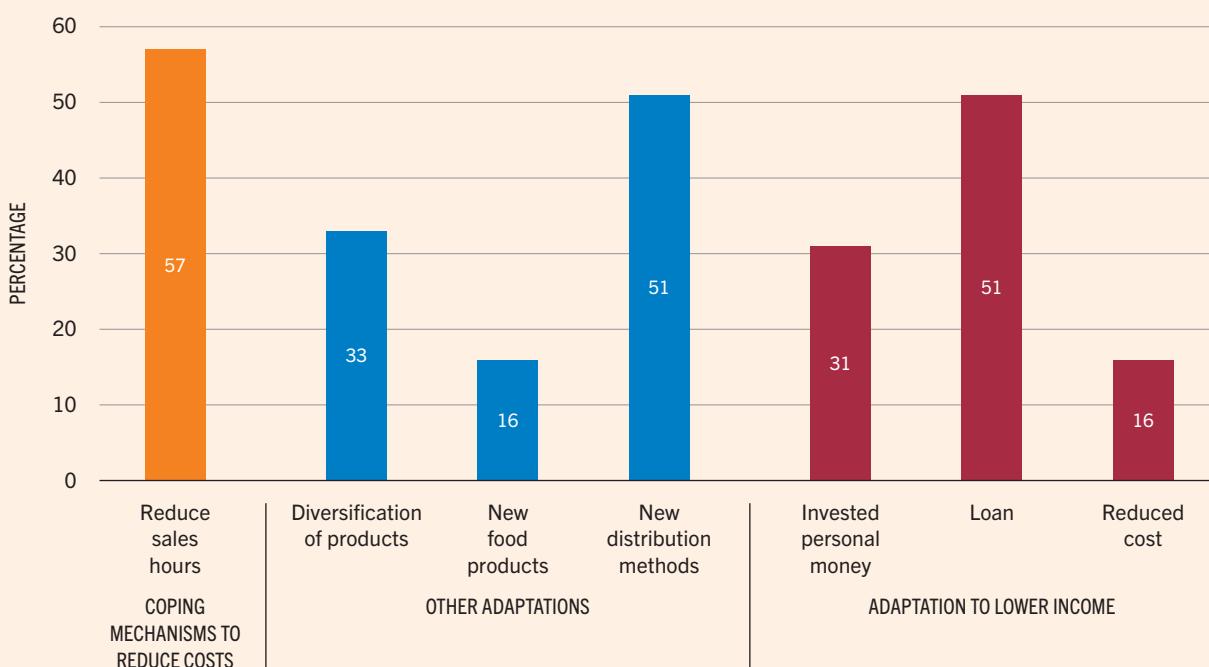
SOURCE: WFP and Dikoda. 2021. Urban rapid market assessment and food system characterization in Jakarta, Quezon City and Dhaka.

Influencing consumer behaviour

Programmes and policies are needed to bring about positive changes in the food environment, and influence consumer behaviours to address food insecurity and malnutrition. Urban food environments can be influenced by national and local policies and governance that determine the regulation and taxation of all types of food products and how they are advertised. In countries where food labelling has been introduced, sales of foods with high energy density and minimal nutritional value have fallen. However, adding labels to street foods is challenging. Government restrictions on marketing foods of high energy density and minimal nutritional value is a key intervention to reduce consumption of these foods. The Plan of Action for Nutrition in the Philippines aims to develop policies and build support for regulation of the marketing of foods of poor nutritional quality for children,[153] and some local governments have banned food marketing around schools. In the Republic of Korea, the sale of foods with high energy density and minimal nutritional value, including fast foods, has been banned within 200 metres of most schools.[154] Malaysia, the Philippines and Thailand are among several countries in the region that have introduced a tax on sugar-sweetened beverages.

Social networks

Community social networks form an important part of food environments. This can include proximity to family, relatives or neighbours who provide support in relation to food access or availability and can therefore buffer against food insecurity risks. Social networks represent an important source of informal social-protection support. They tend to be weaker in urban than rural areas, and therefore, the ability to use coping strategies such as borrowing foods from neighbours is reduced. Surveys of the Status and Determinants of Food Insecurity and Undernutrition (SDFUs) in Jakarta, Quezon city and Yangon revealed that during the COVID-19 pandemic, coping strategies such as borrowing food items from neighbours were less common, but skipping meals or eating smaller portions were more common.[155]

■

8.2 IMPACT OF THE COVID-19 PANDEMIC ON URBAN NUTRITION AND AGRIFOOD SYSTEMS

Agrifood systems play a critical role in increasing the resilience and sustainability of urban physical areas. They determine patterns of land use and food consumption. Strengthening them across towns, cities, and regions is essential for developing inclusive local economies that contribute to livelihoods and employment, and overall sustainable development. Agrifood systems in Asia and the Pacific have focused on increasing food availability and accessibility, but this has often come at the expense of nutritious foods. Urban agrifood systems can be greatly strengthened through rural-urban interconnectivity, by supporting urban informal food economies and enabling collective forms of food production.[156] The pandemic exposed the vulnerability of urban poor populations, with increasing awareness that this has been an urban policy blind spot in many areas in the region.

TABLE 15
Definitions of livelihood-based coping strategies:
stress, crisis and emergency

Livelihood-based coping strategy	Strategies employed
No coping strategy	Not engaged in any strategy
Stress coping	Sold household goods Pawned household assets/goods (such as radio, furniture, television, jewellery) Reduced non-food expenses on health and education Spent savings Borrowed money/food from a formal lender/bank Informal debt without interest
Crisis coping	Sold productive assets or means of transport Withdrew children from school Informal debt with interest
Emergency coping	Begging Pawned house/land certificate or deed

SOURCE: Auma, C., Pradeilles, R., Ohly, H., Eymard-Duvernay, S., Brizendine, K., Blankenship, J., Singhkumarwong, A. and Goudet, S. (forthcoming).
Urban nutrition situation in the slums of three cities in Asia during the COVID-19 pandemic. *Maternal and Child Nutrition Journal*.

FIGURE 39
Coping strategies among urban slum households
in Jakarta (777), Quezon city (474)
and Yangon (2 201)
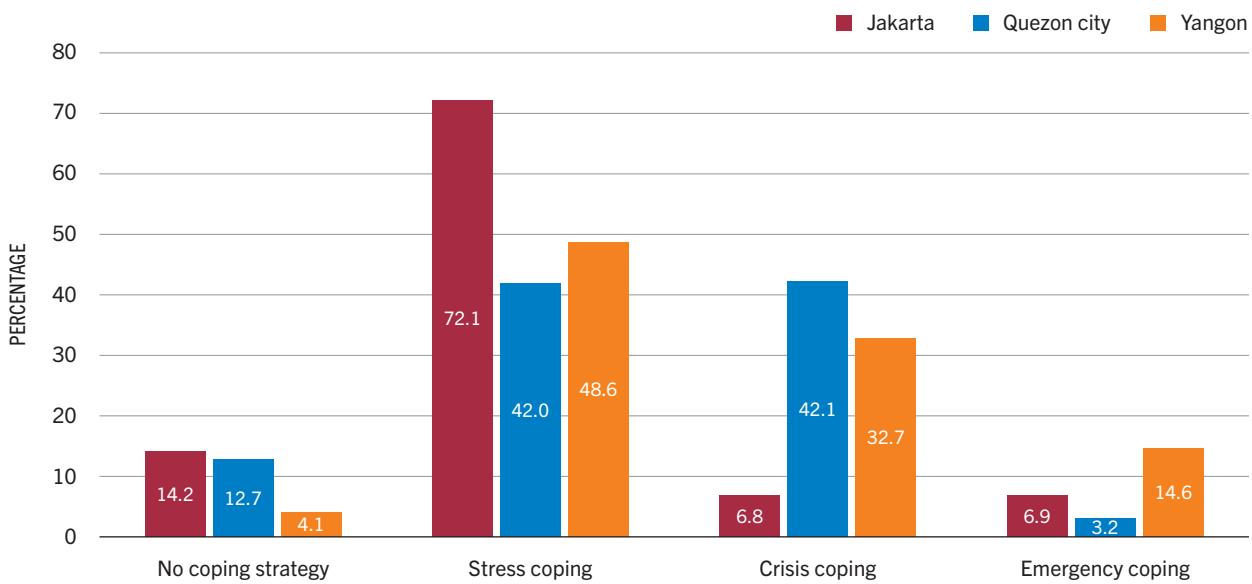
SOURCE: Auma, C., Pradeilles, R., Ohly, H., Eymard-Duvernay, S., Brizendine, K., Blankenship, J., Singhkumarwong, A. and Goudet, S. (forthcoming).
Urban nutrition situation in the slums of three cities in Asia during the COVID-19 pandemic. *Maternal and Child Nutrition Journal*.

Consumer behaviours during the COVID-19 pandemic
Consumer behaviours in Asia and the Pacific have revealed ways that households adjusted to the unprecedented circumstances of the pandemic. SDFUs in Jakarta, Quezon city and Yangon showed a range of strategies that were grouped as stress coping, crisis coping and emergency coping strategies (see TABLE 15). In all three cities, about 80 percent of households employed coping strategies in response to the pandemic (FIGURE 39). The poorest households were more likely to employ crisis coping strategies such as selling household assets, or emergency coping strategies such as begging. Of the three cities, Yangon had the most households using emergency coping strategies (see FIGURE 39).[157]

The COVID-19 pandemic also led to the rise of mutual aid, that is, assistance offered in a spirit of good will and solidarity to improve the plight of communities, which was important for maintaining nutrition and food security. Examples during the pandemic included volunteers distributing food, and many families using social media to exchange groceries, vegetables, root crops and seafood.[158]

Box 6
Analysis of barriers to buying nutritious foods for children by mothers in the slum areas of three cities (SDFUs 2020–2021)

The underlying causes of worsening dietary indicators were investigated in a secondary analysis of income and dietary diversity data from slum areas of three cities: Jakarta in Indonesia, Quezon city in the Philippines and Yangon in Myanmar (SDFUs 2020–2021). The indicators included household food insecurity, minimum dietary diversity among women (MDD-W) and consumption of foods high in energy density and minimal nutritional value. The data were examined to assess whether poorer diets were associated with the financial impacts of the pandemic, or physical barriers, such as closing markets and restrictions on movement and travel, which led to reduced access to nutritious foods. The analysis found that reduced income and unemployment were commonly associated with low dietary diversity, consumption of energy dense foods with minimal nutritional value, and a lack of consumption of fruits and vegetables. However, there were differences over whether financial or physical barriers played a greater role in the different cities.[159]

The impact on food insecurity and nutrition demonstrated multiple vulnerabilities for urban populations and showed that the effects were not similar within the region for the cities for which data are available. Section 2.5 examines what we can learn from the COVID-19 crisis to prepare for future pandemics and minimize disruptions to food systems.

8.3 WATER, SANITATION AND HYGIENE SERVICES

Contamination in urban environments

Water, sanitation and hygiene (WASH) services are critical for creating healthy urban environments. An absence of systems that provide clean drinking water and safely managed sanitation leaves environments in cities vulnerable to high burdens of disease that can cause poor health and malnutrition.[160] Unclean or contaminated environments with insufficient WASH-related services and infrastructure are common in cities. While these are not limited to low-income areas, they are a consistent characteristic of slum environments. Deficiencies in safely managing faecal waste in cities create a risk of contaminated environments and food supply resulting from flooding, poor drainage systems and/or the unsafe dumping of sewage sludge.

Higher levels of contaminants in poor urban environments create an increased risk of poor gut health, known as environmental enteric dysfunction (EED), and illnesses transmitted by contaminated food, fingers or drinking water. This poses a risk of malnutrition and impaired development, particularly for children (see FIGURE 40).

As an example, in Yangon slums, more than 92.8 percent of water samples at the point of use or consumption were contaminated with E. coli to some degree in 2018.[161]

WASH for nutrition

The justification for improving WASH for nutrition is the important biological pathways through which WASH can influence nutritional status, either directly through preventing infection and disease that affect nutrition, or indirectly through the time and cost associated with seeking treatment and caring for sick household members.[162] It is especially important to protect vulnerable groups such as children under 5 years of age, pregnant women and older adults as each episode of diarrhoea deprives individuals of nutrition, and repeated bouts in children can impact their development.

WASH is a foundational determinant for improving urban living environments. Incremental efforts are insufficient, however, to achieve large gains in health. This makes the case for the importance of WASH in contributing to good health and nutrition outcomes, including where stunting remains a public health challenge.

Current regional urban WASH context

Between 2010 and 2020, the status of WASH indicators in urban areas of Asia and the Pacific showed incremental improvements. An estimated 537 million urban residents gained access to safely managed sanitation and 312 million obtained safely managed water supplies.[163] Nearly half of the countries in Asia and the Pacific have piped water-supply levels higher than 85 percent. In 2020, 95.8 percent of the region's urban population had access to at least basic water supply and 54.3 percent had access to safely managed sanitation, representing increases of 0.5 percent and 13.2 percent, respectively, since 2010. However, figures showing high access mask vast inequalities between and within countries regarding healthy WASH environments. There are three key areas where these inequalities are exposed.

FIGURE 40
Causal pathway between unclean environment and child stunting and wasting

SOURCE: Cumming, O. and Cairncross, S. 2016. Can water, sanitation and hygiene help eliminate stunting? Current evidence and policy implications. *Maternal and child nutrition*, 12: 91-105.

1) **Inequalities of access to a healthy WASH environment.** Although urban centres are typically associated with higher coverage rates of improved water and sanitation access compared to rural areas, the benefits of these economies of scale are not experienced equally across all urban residents or all urban areas. Urban residents, and often those in low-lying marginal land, can be disproportionately affected by other people's unmanaged faecal waste; one household can potentially expose many other neighbouring or downstream households to pathogens. Communities with drainage systems have lower exposure to faecal contamination from floodwater compared to those that do not.[164]

2) **Inequalities of governance and service provision outside primary urban centres.** Peri-urban settlements, small towns and high-density rural areas in the Indo-Gangetic Plain; the Mekong Delta; western China; and parts of Indonesia, the Philippines, and Thailand often have similar density and occupation patterns to larger cities but typically lack sufficient administrative capacity, budget and mandate to provide good basic services. Such areas lack resilience to cope with water stresses and shocks.

3) **Inequalities of impact of climate change.** The impacts of climate change are felt disproportionally by the urban poor through disruptions to water supply and safely managed sanitation services. Flooding, in particular, carries a high risk of wide faecal contamination of living environments and increased risk of water-borne diseases. This reinforces inequalities and exacerbates poverty.[165]

Interventions to improve urban WASH
The dynamics of climate change, population growth and urbanization underpin the need for safely managed sanitation services, where sanitation refers to providing services that safely remove excreta for all community members rather than any one piece of infrastructure. Interventions seeking a healthier living environment require a comprehensive reduction of the pathogen load in the target environment to reduce exposure to pathogens if they are to significantly reduce diarrhoea and, by extension, stunting.[166] Interventions, including citywide responses to safely containing faecal waste, are needed to interrupt all relevant pathways.

Where the risk of faecal contamination of the living environment is high with high burdens of enteric disease, such as in many slum environments, steps to control contamination closer to the household rely on good personal hygiene. Hand washing with soap, sanitation and water supply all reduce diarrhoeal episodes.[167] In settings of intermittent supply or non-piped supply that cause households to store water, improved water sources should not necessarily be assumed safe. Drinking water should be managed at the point of use through safe household storage. The inclusion of drinking-water monitoring in national household surveys is an important step.

The nature and coverage of sanitation interventions impacts the level of risk reduction. Sub-city sanitation interventions that safely manage faecal waste and remove it from the living environment, or sanitation upgrades implemented in neighbourhood clusters as opposed to dispersed households, have had a higher impact on diarrhoea.[168]

■

8.4 SOCIAL PROTECTION SYSTEMS

A goal of many social protection systems is to enable vulnerable households to afford, access and consume healthy diets based on the cost of a nutritious food basket, and contribute to food security and nutrition. Social protection can also strengthen resilience by breaking the vicious cycle of poverty. It can provide a platform to gradually move towards more dependable livelihoods through social aid to the poorest that helps them to overcome some of the inequalities created by unequal food systems. Targeting support in urban settings requires consideration of the specific characteristics of urban populations. Urban poor households tend to be more mobile than rural poor households, often moving around in search of work or accommodation. This makes them more difficult to track and interventions more resource intensive to administer. Evidence from Asia and the Pacific shows that well-designed social protection programmes with sufficient national investment have the potential to improve diet and nutrition outcomes — especially if nutrition-sensitive components (such as nutrition education or social and behaviour change communication) are integrated with cash assistance or transfers.[169] Examples of social protection programmes in Asia and the Pacific are provided in TABLE 16.

As the COVID-19 pandemic unfolded, it was evident that many existing social protection programmes were not fit for purpose due to inaccurate targeting and lack of access for workers in the informal economy.[170] This was especially true in urban areas because many existing non-contributory social assistance programmes primarily targeted rural populations on the assumption that those in rural areas were highly vulnerable to poverty and food insecurity. The result was a lack of support for those, largely in urban areas, who were suddenly made vulnerable by closures and lockdowns imposed to slow the spread of the COVID-19 virus, which also affected their already vulnerable food systems.

Governments across Asia and the Pacific have responded by adapting, supplementing, and scaling up their existing social protection programmes. These measures include increasing the value of cash transfers, increasing coverage, waiving restrictions or expanding criteria on eligibility and improving accessibility. Evidence from Asia and the Pacific shows that well-designed and targeted social protection programmes with sufficient national investment have the potential to improve diet and nutrition outcomes — especially if nutrition-sensitive components (such as nutrition education or social and behaviour change communication) are integrated with support such as cash transfers.[171]

TABLE 16
Examples of social protection programmes in Asia and the Pacific
(indicating key components and targeting)

Country	Name of program	Established	Use of poverty and vulnerability criteria	Women and children	Cash transfer	SBCC
Bangladesh	Mother and Child Benefit Programme (MCBP)	2019		■	■	■
Cambodia	Identification of Poor Households (IDPoor)	2006	■		■	■
Indonesia	Programme Keluarga Harapan (PKH)	2007	■	■	■	
Myanmar	Maternal and Child Cash Transfer (MCCT)	2017		■	■	■
Pakistan	Benazir Income Support Programme (BISP)	2008	■	■	■	
Philippines	Pantawid Pamilyang Pilipino Programme (4Ps)	2007	■	■	■	■

SOURCE: Dikoda. 2022. Loughborough, UK. https://dikoda.com/

An urgent challenge for governments during the early stages of the pandemic was to identify who needed support and find ways to provide it. Gaps in social protection systems were evident even before the pandemic, driven predominantly by high levels of informal employment in the region coupled with poorly resourced and administrated systems.[172] Social protection was, however, a key part of the strategy to protect and stabilize household incomes and alleviate food insecurity. Emergency measures were widely taken by governments in the region to step up social protection in urban areas, given that many existing programmes were not geared to provide this in urban areas. This evidence of the successful rollout of more targeted support is valuable for informing the further advancement of social protection assistance specifically in urban areas.

Box 7
Case study on cash aid programme improving food accessibility in urban slums in Dhaka, Bangladesh[173]

During the COVID-19 pandemic, WFP Bangladesh piloted a new cash assistance programme in two Dhaka urban slums, combining cash assistance with a nutrition behaviour change strategy to incentivize healthier choices. The aim was to demonstrate a sustainable and cost-effective cash assistance model for potential replication and scale-up by the Government of Bangladesh.

A total of 7 607 low-income households participated in the programme from September 2020 to July 2021. Each household received monthly cash aid of BDT 3 000 (USD 35), which had the potential to meet up to 60 percent of daily calorie intake needs.

Impacts and success factors: Data collected between December 2020 and April 2021 showed that programme beneficiaries bought and consumed more nutritious food items and experienced less food insecurity compared to the baseline. The digitalized system was considered key to success as it reduced the risk of viral transmission and facilitated timely monitoring.

Box 8
President's cash assistance for small enterprises in Jakarta, Indonesia

In response to economic fallout from the pandemic, and to strengthen its social protection programme, the Indonesian government introduced several relief programmes. The Productive Presidential Assistance Programme for micro, small, and medium-sized enterprises (called BPUM) was introduced to facilitate the recovery of microbusinesses by providing working capital grants. MSMEs in Indonesia comprise more than 95 percent of enterprises, and they make important contributions to economic growth and job creation. Unlike medium-sized businesses that have assets to keep afloat, highly vulnerable micro-actors – which include street food vendors whose turnover is daily or weekly – could not survive a prolonged period of business closure and reduced customers.

Micro and small business owners who met the definition of poor and vulnerable received RP 2.4 million (USD 200) into the account of each recipient in the partner state-owned bank (Bank Rakyat Indonesia). The programme continued in 2021, although eligible small business owners received only half the amount that was granted in 2020. A request was made to extend the programme into 2022.

Impacts and success factors: In late 2020, a survey to measure BPUM's effectiveness showed that the programme had a positive outcome, with 85 percent of the beneficiaries using the assistance for working capital, while the other respondents used it to buy tools.

CHAPTER 9
INNOVATION AND OPPORTUNITY FOR URBAN FOOD SECURITY AND NUTRITION

Government policies are essential to promote urban food security and nutrition. To achieve cost-effective improvements, data, planning mechanisms and innovation are needed. Examples exist of city-level interventions to establish multi-stakeholder food governance mechanisms, integration of food systems in urban and territorial planning, innovative food system actions and increased access to food to illustrate opportunities for strengthening urban food security and nutrition. Targeted support for urban poor households, and key social interventions that local governments and communities promote, provide meaningful lessons across Asia and the Pacific, including lessons from the COVID-19 pandemic.

■

9.1 POLICIES AND URBAN GOVERNANCE

Urban and territorial planning

Local and regional governments typically use urban and territorial planning for identifying and prioritizing interventions on the use of space, infrastructure, and services to facilitate ease of living in densely populated settlements. Agrifood system interventions cannot be implemented if they are not planned for or permitted under land-use planning and zoning regulations. Urban and territorial planning is, therefore, a crucial instrument for mainstreaming agrifood systems at the local level and can facilitate an integrated approach to promoting their sustainability.[174]

Understanding how demand from urban consumers for food translates into land-use needs is increasingly considered in urban plan formulation. In some instances, urban local governments have acted to protect productive agricultural land close to cities. In Indonesia, the Bandung city government protected 32.2 hectares of rice fields to help meet the city's food needs and protect livelihoods.[175] Central to good governance and effective urban planning is the concept of participatory planning, in which city governments play a facilitating role and plans are developed from the bottom-up with the involvement of communities and businesses. Ensuring coordination and dialogue between policymakers, investors and communities is important for successfully integrating food into urban plans. The formulation of an urban food agenda that incorporates food into urban planning is clearly needed. Planning must take into account factors such as transport, the circulation of food in cities, food loss and waste, water supply and waste disposal, among others.

Box 9
The role of urban and peri-urban agriculture in satisfying demand

The success of maintaining or creating space for agriculture depends on policymakers as well as geographic and institutional contexts. It is important to base policy decisions on the best available evidence. The use of high-resolution, spatial data can help policymakers determine the most productive agricultural land and help identify land that may be under threat as a city expands. Analysis for this report details the likely contribution that urban and peri-urban agriculture makes to food security in cities in Asia and the Pacific. Using satellite landcover data it was estimated that cities already allocate about 90 000 km^2 for cultivation within urban areas.

TABLE 17
Total estimated allocation of land in km^2 for urban agriculture
for cities of different sizes

Region	Allocation of land for cultivation (km^2)						
City size (number of people)	300 k	300—500 k	500 k—1 m	1—5 m	5—10 m	10 m+	Total
Southern Asia	28 183.0	5 625.1	4 670.3	6 771.1	2 262.0	4 184.5	**51 696.0**
South-eastern Asia	5 256.3	1 179.8	1 198.2	2 637.3	2 258.2	2 491.6	**15 021.4**
Eastern Asia	11 863.8	2 380.5	2 248.8	3 287.0	1 092.8	2 597.3	**23 470.2**
Total	**45 304.3**	**9 185.4**	**8 117.2**	**12 695.4**	**5 613.1**	**9 273.4**	**90 188.8**

SOURCE: Copernicus. 2015. Copernicus Global Land Service Providing bio-geophysical products of global land surface. Cited 9 January 2023. https://land.copernicus.eu/global/products/lc; European Union Joint Research Centre (EU-JRC). 2022. Global Human Settlements data. In: *Joint Research Centre*. Brussels. Cited 9 January 2023. https://ghsl.jrc.ec.europa.eu/

TABLE 17 confirms the relative importance of different city sizes in the likely contribution urban agriculture makes to food security. The smallest cities (those under 300 000 persons) account for about half of all land used for urban agriculture in Asia and the Pacific, at about 45 000 km^2. Smaller cities exhibit a close relationship with agriculture, especially cropping in urban areas. This, however, is still a fraction of the total land under cultivation.

Beyond contributions to urban food security, there are many sustainable development benefits associated with practicing urban and peri-urban agriculture, including reducing the environmental impact of food production. Globally, these benefits have been valued at an estimated USD 33 billion per year.[176] In terms of social benefits, urban and peri-urban agriculture can support livelihoods, jobs, improved health and wellbeing through the provision of green spaces. These benefits can be secured through statutory urban and territorial plans that have clear links between sustainable development objectives and required infrastructure investment and resource (including land) needs. Developing plans linked to economic and tax incentives is also critical for encouraging the private sector to develop urban infrastructure in specific locations to avoid significant loss of farmlands.[177]

Beyond city administrative boundaries
FAO in its City Region Food Systems approach stresses the need to focus on the spatial dimension of food planning, approaching urban and territorial planning in a way that strengthens the spatial and functional linkages between urban, peri-urban and rural areas.[178] The guiding principles of the FAO Urban Food Agenda reinforce the need to strengthen urban-rural linkages.[179] Far beyond cities, demand for food from urban consumers supports many agricultural and non-agricultural livelihoods. Urban food systems transcend administrative boundaries and suggest a need to think beyond these

boundaries in planning, such as targeting vulnerable groups. International policymakers have offered several approaches to defining functional territories linking urban and rural areas. Examples include the OECD's Functional Urban Areas concept,[180] the European Space Agency's Degree of Urbanization' concept,[181] and more recently FAO's urban rural continuum areas approach.[182] No serious attempts have been made to implement these approaches to food planning by governments in Asia and the Pacific.

Innovative governance mechanisms can play a key role in strengthening linkages between different food-systems actors in a territory, although changes in water resource management sector policy and legal and regulatory frameworks are essential.[183]

Comprehensive urban food policies
Adopting a more comprehensive approach to urban food systems planning may be a more effective way to address food security in cities. In Viet Nam, the city of Da Nang has developed a food-smart city strategy (see BOX 10), created with support from development partners and non-governmental organizations. In the Philippines, Quezon City has established a comprehensive urban food security framework that emphasizes local food production, food supply chain enhancements, marketing by promoting food trading, value-adding of locally produced foods, and repurposing available spaces through partnerships with local CSOs, government and NGOs.[184]

Box 10
A food smart city strategy for Da Nang, Viet Nam

In 2019, Da Nang adopted a Food Smart City Development Strategy for 2020–2030.[185] This initiative is led by Da Nang's Food Safety Management Authority, the Viet Nam National University of Agriculture and Rikolto, a Belgium-based international NGO. It is aimed at transforming the city's food system with an emphasis on increased safety and sustainability of supplies. The strategy has contributed to an enabling environment for producing and selling safe and organic vegetables and raising public awareness about the importance of sustainable and safe food consumption. It has supported the development of a learning community to create sustainable networking among food stakeholders in Da Nang and ensuring participation of smallholder farmers in safe food linkages.

Da Nang is the one of the first cities in South-eastern Asia to implement a comprehensive and inclusive food-smart strategy and its approach for enhancing food security and safety could be adopted by other Asian and Pacific countries with similar agrifood systems, value chain components, and environmental and cultural systems. The strategy relies on continued support from the national and city governments, which may pose a challenge to cities in lower and lower-middle-income countries.

9.2 ENABLING CONDITIONS

Governments, city planners, businesses, and consumers are not passive actors in food systems. Each has a unique and significant role in shaping the conditions through which food is produced and distributed. Enabling conditions are defined here as the circumstances that make it possible, or easier, for city or local governments and others with an interest in food systems planning to develop and deliver urban food policy.[186] The WHO's Healthy Cities initiative[187] recognizes the need to facilitate changes to bring about better health, such as developing healthy cities and environments (to support SDG11), investing in green policies, clean air and water, and providing targeted support for disadvantaged groups. These so-called enabling conditions include laws, policies, and regulations that govern how urban land is used, urban actors interact, and how markets operate, including those for food. Enabling conditions may also go beyond formal rules to include guidance, cooperation agreements, informal norms, policy changes (e.g. promoting gender equality and women's and girls' empowerment[188]), and standards that incentivize food system actors to act in a certain way.

Greening and sustainable solutions for agrifood systems

Food production is greatly affected by climate change as well as being one of its greatest contributors. From farm to fork, the greening of agrifood systems can improve productivity and sustainability, while simultaneously having a dramatic impact on greenhouse gas emissions and the fight against climate change. Greening agrifood systems means creating more sustainable production systems by reducing crop and livestock emissions, and capturing carbon in soils and biomass; it means using better data to make land management decisions, and transitioning to green approaches for transport and storage. It also means producers and consumers changing their habits, reducing their waste and ending an over-reliance on meat-based diets. However, such changes are expensive to adopt and roll out, particularly for LMICs.

Investing in supporting infrastructure

Food systems require infrastructure, facilities, and supporting services to facilitate supply chains transporting produce to and within urban areas. Cities in lower- and lower-middle-income countries may suffer from poorer connectivity and accessibility because of their inability to invest in improved transport, power, and market infrastructure. This impacts their economic growth potential and, as food production and distribution systems rely on infrastructure, food costs are driven by transport infrastructure and the distance between farmers and markets.[189]

Investment is also needed in WASH systems. Shortcomings in sector planning, governance and weak capacity of many WASH sector service providers severely limits their ability to attract commercial finance.

Box 11
The Cambodia Revenue Finance Facility – flexible revenue-based loans to water service providers reaching the poor[190]

In Cambodia there are 300 licensed private water-supply providers, and about another 100 unlicensed operators. For many licensed operators, the supply network covers only about 60 percent of their licensed area. Outlying, poorer and less densely populated areas are often not served for reasons to do with economies of scale. Accessing finance to expand services within their area is a challenge for licensed providers.

The Cambodia Revenue Finance Facility (CRFF) provides flexible finance revenue-based loans to small-scale piped water operators to enable them to expand their network to more remote and poorer areas and cover 100 percent of accessible households. A key success factor for the CRFF has been broader packages of business support to complement the loans.

Data for urban food security and nutrition is driving change

Data on urban food security and nutrition is driving change, but to move forward effectively, more robust data collection methods are needed, as is better use of food systems data. Such data underlie all efforts at progress and partly explain why progress towards meeting SDG 2 is stalling. As governments and organizations invest in food security, the data that underpins this spending is inaccurate, outdated, or non-existent. This leaves policymakers and international organizations struggling to develop evidence-based food-security initiatives or measure their outcomes.[191] The result is failure and unintended negative consequences – losses in productivity and income, environmental degradation, and the perpetuation of hunger and malnutrition. Better food systems data are urgently needed to effectively allocate resources and respond to the crisis of food insecurity. Nowhere is this more evident than in the data representing the urban poor. Collaboration among partners such as FAO, WFP, UNICEF, UN-Habitat, the Demographic and Health Survey (DHS) programme, and others can provide meaningful insight.

As noted by the Global Partnership for Sustainable Development Data 2021 report,[192] "digitalization and the use of new technologies and alternative data sources, such as satellite imagery and citizen-generated data, are accelerating collaboration on agrifood systems. However, lack of investment in national data and statistics systems is hindering countries from harnessing this potential. Donors are facing challenges in financing agricultural data and statistics as historic investments have been ineffective and unsustainable." The report advocates collaboration between multiple stakeholders to contribute to the production of better data.

Box 12

Monitoring food system resilience and the need for standardized indicators at the city level

The identification and monitoring of food system resilience relies on collecting appropriate data. Standardized indicators are needed that accurately capture city-level data because the collection of nutrition and food-security data in urban areas has not been optimal. The Milan Urban Food Policy Pact Monitoring Framework includes indicators that can be used to monitor improvement in the achievements of cities' expected outcomes. Adoption of the framework, backed by strong data collection systems, is encouraged. Acting on the following recommendations would provide significant improvements:

Conduct urban-specific surveys: National surveys, such as the Demographic Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS), should include samples representative at the city level and include slum populations. Urban data should be collected from large enough samples to be disaggregated by wealth quintile to better reflect the inequalities within cities. More standardized urban surveys, such as SDFUs, should be conducted, including a geospatial analysis. More data is needed on men, older adults and school-aged populations.

Spatial modelling of existing datasets: Researchers have recently developed geostatistics based on existing DHS data combined with spatial covariate data to model health outcome indicators at a granular level.[193] This may fill data gaps at the city level or provide a starting point for discussing targeting and programme design.

Include city-level World Health Assembly and Sustainable Development Goal targets: Include these alongside national targets, as most wasted and stunted children live in cities. Ensure that SDG indicators are embedded within government information management systems.

Standardized indicators: Future assessment could include as a minimum such indicators as cultivated land within 50 km of a city (km^2 per 100 000 persons), reductions in average household income, use of coping strategies, dietary frequency and diversity scores, and minimum dietary diversity for women of reproductive age (MDD-W). More research should be undertaken to provide guidance on a standardized indicator relevant to consumer behaviour.

Box 13

In Small Island Developing States (SIDS) in the Pacific data availability is a challenge

Lack of data in SIDS is one of the main obstacles deterring prosperity in the food environment. Their unique geographical landscapes, small areas and populations, dispersed populations, and remoteness are the causes of data not being easily accessible and often not comprehensive. Understanding about improvements in SIDS is limited by low levels of data. Some global databases neglect SIDS and data are commonly completed based on approximation and assumptions. The result is poor-quality data.

Data-driven innovations: Potential opportunities for enhancing food security in SIDS
Strengthening urban populations' access to locally produced food in Samoa through the Maua data-sharing platform

Samoa experiences challenges common to SIDS, such as food insecurity and unbalanced economic growth. The government's Samoa 2040 vision highlights the importance of promoting new technologies and techniques to combat food insecurity. Improved mobile network coverage[194] has raised the potential for e-commerce adoption among Samoans and created opportunities for local producers and urban consumers. The increased adoption of mobile networks led to the launch of the Maua e-commerce app,[195] a data-sharing platform to match supply with demand and facilitate the supply chain of goods to connect buyers and sellers.

Technology — The future of cities, slums and food security

Ensuring food security in cities is essential for achieving sustainable development.[196] Technological advancement is one approach to intensifying agricultural production and the sustainable delivery of environmental, social and economic benefits. The extent to which technological approaches will bring about inclusive food and nutritional security in cities across Asia and the Pacific will have limitations as well as perceived negative impacts, such as job losses, as traditional rural and urban farming jobs give way to mechanization. However, these losses can be partly offset by increased demand for labour in other parts of the food supply chain and in sectors producing technology for agrifood system management. Off-farm job opportunities along with skilling and reskilling opportunities through technical and vocational education and training programmes will be needed to accommodate the workforce.

Access to technology may present a major barrier for the urban poor: the UN estimates that over half of the Asia and the Pacific region's 4.3 billion people are offline, limiting how much technology can strengthen urban food security and inclusive urbanization. While technology has the potential to improve food security, it is paramount that these advances benefit the whole of society and that assessments are done to ensure that such changes do not increase inequality and poverty gaps in countries in the region. Bridging the digital divide and ensuring equitable access needs to be an important priority of countries.[197]

There are many examples of the application of technology throughout food systems, including food supply chains and community food environments, resulting in increased agricultural production in cities while reducing food waste and making contributions to increased food and nutritional security. Vertical farming is the cultivation of crops using hydroponic and aeroponic technologies, organized in vertically stacked layers. Beyond providing fresh local produce, vertical agriculture could help increase food production and expand agricultural operations. Producing fresh green vegetables close to expected growing urban populations could help meet increasing global and regional food demands in an environmentally responsible and sustainable way by reducing distribution chains to offer lower emissions, providing higher-nutrient products, and drastically reducing water usage and runoff. Vertical farming acquired higher visibility during the pandemic, as supply chain disruptions and labour shortages led to fears over food security.

Likewise, aqua- and hydroponics could improve the urban poor's access to healthy foods. Domestic production of food, access to markets and the acquisition of skills are invaluable for the empowerment of women in developing countries, and aqua- and hydroponics can provide the foundation for fair and sustainable socioeconomic growth. Contrary to allotment gardens in peri-urban and urban areas, hydroponic systems do not require much space and can be realized in small areas in and around the home. Moreover, these can be developed by individuals and communities alike.

Technology has also been successfully applied to provide systems that help guide consumer choice and confidence in the safety and nutritional value of the food choices they make, resulting in improved diets and health outcomes.

Box 14

Government-led farmers' markets in Jakarta, Indonesia[198]

Indonesia's National and Provincial Food Security Agency, under the Ministry of Agriculture, established an online and offline food market called Pasar Mitra Tani (Farmers Partner Market) in two Jakarta subdistricts targeting the public, especially low-income families. This intervention sought to address price and supply instability of essential food commodities by shortening supply chains and creating more equitable and secure opportunities for food producers, retailers and consumers to interact.

The intervention involved the setting up of a national-level hub in South Jakarta that distributed produce to a network of district and sub-district level hubs and outlets. Farmers' unions supplied produce to the hub. The subdistrict hubs provided the food to targeted residential areas densely populated by the low- and the middle-income groups. The low-cost food bazaars ensures access to those who may not be digitally literate. Online ordering is available to those who have access to smartphones. The hubs are also a source for first-hand sellers, online taxi motorcycles, direct importers of frozen meat and small-medium enterprises.

This intervention was implemented through a costed nationwide strategy to support food supply chains. The agency also put in place a monitoring system that tracks sales, including leftover stock, visitor numbers and customer satisfaction. Food prices at the Pasar Mitra Tani are considerably lower and less volatile than at open markets, providing an example of how governments can protect livelihoods and increase food security among the urban population.

Impacts and success factors: Consumer surveys in October 2020 found that most respondents were satisfied with price, availability and service in the new market. The vendors and customers interviewed reported fair market conditions and prices through online and offline sales. Government ownership and commitment was key to success.

Big data. Information is an essential tool for alleviating global poverty.[199] Big data use in promoting urban food security remains at an early stage and more can be done to optimize the use of the technology in urban food systems. Big data technologies can be used to strengthen food production systems, food safety and consumer choices, and inform policy and enabling environment reform, all of which can positively impact the food security of the urban poor.

Applicability and potential barriers to technological advancement. Adopting advanced technologies comes with some significant challenges. Among them are high initial investment, weak or absent regulation, and a lack of technical knowledge and public and cultural awareness about the use of digital and other technology in urban food systems. Other factors include an absence of coordination across actors stemming from the lack of a food systems-based approach and the absence of food as a key consideration in the urban development agenda. Of the 250 signatories to the Milan Urban Food Policy Pact, less than 50 are from Asia, the world's most populous continent. This is the case even in mature economies such as Japan, Republic of Korea and Singapore. However, early adopters in Asia and the Pacific cities will ensure that the quality and usability of technology improves, costs come down, and knowledge emerges to guide the next wave of users in lower-income cities.

Box 15
Use of blockchain in food supply chains and Internet of Things (IoT) for smart urban agriculture in Singapore

The Singapore government, in partnership with major mobile telecommunications provider SPTel, is providing grants to develop IoT-based urban farms on underused sites at housing estates and carparks as part of a strategy to meet 30 percent of the city-state's food and nutrition needs locally by 2030. IoT enabled sites of up to 3 000 square metres will be developed, guaranteeing optimum growing and high-quality food. One site is capable of producing about 240 tonnes of vegetables annually.[201]

The Singapore Food Authority has also invested in integrating blockchain technology in its food supply-chain system.[202] Blockchain technology can validate the providence of food supply and verify the integrity of claims to be organic or sustainably sourced, which builds trust between food producers, suppliers and consumers, and benefits food safety.[203]

Although internet-enabled food-related services can increase access to nutritious food, the internet also provides a marketing channel that has been linked to higher rates of childhood obesity. In the Philippines, children aged 5 to 17 with internet access are avid users and ask their parents to buy foods they see online.[200]

Policies and legislation to improve food environments
Fiscal policies, such as taxes, subsidies and changes in import tariffs, can also be used to influence actors within the food system. The Fiji government removed customs duties on imported vegetables in 2013 to encourage trade and promote greater consumption. There has been a significant increase in the volume of imported vegetables since the policy was introduced.[204]

The WHO has urged its member states to implement a range of food environment regulations and policies to improve food environments and protect, promote and support healthy diets. These include the implementation of food and beverage taxes such as a tax on sugar-sweetened beverages (SSB). These forms of tax not only reduce consumption of sugary drinks but also generate significant government revenue, which may be reinvested into societal health and wellbeing. Consistent evidence across multiple countries and contexts shows that SSB taxes reduce purchases and consumption of sugary drinks, reduce sugar intake in the population, and have a greater impact on lower-income households who in many contexts have the highest consumption of SSBs.[205] Several countries in Asia and Pacific have introduced SSB taxes including Malaysia, the Philippines and Thailand. The SSB tax implemented in Thailand[206] generated reductions in SSB intake, particularly for children aged 6 to 14 years.

Another key policy is marketing restrictions on unhealthy foods and beverages. Children in Asia and the Pacific are exposed to high volumes of unhealthy food and beverage television advertising[207] and increasingly digital marketing.[208] Clear evidence shows that unhealthy food marketing increases children's preference and consumption for ultra-processed foods, and increases total energy intake.[209] While some countries in the region have introduced marketing restrictions in some settings, such as schools, no country in the region has yet introduced comprehensive legislation covering all settings and channels including digital media. There is global evidence, however, that restrictions on marketing can effectively reduce children's exposure to marketing of unhealthy food[210] and lead to reduced consumption of unhealthy food and drinks.

Government-led and mandatory front-of-pack nutrition labelling systems for packaged foods and beverages is another effective policy that provides a clear and easy way for consumers to make healthier purchases. A 2021 meta-analysis of more than 100 studies found that traffic lights, nutrient-specific warning logos and Nutri-Score systems all increased the likelihood of selecting more healthy products and decreased the likelihood of selecting ones that are less healthy.[211] Several countries in Asia and Pacific region have introduced Healthier Choices labels, including Malaysia and Thailand, but strong evidence is limited that this type of label prevents the purchase of less healthy products.

Legal protections and acknowledgement of street food vendors

Street food vendors play a significant role in achieving food security in urban areas of Asia and the Pacific. Street food micro industries are vital for the economic planning and development of many towns.[212] Each street food enterprise is generally small, requires relatively simple skills, basic facilities and small amounts of capital, yet they have considerable potential for generating income and employment.[213] Several countries have legislated to protect street food vendors, including India and the Philippines, where they were legalized in 2001. In Indonesia, the state government in Jakarta waived license fees for street vendors in 2013 and included areas for hawkers in the city's Spatial Plan 2030.[214] In Myanmar in 2016, food vendors on Yangon's 11 busiest streets were relocated to night markets or side streets with plans to open more night markets.[215]

Other enabling environment factors to enhance inclusiveness

Often there may be intentional or unintentional blindness to the needs of marginalized groups by key decision makers within policy, legal and institutional considerations. Explicit attention to ensuring participation of these stakeholders in planning and decision making is important for successful and inclusive approaches. This can be addressed through capacity building and sensitization of decision-makers through training and encouraging meaningful consultation. Checks and reviews can be put in place with processes to measure whether meaningful representation and participation is assured. This could potentially be incorporated with broader safeguarding and complaint mechanism initiatives. The needs of marginalized groups can potentially be expensive and/or time consuming and, therefore, are often disincentives to engage meaningfully. To this extent, careful economic analysis may be needed to justify wider benefits, and the involvement of third parties to monitor and ensure inclusion and safeguarding mechanisms are especially functional.

Capacity building is also important for community residents, marginalized groups, community leaders, and community-based organisations. This is to ensure they can participate effectively and that issues affecting them are clearly explained along with their rights and means to defend their rights. An understanding of issues related to land tenure and people's rights is also important to develop successful programmes.[216] Approaches can involve governmental or non-governmental agencies undertaking broad-scale programmes, or community-based initiatives that use community resources internal to the slums.[217] Interventions that work to effect more immediate change in health outcomes include improved access to quality healthcare for slum dwellers including marginalized groups and improving the quality of local schools and the training of community health workers.[218] Fundamental infrastructure changes and improvements to housing structures, developing roadways, and access to water and sanitation are often required, and frequently, this can lead to necessary displacement of slum communities. In these instances, the risks to marginalized communities may be much higher and consequently more time and consultation may be necessary to propose realistic resettlement strategies.

9.3 EXAMPLES OF EFFECTIVE STRATEGIES TO PREVENT FOOD INSECURITY AND MALNUTRITION IN URBAN AREAS

To address the constraints and challenges unique to urban contexts, customized low cost, cost-effective and scalable solutions adapted for urban dwellers at the individual, community, city and national levels need to be implemented to tackle the drivers of food insecurity and malnutrition. People in cities are increasingly facing the double burden of malnutrition and that double-duty actions[219] aimed at both excess calories and insufficient nutrients should be used to effectively address all forms of malnutrition in a more synergic way in urban areas.

Investing in nutrition and making food supply chains efficient, inclusive, resilient and sustainable can provide many benefits for both poverty reduction and economic growth. This has been demonstrated through research that has modelled the cost-effectiveness of scaling up 10 nutrition interventions for use in South Asia.[220] Initiating agricultural programmes such as urban agriculture and direct farm-consumer markets could improve food environments and food security. It is essential, however, that they be provided with sustained support, alongside country-wide double-duty actions such as scaling up access to healthcare, redesigning cash and food transfers, subsidies, and vouchers, and devising new nutritional guidelines for food in and around educational institutions.[221]

The role of city governments
Urban local governments and regulatory bodies are well-placed to take a leading role in shaping urban food policies. Civil society, private-sector and other key stakeholders must be involved in policy formulation, which should be based on an evidence-based understanding of the unique characteristics of food systems that feed the city. Strong leadership and strategic direction from city governments are essential enabling conditions for managing urban food and nutrition challenges. Further, effective partnerships must be formed between stakeholders at the city, national and international levels, and between cities of different countries, which is fundamental to constructing effective, inclusive solutions.

Role of the private sector
The private sector plays a crucial role in creating more sustainable agrifood systems, contributing to a wide range of activities from the input of raw materials and production to final food consumption. The private sector manages small and large farms, operates food value-chain enterprises, logistics, distribution, retail and wholesale markets. Individual firms, micro family-run businesses, social enterprises, and conglomerates are all active in the formal and informal food sectors. The private sector is also often responsible for innovation, technology transfer, and may even play a role in directly feeding its workforce.

Role of schools and day-care in promoting nutrition in urban areas
Schools and day care centres can play a significant role in promoting nutrition and providing healthy diets in urban areas. Recent research conducted in the Lao People's Democratic Republic and the Philippines found that highly processed snack foods are affordable and readily available to children in and around schools, whereas the sale of fresh fruits or vegetables is limited, which highlights how the school food environment can drive nutrition choices and food intake.[222] Improving the regulation of what is sold in and around schools is recommended as a future intervention target, and evidence supports

the use of "nudges" to promote healthy eating in schools.[223] An intervention in Bhutan[224] saw its School Health and Nutrition Programmes expanded, as part of the National Health Promotion Strategic Plan (NHPSP) 2015–2023, to have an increased focus on achieving nutritional outcomes for school children. It includes the provision of nutritious meals, improved hygiene, and the development of a digital monitoring and reporting system that integrates nutrition, health and education data.

Role of urban agriculture

Urban agriculture ranges from container gardening in urban slums, to individual household plots and community gardens feeding neighbourhoods, to full-time commercial operations supplying markets and restaurants. Urban agriculture provides for more resilient agrifood systems. It helps to reduce the risk and impacts of disruption by shortening food supply chains, making cities more self-sufficient and resilient, which has become more important since the pandemic. It also has positive environmental effects.

Minimizing post-harvest losses and food waste

Urban administrations can promote responsible food-purchasing behaviour to reduce food waste, and develop innovations in sourcing and distributing food to vulnerable people, such as alternatives to school-feeding programmes when schools are closed.[225]

An integrated supply management strategy was devised by the Bangladesh Department of Agriculture Marketing (DAM), under the Ministry of Agriculture, as an urgent response to supply chain disruptions during a lockdown that coincided with the harvest season in March 2020. It aimed to prevent the stockpiling and wastage of fruits and vegetables harvested by producers in abundance while city dwellers faced food shortages and difficulties accessing foods. The initiative, which involved a range of local and regional stakeholders, ensured the flow of agricultural produce along supply chains, meeting the food access needs of urban dwellers and mitigating economic shocks to producers.

The approach mitigated food insecurity related to the pandemic and, even though the intervention was designed to reduce food waste and increase the availability of local foods during the pandemic, certain components are likely to be sustained.

■

9.4 RECOMMENDATIONS

Despite the complex challenges facing urban food systems, opportunities for positive transformation exist. Expanding evidence-based outreach, supporting an enabling environment, and protecting the most vulnerable as the region continues to urbanize are key to achieving food security and nutrition in Asia and the Pacific.

Expanding evidence-based outreach

- Better food-systems data are urgently needed to inform city-level planning decisions and effectively allocate resources and respond to the crisis of food insecurity. This is especially evident in data about the urban poor. Collaboration among partners such as FAO, WFP, UNICEF, UN-Habitat and others can provide meaningful insight.

- Advocate for consensus around a common definition of slum to facilitate their identification and inclusion in major, population-based surveys. This will allow for the generation of much-needed evidence that can be compared across cities, countries and regions.

Supporting an enabling environment

- Implement changes to ensure that the cost of nutritious food is affordable for all.

- Develop policy and regulatory frameworks supportive of initiatives, such as urban farming, to guide public, private and community stakeholders and align incentives towards common nutrition, economic, environmental and social objectives. It is also important to ensure the presence of systems to support their implementation and monitoring and evaluation of success.

- Develop and strengthen the comprehensive suite of food environment regulations and policies that the World Health Organization (WHO) has urged its member states to implement and that are highly effective. These include SSB taxes, restrictions on marketing of unhealthy food and drink to children and front-of-pack nutrition labelling.

- Provide support and capacity development for SMEs, including smallholder markets, and invest in food storage technology to prevent post-harvest losses and food waste when transport restrictions apply.

- Support informal street food vendors to provide safe, healthy and affordable food options to low-income urban populations.

- Promote measures to consistently ensure the smooth operation of transport, processing and marketing activities, especially for nutritious foods such as animal-source foods and fruits and vegetables to ensure food availability.

- Strengthen food supply routes from rural producers to urban communities to support agrifood systems along with innovative food distribution and logistics.[226]

- Interventions to improve food access and food safety, such as safely reopening wet markets with physical distancing and greater use of protective equipment after the COVID-19 pandemic, are essential to promote food security among the urban poor. These initiatives can be used in combination with efforts to monitor and regulate the quality of foods sold by vendors in these locations.

Protecting the most vulnerable

- Develop social protection programmes that can respond to shocks and support the most vulnerable population groups, including migrants, internally displaced peoples, refugees, and women. Cash transfer systems and provision of financial support through loans, grants or technical assistance to vulnerable individuals, and to SMEs in the food sector would protect the integrity of food systems. Support for enterprises led by women, as well as informal enterprises, such as street food vendors is also recommended.

- Social protection systems should specifically target women whenever possible. Interventions should be designed to promote consumption of locally sourced nutritious foods while taking into account the cost of a healthy diet. They should specifically ensure that the nutrient requirements of young children, adolescent girls, and pregnant and nursing mothers are met. Programmes can be designed to increase demand for such foods, for example vouchers for fruits, vegetables or animal-source foods, or to support buying foods at local markets.[227] Complementary programming, including nutrition SBCC interventions, will increase the likelihood of positive nutrition outcomes of cash-based programming, especially for those women and children in greatest need.

- Developing urban agriculture programmes to allow city residents and communities to grow their own food, either for home consumption or to generate income, is another strategy for building resilience.

- Social and behaviour change interventions related to healthy food choices – both understanding what local barriers and enablers are, and working to overcome them at the individual, family, community or system levels. Explore whether effective nutrition information strategies can feasibly be implemented at the policy level, such as food labelling to provide consumers with more information.

- Policy initiatives to protect breastfeeding and infant nutrition, including full implementation of WHO recommendations at national levels on the World Health Assembly's International Code of Marketing of Breast-milk Substitutes to regulate all forms of marketing and promotion of BMS products. Regulations should expand to include all BMS products marketed for children under 3 years.

- Collaborate with government and the private sector to implement workplace nutrition programmes and maternity protections, especially for low-wage and informal workers.

- Advocate for municipal policies to improve the conditions for those living in slums and other informal settlements, including supporting access to WASH infrastructure, health services, electricity and public transportation.

CHAPTER 10
CONCLUSIONS

This regional overview of food security and nutrition for Asia and the Pacific region has focused on ensuring healthy diets for poor urban populations within complex urban environments. It highlights inequalities in urban areas that are typically hidden when data are disaggregated on an urban-rural basis. Understanding these urban inequalities is essential to tackling the drivers of food insecurity and malnutrition in vulnerable urban communities.

Investing in food security and nutrition can provide benefits for poverty reduction and economic growth. For cities, such initiatives might include carefully designing and supporting urban and peri-urban agriculture to promote and support the increasing demand for nutritious foods in urban areas. Similarly, initiating agricultural programmes, such as urban agriculture and direct farm-consumer markets, could improve agrifood systems and food security if given sustained support, along with country-wide double-duty actions, such as scaling up access to healthcare, redesigning cash and food transfers, subsidies, and vouchers, and devising new nutritional guidelines for food in and around educational institutions. SMEs constitute at least half of the food system and are fundamental to transforming the ways food is produced and consumed.[228] Targeted support to those actors is crucial to reduce the cost of nutritious food, increase affordability and enhance the resilience of the overall urban food system.

The impact of the pandemic has reinforced the need for food systems in Asia and the Pacific to become more nourishing, sustainable, equitable and resilient. This is the imperative set by the 2021 United Nations Food Systems Summit, and together with the new Urban Agenda and SDG11 — which aims to "Make cities and human settlements inclusive, safe, resilient and sustainable" — can shape future actions for transforming urban food systems.

ANNEX 1
DATA TABLES

Prevalence of undernourishment (percent)

	2000–02	2004–06	2009–11	2014–16	2017–19	2018–20	2019–21
World	**13.1**	**12.2**	**8.9**	**7.9**	**7.8**	**8.3**	**9.0**
Asia and the Pacific	14.7	13.9	9.5	7.8	7.1	7.6	8.3
Eastern Asia	9.4	6.9	2.6	<2.5	<2.5	<2.5	<2.5
East Asia (excluding China)	5.5	5.6	6.5	6.1	6.4	6.7	6.8
Oceania	6.6	6.7	6.2	5.7	5.7	5.6	5.6
South-eastern Asia	20.0	17.0	11.4	7.4	5.8	5.8	5.9
Southern Asia	18.4	19.9	15.3	13.8	12.7	13.8	15.3
South Asia (excluding India)	18.1	15.4	13.7	11.8	11.0	11.8	13.1
Afghanistan	47.8	36.1	21.2	21.5	24.0	26.9	29.8
American Samoa							
Australia	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Bangladesh	15.9	14.2	15.2	14.0	11.5	11.0	11.4
Bhutan							
Brunei Darussalam	20.0	17.0	11.4	7.4	5.8	5.8	5.9
Cambodia	23.6	17.0	11.2	8.9	6.6	6.0	6.3
China	10.0	7.0	<2.5	<2.5	<2.5	<2.5	<2.5
Cook Islands							
Democratic People's Republic of Korea	35.7	33.8	39.1	40.3	42.6	43.0	41.6
Fiji	4.0	3.7	5.6	6.5	5.5	4.9	5.7
French Polynesia	4.2	3.8	3.5	3.6	4.1	4.1	4.0
India	18.4	21.6	15.9	14.5	13.3	14.6	16.3
Indonesia	19.2	19.2	13.0	7.2	5.9	6.2	6.5
Iran (Islamic Republic of)	4.8	5.2	6.1	4.7	5.2	4.9	4.1
Japan	<2.5	<2.5	2.7	<2.5	<2.5	2.8	3.2
Kiribati	4.4	5.3	4.4	3.2	3.9	4.0	4.2
Lao People's Democratic Republic	31.2	22.4	14.1	6.7	5.3	5.4	5.1
Malaysia	2.5	3.2	3.4	3.8	2.7	2.6	<2.5

TABLE A1
(Continued)

	2000–02	2004–06	2009–11	2014–16	2017–19	2018–20	2019–21
Maldives							
Marshall Islands							
Micronesia (Federated States of)							
Mongolia	31.1	29.6	16.5	8.4	5.5	4.0	3.6
Myanmar	37.6	27.8	10.2	4.2	2.6	<2.5	3.1
Nauru							
Nepal	23.5	16.8	9.9	5.3	4.3	4.8	5.5
New Zealand	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Niue							
Pakistan	21.1	17.6	15.4	12.8	12.3	14.1	16.9
Palau							
Papua New Guinea	26.3	27.4	26.2	23.0	22.6	21.9	21.6
Philippines	18.7	14.4	12.2	10.2	6.2	5.5	5.2
Republic of Korea	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Samoa	3.5	3.4	4.2	4.4	4.5	4.4	4.4
Singapore							
Solomon Islands	13.3	12.5	13.7	18.5	17.6	17.8	18.1
Sri Lanka	16.7	14.0	9.6	5.2	4.1	3.7	3.4
Thailand	17.3	11.9	9.9	7.3	7.8	8.0	8.8
Timor-Leste	41.5	32.2	31.2	24.5	25.1	25.0	26.2
Tonga							
Tuvalu							
Vanuatu	7.5	6.9	6.3	10.3	12.6	12.4	11.9
Viet Nam	19.7	15.5	10.9	8.1	6.8	6.2	5.7

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

TABLE A2
Number of undernourished people (millions)

	2000–02	2004–06	2009–11	2014–16	2017–19	2018–20	2019–21
World	**816.7**	**798.9**	**620.6**	**581.8**	**594.1**	**643.5**	**702.7**
Asia and the Pacific	525.1	520.7	373.6	322.8	300.6	326.0	359.6
Eastern Asia	144.1	107.4	41.9	n.r.	n.r.	n.r.	n.r.
East Asia (excluding China)	12.6	13.1	15.2	14.6	15.4	16.0	16.2
Oceania	2.1	2.2	2.3	2.3	2.4	2.3	2.4
South-eastern Asia	106.7	95.4	68.1	47.2	38.3	38.1	39.4
Southern Asia	272.3	315.8	261.3	251.4	240.1	265.0	297.8
South Asia (excluding India)	74.1	67.9	65.4	60.9	59.9	65.0	73.5
Afghanistan	10.3	9.2	6.2	7.4	8.9	10.2	11.6
American Samoa							
Australia	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Bangladesh	20.7	19.7	22.5	21.8	18.5	18.0	18.8
Bhutan							
Brunei Darussalam	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cambodia	2.9	2.3	1.6	1.4	1.1	1.0	1.0
China	132.5	95.4	n.r.	n.r.	n.r.	n.r.	n.r.
Cook Islands							
Democratic People's Republic of Korea	8.2	8.1	9.6	10.1	10.9	11.0	10.7
Fiji	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
French Polynesia	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
India	198.3	247.8	195.9	190.5	180.2	200.0	224.3
Indonesia	41.1	43.5	31.4	18.7	15.7	16.7	17.7
Iran (Islamic Republic of)	3.2	3.6	4.5	3.7	4.3	4.1	3.4
Japan	n.r.	n.r.	3.4	n.r.	n.r.	3.6	4.0
Kiribati	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lao People's Democratic Republic	1.7	1.3	0.9	0.5	0.4	0.4	0.4
Malaysia	0.6	0.8	1.0	1.1	0.9	0.8	n.r.
Maldives							
Marshall Islands							
Micronesia (Federated States of)							
Mongolia	0.8	0.7	0.4	0.3	0.2	0.1	0.1
Myanmar	17.7	13.6	5.2	2.2	1.4	n.r.	1.7
Nauru							
Nepal	5.7	4.3	2.7	1.4	1.2	1.4	1.6
New Zealand	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Niue							

TABLE A2
(Continued)

	2000—02	2004—06	2009—11	2014—16	2017—19	2018—20	2019—21
Pakistan	30.8	28.2	27.5	25.5	26.0	30.5	37.2
Palau							
Papua New Guinea	1.6	1.8	1.9	1.9	1.9	1.9	1.9
Philippines	14.9	12.4	11.4	10.4	6.6	5.9	5.7
Republic of Korea	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Samoa	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Singapore							
Solomon Islands	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1
Sri Lanka	3.2	2.7	1.9	1.1	0.9	0.8	0.7
Thailand	11.0	7.8	6.6	5.0	5.4	5.5	6.2
Timor-Leste	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Tonga							
Tuvalu							
Vanuatu	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Viet Nam	15.9	13.0	9.6	7.5	6.5	6.0	5.6

NOTE: n.r. = data not reported as the prevalence is less than 2.5 percent. Please refer to Annex 4 for the country coverage of this report.
In particular, Central Asia and Western Asia are not included.
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

TABLE A3
Prevalence of food insecurity (percent)

	Moderate or severe food insecurity				Severe food insecurity			
	2014—16	2017—19	2018—20	2019—21	2014—16	2017—19	2018—20	2019—21
World	**21.8**	**24.8**	**26.6**	**28.1**	**7.7**	**8.9**	**9.7**	**10.7**
Asia and the Pacific	17.1	20.0	22.4	23.5	6.6	7.6	8.7	9.5
Eastern Asia	6.1	9.0	8.3	7.1	1.0	1.6	1.7	1.4
East Asia (excluding China)	3.9	4.6	4.6	4.8	<0.5	0.8	0.8	0.9
Oceania	11.1	13.7	12.9	12.9	2.8	3.9	3.4	3.7
South-eastern Asia	15.9	17.3	17.7	18.8	2.4	2.7	2.8	3.4
Southern Asia	27.7	30.8	36.5	39.4	13.2	14.6	16.9	18.8
South Asia (excluding India)	27.2	27.1	32.0	35.8	7.4	6.8	8.3	10.1
Afghanistan	45.1	57.5	63.1	70.0	14.8	17.3	19.8	22.5
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Australia	10.8	13.3	12.3	11.9	2.8	3.8	3.3	3.6
Bangladesh	32.2	31.5	31.9	31.7	13.3	10.6	10.5	10.7
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cambodia	48.9	44.1	46.6	50.0	16.9	13.6	14.0	15.1
China								
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Fiji	n.a.	n.a.	14.3	19.3	n.a.	n.a.	2.0	4.2
French Polynesia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
India								
Indonesia	6.0	7.0	6.2	6.0	0.7	0.8	0.7	0.7
Iran (Islamic Republic of)	48.0	40.6	42.5	42.4	9.5	8.4	8.7	7.7
Japan	2.6	3.2	3.4	3.8	<0.5	0.7	0.7	0.9
Kiribati	n.a.	41.0	41.0	41.0	n.a.	8.0	8.0	8.0
Lao People's Democratic Republic	n.a.	n.a.	29.4	31.8	n.a.	n.a.	8.9	8.3
Malaysia	17.4	15.1	14.9	15.4	7.8	6.7	6.6	6.3
Maldives	n.a.	n.a.	n.a.	13.4	n.a.	n.a.	n.a.	2.2
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mongolia	21.0	27.5	26.2	25.7	3.4	5.9	4.9	5.0
Myanmar	n.a.	n.a.	22.2	25.5	n.a.	n.a.	1.9	3.7
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

TABLE A3
(Continued)

	Moderate or severe food insecurity				Severe food insecurity			
	2014—16	2017—19	2018—20	2019—21	2014—16	2017—19	2018—20	2019—21
Nepal	29.5	33.8	36.4	37.8	10.4	10.3	12.0	13.6
New Zealand	10.0	13.9	14.0	14.5	2.8	4.4	3.9	3.5
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Pakistan	14.0	14.2	24.3	32.6	0.9	1.6	4.8	8.7
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	n.a.	41.2	42.7	43.8	n.a.	3.2	4.0	4.8
Republic of Korea	4.8	5.2	5.1	5.3	<0.5	<0.5	0.6	0.7
Samoa	n.a.	23.6	23.6	23.6	n.a.	3.4	3.4	3.4
Singapore	2.8	4.7	4.5	4.6	1.0	1.4	0.9	0.7
Solomon Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sri Lanka	5.9	7.6	8.9	10.0	0.7	0.7	0.9	1.1
Thailand	15.1	26.4	29.8	33.8	4.2	7.7	8.5	10.5
Timor-Leste	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	23.2	23.2	23.2	n.a.	6.0	6.0	6.0
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Vanuatu	n.a.	23.3	23.3	23.3	n.a.	2.4	2.4	2.4
Viet Nam	n.a.	6.2	6.5	7.6	n.a.	<0.5	0.5	0.6

NOTE: n.a. = data not available. Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

TABLE A4
Number of food insecure people (millions)

	Moderately or severely food insecure				Severely food insecure			
	2014—16	2017—19	2018—20	2019—21	2014—16	2017—19	2018—20	2019—21
World	**1 609.1**	**1 888.9**	**2 053.0**	**2 187.4**	**569.3**	**675.4**	**751.5**	**830.2**
Asia and the Pacific	710.2	852.8	960.3	1 015.2	273.8	322.5	373.4	412.3
Eastern Asia	99.7	150.1	138.3	119.9	16.8	27.1	28.9	24.3
East Asia (excluding China)	9.3	11.0	11.0	11.4	1.2	1.8	1.9	2.2
Oceania	4.4	5.7	5.4	5.5	1.1	1.6	1.4	1.6
South-eastern Asia	100.7	113.4	117.0	125.7	15.0	17.5	18.8	22.4
Southern Asia	505.5	583.7	699.6	764.3	241.0	276.3	324.2	364.0
South Asia (excluding India)	141.1	147.0	176.5	200.7	38.2	37.0	45.9	56.3
Afghanistan	15.5	21.4	24.0	27.3	5.1	6.4	7.5	8.8
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Australia	2.6	3.3	3.1	3.0	0.7	1.0	0.8	0.9
Bangladesh	50.4	50.8	52.0	52.3	20.7	17.2	17.1	17.5
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cambodia	7.6	7.2	7.7	8.4	2.6	2.2	2.3	2.5
China								
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Fiji	n.a.	n.a.	0.1	0.2	n.a.	n.a.	<0.1	<0.1
French Polynesia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
India								
Indonesia	15.5	18.7	16.8	16.5	1.8	2.2	1.9	1.9
Iran (Islamic Republic of)	37.7	33.2	35.2	35.6	7.5	6.9	7.2	6.5
Japan	3.3	4.0	4.3	4.8	0.5	0.9	0.8	1.2
Kiribati	n.a.	<0.1	<0.1	<0.1	n.a.	<0.1	<0.1	<0.1
Lao People's Democratic Republic	n.a.	n.a.	2.1	2.3	n.a.	n.a.	0.6	0.6
Malaysia	5.3	4.7	4.8	5.0	2.4	2.1	2.1	2.0
Maldives	n.a.	n.a.	n.a.	<0.1	n.a.	n.a.	n.a.	<0.1
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mongolia	0.6	0.9	0.8	0.8	0.1	0.2	0.2	0.2
Myanmar	n.a.	n.a.	12.0	13.9	n.a.	n.a.	1.0	2.0
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

TABLE A4
(Continued)

	Moderately or severely food insecure				Severely food insecure			
	2014—16	2017—19	2018—20	2019—21	2014—16	2017—19	2018—20	2019—21
Nepal	8.0	9.5	10.4	11.0	2.8	2.9	3.4	4.0
New Zealand	0.5	0.7	0.7	0.7	0.1	0.2	0.2	0.2
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Pakistan	28.0	30.1	52.6	72.0	1.8	3.4	10.3	19.2
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	n.a.	44.0	46.1	48.0	n.a.	3.4	4.3	5.3
Republic of Korea	2.4	2.6	2.6	2.7	0.2	0.2	0.3	0.4
Samoa	n.a.	<0.1	<0.1	<0.1	n.a.	<0.1	<0.1	<0.1
Singapore	0.2	0.3	0.3	0.3	<0.1	<0.1	<0.1	<0.1
Solomon Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sri Lanka	1.2	1.6	1.9	2.1	0.1	0.1	0.2	0.2
Thailand	10.4	18.3	20.8	23.6	2.9	5.4	5.9	7.3
Timor-Leste	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	<0.1	<0.1	<0.1	n.a.	<0.1	<0.1	<0.1
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Vanuatu	n.a.	<0.1	<0.1	<0.1	n.a.	<0.1	<0.1	<0.1
Viet Nam	n.a.	6.0	6.2	7.4	n.a.	0.4	0.5	0.6

NOTE: n.a. = data not available. Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

TABLE A5
Prevalence of stunting among children under 5 (percent)

	2000	2005	2010	2015	2018	2019	2020
World	**33.1**	**30.7**	**27.7**	**24.4**	**22.9**	**22.4**	**22.0**
Asia and the Pacific	38.0	34.9	31.3	26.5	24.2	23.5	22.9
Eastern Asia	19.5	13.0	8.8	6.3	5.4	5.2	4.9
Oceania (excluding Australia and New Zealand)	35.6	37.8	40.0	40.4	41.0	41.2	41.4
South-eastern Asia	38.0	34.4	31.6	29.1	28.1	27.8	27.4
Southern Asia	48.3	46.2	42.6	36.5	32.9	31.7	30.7
Afghanistan	54.6	52.2	47.2	41.1	37.4	36.3	35.1
Australia	1.3	1.6	2.0	2.1	2.1	2.1	2.1
Bangladesh	56.0	47.1	40.2	35.0	32.0	31.0	30.2
Bhutan	46.5	40.3	33.0	26.4	23.7	23.0	22.4
Brunei Darussalam	20.9	20.5	18.4	15.7	13.7	13.2	12.7
Cambodia	51.1	44.8	37.5	31.3	30.2	30.0	29.9
China, mainland	20.1	13.0	8.7	6.1	5.2	4.9	4.7
Democratic People's Republic of Korea	54.4	40.4	29.0	22.6	19.8	18.9	18.2
Fiji	5.9	7.8	8.5	8.0	7.5	7.5	7.5
India	49.8	48.2	44.5	37.5	33.5	32.1	30.9
Indonesia	41.5	38.3	35.7	32.9	32.2	32.0	31.8
Iran (Islamic Republic of)	14.5	8.4	6.3	6.2	6.2	6.3	6.3
Japan	8.4	7.6	6.9	6.1	5.7	5.6	5.5
Kiribati	20.4	18.1	16.3	15.6	15.5	15.3	14.9
Lao People's Democratic Republic	49.7	47.6	43.2	36.5	32.4	31.2	30.2
Malaysia	20.0	18.3	17.9	19.1	20.3	20.6	20.9
Maldives	33.6	24.9	18.3	16.2	15.1	14.6	14.2
Marshall Islands	38.2	35.7	37.6	35.0	33.5	32.8	32.2
Mongolia	29.4	23.3	15.2	10.1	8.1	7.6	7.1
Myanmar	47.0	39.1	33.2	29.5	26.9	26.1	25.2
Nauru	26.8	25.3	21.6	18.2	16.3	15.5	15.0
Nepal	57.9	49.5	42.8	36.4	32.5	31.4	30.4
Pakistan	42.1	43.8	44.2	41.3	38.5	37.5	36.7
Papua New Guinea	41.9	44.0	46.6	47.5	48.1	48.3	48.4
Philippines	35.7	34.0	32.7	31.1	29.9	29.4	28.7
Republic of Korea	2.9	2.6	2.3	2.2	2.2	2.2	2.2
Samoa	6.1	5.4	5.6	5.8	6.4	6.6	6.8
Singapore	4.4	3.9	3.3	3.0	2.9	2.9	2.8
Solomon Islands	34.0	34.2	33.0	30.5	29.7	29.5	29.3
Sri Lanka	20.6	18.3	17.2	16.3	16.2	16.1	16.0

TABLE A5
(Continued)

	2000	2005	2010	2015	2018	2019	2020
Thailand	16.9	16.4	14.9	12.9	12.6	12.4	12.3
Timor-Leste	54.8	57.1	54.4	50.9	49.5	49.1	48.8
Tonga	12.9	10.2	7.8	4.9	3.3	3.0	2.6
Tuvalu	12.1	10.5	10.1	9.9	9.8	9.8	9.7
Vanuatu	25.1	26.3	27.0	27.9	28.5	28.6	28.7
Viet Nam	41.8	32.9	27.6	24.4	23.0	22.7	22.3

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition.* https://data.unicef.org/resources/jme-report-2021

TABLE A6
Prevalence of wasting among children under 5 (percent)

	2000	2005	2010	2015	2018	2019	2020
World							**6.7**
Asia and the Pacific							9.9
Eastern Asia							1.7
Oceania (excluding Australia and New Zealand)							9.0
South-eastern Asia							8.2
Southern Asia							14.1
Afghanistan					5.1		
Bangladesh	12.5	11.8			8.4	9.8	
Bhutan			5.9				
Cambodia	17.1	8.5	11.0				
China, mainland	2.5	2.9	2.3				
Democratic People's Republic of Korea	12.2						
India				20.8			
Indonesia	5.5		12.3		10.2		
Iran (Islamic Republic of)			4.0				
Japan			2.3				
Kiribati					3.5		
Lao People's Democratic Republic	17.5			9.7			
Malaysia					8.0	9.7	
Mongolia	7.1	2.7	1.8		0.9		
Myanmar	10.7				6.7		
Nepal						12.0	
Pakistan					7.1		
Papua New Guinea		4.4	14.1				
Philippines					6.8	5.6	
Samoa						3.1	
Singapore	3.6						
Solomon Islands				8.5			
Sri Lanka	15.9						
Thailand						7.7	
Tonga						1.1	
Viet Nam	6.1	10.7	4.1	6.4			

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition.* https://data.unicef.org/resources/jme-report-2021

TABLE A7
Prevalence of overweight among children under 5 (percent)

	2000	2005	2010	2015	2018	2019	2020
World	**5.4**	**5.7**	**5.6**	**5.6**	**5.7**	**5.7**	**5.7**
Asia and the Pacific	4.2	4.3	4.5	4.7	4.9	4.9	5.0
Eastern Asia	6.0	6.2	6.6	7.1	7.5	7.7	7.9
Oceania (excluding Australia and New Zealand)	5.2	6.1	7.0	7.7	8.0	8.0	8.0
South-eastern Asia	3.7	4.3	5.3	6.6	7.2	7.4	7.5
Southern Asia	3.3	3.3	3.0	2.8	2.6	2.6	2.5
Afghanistan	5.2	5.8	5.6	4.8	4.3	4.1	3.9
Australia	8.2	10.3	13.0	16.1	17.7	18.2	18.5
Bangladesh	0.7	1.0	1.5	1.9	2.1	2.1	2.1
Bhutan	4.3	5.4	6.0	5.9	5.5	5.4	5.2
Brunei Darussalam	6.2	7.1	8.1	8.9	9.1	9.2	9.3
Cambodia	3.2	2.7	2.3	2.0	2.0	2.0	2.1
China, mainland	6.4	6.6	7.0	7.5	7.9	8.1	8.3
Democratic People's Republic of Korea	1.1	1.1	1.2	1.5	1.7	1.8	1.9
Fiji	3.8	4.3	4.7	5.0	5.1	5.2	5.2
India	3.3	3.0	2.6	2.1	2.0	1.9	1.9
Indonesia	4.0	5.3	7.2	9.5	10.7	10.9	11.1
Iran (Islamic Republic of)	6.8	7.4	8.2	8.7	9.1	9.2	9.4
Japan	2.1	1.9	1.9	2.1	2.2	2.3	2.4
Kiribati	2.6	2.5	2.4	2.3	2.4	2.4	2.4
Lao People's Democratic Republic	2.1	2.1	2.2	2.5	2.8	2.9	3.0
Malaysia	5.4	5.8	6.0	6.1	6.1	6.1	6.1
Maldives	4.4	5.5	5.9	5.5	5.0	4.8	4.6
Marshall Islands	3.8	3.9	4.0	4.1	4.2	4.2	4.2
Mongolia	8.5	9.5	10.1	10.2	10.3	10.2	10.1
Myanmar	4.5	3.5	2.6	1.9	1.6	1.6	1.5
Nauru	3.0	3.0	3.1	3.3	3.5	3.6	3.7
Nepal	0.9	1.0	1.3	1.5	1.7	1.7	1.8
Pakistan	4.8	5.1	4.9	4.2	3.7	3.6	3.4
Papua New Guinea	5.5	6.6	7.7	8.6	8.9	8.9	8.9
Philippines	2.4	2.7	3.1	3.7	4.0	4.1	4.2
Republic of Korea	5.8	6.6	7.4	8.2	8.6	8.7	8.8
Samoa	5.8	6.2	6.6	6.8	7.0	7.0	7.1
Singapore	3.0	3.2	3.8	4.3	4.6	4.7	4.8
Solomon Islands	2.9	3.1	3.4	3.7	3.8	3.9	4.0
Sri Lanka	1.0	1.1	1.2	1.2	1.3	1.3	1.3

TABLE A7
(Continued)

	2000	2005	2010	2015	2018	2019	2020
Thailand	6.4	7.5	8.4	9.0	9.2	9.2	9.2
Timor-Leste	3.6	3.4	3.1	2.8	2.7	2.7	2.6
Tonga	10.4	12.1	13.0	13.1	12.9	12.8	12.6
Tuvalu	5.4	5.8	6.1	6.3	6.3	6.4	6.4
Vanuatu	4.3	4.6	4.8	4.9	4.9	4.9	4.9
Viet Nam	2.4	2.9	3.7	4.9	5.6	5.8	6.0

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition.* https://data.unicef.org/resources/jme-report-2021

TABLE A8
Prevalence of anaemia among women aged 15 to 49 years (percent)

	2000	2005	2010	2015	2017	2018	2019
World	**31.2**	**29.9**	**28.6**	**28.8**	**29.3**	**29.6**	**29.9**
Asia and the Pacific	34.2	32.5	31.2	31.6	32.2	32.5	32.9
Eastern Asia	22.2	18.7	16.0	15.6	15.9	15.9	16.1
Oceania	14.6	14.3	14.2	14.8	15.3	15.6	16.0
Oceania (excluding Australia and New Zealand)	34.4	33.6	32.8	33.1	33.5	33.7	33.9
South-eastern Asia	31.4	27.9	25.3	25.6	26.3	26.7	27.2
Southern Asia	49.4	49.1	48.5	47.8	48.0	48.1	48.2
Afghanistan	35.7	35.6	36.8	39.4	40.9	41.8	42.6
Australia	8.0	7.5	7.3	7.6	7.9	8.2	8.5
Bangladesh	35.6	35.8	35.7	35.9	36.2	36.4	36.7
Bhutan	45.2	43.2	40.7	38.8	38.6	38.6	38.6
Brunei Darussalam	17.1	15.5	14.9	15.1	15.7	16.2	16.7
Cambodia	53.9	49.2	46.3	46.5	46.8	47.0	47.1
China	22.1	18.3	15.3	14.9	15.2	15.3	15.5
Cook Islands	26.9	26.1	25.7	26.2	26.6	26.8	27.1
Democratic People's Republic of Korea	35.0	32.5	31.6	32.5	33.2	33.5	33.9
Fiji	34.8	32.9	31.7	31.5	31.7	31.8	32.0
India	54.1	54.2	53.5	52.7	52.8	52.9	53.0
Indonesia	33.3	29.5	27.0	28.2	29.6	30.4	31.2
Iran (Islamic Republic of)	27.4	24.5	23.0	23.0	23.4	23.7	24.1
Japan	21.3	21.2	20.1	19.2	19.1	19.0	19.0
Kiribati	32.8	31.2	31.6	32.1	32.3	32.4	32.6
Lao People's Democratic Republic	42.6	38.7	36.4	37.2	38.2	38.8	39.5
Malaysia	35.1	32.5	30.4	30.7	31.3	31.6	32.0
Maldives	48.0	44.8	44.5	48.3	50.3	51.3	52.2
Marshall Islands	31.0	30.3	29.7	29.9	30.2	30.4	30.6
Micronesia (Federated States of)	21.7	21.9	22.3	23.5	24.3	24.6	25.0
Mongolia	15.4	16.5	14.8	14.1	14.1	14.3	14.5
Myanmar	47.6	43.0	39.6	40.4	41.2	41.7	42.1
Nauru	30.0	30.0	29.5	29.4	29.5	29.5	29.6
Nepal	45.8	40.0	36.6	35.3	35.3	35.5	35.7
New Zealand	8.1	8.2	8.5	9.3	9.8	10.1	10.4
Niue	26.9	26.2	25.8	26.4	26.8	27.0	27.3
Pakistan	40.6	41.8	42.6	42.0	41.6	41.4	41.3
Palau	28.1	27.5	27.2	27.7	28.1	28.3	28.5

TABLE A8
(Continued)

	2000	2005	2010	2015	2017	2018	2019
Papua New Guinea	34.7	34.1	33.3	33.6	34.0	34.2	34.4
Philippines	25.0	22.2	18.7	14.5	13.3	12.8	12.3
Republic of Korea	17.5	16.0	14.3	13.1	13.1	13.2	13.5
Samoa	24.7	24.7	24.5	25.1	25.9	26.3	26.8
Singapore	12.3	11.7	11.4	11.9	12.4	12.7	13.0
Solomon Islands	41.0	40.2	38.8	38.0	37.9	37.8	37.7
Sri Lanka	38.8	36.0	33.8	33.8	34.1	34.4	34.6
Thailand	21.0	21.3	21.8	22.7	23.3	23.7	24.0
Timor-Leste	36.9	30.7	26.9	27.7	28.8	29.3	29.9
Tonga	28.0	27.5	27.2	27.6	28.0	28.2	28.5
Tuvalu	26.9	26.2	25.8	26.5	27.0	27.2	27.5
Vanuatu	30.9	27.3	24.2	25.2	26.7	27.5	28.5
Viet Nam	27.3	20.9	17.2	18.0	19.1	19.8	20.6

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: WHO. 2021. Global anaemia estimates, Edition 2021. In: *Global Health Observatory (GHO) data repository*. Geneva, Switzerland. Cited 25 May 2021. www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-anaemia-in-women-of-reproductive-age-(-)

TABLE A9
Prevalence of obesity among adults (percent)

	2000	2005	2010	2013	2014	2015	2016
World	**8.7**	**9.9**	**11.2**	**12.1**	**12.5**	**12.8**	**13.1**
Asia and the Pacific	2.6	3.4	4.5	5.2	5.5	5.8	6.1
Eastern Asia	2.4	3.2	4.3	5.1	5.4	5.7	6.0
Oceania	19.5	22.1	24.7	26.4	27.0	27.5	28.1
Oceania (excluding Australia and New Zealand)	15.6	17.8	20.2	21.9	22.4	23.0	23.6
South-eastern Asia	2.7	3.6	4.8	5.7	6.0	6.4	6.7
Southern Asia	2.5	3.2	4.1	4.7	4.9	5.2	5.4
Afghanistan	2.3	3.0	4.0	4.7	4.9	5.2	5.5
Australia	20.2	22.9	25.6	27.3	27.9	28.4	29.0
Bangladesh	1.3	1.8	2.5	3.0	3.2	3.4	3.6
Bhutan	2.4	3.4	4.6	5.5	5.7	6.1	6.4
Brunei Darussalam	7.2	9.0	11.1	12.6	13.1	13.6	14.1
Cambodia	1.5	2.0	2.7	3.3	3.5	3.7	3.9
China	2.4	3.2	4.4	5.2	5.5	5.9	6.2
Cook Islands	44.9	49.1	52.6	54.3	54.9	55.4	55.9
Democratic People's Republic of Korea	4.0	4.7	5.5	6.1	6.3	6.5	6.8
Fiji	21.0	23.7	26.5	28.3	28.9	29.5	30.2
India	1.6	2.1	2.8	3.3	3.5	3.7	3.9
Indonesia	2.6	3.6	4.9	5.8	6.1	6.5	6.9
Iran (Islamic Republic of)	16.6	19.1	22.1	24.0	24.6	25.2	25.8
Japan	2.1	2.6	3.3	3.8	3.9	4.1	4.3
Kiribati	34.9	38.9	42.2	44.1	44.7	45.3	46.0
Lao People's Democratic Republic	1.7	2.5	3.5	4.4	4.7	5.0	5.3
Malaysia	7.0	9.4	12.0	13.7	14.3	14.9	15.6
Maldives	3.0	4.2	5.9	7.2	7.6	8.1	8.6
Marshall Islands	43.7	46.7	49.6	51.3	51.8	52.4	52.9
Micronesia (Federated States of)	34.7	37.9	41.5	43.7	44.4	45.1	45.8
Mongolia	11.6	13.8	16.7	18.6	19.2	19.9	20.6
Myanmar	2.2	3.0	4.0	4.8	5.1	5.4	5.8
Nauru	55.1	57.0	58.9	60.0	60.3	60.7	61.0
Nepal	1.6	2.1	2.9	3.5	3.7	3.9	4.1
New Zealand	21.5	24.4	27.2	29.0	29.6	30.2	30.8
Niue	37.5	41.3	45.2	47.6	48.4	49.2	50.0
Pakistan	3.9	5.1	6.5	7.5	7.8	8.2	8.6
Palau	45.0	48.2	51.8	53.7	54.2	54.8	55.3

TABLE A9
(Continued)

	2000	2005	2010	2013	2014	2015	2016
Papua New Guinea	13.3	15.5	17.9	19.6	20.1	20.7	21.3
Philippines	3.3	4.1	5.0	5.7	5.9	6.2	6.4
Republic of Korea	2.9	3.4	3.9	4.3	4.4	4.5	4.7
Samoa	36.7	40.2	43.4	45.4	46.0	46.7	47.3
Singapore	4.4	4.9	5.4	5.7	5.8	6.0	6.1
Solomon Islands	13.5	15.9	18.7	20.6	21.2	21.9	22.5
Sri Lanka	2.1	2.8	3.7	4.4	4.6	4.9	5.2
Thailand	3.7	5.0	7.0	8.4	8.9	9.4	10.0
Timor-Leste	1.4	1.9	2.6	3.1	3.3	3.6	3.8
Tonga	37.0	40.6	44.1	46.1	46.8	47.5	48.2
Tuvalu	39.3	43.1	47.0	49.4	50.1	50.9	51.6
Vanuatu	15.6	18.4	21.3	23.2	23.9	24.5	25.2
Viet Nam	0.6	0.9	1.4	1.7	1.8	2.0	2.1

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: WHO. 2020. Global Health Observatory (GHO) data repository. In: *World Health Organization*. Geneva, Switzerland. Cited 28 April 2020.
https://apps.who.int/gho/data/node.main.A900A?lang=en

TABLE A10
Prevalence of exclusive breastfeeding among infants 0—5 months of age (percent)

	2000	2005	2010	2012	2015	2019	2020
World				37.1			43.8
Asia and the Pacific				39.7			45.8
Eastern Asia				28.5			22.0
Oceania (excluding Australia and New Zealand)				56.9			61.1
South-eastern Asia				33.5			45.1
Southern Asia				47.4			57.0
Afghanistan					43.1		
Bangladesh						62.6	
Bhutan			48.7		53.2		
Cambodia	10.8	60.0	72.8				
Democratic People's Republic of Korea				68.9			
India					54.9		
Indonesia				40.9			
Iran (Islamic Republic of)	44.1		53.1				
Lao People's Democratic Republic	18.8						
Marshall Islands	47.8	56.7	65.7				58.0
Mongolia	10.5						
Myanmar						62.1	
Pakistan					76.2		
Papua New Guinea	52.6						
Solomon Islands				12.3		14.0	
Sri Lanka							65.0
Thailand				52.2		39.6	
Viet Nam	22.0		17.0				

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: UNICEF. 2021. Infant and young child feeding. In: *UNICEF*. New York, USA. Cited 6 April 2022.
https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding

TABLE A11
Prevalence of low birthweight (percent)

	2000	2005	2010	2012	2013	2014	2015
World	**17.5**	**16.4**	**15.3**	**15.0**	**14.8**	**14.7**	**14.6**
Asia and the Pacific	27.0	25.0	23.4	22.8	22.5	22.3	22.1
Eastern Asia	5.8	5.4	5.2	5.1	5.1	5.1	5.1
Oceania (excluding Australia and New Zealand)	10.4	10.2	10.1	10.0	9.9	9.9	9.9
South-eastern Asia	13.7	13.0	12.5	12.4	12.4	12.3	12.3
Southern Asia	32.3	29.9	27.9	27.2	26.9	26.6	26.4
Australia	6.3	6.3	6.2	6.3	6.3	6.4	6.5
Bangladesh	36.2	32.7	30.0	29.0	28.6	28.2	27.8
Bhutan	13.8	12.9	12.2	11.9	11.8	11.8	11.7
Brunei Darussalam	10.3	9.5	11.8	12.1	12.0	11.5	10.8
Cambodia	15.4	13.8	12.9	12.6	12.4	12.2	12.1
China	5.8	5.4	5.1	5.0	5.0	5.0	5.0
Cook Islands	3.7	3.6	3.6	3.5	3.5	3.5	3.5
Indonesia	11.2	10.7	10.3	10.2	10.1	10.0	10.0
Japan	8.6	9.5	9.6	9.6	9.5	9.5	9.5
Lao People's Democratic Republic	20.4	19.1	18.1	17.7	17.6	17.4	17.3
Malaysia	10.0	10.2	11.1	11.3	11.4	11.4	11.3
Maldives	15.6	13.4	12.3	12.0	11.9	11.8	11.7
Mongolia	6.3	5.9	5.6	5.5	5.4	5.4	5.4
Myanmar	13.9	13.2	12.7	12.5	12.5	12.4	12.3
Nepal	27.2	25.0	23.2	22.6	22.3	22.1	21.8
New Zealand	6.6	6.0	5.9	5.9	5.8	5.8	5.7
Philippines	21.5	21.0	20.6	20.4	20.3	20.2	20.1
Republic of Korea	3.8	4.3	5.1	5.4	5.5	5.7	5.8
Singapore	9.8	9.7	9.7	9.7	9.6	9.6	9.6
Sri Lanka	16.3	17.3	17.0	16.6	16.4	16.1	15.9
Thailand	13.5	11.4	10.8	10.8	10.7	10.6	10.5
Vanuatu	11.1	11.0	11.0	11.0	11.0	10.9	10.9
Viet Nam	9.2	8.6	8.5	8.4	8.3	8.3	8.2

NOTE: Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: UNICEF and WHO. 2019. UNICEF-WHO joint low birthweight estimates. In: *United Nations Children's Fund*. New York, USA and Geneva, Switzerland. Cited 28 April 2020. www.unicef.org/reports/UNICEF-WHO-low-birthweight-estimates-2019

TABLE A12
Affordability of a healthy diet

	Number of people unable to afford a healthy diet (million)				Percentage of people unable to afford a healthy diet (percent)			
	2017	2018	2019	2020	2017	2018	2019	2020
World	3 049.1	2 973.8	2 961.9	3 074.2	42.9	41.5	40.9	42.0
Asia and the Pacific	1 890.4	1 808.7	1 776.0	1 853.8	46.2	44.1	43.0	44.5
Eastern Asia	205.2	166.3	146.9	174.4	12.8	10.5	9.2	11.0
Oceania	0.6	0.7	0.7	0.7	2.5	2.5	2.8	2.7
South-eastern Asia	347.3	340.9	331.6	347.2	55.6	54.0	52.0	53.9
Southern Asia	1 337.3	1 300.9	1 296.7	1 331.5	72.8	70.0	69.0	70.0
Australia	0.2	0.2	0.2	0.2	0.7	0.7	0.7	0.7
Bangladesh	123.7	120.5	119.8	121.1	77.4	74.6	73.5	73.5
Bhutan	0.4	0.4	0.4	0.4	57.6	52.2	50.0	53.0
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cambodia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China	199.3	160.5	141.4	168.7	14.3	11.4	10.0	12.0
Fiji	0.5	0.5	0.5	0.5	51.5	53.2	60.3	60.4
India	1 002.5	966.6	948.6	973.3	74.9	71.5	69.4	70.5
Indonesia	187.2	184.4	182.0	189.1	70.7	68.9	67.3	69.1
Iran (Islamic Republic of)	9.6	11.4	18.3	17.1	12.0	14.0	22.1	20.3
Japan	3.2	3.1	3.1	3.1	2.5	2.5	2.5	2.5
Lao People's Democratic Republic	5.6	5.6	5.6	5.8	80.6	79.2	78.4	79.8
Malaysia	0.8	0.7	0.5	0.6	2.6	2.1	1.7	1.9
Maldives	0.0	0.0	0.0	0.0	4.2	2.4	1.1	1.4
Mongolia	1.7	1.7	1.6	1.7	55.3	52.8	49.4	51.4
Myanmar	36.3	34.2	32.3	35.4	68.1	63.6	59.7	65.1
Nepal	24.0	23.7	23.8	24.5	86.8	84.5	83.3	84.0
New Zealand	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Pakistan	165.7	167.6	175.9	184.4	79.7	79.0	81.2	83.5
Philippines	74.6	75.7	74.2	75.2	71.0	71.0	68.6	68.6
Republic of Korea	0.9	0.9	0.8	0.9	1.7	1.7	1.5	1.7
Singapore	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sri Lanka	11.2	10.6	9.9	10.7	52.3	48.8	45.3	49.0
Thailand	12.1	12.4	11.1	11.9	17.5	17.9	16.0	17.0
Viet Nam	30.7	28.1	25.8	29.2	32.4	29.4	26.8	30.0

NOTE: n.a. = data not available. Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.

SOURCE: FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable.* Rome, FAO. https://doi.org/10.4060/cc0639en

TABLE A13
Cost of a healthy diet (USD per person per day)

	2017	2018	2019	2020
World	**3.314**	**3.350**	**3.425**	**3.537**
Asia and the Pacific	3.638	3.711	3.805	3.978
Eastern Asia	4.167	4.344	4.449	4.718
Oceania	2.847	2.846	2.958	3.066
South-eastern Asia	3.676	3.776	3.855	4.019
Southern Asia	3.489	3.560	3.658	3.806
Australia	2.259	2.273	2.325	2.561
Bangladesh	2.882	2.971	3.024	3.064
Bhutan	4.383	4.587	4.712	5.029
Brunei Darussalam	4.126	4.263	4.327	4.405
Cambodia	3.618	3.706	3.778	3.888
China	2.571	2.630	2.792	2.983
China, Hong Kong SAR	3.659	3.819	4.147	4.513
China, Taiwan Province of	3.990	n.a.	n.a.	n.a.
Fiji	3.612	3.677	3.858	3.914
India	2.824	2.830	2.877	2.970
Indonesia	4.129	4.273	4.268	4.466
Iran (Islamic Republic of)	3.005	3.212	3.642	3.550
Japan	5.529	5.701	5.609	5.808
Lao People's Democratic Republic	3.776	3.838	3.959	4.141
Malaysia	3.224	3.319	3.412	3.538
Maldives	3.581	3.634	3.662	3.861
Mongolia	4.544	4.667	4.901	5.103
Myanmar	3.706	3.786	3.861	4.186
Nepal	4.127	4.145	4.222	4.362
New Zealand	2.671	2.589	2.692	2.723
Pakistan	3.408	3.395	3.460	3.685
Philippines	3.843	3.998	4.054	4.108
Republic of Korea	4.712	4.900	4.800	5.183
Singapore	2.775	2.867	2.936	3.064
Sri Lanka	3.702	3.705	3.667	3.923
Thailand	3.971	4.042	4.181	4.321
Viet Nam	3.586	3.663	3.776	4.072

NOTE: n.a. = data not available. Please refer to Annex 4 for the country coverage of this report. In particular, Central Asia and Western Asia are not included.
SOURCE: FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable.* Rome, FAO. https://doi.org/10.4060/cc0639en

ANNEX 2
GLOSSARY

Undernourishment

Undernourishment is defined as the condition of an individual whose habitual food consumption is insufficient to provide, on average, the amount of dietary energy required to maintain a normal, active and healthy life. The indicator is reported as a prevalence and is denominated as "prevalence of undernourishment", which is an estimate of the percentage of individuals in the total population who are in a condition of undernourishment.

Data source: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

Food insecurity as measured by the Food Insecurity Experience Scale

Food insecurity as measured by the FIES indicator refers to limited access to food, at the level of individuals or households, due to lack of money or other resources. The severity of food insecurity is measured using data collected with the FIES survey module (FIES-SM), a set of eight questions asking respondents to self-report conditions and experiences typically associated with limited access to food. For purposes of annual SDG monitoring, the questions are asked with reference to the 12 months preceding the survey.

FAO provides estimates of food insecurity at two different levels of severity: moderate or severe food insecurity and severe food insecurity. People affected by moderate food insecurity face uncertainties about their ability to obtain food and have been forced to reduce, at times during the year, the quality and/or quantity of food they consume due to lack of money or other resources. Severe food insecurity refers to situations when individuals have likely run out of food, experienced hunger and, at the most extreme, gone for days without eating. The prevalence of moderate or severe food insecurity is the combined prevalence of food insecurity at both severity levels.

Data source: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. Rome. Cited November 2022. https://www.fao.org/faostat/en/#data/FS

Stunting, wasting and overweight in children under five years of age

Stunting (children under five years of age): Height/length (cm) for age (months) <-2 SD of the WHO Child Growth Standards median. Low height-for-age is an indicator that reflects the cumulative effects of undernutrition and infections since and even before birth. It may be the result of long-term nutritional deprivation, recurrent infections and lack of water and sanitation infrastructures. Stunted children are at greater risk for illness and death. Stunting often adversely affects the cognitive and physical growth of children, making for poor performance in school and reduced intellectual capacity.

Prevalence cut-off values for public health significance are as follows: very low <2.5 percent; low 2.5—<10 percent; medium 10—<20 percent; high 20—<30 percent; very high >=30 percent.

Wasting: Weight (kg) for height/length (cm) <-2 SD of the WHO Child Growth Standards median. Low weight-for-height is an indicator of acute weight loss or a failure to gain weight and can be the result of insufficient food intake and/or an incidence of infectious diseases, especially diarrhoea. Wasting indicates acute malnutrition and increases the risk of death in childhood from infectious diseases such as diarrhoea, pneumonia and measles.

Prevalence cut-off values for public health significance for wasting are as follows: very low <2.5 percent; low 2.5—<5 percent; medium 5—<10 percent; high 10—<15 percent; very high >=15 percent.

Overweight: Weight (kg) for height/length (cm) >+2 SD of the WHO Child Growth Standards median. This indicator reflects excessive weight gain for height generally due to energy intakes exceeding children's energy requirements. Childhood overweight and obesity is associated with a higher probability of overweight and obesity in adulthood, which can lead to various non-communicable diseases, such as diabetes and cardiovascular diseases.

Prevalence cut-off values for public health significance for child overweight are as follows: very low <2.5 percent; low 2.5—<5 percent; medium 5—<10 percent; high 10—<15 percent; very high >=15 percent.

Data source: UNICEF, WHO and World Bank. 2021. *Levels and Trends in Child Malnutrition*. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates. Key findings of the 2021 edition. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition

Exclusive breastfeeding

Exclusive breastfeeding for infants under 6 months of age is defined as receiving only breastmilk and no additional food or drink, not even water. Exclusive breastfeeding is a cornerstone of child survival and is the best food for newborns, as breastmilk shapes the baby's microbiome, strengthens the immune system and reduces the risk of developing chronic diseases. Breastfeeding also benefits mothers by preventing postpartum haemorrhage and promoting uterine involution, decreasing risk of iron-deficiency anaemia, reducing the risk of various types of cancer and providing psychological benefits.

Data source: UNICEF. 2021. Infant and young child feeding. In: *UNICEF*. New York, USA. Cited 6 April 2022. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding

Low birthweight

Low birthweight is defined as a weight at birth of less than 2 500 g (less than 5.51 lbs), regardless of gestational age. A newborn's weight at birth is an important marker of maternal and foetal health and nutrition.

Data source: UNICEF and WHO. 2019. UNICEF–WHO joint low birthweight estimates. In: *United Nations Children's Fund*. New York, USA and Geneva, Switzerland. Cited 28 April 2020. www.unicef.org/reports/UNICEF-WHO-low-birthweight-estimates-2019

Adult obesity

The body mass index (BMI) is the ratio of weight-to-height commonly used to classify the nutritional status of adults. It is calculated as the body weight in kilograms divided by the square of the body height in metres (kg/m2). Obesity includes individuals with BMI equal to or higher than 30 kg/m^2.

Data source: WHO. 2020. Global Health Observatory (GHO) data repository. In: *World Health Organization*. Geneva, Switzerland. Cited 28 April 2020. https://apps.who.int/gho/data/node.main.A900A?lang=en

Anaemia in women aged 15 to 49 years

Definition: percentage of women aged 15 to 49 years with a haemoglobin concentration less than 120 g/L for non-pregnant women and lactating women, and less than 110 g/L for pregnant women, adjusted for altitude and smoking.

Prevalence cut-off values for public health significance are as follows: no public health problem <5 percent; mild 5–19.9 percent; moderate 20–39.9 percent; severe ≥40 percent.

Data source: WHO. 2021. Vitamin and Mineral Nutrition Information System (VMNIS). In: *WHO*. Geneva, Switzerland. Cited 25 May 2021. www.who.int/teams/nutrition-food-safety/databases/vitamin-and-mineral-nutrition-information-system. WHO. 2021. Global anaemia estimates, Edition 2021. In: *Global Health Observatory (GHO) data repository*. Geneva, Switzerland. Cited 25 May 2021. www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-anaemia-in-women-of-reproductive-age-(−)

Cost and affordability of a healthy diet

The cost of a healthy diet is defined as the cost needed to buy the least expensive locally available foods to meet energy requirements of 2 330 kcal/capita/day, and nutritional standards determined by national food-based dietary guidelines (FBDG) around the world, with sufficient diversity and quantity between and within food groups. The final cost is the sum of the least expensive food items across six identified food groups of a healthy diet: fruits; vegetables; starchy staples; animal-source foods; legumes, nuts, and seeds; and oils and fats. For each country, the cost of a healthy diet is compared with country-specific income distributions available in the Poverty and Inequality Platform (PIP) of the World Bank https://pip.worldbank.org/home. It allows estimating the two affordability indicators that measure, respectively, the percentage and the number of people in a country who are unable to afford a healthy diet since their food budget is below the estimated cost.

Data source: FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. Rome, FAO. https://doi.org/10.4060/cc0639en

Agrifood systems is a term increasingly used in the context of transforming food systems for sustainability and inclusivity. The term refers to both food and non-food agricultural products with clear overlaps. Agrifood systems encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products. They comprise all food products that originate from crop and livestock production, forestry, fisheries and aquaculture, and the broader economic, societal and natural environments in which these diverse production systems are embedded.[229]

Breastmilk substitutes (BMS) are any food or milk marketed as partially or fully replacing breastmilk. They include any liquid or powdered milk or milk-replacement products marketed for feeding infants and children up to the age of three. Sometimes referred to as formula-milk products, they include infant formula, follow-up formula and growing-up milks.[230]

Built-up area or the *urban footprint* of a city is a measure of the land cover within a territory that is given over to urban uses and is irreversibly urban in character. Measures of a built-up area referred to in this report reflect the working definition adopted by the Global Human Settlements Framework: human settlements are land covered by roofed construction above ground intended or used for the shelter of humans, animals, things, the production of economic goods or the delivery of services.[231]

Environmental Enteric Dysfunction (EED), also known as environmental enteropathy, is a subclinical disorder of intestinal function in low-income settings. Enteropathy, or the mucosal inflammation and villus blunting that underlies this syndrome, is a form of systemic inflammation in the intestine that reduces the body's absorptive capacity of nutrients. EED is associated with wasting, stunting (chronic malnutrition) and reduced vaccine efficacy. There is still much to learn about the mechanism through which EED leads to malabsorption and growth failure and how to prevent it. However, there is a consensus that this systematic inflammation is caused by infection and chronic exposure to environmental pathogens and toxins. Unclean and contaminated environments where water, sanitation and hygiene infrastructure and services are insufficient, such as in slums or other resource-poor settings, are correlated with EED.[232]

Food desert describes neighbourhoods and communities with limited access to nutritious and affordable foods.[233]

Food environment is the physical, economic, political and sociocultural context in which consumers engage with the food system to make their decisions about acquiring, preparing and consuming food. It is the marketplace where food prices are determined based on supply and demand, where food marketing shapes food preferences, and where consumers form their understanding and expectations of food safety and quality (e.g. through nutrition labelling).[234]

Food swamps are neighbourhoods and communities with a high density of establishments selling products that do not contribute to healthy diets. Those products include confectionary and highly processed foods of high energy density and minimal nutritional value relative to more nutritious food options.

Food systems include the activities related to the system, such as growing, transporting and consuming food, and the individuals that participate in it. The four main components of a food system are food supply chains, food environments, individual factors and consumer behaviour. Food systems play a critical role in influencing diets by determining the types of foods produced and the kinds of foods people want to eat and can access; this affects nutrition and health in both positive and negative ways.

While some elements of the food system are observable, other features, such as consumer preferences, are unseen. A variety of external factors, including climate change, globalization, income distribution, urbanization, population growth, politics and culture, can influence food systems.[235]

Healthy diets that are sustainable are dietary patterns that promote all dimensions of an individual's health and well-being, have low environmental pressure and impact, are accessible, affordable, safe and equitable, and are culturally acceptable.[236]

Informal settlement or slum (UN-HABITAT 2020) refers to living conditions characterized by lack of access to basic services, including drinking water or sanitation, energy, waste collection and transportation; low structural quality of shelters; noncompliance with planning and building regulations; overcrowding; dangerous or environmentally sensitive locations; or insecure tenure. Informal settlements may develop because of rapid urbanization. Informal settlements can be on public or private land and can form spontaneously or through a broker who organizes a group to occupy a piece of land.

Multidimensional poverty encompasses the various deprivations experienced by poor people in their daily lives. Deprivations include poor health, lack of education, inadequate living standards, disempowerment, poor work quality, violence threat, and living in environmentally hazardous areas, among others. In this report, we refer to multidimensional poverty as the daily challenges faced by populations in the slums that are not limited to constraints in income but include multiple deprivations such as inadequate access to energy, health, and water, sanitation and hygiene (WASH) facilities.

Nutrition transition is the phenomenon of predictable shifts in diets due to modernization, urbanization, economic development, and increased wealth. Populations in many low- and middle-income countries are shifting towards more energy-dense diets, characterized by higher consumption of vegetable oils, sugar, refined carbohydrates and animal-sourced foods. These shifts in diet patterns – particularly the consumption of processed and ultra-processed food – alongside reduced food biodiversity and energy expenditure changes contribute to obesity and diet-related diseases.[237]

Population living in slums is the proportion of the urban population living in slum households. A slum household is a group of individuals living under the same roof but lacking one or more of the following: access to improved water, access to improved sanitation, sufficient living area, housing durability, and security of tenure, as adopted in the Millennium Development Goal Target 7.D.[238] Its successor, Sustainable Development Goal 11.1.1, considers inadequate housing (housing affordability) to complement the above definition of slums/informal settlements. It is noteworthy that countries use different definitions for slums. This lack of consensus leads to challenges in data comparability.

Triple burden of malnutrition is the phenomenon of the coexistence of (1) undernutrition – including stunting, wasting, and underweight – alongside (2) "hidden hunger" or micronutrient deficiencies, as well as (3) overweight and obesity, which can lead to diet-related non-communicable diseases. The term "double burden of malnutrition" is also sometimes used to indicate all forms of undernutrition and overnutrition.

Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects. Aggregation of urban and rural populations may not add up to a total population figure because of different country coverages. There is no internationally recognized definition of urban areas or peri-urban areas.

ANNEX 3
NOTES

For specific country notes, please refer to Tables A.1.1 and A.1.2 in FAO, IFAD, UNICEF, WFP and WHO. 2021. *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome, FAO. http://www.fao.org/3/cb4474en/cb4474en.pdf

Prevalence of undernourishment

Regional estimates were included when more than 50 percent of the population was covered. National estimates are reported as three-year moving averages to control for the low reliability of some of the underlying parameters such as the year-to-year variation in food commodity stocks, one of the components of the annual FAO Food Balance Sheets, for which complete and reliable information is scarce. Regional and global aggregates are reported as annual estimates on account of the fact that possible estimation errors are expected not to be correlated across countries.

Food insecurity

Regional estimates were included when more than 50 percent of the population was covered. To reduce the margin of error, national estimates are presented as three-year averages.

FAO estimates refer to the number of people living in households where at least one adult has been found to be food insecure.

Country-level results are presented only for those countries for which estimates are based on official national data or as provisional estimates, based on FAO data collected through the Gallup© World Poll, for countries whose national relevant authorities expressed no objection to their publication. Note that consent to publication does not necessarily imply validation of the estimate by the national authorities involved and that the estimate is subject to revision as soon as suitable data from official national sources are available. Global, regional and subregional aggregates are based on data collected in approximately 150 countries

Child stunting, wasting and overweight

The collection of household survey data on child height and weight were limited in 2020 due to the physical distancing measures required to prevent the spread of the virus. Only four national surveys included in the database were carried out (at least partially)

in 2020. The estimates on child stunting, wasting and overweight are therefore based almost entirely on data collected before 2020 and do not take into account the impact of the COVID-19 pandemic.

For child wasting regional estimates, values correspond to the model predicted estimates for the year 2020 only. Wasting is an acute condition that can change often and rapidly over the course of a calendar year. This makes it difficult to generate reliable trends over time with the input data available – as such, this report provides only the most recent global and regional estimates.

Wasting under 5 years of age and low birthweight regional aggregates exclude Japan.

Some aggregates are calculated by FAO.

Exclusive breastfeeding

Regional estimates are included when more than 50 percent of the population is covered.

Some aggregates are calculated by FAO.

Low birthweight

Wasting under 5 years of age and low birthweight regional aggregates exclude Japan.

Some aggregates are calculated by FAO.

Adult obesity

Some aggregates are calculated by FAO.

Anaemia in women aged 15 to 49 years

Some aggregates are calculated by FAO.

Cost and affordability of a healthy diet

The cost of a healthy diet is estimated in 2017 (benchmark year) using the latest retail price data available from the International Comparison Programme (ICP) led by the World Bank. To update the series in years 2018–2020, where ICP data are not available, the 2017 cost indicator was inflated using FAOSTAT data for each country's consumer price index (CPI), and World Development Indicators (WDI) data for purchasing power parity (PPP) exchange rates. Regarding affordability indicators, income distributions in the Poverty and Inequality (PIP) platform are currently available for years 2017, 2018 and 2019, but not available for year 2020. Thus, the percentage of people who cannot afford a healthy diet in 2020 was computed using the 2020 CPI-inflated cost of the diet and the corresponding 2019 income distributions available in PIP. Therefore, while affordability estimates in 2020 reflect food price shocks induced by the COVID-19 pandemic, the income shocks are not yet captured. Regional and country aggregates indicating the share of people unable to afford a healthy diet are expressed as weighted percentages using population weights.

ANNEX 4
COUNTRY GROUPINGS

FAO uses the M49 country and regional groupings, available at
https://unstats.un.org/unsd/methodology/m49

The groupings are:

- **Eastern Asia:** China, the Democratic People's Republic of Korea, Japan, Mongolia, the Republic of Korea;

- **Oceania:** American Samoa, Australia, the Cook Islands, Fiji, French Polynesia, Kiribati, the Marshall Islands, Micronesia (Federated States of), Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu;

- **South-eastern Asia:** Brunei Darussalam, Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste, Viet Nam; and

- **Southern Asia:** Afghanistan, Bangladesh, Bhutan, India, Iran (Islamic Republic of), Maldives, Nepal, Pakistan, Sri Lanka.

ANNEX 5
DHS AND MICS SECONDARY DATA ANALYSIS

FIGURE A1

Variables identified for possible secondary data analysis and notes on which database(s) the data are available in (DHS and/or MICS)

Variables for desondary data analysis of MICS and DHS datasets, inclusing notes on which databases(s) the data are available in (DHS and/or MICS)

URBAN CONTEXT	HOUSEHOLD FOOD SPACE/ENVIRONMENT		OUTCOMES
SLUM/NON-SLUM DHS/MICS*	Ownership of agricultural land and livestock# DHS/MICS	Mother	BMI — underweight and overweight/obesity DHS
Wealth quintiles DHS/MICS			Iron deficiency anaemia DHS
Maternal education DHS/MICS		Infant/young child	Minimal acceptable diet DHS/MICS
Mother's work DHS			Minimal meal frequency DHS/MICS
Recent migrant DHS/MICS			Minimal dietary diversity DHS/MICS
Ownership of house DHS/MICS			Stunting HAZ <2 DHS/MICS
			Wasting WHZ <2 DHS/MICS
			Height weight for height WHZ >2 DHS/MICS
			Iron deficiency anaemia DHS
			Breastfed within 24 hours of birth DHS/MICS

* Defined based on UN-HABITAT (2003) definition

Analysis to control for age and sex of the child

\# This variable will permit exploration of the proportion of housegholds which have some clean means of producing food in the urban setting.

Overview of secondary analysis

Conducted a comparison of the outcome variables between those living and not living in slum areas. Looked at whether the outcomes differ based on the other urban context factors for those in slum or non-slum areas (where adequate samples from slum areas are available in the datasets).

Controlled for child age and sex in most/all analyses and, if the sample size was big enough, presented some tables of the data for slum and non-slum dwellers for each country.

TABLE A14
Number of Asia and the Pacific countries for which secondary analysis of household surveys
(DHS and MICS) on food security and nutrition inequalities was conducted,
and the urban, rural and total sample sizes for each country

		Urban	Rural	Total
Afghanistan (DHS 2015)	Number	6 269	18 126	24 395
	Percent	25.7	74.3	100.0
Bangladesh (MICS 2019)	Number	13 564	47 678	61,242
	Percent	22.1	77.9	100.0
India (DHS 2015/16)	Number	209 807	391 702	601,509
	Percent	34.9	65.1	100.0
Indonesia (DHS 2017)	Number	23 458	24 505	47,963
	Percent	48.9	51.1	100.0
Kiribati (MICS 2018/19)	Number	1 464	1 607	3,071
	Percent	47.7	52.3	100.0
Mongolia (MICS 2018)	Number	9 235	4 563	13,798
	Percent	66.9	33.1	100.0
Myanmar (DHS 2015/16)	Number	3 315	9 185	12,500
	Percent	26.5	73.5	100.0
Nepal (MICS 2019)	Number	8 590	4 065	12,655
	Percent	67.9	32.1	100.0
Pakistan (DHS 2019)	Number	4 540	7 329	11,869
	Percent	38.2	61.8	100.0
Philippines (DHS 2017)	Number	12 703	14 793	27,496
	Percent	46.2	53.8	100.0
Thailand (MICS 2019)	Number	17 196	18 408	35,604
	Percent	48.3	51.7	100.0
Tuvalu (MICS 2019/20)	Number	380	315	695
	Percent	54.6	45.4	100.0

NB Sri Lanka data required fees to access it, and the format of the Timor-Leste data was incompatible with the other datasets.

Sample sizes taken from the household datasets.

For detailed information on the output of the surveys, please contact Dikoda.

ANNEX 6
SCOPING REVIEW OF URBAN SURVEYS

Scoping review of urban surveys

Dataset	Citation	Country/region	Sample information	Sample size as a proportion of the country's population*	Nutrition outcome and behaviour variable of interest
How the urban poor define and measure food security	[1]	Cambodia and Nepal	Sub-sample from a larger qualitative study conducted in Cambodia (n=80) and Nepal (n=108). Data was collected from urban centres in Cambodia (Phnom Penh and Neal Loeung) and Nepal (Kathmandu and Birgunj-Kalaiya). Four communities in Phnom Pen were squatter communities, six sites in Neak Loeung were informal communities, and two inner-city squatter settlement communities in Kathmandu.	Total population 2020 Cambodia= **0.0005 percent** (80/16 718 971) Nepal= **0.0004 percent** (108/29 136 808) Total population when study took place (2018) Cambodia= **0.0005 percent** (80/16 249 795) Nepal= **0.0004 percent** (108/28 095 712)	■ Food expenditure ■ Food purchasing
Replication files for: nutrition and the gut microbiota in 10 to 18 month old children living in urban slums of Mumbai, India	[2]	India	Sample of (n=53) children aged 10 to 18 months old from five urban slums in Mumbai, India.	Total population 2020 **0.000004 percent** (53/1 380 000 000) Total population when study took place (2017) **0.000004 percent** (53/1 339 000 000)	■ Anthropometry ■ Hemoglobin/anaemia ■ Dietary intake ■ IYCF feeding practices
Longitudinal study of extreme poor households in Bangladesh, 2010—2016	[3]	Bangladesh	Sample of (n=789) individuals, which is made up of adults (n=458), children aged 5—15 years (n=184) and children less than 5 years of age (n=147). The sample data was collected from a sub-sample of households of each round of the larger study. Urban and rural cohorts were recruited, with an urban cohort recruited from Dhaka slum populations	Total population 2020 **0.0005 percent** (789/164 689 383) Total population when study took place (2010) **0.0005 percent** (789/147 575 433)	■ Socio-economic and socio-demographic Anthropometric ■ Hemoglobin/anaemia ■ Food expenditure ■ Food intake ■ Food security

(Continued)

Dataset	Citation	Country/region	Sample information	Sample size as a proportion of the country's population*	Nutrition outcome and behaviour variable of interest
Replication Data for: food transfers, electronic food vouchers and child nutritional status among Rohingya children living in Bangladesh	[4]	Bangladesh	Sample of (n=523) children aged 6–23 months were recruited from communities within Cox's Bazaar, Rohingya migrant camps. All children were from households which received monetary/food aid.	Total population 2020 **0.0003 percent** (523/164 689 383) Total population when study took place (2018) **0.0003 percent** (523/161 376 713)	■ Anthropometry ■ Socio-economic ■ Socio-demographic ■ Food consumption ■ Food expenditure ■ Coping strategies ■ Access to nutrition assistance
Malnutrition trends in Rohingya children aged 6–59 months residing in informal settlements in Cox's Bazaar District, Bangladesh: An analysis of cross-sectional, population-representative surveys	[5]	Bangladesh	Data was collected from three cross-sectional population-representative cluster surveys. Selection for each survey was independent of the other surveys. The final samples for each round of surveys were n=1,113 in Round 1; n=628 in Round 2; n=683 in Round 3 of children aged 6–59 months.	Total population 2020 Round 1= **0.0007 percent** (1 113/164 689 383) Round 2= **0.0004 percent** (628/164 689 383) Round 3= **0.0004 percent** (683/164 689 383) Total population when study took place (2018) Round 1= **0.0007 percent** (1 113/159 685 421) Round 2= **0.0004 percent** (628/159 685 421) Round 3= **0.0004 percent** (683/159 685 421) Based on the estimated total population of settlements at time of survey. Round 1= **0.15 percent** (1 113/720 900) Round 2= **0.07 percent** (628/904 700) Round 3= **0.08 percent** (683/867 700)	■ Anthropometry ■ Hemoglobin ■ Breastfeeding practices ■ Dietary diversity
Replication data for the Survey of Dietary intakes of the urban poor in Dhaka City, Bangladesh	[6]	Bangladesh	This data assesses seasonal variation of food consumption and intrahousehold food distribution among the urban poor in Dhaka City.		■ Food consumption ■ Anthropometric

TABLE A15
(Continued)

Dataset	Citation	Country/ region	Sample information	Sample size as a proportion of the country's population*	Nutrition outcome and behaviour variable of interest
Comprehensive National Nutrition Survey 2016–18		India	This dataset includes a representative sample of households and individuals aged 0–19 years in India. The sample included rural, urban and slum areas in metropolitan cities. The data was collected from three population groups 0–4 years (n=38 060), 5–9 years of age (n=38 355) and 10–19 years (n=35 830)	Total population 2020 0.008 percent (112 245/1 380 000 000) Total population when study took place (2016) 0.009 percent (112 245/1 325 000 000)	▪ Sociodemographic ▪ Socioeconomic ▪ IYCF practices ▪ Dietary diversity

NOTE: * Total population of each country was sourced from estimates published by The World Bank – Data.[iii] Sample as a proportion of the total population were calculated from the most recent estimates of total population (2020) and estimates at the start of data collection for a dataset.

Citation details for studies in spotlight table

1. Txakoli, Cecilia (2021). How the urban poor define and measure food security in Cambodia and Nepal 2017-2019. [Data Collection]. Colchester, Essex: UK Data Service. 10.5255/UKDA-SN-853945

2. Shinsugi C, Gunasekara D, Gunawardena NK, Subasinghe W, Miyoshi M, Kaneko S, *et al*. (2019) Double burden of maternal and child malnutrition and socioeconomic status in urban Sri Lanka. PLoS ONE 14(10): e0224222. https://doi.org/10.1371/journal.pone.0224222

3. Goto, R., Mascie-Taylor, N. (2017). Longitudinal Study of Extreme Poor Households in Bangladesh, 2010-2016. [data collection]. UK Data Service. SN: 8102, http://doi.org/10.5255/UKDA-SN-8102-1

4. International Food Policy Research Institute (IFPRI), 2020, "Replication Data for: Food Transfers, Electronic Food Vouchers and Child Nutritional Status Among Rohingya Children Living in Bangladesh", https://doi.org/10.7910/DVN/5BAN6C, Harvard Dataverse, V1, UNF:6:ODQ0npEC/6CFqPJjagkwWg==[fileUNF]

5. Leidman E, Miah ML, Humphreys A, Toroitich-van Mil L, Wilkinson C, Chelang'at Koech M, *et al*. (2020) Malnutrition trends in Rohingya children aged 6–59 months residing in informal settlements in Cox's Bazar District, Bangladesh: An analysis of cross-sectional, population-representative surveys. PLoS Med 17(3): e1003060. https://doi.org/10.1371/journal.pmed.1003060

6. Waid, Jillian; Shakuntala H. Thilsted, 2018, "Replication Data for the Survey of dietary intakes of the urban poor in Dhaka City, Bangladesh", https://doi.org/10.7910/DVN/13KIPQ, Harvard Dataverse, V2

---

iii The World Bank (2021). Population, total. Retrieved from https://data.worldbank.org/indicator/SP.POP.TOTL?locations=IN

FILLING THE EVIDENCE GAPS — STATUS AND DETERMINANTS OF FOOD INSECURITY AND UNDERNUTRITION IN POOR URBAN AREAS (SDFUs)

Before the COVID-19 pandemic, the UN nutrition partners — FAO, WFP, WHO and UNICEF — in Asia and the Pacific, along with their country offices in Myanmar, Indonesia and the Philippines, planned comprehensive surveys of the Status and Determinants of Undernutrition in urban areas (SDFU), including survey modules on food security, WASH, and nutrition. Due to the pandemic, the surveys in two countries had to change, and switched to a phone survey that focused on a smaller selection of key indicators.

SDFU Myanmar 2018—2021

- Location: slums and non-slums in Yangon

- Year of data collection: 2018

- Sample size: 3 000 households

- Methods: Use of geospatial analysis and sampling, water quality assessment at point of consumption, and anthropometry data for women and children

- 2021: 3 000 HH including 2 300 HH with children under 5 years of age and 1 000 with children under 2 years of age. Phone numbers from SDFU 2018 plus contact list from UNICEF partner in Yangon.

SDFU Indonesia 2020

- Location: Jakarta slums

- Year of data collection: 2020

- Sample size: 730 households and 777 children aged under 5 in Jakarta's slums

- Methods: Phone numbers based on community health workers' records, as they had registered numbers of participants in a survey in 2018.

SDFU Philippines 2020

- Location: Quezon City slums

- Year of data collection: 2020

- Sample size: 2 725 households and 2 700 children aged under 5 in Quezon city's slums

- Methods: To reach the sample size, the local partner planned to call 5 400 households to account for missed calls and call refusals. The phone numbers were gathered from a breastfeeding promotion list and social protection register. Cost of Diet data collected for children 11—23 months — analysis underway. Mid-upper arm circumference, height and weight measured but not used.

TYPOLOGY OF FOOD SYSTEMS RESILIENCE DURING THE COVID-19 PANDEMIC

A typology of resilience in urban food systems has been developed to show how different parts of the food system exhibited different capacities during the pandemic. Based upon the Food Systems Dashboard Framework,[239] we selected one key indicator for each of the following dimensions: external drivers, food supply chains, food environments, individual factors, consumer behaviour and diets (outcomes). For each indicator, we developed cutoffs for absorptive capacity, adaptive capacity and transformative capacity. These capacities may also be interpreted as low, medium and high levels of resilience, respectively.[240]

This typology offers a simplified classification of resilience in urban food systems, which can be used to compare cities and identify priorities and opportunities to strengthen resilience. It is intended as an operational tool, which may be modified and adapted.

TABLE A16
Indicators used in the typology of resilience

Food systems dashboard indicators	Proxy indicator used for the typology of food systems
External drivers	Cultivated land within 50 km of city (km² per 100 000 persons)
Food supply chains	Proportion of food-sector businesses with most suppliers located within the city (percent)
Food environments	Average change in food prices (during pandemic) based on 4 selected food items (percent)
Individual factors	Reduction in average household income (percent)
Consumer behaviour	No indicator was available for all cities
Diets	Minimum Dietary Diversity for Women of Reproductive Age (MDD-W) (percent)

SOURCE: Food systems dashboard indicators adapted from The Food Systems Dashboard. Global Alliance for Improved Nutrition (GAIN) and Johns Hopkins University. 2020. Geneva, Switzerland. https://www.foodsystemsdashboard.org

This tool was applied in eight cities for low-income urban communities: Chittagong; Cox's Bazar and Dhaka in Bangladesh; Jakarta, Indonesia; Kabul, Afghanistan; Peshawar, Pakistan; Phnom Penh, Cambodia; and Quezon City, the Philippines. Using the framework in **FIGURE A1**, the relevant data were extracted for each indicator to make cross-city comparisons as shown in **FIGURE A2**.

Main findings

The study findings are presented in the context of external drivers, the components of food systems (food supply chains, food environments, individual factors, consumer behaviours) and diet outcomes.

The COVID-19 pandemic has increased levels of vulnerability and food insecurity in cities through three main mechanisms, which varied geographically between cities and temporally throughout the pandemic:

- disruptions to food supply chains;

- increased food prices; and

- loss of income.

Food supply chains have been disrupted (in some cases for multiple, prolonged periods) due to transport and movement restrictions during the pandemic. Urban areas typically have longer and more complex supply chains than rural areas, which makes them more susceptible to disruption. A range of government and private-sector interventions helped to protect supply chains and keep food moving from rural areas into major cities. Many food-sector businesses lost a large proportion of their income, and some were forced to close, reduce costs, or adapt in other ways. We found that many small and medium enterprises (SMEs) were unable to access financial support and technical assistance they needed during the pandemic. Responses and adaptations developed by SMEs (often with no external support) may contribute to longer-term resilience, such as diversification, online sales and home deliveries.

The combination of increased food prices and loss of income affected food affordability for the urban poor. Food prices increased during the pandemic in all eight cities, with considerable variations between cities and between food groups. Daily-wage earners and informal-sector workers were most affected by loss of income and their access to food was compromised when local markets and street food vendors were subject to restrictions. Many of these people were not registered for social protection programmes and had no financial buffer, making them highly susceptible to food insecurity.

Urban inequity has increased with wealthier households adopting coping strategies that may improve longer-term resilience, while poorer households are adopting unsustainable negative strategies. Average household income declined by at least 40 percent in all cities, with the largest decline (75 percent) reported in urban slums in Bangladesh (from February to April 2020). Governments adapted, supplemented and scaled up their existing social protection programmes in response to the pandemic to support people who became vulnerable in cities. Poor urban households reduced their food basket (diet diversity) and meal frequency, prioritized children over adults or begged for food. Wealthier households in cities adapted by engaging with online shopping using larger supermarkets.

The typology suggests that food systems in the eight cities did not show high levels of resilience (or transformative capacity) to respond effectively to the COVID-19 crisis. Individual factors, represented by reduced income, were particularly affected and remained at the absorptive level, meaning a lower level of resilience characterized by coping rather than adapting or transforming. Combined with even a moderate rise in food prices, this loss of income raises concerns regarding the resilience of households and is eventually likely to reflect in diet and nutritional outcomes.

FIGURE A2
Comparison of the eight city typologies:
low level of resilience to cope
with the COVID-19 crisis

	External drivers	Food supply chains	Food environments	Individual factors	Diets
Chittagong	Adaptive	Absorptive	Adaptive	Absorptive	Absorptive
Cox's Bazar		Adaptive	Adaptive	Adaptive	
Dhaka	Adaptive	Adaptive	Adaptive	Absorptive	Absorptive
Jakarta	Absorptive	Adaptive	Adaptive	Absorptive	Adaptive
Kabul	Adaptive	Adaptive	Absorptive		
Peshawar	Transformative	Absorptive	Adaptive	Absorptive	
Phnom Penh	Transformative	Transformative	Transformative	Adaptive	
Quezon city	Absorptive	Absorptive	Absorptive		Absorptive

■ Absorptive   ■ Adaptive   ■ Transformative

SOURCE: WFP and Dikoda. 2021. Urban food systems in Asia: Covid-19, food security and resilience.

Key to figure: Absorptive capacity = leading to persistence (or coping with the shock); Adaptive capacity = leading to incremental adjustments/changes/adaptations; Transformative capacity = leading to transformational responses. Transformative capacity is considered to provide high resilience while absorptive capacity provides low resilience.

Positive opportunities exist for transformation of urban systems. Innovative transformations represent an area that could be strengthened on the supply side to increase the resilience of the economy and the livelihoods of those working in the food system by protecting income and the access of vulnerable individuals to the food system. Interventions are needed to shorten food supply chains to make city food systems more sustainable and resilient.

The findings from this work have been used to develop recommendations for governments and development actors on potential entry points to consider in the response to the pandemic and to strengthen the resilience of urban food systems against inevitable future shocks.

Methodological recommendations:

■ Standardized indicators of resilience and vulnerability are needed to facilitate comparisons between cities, especially for individual factors and consumer behaviour. In future assessments, the indicators included in the urban analysis should be considered and can be adjusted depending on the type of shock in question or depending on local priorities. These new indicators at the city level include cultivated land within 50 km of a city (km2 per 100 000 persons), proportion of food-sector businesses with most suppliers located within the city, average change in food prices during a specific time frame based on four selected food items, reduction in average household income, and Minimum Dietary Diversity for Women of Reproductive Age (MDD-W). For individual factors, a child Food Insecurity Experience Scale indicator (currently being developed) should be used to capture the level of food insecurity experienced by children and adolescents, as research has shown that their experience is different to the household's head. More research should be undertaken to provide guidance on a standardized set of indicators relevant to consumer behaviour.

■ Further development and application of the typology of urban food systems resilience, which may be used as an operational tool to identify priorities and opportunities to strengthen resilience.

Innovative approaches to defining urban areas and collecting city-specific data, such as combining local surveys with spatial, remotely sensed data that can bring unique insights: Approaches that support and improve government's existing assessment, monitoring and surveillance tools and systems are recommended.

NOTES

1   For more detail see **FAO, IFAD, UNICEF, WFP and WHO.** 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. Rome, FAO. https://doi.org/10.4060/cc0639en

2   **FAO, UNHCR, UNICEF, WFP and WHO.** 2020. *Global action plan on child wasting: a framework for action to accelerate progress in preventing and managing child wasting and the achievement of the Sustainable Development Goals*. Geneva, WHO. https://www.who.int/publications/m/item/global-action-plan-on-child-wasting-a-framework-for-action

3   **WHO.** 2014. *Global Nutrition Targets 2025: Low birth weight policy brief*. Geneva, WHO. https://apps.who.int/iris/bitstream/handle/10665/149020/WHO_NMH_NHD_14.5_eng.pdf?ua=1

4   **FAO, UNICEF, WFP and WHO.** 2021. *Asia and the Pacific Regional Overview of Food Security and Nutrition 2020: Maternal and child diets at the heart of improving nutrition*. Bangkok, FAO. http://doi.org/10.4060/cb2895en

5   **Herforth, A., Bai, Y., Venkat, A., Mahrt, K., Ebel, A. and Masters, W.A.** 2020. *Cost and affordability of healthy diets across and within countries. Background paper for The State of Food Security and Nutrition in the World 2020*. FAO Agricultural Development Economics Technical Study No. 9. Rome, FAO. https://doi.org/10.4060/cb2431en

6   **United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).** 2019. The Future of Asian and Pacific Cities. Bangkok, UNESCAP. https://www.unescap.org/publications/future-asian-and-pacific-cities-2019-transformative-pathways-towards-sustainable-urban; Data is analysed by Dikoda, from **UN DESA.** 2018. Population Division: World Urbanization Prospects 2018. In: *United Nations*. New York, USA, UN. Cited 4 November 2022. https://population.un.org/wup/

7   The Milan Urban Food Policy Pact is an international agreement among cities all over the world who are committed "to develop sustainable food systems that are inclusive, resilient, safe and diverse, that provide healthy and affordable food to all people in a human rights-based framework, that minimize waste and conserve biodiversity while adapting to and mitigating impacts of climate change". Its main aim is to support cities wishing to develop more sustainable urban food systems by fostering city to city cooperation and best practices exchange.

8   **UNDESA.** 2018. 68% of the world population projected to live in urban areas by 2050, says UN. In: *United Nations*. New York, USA, UN. Cited 4 November 2022. https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html

9   **Blankenship, J.L., Rudert, C., and Aguayo, V.M.** 2020. Triple trouble: Understanding the burden of child undernutrition, micronutrient deficiencies, and overweight in East Asia and the Pacific. *Maternal and Child Nutrition*, 16(S2). https://doi.org/10.1111/mcn.12950

10   **International Food Policy Research Institute (IFPRI).** 2017. 2017 Global food policy report. Washington, DC, IFPRI. https://doi.org.10.2499/9780896292529

11   **FAO.** 2017. The State of Food and Agriculture 2017. Rome, FAO. https://www.fao.org/3/I7658e/I7658e.pdf

12   **Ruel, M.T., Garrett, J.L. and Yosef, S.** 2017. *Global Food Policy Report: Food security and nutrition: Growing cities, new challenges*. pp. 24-33. Washington, DC, IFPRI. https://doi.org/10.2499/9780896292529_03

13   **UNICEF.** 2018. Advantage or Paradox? The challenge for children and young people of growing up urban. In: *UNICEF*. New York, USA. UNICEF. Cited 7 December 2022. https://data.unicef.org/resources/urban-paradox-report/

14   **UNDP International Poverty Centre (IPC).** 2005. *In Focus: Poverty and the City*. Brasilia, Brazil, IPC. https://ipcig.org/sites/default/files/pub/en/IPCPovertyInFocus7.pdf

15   Throughout this publication, Oceania refers to the aggregate of Australia, New Zealand and the Pacific Islands, including all countries for which data are available.

16   **Liu, J.X., Wang, M.J., Yang, L., Rahman, S. and Sriboonchitta, S.** 2020. Agricultural Productivity Growth and Its Determinants in South and Southeast Asian Countries. *Sustainability*, 12(12): 4981. https://doi.org/10.3390/su12124981

17   **Warr, P.** 2020. Urbanisation and the Demand for Food. *Bulletin of Indonesian Economic Studies*, 56(1):43-86 https://doi.org/10.1080/00074918.2020.1742285

18   **Fred, G., Tang, P., Bai, X.H. and Xu, H.J.** 2005. *Commercialization of food consumption in rural China*. Washington, DC, United States, Department of Agriculture, and Economic Research Service. https://handle.nal.usda.gov/10113/18039; **Lyon, C. and Durham, C.** 1999. Refrigeration and food demand in China: Can refrigerator ownership help predict consumption of food products in China? Paper presented at the Chinese Agriculture and WTO, Proceedings of the WCC-101, 2-3 December 1999; **Organization for Economic Co-operation and Development (OECD) and FAO.** 2013. OECD-FAO Agricultural Outlook 2013–2022. Paris, OECD Publishing. https://doi.org/10.1787/f1b0b29c-en; **Zhao, J. and Thompson, W.** 2013. The effect of refrigerator use on meat consumption in rural China. Paper presented at the Annual Meeting of Southern Agricultural Economics Association, 2–5 February 2013. Cited 7 December 2022 https://ideas.repec.org/s/ags/saea13.html

19   **Warr, P.** 2020. Urbanisation and the Demand for Food. *Bulletin of Indonesian Economic Studies*, 56(1):43-86 https://doi.org/10.1080/00074918.2020.1742285

20   **FAO.** 2020. *Cities and local governments at the forefront in building inclusive and resilient food systems: Key results from the FAO Survey "Urban Food Systems and COVID-19"*, Revised version. Rome.

21   **FAO.** 2020. *Cities and local governments at the forefront in building inclusive and resilient food systems: Key results from the FAO Survey "Urban Food Systems and COVID-19"*, Revised version. Rome. https://doi.org/10.4060/cb0407en

22 **FAO.** 2020. *Cities and local governments at the forefront in building inclusive and resilient food systems: Key results from the FAO Survey "Urban Food Systems and COVID-19"*, Revised version. Rome. https://doi.org/10.4060/cb0407en

23 **International Panel of Experts on Sustainable Food Systems (IPES-Food).** 2007. *What makes urban food policy happen? Insights from five case studies*. Brussels, IPES-Food. https://www.ipes-food.org/_img/upload/files/Cities_full.pdf

24 **International Panel of Experts on Sustainable Food Systems (IPES-Food).** 2007. *What makes urban food policy happen? Insights from five case studies*. Brussels, IPES-Food. https://www.ipes-food.org/_img/upload/files/Cities_full.pdf

25 **FAO and GAIN.** 2021. Food Systems Summit 2021: Coalition on Sustainable and Inclusive Urban Food Systems. In: *United Nations*. New York, USA, UN. Cited 8 December 2022. https://foodsystems.community/commitment_to_action/coalition-on-sustainable-and-inclusive-urban-food-systems/

26 **Ezeh, A., Oyebode, O., Satterthwaite, D., Chen, Y.F., Ndugwa, R., Sartori, J., Mberu, B., Melendez-Torres, G.J., Haregu, T., Watson, S.I. and Caiaffa, W.** 2017. The history, geography, and sociology of slums and the health problems of people who live in slums. *The lancet*, 389(10068):547-558. https://doi.org/10.1016/S0140-6736(16)31650-6

27 **United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).** 2019. The Future of Asian and Pacific Cities. Bangkok, UNESCAP. https://www.unescap.org/publications/future-asian-and-pacific-cities-2019-transformative-pathways-towards-sustainable-urban

28 **Vilar-Compte, M., Burrola-Méndez, S., Lozano-Marrufo, A.** *et al.* 2021. Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity in Health*, 20(40). https://doi.org/10.1186/s12939-020-01330-0

29 **Congdon, P.** 2019. Obesity and Urban Environments. *Int J Environ Res Public Health*, 16(3):464. https://doi.org/10.3390/ijerph16030464; **Nurwanti, E., Hadi, H., Chang, JS, Chao J.C., Paramashanti, B.A., Gittelsohn. J. and Bai, C.H.** 2019. Rural-Urban Differences in Dietary Behavior and Obesity: Results of the Riskesdas Study in 10-18-Year-Old Indonesian Children and Adolescents. *Nutrients*, 11(11):2813. https://doi.org/10.3390/nu11112813; **WHO Regional Office for the Western Pacific.** 2017. *Overweight and Obesity in the Western Pacific Region*. Manila. https://apps.who.int/iris/bitstream/handle/10665/255475/9789290618133-eng.pdf?sequence=1&isAllowed=y

30 **Vilar-Compte, M., Burrola-Méndez, S., Lozano-Marrufo, A.** *et al.* 2021. Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity in Health*, 20(40). https://doi.org/10.1186/s12939-020-01330-0

31 **Tacoli, C.** 2019. The urbanization of food insecurity and malnutrition. *Environment and Urbanization Briefs*, 31(2): 371–374. https://www.iied.org/10879iied

32 **International Labour Organization (ILO).** 2018. *Women and men in the informal economy: a statistical picture (third edition)*. Geneva. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_626831.pdf

33 **Vilar-Compte, M., Burrola-Méndez, S., Lozano-Marrufo, A.** *et al.* 2021. Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity in Health*, 20(40). https://doi.org/10.1186/s12939-020-01330-0

34 **United Nations Human Settlements Programme (UN-HABITAT).** 2006. *State of the world's cities 2006/7*. Kenya. https://unhabitat.org/sites/default/files/download-manager-files/State%20of%20the%20World%E2%80%99s%20Cities%202020062007.pdf; **Vilar-Compte, M., Burrola-Méndez, S., Lozano-Marrufo, A.** *et al.* 2021. Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity in Health*, 20(40). https://doi.org/10.1186/s12939-020-01330-0

35 **FAO, IFAD, UNICEF, WFP and WHO.** 2021. *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome, FAO. https://doi.org/10.4060/cb4474en

36 **Ezeh, A., Oyebode, O., Satterthwaite, D., Chen, Y.F., Ndugwa, R., Sartori, J.** *et al.* 2017. The history, geography, and sociology of slums and the health problems of people who live in slums. *The Lancet*, The health of people who live in slums series, 389(10068), 547-558. https://doi.org/10.1016/S0140-6736(16)31650-6

37 **Ezeh, A., Oyebode, O., Satterthwaite, D., Chen, Y.F., Ndugwa, R., Sartori, J.** *et al.* 2017. The history, geography, and sociology of slums and the health problems of people who live in slums. *The Lancet*, The health of people who live in slums series, 389(10068), 547-558. https://doi.org/10.1016/S0140-6736(16)31650-6

38 **Asian Development Bank (ADB).** 2014. Urban poverty in Asia. Manila, ADB. Cited 17 January 2023. http://hdl.handle.net/11540/3310

39 **FAO.** 2019. *FAO framework for the Urban Food Agenda*. Rome. https://doi.org/10.4060/ca3151en

40 **Gouel, C. and Guimbard, H.** 2019. Nutrition Transition and the Structure of Global Food Demand. *American Journal of Agricultural Economics*, 101(2): 383–403. https://doi.org/10.1093/ajae/aay030

41 **Bijl, D.L., Bogaart, P.W., Dekker, S.C., Stehfest, E., Vries, B.J.M. and Vuuren, D.P.** 2017. A physically-based model of long-term food demand. Global Environmental Change, 45: 47-62. https://doi.org/10.1016/j.gloenvcha.2017.04.003

42 **Bijl, D.L., Bogaart, P.W., Dekker, S.C., Stehfest, E., Vries, B.J.M. and Vuuren, D.P.** 2017. A physically-based model of long-term food demand. *Global Environmental Change*, 45: 47-62. https://doi.org/10.1016/j.gloenvcha.2017.04.003

43 **World Bank.** 2022. World Development Indicators: Population living in slums (% of urban population). In: *World Bank*. Washington, DC. Cited 23 December 2022. https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS/

44 **Bhardwaj, G., Esch, T., Lall, S., Marconcini, M., Soppelsa, M. and Wahba, S.** 2020. *Cities, Crowding, and the Coronavirus: Predicting Contagion Risk Hotspots*. Washington, DC. World Bank. https://openknowledge.worldbank.org/handle/10986/33648

45 **Yap, C. and McFarlane, C.** 2020. Understanding and researching urban extreme poverty: a conceptual–methodological approach. *Environment and Urbanization*, 32(1): 254–274. https://doi.org/10.1177/0956247819890829

46 **Reardon, T., Echeverria, R., Berdegué, J., Minten, B., Liverpool-Tasie, S., Tschirley, D. and Zilbermane, D.** 2019. Rapid Transformation of Food Systems in Developing Regions: Highlighting the Role of Agricultural Research and Innovations. *Agricultural Systems*, 172: 47–59. https://doi.org/10.1016/j.agsy.2018.01.022

47 Analysis by Dikoda using MODIS landcover data: **Friedl, M. and Sulla-Menashe, D.** 2019. MCD12Q1 MODIS/Terra+Aqua Land Cover Type Yearly L3 Global 500m SIN Grid V006 [Data set]. NASA EOSDIS Land Processes DAAC. In: United States Geological Survey (USGS). Virginia, USA. Cited 15 November 2022. https://doi.org/10.5067/MODIS/MCD12Q1.006

48 **Bren d'Amour, C., Reitsma, F., Baiocchi, G., Barthel, S., Güneralp, B., Erb, K.H., Haberl, H., Creutzig, F. and Seto, K.C.** 2017. Future Urban Land Expansion and Implications for Global Croplands. *Proceedings of the National Academy of Sciences*, 114(34): 8939–8944. https://doi.org/10.1073/pnas.1606036114

49 **Acharya, G., Cassou, E., Jaffee, S. and Ludher, E.K.** 2021. *RICH Food, Smart City: How Building Reliable, Inclusive, Competitive, and Healthy Food Systems is Smart Policy for Urban Asia*. Washington, DC. World Bank. https://openknowledge.worldbank.org/handle/10986/35137

50 **Angel, S.** 2020. *Planet of Cities, Illustrated edition*. Cambridge, MA: Lincoln Institute of Land Policy. https://doi.org/10.1111/jors.12091

51 **Sahasranaman, A. and Jensen, H.J.** 2021. Spread of COVID-19 in urban neighbourhoods and slums of the developing world. *The Royal Society*, 18(174). https://doi.org/10.1098/rsif.2020.0599

52 **World Bank.** 2015. *Competitive Cities for Jobs and Growth: What, Who, and How*. Washington, DC. https://openknowledge.worldbank.org/handle/10986/23227

53 **Asian Development Bank (ADB).** 2014. Urban Poverty in Asia. Manila. http://hdl.handle.net/11540/3310

54 **Gravina, A.F. and Lanzafame, M.** 2021. Finance, globalization, technology and inequality: Do nonlinearities matter? Economic Modelling, 96: 96-110. https://doi.org/10.1016/j.econmod.2020.12.026

55 **Reardon, T., Timmer, C.P., Barrett, C.B. and Berdegué, J.** 2003. The Rise of Supermarkets in Africa, Asia, and Latin America. American Journal of Agricultural Economics, 85(5): 1140-1146. https://doi.org/10.1111/j.0092-5853.2003.00520.x; **Reardon, T., Timmer, C.P. and Minten, B.** 2010. Supermarket revolution in Asia and emerging development strategies to include small farmers. *PNAS*, 109 (31):12332-12337. https://doi.org/10.1073/pnas.1003160108; **Reardon, T. and Gulati, A.** 2008. *The Rise of Supermarkets and Their Development Implications-International Experience Relevant for India*. Washington, DC, IFPRI. Cited 9 January 2023. https://www.ifpri.org/publication/rise-supermarkets-and-their-development-implications

56 **Chen, T.L., Chiu, H.W. and Lin, Y.F.** 2020. How do East and Southeast Asian Cities Differ from Western Cities? A Systematic Review of the Urban Form Characteristics. *Sustainability*, 12(6): 2423. https://doi.org/10.3390/su12062423

57 **Moran, D., Kanemoto K; Jiborn, M., Wood, R., Többen, J. and Seto, K.C.** 2018. Carbon footprints of 13,000 cities. *Environmental Research Letters*, 13(6). DOI: 10.1088/1748-9326/aac72a

58 **Dodman, D., Hayward, B., Pelling, M., Castan Broto, V., Chow, W., Chu, E., Dawson, R., Khirfan, L., McPhearson, T., Prakash, A., Zheng, Y. and Ziervogel, G.** 2022: Cities, Settlements and Key Infrastructure. In: H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama, eds. *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. pp. 907–1040. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi:10.1017/9781009325844.008

59 **D'Odorico. P., Davis, K.F., Rosa, L., Carr, J.A. and et al.** 2018. The Global Food-Energy-Water Nexus', *Reviews of Geophysics*, 56,(3): 456–531, https://doi.org/10.1029/2017RG000591

60 **Headey, D., Hirvonen, K. and Hoddinott, J.** 2018. Animal sourced foods and child stunting. *American Journal of Agricultural Economics*, 100(5): 1302-1319. https://doi.org/10.1093/ajae/aay053

61 **United Nations Environment Programme (UNEP).** 2021. *Food Waste Index Report 2021*. Nairobi, UNEP. https://www.unep.org/resources/report/unep-food-waste-index-report-2021

62 **Abduh, M.N., Yusuf, R. and Buraerah, F.** 2020. The Impact of Household Waste on Slum Neighborhoods. *International Journal of Engineering Research and Technology*. 13(9): 2374-2379. https://dx.doi.org/10.37624/IJERT/13.9.2020.2374-2379

63 **Intergovernmental Panel on Climate Change (IPCC).** 2022. Climate Change 2022: Impacts, Adaptation and Vulnerability. In: H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama, eds. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. 3056 pp. Cambridge, UK and New York, NY, USA, Cambridge University Press. doi:10.1017/9781009325844

64 **Marielle, D., René, V.V. and Jess, H.** 2019. Urban agriculture as a climate change and disaster risk reduction strategy. *Field Actions Science Reports*, Special Issue 20 Urban Agriculture: Another Way to Feed Cities, pp. 32-39.

65 **IPCC.** 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. In: C.B. Field, Barros, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White, eds. *Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. pp. 535-613. Cambridge, UK and New York, NY, USA, Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-FrontMatterA_FINAL.pdf

66 **Chen, M., Xu, G., Wu, S. and Zheng, S.** 2010. High-Temperature Hazards and Prevention Measurements for Asphalt Pavement. Published in Proceedings of the International Conference on Mechanic Automation and Control Engineering (MACE), Wuhan, China, 26–28 June 2010. Institute of Electrical and Electronics Engineers (IEEE), New York, NY, pp. 1341–344. doi:10.1109/ MACE.2010.5536275

67 **Tacoli, C., Bukhari, B. and Fisher, S.** 2013. *Human settlements working paper No. 37, Rural-urban interactions and livelihood strategies-Urban poverty, food security and climate change*. London, International Institute for Environment and Development (IIED). https://www.iied.org/sites/default/files/pdfs/migrate/10623IIED.pdf

68 **Hidalgo, D.M., Witten, I., Nunn, P.D., Burkhart, S., Bogard, J.R., Beazley, H. and Herrero, M.** 2020. Sustaining healthy diets in times of change: linking climate hazards, food systems and nutrition security in rural communities of the Fiji Islands. *Regional Environmental Change*, 20(73). https://doi.org/10.1007/s10113-020-01653-2

69 **UNESCAP.** 2015. Asia-Pacific Disaster Report 2015-Disasters Without Borders. Bangkok. https://www.unescap.org/sites/default/d8files/knowledge-products/apdr2015-full.pdf

70 **UNESCAP.** 2015. Asia-Pacific Disaster Report 2015-Disasters Without Borders. Bangkok. https://www.unescap.org/sites/default/d8files/knowledge-products/apdr2015-full.pdf

71 **Akther, H. and Ahmad, M. M.** 2021. Livelihood Under Stress: The Case of the Urban Poor during post-flood Dhaka, Bangladesh. *Geographical Journal*, 187(3): 186-199. https://doi.org/10.1111/geoj.12379

72 **Goudet, S.M., Griffiths, P.L., Bogin, B.A. and Selim, N.** 2011. Impact of flooding on feeding practices of infants and young children in Dhaka, Bangladesh Slums: what are the coping strategies? *Maternal and Child Nutrition*, 7: 198-214. https://doi.org/10.1111/j.1740-8709.2010.00250.x

73 **ADB.** 2020. Pacific Urban Update 2020. Manila, ADB. https://www.adb.org/sites/default/files/institutional-document/619621/pacific-urban-update-2020.pdf

74 **Fan, S.G.** 2019. The intersection between climate change, food, and migration, Transforming agri-food systems for human and planetary health. In: International Food Policy Research Institute (IFPRI). Washington, DC. Cited 22 November 2022. https://www.ifpri.org/blog/intersection-between-climate-change-food-and-migration

75 **UNESCAP.** 2021. *Resilience in a Riskier World, Managing systemic risks from biological and other natural hazards, Asia-Pacific Disaster Report 2021*. Bangkok, UNESCAP. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021_full%20version_0.pdf

76 **International Organization for Migration (IOM).** 2015. *World Migration Report 2015 – Migrants and Cities: New Partnerships to Manage Mobility*. Geneva, IOM. https://publications.iom.int/books/world-migration-report-2015-migrants-and-cities-new-partnerships-manage-mobility

77 **Pingali, P.** 2007. Westernization of Asian diets and the transformation of food systems: Implications for research and policy. *Food Policy*, 23(3):281-298. https://doi.org/10.1016/j.foodpol.2006.08.001

78 **Reardon, T., Tschirley, D., Dolislager, M., Snyder, J., Hu, C.R. and White, S.** 2014. *Urbanization, Diet Change, and Transformation of Food Supply Chains in Asia*. Michigan, USA, Michigan State University. https://www.fao.org/fileadmin/templates/ags/docs/MUFN/DOCUMENTS/MUS_Reardon_2014.pdf; **FAO.** 2018. *Dynamic development, shifting demographics, changing diets*. Bangkok. FAO. https://www.fao.org/3/i8499en/i8499EN.pdf

79 **Pingali, P.** 2007. Westernization of Asian diets and the transformation of food systems: Implications for research and policy. *Food Policy*, 32(3): 281-298. https://doi.org/10.1016/j.foodpol.2006.08.001; **Hawkes, C., Harris, J. and Gillespie, S.** 2017. Changing diets: Urbanization and the nutrition transition. In: 2017 *Global Food Policy Report, Chapter 4*, pp. 34-41. Washington, DC, IFPRI. https://doi.org/10.2499/9780896292529_04; **Kelly, M.** 2016. The Nutrition Transition in Developing Asia: Dietary Change, Drivers and Health Impacts. In: Jackson, P., Spiess, W., Sultana, F, eds. *Eating, Drinking: Surviving. Springer Briefs in Global Understanding*, pp. 83-90. Springer, Cham. https://doi.org/10.1007/978-3-319-42468-2_9

80 **Reardon, T., Tschirley, D., Dolislager, M., Snyder, J., Hu, C.R. and White, S.** 2014. *Urbanization, Diet Change, and Transformation of Food Supply Chains in Asia*. Michigan, USA, Michigan State University. https://www.fao.org/fileadmin/templates/ags/docs/MUFN/DOCUMENTS/MUS_Reardon_2014.pdf; **Vilar-Compte, M., Burrola-Méndez, S., Lozano-Marrufo, A.** *et al.* 2021. Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity in Health*, 20(40). https://doi.org/10.1186/s12939-020-01330-0

81 **Vilar-Compte, M., Burrola-Méndez, S., Lozano-Marrufo, A.** *et al.* 2021. Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity in Health*, 20(40). https://doi.org/10.1186/s12939-020-01330-0

82 **Mostafa, I., Naila, N, N., Mahfuz, M., Roy, M., Faruque, AS.G. and Ahmed, T.** 2018. Children living in the slums of Bangladesh face risks from unsafe food and water and stunted growth is common. *Acta Paediatrica*, 107(7): 1230-1239. https://doi.org/10.1111/apa.14281

83 **Kelly, M.** 2016. The Nutrition Transition in Developing Asia: Dietary Change, Drivers and Health Impacts. In: Jackson, P., Spiess, W., Sultana, F, eds. *Eating, Drinking: Surviving. SpringerBriefs in Global Understanding*, pp. 83-90. New York, USA, Springer, Cham. https://doi.org/10.1007/978-3-319-42468-2_9

84 **Sievert, K., Lawrence, M., Naika, A., and Baker, P.** 2019. Processed Foods and Nutrition Transition in the Pacific: Regional Trends, Patterns and Food System Drivers. *Nutrients*, 11(6): 1328. https://doi.org/10.3390/nu11061328

85 **Sievert, K., Lawrence, M., Naika, A., and Baker, P.** 2019. Processed Foods and Nutrition Transition in the Pacific: Regional Trends, Patterns and Food System Drivers. *Nutrients*, 11(6): 1328. https://doi.org/10.3390/nu11061328; *Zhang, J., Wang, D., Eldridge, A. L., Huang, F., Ouyang, Y., Wang, H., and Zhang, B.* 2017. Urban-Rural Disparities in Energy Intake and Contribution of Fat and Animal Source Foods in Chinese Children Aged 4-17 Years. *Nutrients*, 9(5): 526. https://doi.org/10.3390/nu9050526

86 **Xue, H., Wu, Y., Wang, X. and Wang, Y.** 2016. Time Trends in Fast Food Consumption and Its Association with Obesity among Children in China. *PLoS One*, 11(3):e0151141. doi: 10.1371/journal.pone.0151141; **Sharma, M., Kishore, A., Roy, D.** *et al.* 2020. A comparison of the Indian diet with the EAT-Lancet reference diet. *BMC Public Health*, 20:812. https://doi.org/10.1186/s12889-020-08951-8; **Farrell, P., Negin, J., Awoke, M., Thow, A.M., Taua, M., Faumuina, T., Mihrshahi, S., Vizintin, P. and Richards, J.** 2019. Associations between sociodemographic and behaviour factors, and dietary risk factors for overweight and obesity, in Samoan women. *Appetite*, 134: 155-161. https://doi.org/10.1016/j.appet.2018.12.037; **Sang-ngoen, D., Hutchinson, C., Satheannoppakao, W. and Tipayamongkholgul, M.** 2019. Food Consumption and Accessibility in Hill Tribe and Urban Women, Chiang Rai Province, Northern Thailand. *Ecology of Food and Nutrition*, 58(4): 335-352. https://doi.org/10.1080/03670244.2019.1600514; **Banik, R., Naher, S., Pervez, S. and Hossain, M,M.** 2020. Fast food consumption and obesity among urban college going adolescents in Bangladesh: A cross-sectional study. *Obesity Medicine*, 17(100161). https://doi.org/10.1016/j.obmed.2019.100161; **Sirasa, F., Mitchell, L. and Harris, N.** 2020. Dietary diversity and food intake of urban preschool children in North-Western Sri Lanka. *Maternal and Child Nutrition*, 16(4). https://doi.org/10.1111/mcn.13006; **Pries, A.M., Huffman, S.L., Adhikary, I., Upreti, S.R., Dhungel, S., Champeny, M. and Zehner, E.** 2016. High consumption of commercial food products among children less than 24 months of age and product promotion in Kathmandu Valley, Nepal. *Maternal and Child Nutrition*, 12(S2): 22-37. https://doi.org/10.1111/mcn.12267; **Wate, J.T., Snowdon, W., Millar, L.** *et al.* 2013. Adolescent dietary patterns in Fiji and their relationships with standardized body mass index. *International Journal of Behavioral Nutrition and Physical Activity*, 10(45). https://doi.org/10.1186/1479-5868-10-45

87 Based on the "UNICEF initiative on reshaping urban retail food environments in the East-Asia and Pacific Region: mapping analysis of the food retail market in the region" report (unpublished), prepared by UNICEF EAPRO and Deakin University with financial support from the Pictet Foundation.

88 **UNICEF East Asia and Pacific Regional Office (UNICEF EAPRO) and Deakin University.** (forthcoming). *UNICEF initiative on reshaping urban retail food environments in the East-Asia and Pacific Region: mapping analysis of the food retail market in the region*. Bangkok, UNICEF and Geelong, Australia, Deakin University.

89 **Glanz, K., Bader, M.D.M. and Iyer S.** 2012. Retail Grocery Store Marketing Strategies and Obesity: An Integrative Review. *Am J Prev Med*, 42(5): 503-512. doi: 10.1016/j.amepre.2012.01.013

90 **Bishwajit, G.** 2015. Nutrition transition in South Asia: the emergence of non-communicable chronic diseases (version 2; peer review: 2 approved). *F1000 Research*, 4(8). https://doi.org/10.12688/f1000research.5732.2

91 **Baker, P. and Friel, S.** 2014. Processed foods and the nutrition transition: evidence from Asia. *Obesity Reviews*, 15(7): 564-577. https://doi.org/10.1111/obr.12174

92 **Agarwal, S., Sethi, V., Gupta, P., Jha, M., Agnihotri, A. and Nord, M.** 2009. Experiential household food insecurity in an urban underserved slum of North India. *Food Security*, 1: 239-250. https://doi.org/10.1007/s12571-009-0034-y; **Vilar-Compte, M., Burrola-Méndez, S., Lozano-Marrufo, A.** *et al.* 2021. Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity in Health*, 20(40). https://doi.org/10.1186/s12939-020-01330-0

93 **Hasnain, G., Akter, M., Sharafat, S.I. and Mahmuda, A.** 2014. Morbidity patterns, nutritional status, and healthcare-seeking behavior of female garment workers in Bangladesh. *Electron Physician*, 6(2):801-807. doi: 10.14661/2014.801-807

94 **Goudet, S., Hlaing, L.M. and Griffiths, P.L.** 2020. Exploring food security and nutrition among young women in the formally regulated garment sector of Myanmar. Annals of the New York Academy of Sciences, 1468(1): 35-54. https://doi.org/10.1111/nyas.14370

95 **ILO.** 2021. *The impact of COVID-19 in Myanmar: a study of income loss of workers in the garment sector*. Myanmar, ILO. https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-yangon/documents/publication/wcms_815347.pdf

96 **Toyama, N., Wakai, S., Nakamura, Y. and Arifin, A.** 2001. Mother's working status and nutritional status of children under the age of 5 in urban low-income community, Surabaya, Indonesia. *J Trop Pediatr*, 47(3):179-81. doi: 10.1093/tropej/47.3.179

97 **Kabir, A and Maitrot, M.R.L.** 2017. Factors influencing feeding practices of extreme poor infants and young children in families of working mothers in Dhaka slums: A qualitative study. *PLoS ONE*, 12(2): e0172119. https://doi.org/10.1371/journal.pone.0172119

98 **Dhillon, C.N. and Stone, G.** 2019. *The evidence for workforce nutrition programmes*. In: *GAIN*. Geneva, Switzerland, GAIN. Cited 14 December 2022. https://www.gainhealth.org/resources/reports-and-publications/evidence-workforce-nutrition-programmes

99 **Centers for Disease Control and Prevention (CDC).** 2016. Workplace Health Model. In: CDC. Georgia, USA, CDC. Cited 14 December 2022. https://www.cdc.gov/workplacehealthpromotion/model/index.html

100 **Sutliffe, J.T., Carnot, M.J., Fuhrman, J.H., Sutliffe, C.A. and Scheid, J.C.** 2018. A Worksite Nutrition Intervention is Effective at Improving Employee Well-Being: A Pilot Study. *Journal of Nutrition and Metabolism*, Article ID 8187203. https://doi.org/10.1155/2018/8187203

101 **UNICEF.** 2019. *Breastfeeding support in the workplace – a global guide for employers*. New York, UNICEF. https://www.unicef.org/media/73206/file/Breastfeeding-room-guide.pdf

102 **Ruel, M.T., Garrett, J.L. and Yosef, S.** 2017. *Global Food Policy Report: Food security and nutrition: Growing cities, new challenges*. pp. 24-33. Washington, DC, IFPRI. https://doi.org/10.2499/9780896292529_03

103 **WHO and UNICEF.** 2021. Indicators for assessing infant and young child feeding practices: definitions and measurement methods. Geneva, WHO and UNICEF. https://www.who.int/publications/i/item/9789240018389

104 **UNICEF.** 2021. Breastfeeding. In: *UNICEF*. Geneva. Switzerland, UNICEF. Cited 14 December 2022. https://data.unicef.org/topic/nutrition/breastfeeding/

105 **Khatun, H., Comins, C.A., Shah, R., Islam, M.M., Choudhury, N. and Ahmed, T.** 2018. Uncovering the barriers to exclusive breastfeeding for mothers living in Dhaka's slums: a mixed method study. *International Breastfeeding Journal*, 13(44). https://doi.org/10.1186/s13006-018-0186-5; **Velusamy, V., Premkumar, P.S. and Kang, G.** 2017. Exclusive breastfeeding practices among mothers in urban slum settlements: pooled analysis from three prospective birth cohort studies in South India. *International Breastfeeding Journal*, 12(35). https://doi.org/10.1186/s13006-017-0127-8

106 **Neves,P.A.R., Vaz, J.S., Maia, F.S., Baker, P., Gatica-Domínguez, G., Piwoz, E., Rollins, N. and Victora, C.G.** 2021. Rates and time trends in the consumption of breastmilk, formula, and animal milk by children younger than 2 years from 2000 to 2019: analysis of 113 countries. *Lancet Child Adolesc Health*, 5: 619-630. https://doi.org/10.1016/S2352-4642(21)00163-2

107 **Richards, L.** 2009. Protein content of infant formula linked to obesity risk. *Nature Reviews Endocrinology*, 5(415). https://doi.org/10.1038/nrendo.2009.119

108 **Prak, S., Dahl, M.I., Oeurn, S., Conkle, J., Wise, A. and Laillou, A.** 2014. Breastfeeding trends in Cambodia, and the increased use of breast-milk substitute-why is it a danger? *Nutrients*, 6(7): 2920-2930. doi: 10.3390/nu6072920

109 **Hou, K., Green, M., Chum, S., Kim, C., Stormer, A. and Mundy, G.** 2019. Pilot implementation of a monitoring and enforcement system for the International Code of Marketing of Breast-milk Substitutes in Cambodia. *Maternal and Child Nutrition*, 15(S4):e12795. https://doi.org/10.1111/mcn.12795

110 **Helen Keller International, UNICEF and WHO.** 2020. Joint Statement on the Enforcement of Sub-Decree 133 Implementation in Cambodia. In: *Open Development Cambodia*. Cambodia. Cited 14 December. https://opendevelopmentcambodia.net/pdf-viewer/?pdf=files_mf/1593516710JointstatementofWHOUnicefandHKIonSubdecree133_ENG.pdf

111 **Green, M., Pries, A.M., Hadihardjono, D.N., Izwardy, D., Zehner, E. and Moran, V.H.** 2021. Breastfeeding and breastmilk substitute use and feeding motivations among mothers in Bandung City, Indonesia. *Maternal and Child Nutrition*, 17(3). https://doi.org/10.1111/mcn.13189

112 **Prak, S., Dahl, M.I., Oeurn, S., Conkle, J., Wise, A. and Laillou, A.** 2014. Breastfeeding trends in Cambodia, and the increased use of breast-milk substitute-why is it a danger? *Nutrients*, 6(7): 2920-2930. doi: 10.3390/nu6072920

113 **WHO and UNICEF.** 2022. *How the marketing of formula milk influences our decisions on infant feeding*. Geneva, WHO and UNICEF. https://www.who.int/publications/i/item/9789240044609

114 **WHO and UNICEF.** 2022. *How the marketing of formula milk influences our decisions on infant feeding*. Geneva, WHO and UNICEF. https://www.who.int/publications/i/item/9789240044609

115 **Green, M., Pries, A.M., Hadihardjono, D.N., Izwardy, D., Zehner, E. and Moran, V.H.** 2021. Breastfeeding and breastmilk substitute use and feeding motivations among mothers in Bandung City, Indonesia. *Maternal and Child Nutrition*, 17(3). https://doi.org/10.1111/mcn.13189

116 **WHO and UNICEF.** 2022. *How the marketing of formula milk influences our decisions on infant feeding*. Geneva, WHO and UNICEF. https://www.who.int/publications/i/item/9789240044609

117 **WHO.** 2022. *Scope and impact of digital marketing strategies for promoting breast-milk substitutes*. Geneva, WHO. https://www.who.int/publications/i/item/9789240046085

118 **UN-HABITAT.** 2003. *The challenge of slums, Global report on human settlements 2003*. Kenya, UN-HABITAT. https://unhabitat.org/sites/default/files/download-manager-files/The%20Challenge%20of%20Slums%20-%20Global%20Report%20on%20Human%20Settlements%202003.pdf

119 **UNICEF.** 2018. Advantage or Paradox? The challenge for children and young people of growing up urban. In: UNICEF. New York, USA. Cited 9 January 2023. https://data.unicef.org/resources/urban-paradox-report/

120 **UNDP International Poverty Centre (IPC).** 2005. *In Focus: Poverty and the City*. Brasilia, Brazil, IPC. https://ipcig.org/sites/default/files/pub/en/IPCPovertyInFocus7.pdf

121 **Ezeh, A., Oyebode, O., Satterthwaite, D., Chen, Y.F., Ndugwa, R., Sartori, J., Mberu, B., Melendez-Torres, G.J., Haregu, T., Watson, S.I. and Caiaffa, W.** 2017. The history, geography, and sociology of slums and the health problems of people who live in slums. *The lancet*, 389(10068):547-558. https://doi.org/10.1016/S0140-6736(16)31650-6

122 **Raza, A., Jaacks, L., Ganpule-Rao, A. Pandey, H. and Lobo, A.S.** 2022. *Urban food system assessments for nutrition and healthy diets – Technical guidance note*. Rome, FAO. https://doi.org/10.4060/cb8612en

123 **Ezeh, A., Oyebode, O., Satterthwaite, D., Chen, Y.F., Ndugwa, R., Sartori, J., Mberu, B., Melendez-Torres, G.J., Haregu, T., Watson, S.I., Caiaffa, W., Capon, A. and Lilford, R.J.** 2017. *The Lancet*, 389: 547-558. https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(16)31650-6.pdf

124 **Nguyen, P.H., Scott, S., Headey, D., Singh, N., Tran, L.M., Menon, P. and Ruel, M.T.** 2021. The double burden of malnutrition in India: Trends and inequalities (2006-2016). *PLoS One*, 16(2): e0247856. doi: 10.1371/journal.pone.0247856

125 **Nguyen, P.H., Scott, S., Headey, D., Singh, N., Tran, L.M., Menon, P. and Ruel, M.T.** 2021. The double burden of malnutrition in India: Trends and inequalities (2006-2016). *PLoS One*, 16(2): e0247856. doi: 10.1371/journal.pone.0247856

126 **United Nations.** 2020. *Policy Brief: The Impact of COVID-19 on Food Security and Nutrition*. New York, United Nations. https://unsdg.un.org/sites/default/files/2020-06/SG-Policy-Brief-on-COVID-Impact-on-Food-Security.pdf

127 **Osendarp, S., Akuoku, J.K., Black, R.E., Headey, D., Ruel, M., Scott, N., Shekar, M., Walker, N., Flory, A., Haddad, L., Laborde, D., Stegmuller, A., Thomas, M. and Heidkamp, R.** 2021. The COVID-19 crisis will exacerbate maternal and child undernutrition and child mortality in low- and middle-income countries. *Nature Food*, 2: 476–484. https://doi.org/10.1038/s43016-021-00319-4

128 **Picchioni, F., Goulao, L.F. and Roberfroid, D.** 2021. The impact of COVID-19 on diet quality, food security and nutrition in low and middle income countries: A systematic review of the evidence. *Clinical Nutrition*, 41(12): 2955-2964. doi: 10.1016/j.clnu.2021.08.015

129 **FAO.** 2020. *Small Island Developing States Response to COVID-19: Highlighting food security, nutrition and sustainable food systems*. Rome, FAO. https://doi.org/10.4060/ca8994en

130 **Picchioni, F., Goulao, L.F. and Roberfroid, D.** 2021. The impact of COVID-19 on diet quality, food security and nutrition in low and middle income countries: A systematic review of the evidence. *Clinical Nutrition*, 41(12): 2955-2964. doi: 10.1016/j.clnu.2021.08.015

131 **FAO, UNICEF and WFP.** 2021. Status and determinants of food insecurity and undernutrition in urban areas, Indonesia: Evidence from a remote survey (SDFU-I).

132 **UNICEF and WFP.** 2021. Food security and nutrition in urban Myanmar: Evidence from a remote follow-up survey in Yangon. 2021 Internal UNICEF and WFP report. Unpublished

133 **Bonis-Profumo, G., Stacey, N. and Brimblecombe, J.** 2021. Measuring women's empowerment in agriculture, food production, and child and maternal dietary diversity in Timor-Leste, *Food Policy*, 102. https://doi.org/10.1016/j.foodpol.2021.102102

134 **Auma, C., Pradeilles, R., Ohly, H., Eymard-Duvernay, S., Brizendine, K., Blankenship, J., Singhkumarwong, A., and Goudet, S.** (forthcoming). Urban nutrition situation in the slums of three cities in Asia during the COVID-19 pandemic. *Maternal and Child Nutrition Journal*.

135 **Global Alliance for Improved Nutrition (GAIN) and Johns Hopkins University.** 2020. About Food Systems. In: *Food Systems Dashboard*. Geneva, Switzerland. Cited 14 December 2022. https://foodsystemsdashboard.org

136 **WFP Regional Bureau for Asia and the Pacific (WFP RBB) and Dikoda.** 2022. *Food security and diets in urban Asia: how resilient are food systems in times of COVID-19?* Bangkok, WFP. Cited 9 January 2023. https://www.wfp.org/publications/food-security-and-diets-urban-asia-how-resilient-are-food-systems-times-covid-19

137 **FAO and GAIN.** 2018. *Leveraging Small and Medium Enterprises to improve nutrition*. Rome, FAO. https://www.fao.org/3/CA2880EN/ca2880en.pdf

138 **United Nations Food Systems Summit.** 2021. *A Small Business Agenda for the UN Food Systems Summit*. New York, United Nations. https://www.un.org/sites/un2.un.org/files/2021/07/unfss-small_business_agenda.pdf

139 **Reardon, T., Liverpool-Tasie, L. and Minten, B.** 2021. Quiet Revolution by SMEs in the midstream of value chains in developing regions: wholesale markets, wholesalers, logistics, and processing. *Food Security*, 13: 1577–1594. https://doi.org/10.1007/s12571-021-01224-1

140 **WFP Regional Bureau for Asia and the Pacific (WFP RBB) and Dikoda.** 2022. *Food security and diets in urban Asia: how resilient are food systems in times of COVID-19?* Bangkok, WFP. Cited 9 January 2023. https://www.wfp.org/publications/food-security-and-diets-urban-asia-how-resilient-are-food-systems-times-covid-19

141 **WFP and Dikoda.** 2021. *Urban rapid market assessment and food system characterization in Jakarta, Quezon city and Dhaka*. Internal WFP report. Unpublished

142 **FAO.** 2020. *Cities and Local Governments at the Forefront in Building Inclusive and Resilient Food Systems: Key results from the FAO survey "Urban Food Systems and COVID-19", Revised version*. Rome, FAO. https://doi.org/10.4060/cb0407en

143 **FAO.** 2020. *Cities and Local Governments at the Forefront in Building Inclusive and Resilient Food Systems: Key results from the FAO survey "Urban Food Systems and COVID-19", Revised version*. Rome, FAO. https://doi.org/10.4060/cb0407en

144 **FAO, IFAD, UNICEF, WFP and WHO.** 2021. *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome, FAO. https://doi.org/10.4060/cb4474en

145 **Hawkes, C., Smith, T.G., Jewell, J., Wardle, J., Hammond, R.A., Friel, S., Thow, A.M. and Kain, J.** 2015. Smart food policies for obesity prevention. *The Lancet*, 385(9985):2410–2421. https://doi.org/10.1016/S0140-6736(14)61745-1

146 **Popkin, B.M.** 2015. Nutrition Transition and the Global Diabetes Epidemic. *Current Diabetes Reports*, 15(9):64. doi: 10.1007/s11892-015-0631-4

147 **Vilar-Compte, M., Burrola-Méndez, S., Lozano-Marrufo, A. *et al.*** 2021. Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity in Health*, 20(40). https://doi.org/10.1186/s12939-020-01330-0

148 **Habib, K.R.** 2016. Understanding challenges faced by street food vendors to maintain street food hygiene in Dhaka city. *Journal of Food and Nutrition Sciences*, 4(4):78-85. doi: 10.11648/j.jfns.20160404.11; **Winarno, F.G. and Allain, A.** 1991. *Food, Nutrition and Agriculture: Street foods in developing countries: lessons from Asia*. Rome, FAO. https://www.fao.org/3/u3550t/u3550t08.htm

149 **WFP and Dikoda.** 2021. *Urban rapid market assessment and food system characterization in Jakarta, Quezon city and Dhaka*. Internal WFP report. Unpublished

150 **WFP and Dikoda.** 2021. *Urban rapid market assessment and food system characterization in Jakarta, Quezon city and Dhaka*. Internal WFP report. Unpublished

151 **WFP and Dikoda.** 2021. *Urban rapid market assessment and food system characterization in Jakarta, Quezon city and Dhaka*. Internal WFP report. Unpublished

152 **WFP and Dikoda.** 2021. *Urban rapid market assessment and food system characterization in Jakarta, Quezon city and Dhaka*. Internal WFP report. Unpublished

153 **Philippine Department of Health.** 2017. Philippine Plan of Action for Nutrition (PPAN) 2017-2022. Philippine, Department of Health- National Nutrition Council. https://extranet.who.int/nutrition/gina/sites/default/filesstore/PHL_2017_The%20Philippine%20Plan%20of%20Action%20for%20Nutrition.pdf

154 **FAO, IFAD, UNICEF, WFP and WHO.** 2021. *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome, FAO. https://doi.org/10.4060/cb4474en

155 **Auma, C., Pradeilles, R., Ohly, H., Eymard-Duvernay, S., Brizendine, K., Blankenship, J., Singhkumarwong, A., and Goudet, S.** (forthcoming). Urban nutrition situation in the slums of three cities in Asia during the COVID-19 pandemic. *Maternal and Child Nutrition Journal*.

156 **FAO.** *Cities and Local Governments at the Forefront in Building Inclusive and Resilient Food Systems*. The Results from the FAO Survey "Urban Food Systems and COVID-19." Rome. 2020.

157 **Auma, C., Pradeilles, R., Ohly, H., Eymard-Duvernay, S., Brizendine, K., Blankenship, J., Singhkumarwong, A., and Goudet, S.** (forthcoming). Urban nutrition situation in the slums of three cities in Asia during the COVID-19 pandemic. *Maternal and Child Nutrition Journal*.

158 **FAO.** 2020. *National agrifood systems and COVID-19 in Fiji. Effects, policy responses and long term implications*. Rome, FAO. https://doi.org/10.4060/cb1349en

159 **Auma, C., Pradeilles, R., Ohly, H., Eymard-Duvernay, S., Brizendine, K., Blankenship, J., Singhkumarwong, A., and Goudet, S.** (forthcoming). Urban nutrition situation in the slums of three cities in Asia during the COVID-19 pandemic. *Maternal and Child Nutrition Journal*.

160 **Holcomb, D.A., Knee, J., Sumner, T., Adriano, Z., de Bruijn, E., Nalá, R., Cumming, O., Brown, J. and Stewart, J.R.,** 2020. Human fecal contamination of water, soil, and surfaces in households sharing poor-quality sanitation facilities in Maputo, Mozambique. *International journal of hygiene and environmental health*, 226:113496.

161 **UNICEF and WFP.** 2018. *Food security and nutrition in urban Myanmar: Evidence from a face to face survey in Yangon*. Internal UNICEF and WFP report. Unpublished

162 **World Bank.** 2019. *Nutrition-Sensitive Water Supply, Sanitation, and Hygiene*. Washington, DC, World Bank. Cited 15 December 2022. https://openknowledge.worldbank.org/bitstream/handle/10986/31429/135459-WP-P166089-PUBLIC.pdf?sequence=1&isAllowed=y

163 **ADB.** 2016. *Asian water development outlook 2016: Strengthening water security in Asia and the Pacific*. Manila, ADB. Cited 15 December 2022. https://www.adb.org/sites/default/files/publication/189411/awdo-2016.pdf

164 **Green, J., Raj, S., Wang, Y., Duong, D., Yakushima, M., Chhun, S., Yakubu, H., Michiel, J., Wicken, J. and Moe, C.L.** 2017. Fecal Exposure Assessment in Informal Settlements and Formal Neighborhoods of Siem Reap, Cambodia. Conference poster at UNC Water and Health Conference, 16-20 October 2017. University of North Carolina - Chapel Hill. Cited 15 December 2022. https://www.sanipath.net/post/assessment-of-exposure-to-fecal-contamination-in-informal-settlements-and-formal-neighborhoods-of-si

165 **Hijioka, Y., Lin. E., Pereira, J.J., Corlett, R.T., Cui, X., Insarov, G.E., Lasco, R.D., Lindgren, E. and Surjan, A.** 2014. Asia. In: V.R. Barros, C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White, eds. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, pp. 1327-1370. Cambridge, UK and New York, NY, USA, Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap24_FINAL.pdf

166 **Black, R.E., Allen, L.H., Bhutta, Z.A., Caulfield, L.E, de Onis, M., Ezzati, M.,** *et al*. 2008. Maternal and child undernutrition: global and regional exposures and health consequences. *The Lancet*, 371(9608): 243-260. https://doi.org/10.1016/S0140-6736(07)61690-0

167 **Dangour, A.D., Watson, L., Cumming, O., Boisson, S., Che, Y., Velleman, Y., Cavill, S., Allen, E. and Uauy, R.** 2013. Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutritional status of children. *Cochrane Database of Systematic Reviews*, 1(8):CD009382. doi: 10.1002/14651858.CD009382.pub2

168 **Buttenheim, A.M.** 2008. The sanitation environment in urban slums: implications for child health. *Population Environment*, 30(1-2): 26–47. https://doi.org/10.1007/s11111-008-0074-9

169 **Blankenship, J., Owen, J. and Villanueva, R.** 2020. *The Social Protection Pathways to Nutrition. A stock taking of evidence in Asia and the Pacific, UNICEF East Asia and the Pacific, Policy working paper EAPWP/02/2020*. Bangkok, UNICEF EAPRO. Cited 15 December 2022. https://socialprotection.org/sites/default/files/publications_files/1.UNICEF-2020_WP_Social%20Protection%20and%20Nutrition_FINAL_Public-clean.pdf

170 **UNDP.** 2020. *Addressing the COVID-19 economic crisis in Asia through social protection*. New York, UNDP. https://www.undp.org/publications/addressing-covid-19-economic-crisis-asia-through-social-protection

171 **Blankenship, J., Owen, J. and Villanueva, R.** 2020. *The Social Protection Pathways to Nutrition. A stock taking of evidence in Asia and the Pacific, UNICEF East Asia and the Pacific, Policy working paper EAPWP/02/2020*. Bangkok, UNICEF EAPRO. Cited 15 December 2022. https://socialprotection.org/sites/default/files/publications_files/1.UNICEF-2020_WP_Social%20Protection%20and%20Nutrition_FINAL_Public-clean.pdf

172 **UNESCAP.** 2020. *The Protection We Want: Social Outlook for Asia and the Pacific*. Bangkok, UNESCAP. https://unescap.org/publications/protection-we-want-social-outlook-asia-and-pacific

173 **WFP and Dikoda.** 2021.*Overview 4 deep dive case studies*. Internal WFP report. Unpublished

174 **Cabannes, Y. and Marocchino, C. (eds).** 2018.*Integrating Food into Urban Planning*. London, UCL Press and Rome, FAO. https://doi.org/10.14324/111.9781787353763

175 **Rizkhy, P.P., Widianingsih, I. and Pancasilawan, R.** 2021. Urban Food Security In Indonesia: An Overview Of Bandung Municipality. doi:10.13140/RG.2.2.10154.95687

176 **Clinton, N., Stuhlmacher, M., Miles, A., Aragon, N.U., Wagner, M., Georgescu, M., Herwig, C. and Gong, P.** 2018. A Global Geospatial Ecosystem Services Estimate of Urban Agriculture. *Earth's Future*, 6(1):40-60. https://doi.org/10.1002/2017EF000536

177 **Angel, S., Parent, J., Civco, D.L., Blei, A. and Potere, D.** 2011. The dimensions of global urban expansion: Estimates and projections for all countries, 2000–2050. *Progress in Planning*, 75(2):53-107. https://doi.org/10.1016/j.progress.2011.04.001

178 **Blay-Palmer, A., Santini, G., Dubbeling, M., Renting, H., Taguchi, M. and Giordano, T.** 2018. Validating the City Region Food System Approach: Enacting Inclusive, Transformational City Region Food Systems. *Sustainability*, 10(5):1680. https://doi.org/10.3390/su10051680

179 **FAO.** 2019. *FAO framework for the Urban Food Agenda*. Rome, FAO. https://doi.org/10.4060/ca3151en

180 **Dijkstra, L., H. Poelman and P. Veneri.** 2019. *The EU-OECD definition of a functional urban area. OECD Regional Development Working Papers, No. 2019/11*. Paris, OECD Publishing. https://doi.org/10.1787/d58cb34d-en

181 **European Commission and Eurostat.** 2021. *Applying the degree of urbanisation: a methodological manual to define cities, towns and rural areas for international comparisons: 2021 edition*. Brussels, Publications Office of the European Union. https://data.europa.eu/doi/10.2785/706535

182 **Cattaneo, A., Nelson, A. and McMenomy, T.** 2021. Global mapping of urban–rural catchment areas reveals unequal access to services. *Environmental Sciences*, 118(2): e2011990118. https://doi.org/10.1073/pnas.2011990118

183 **Reddy, V.R., Saharawat, Y.S. and George, B.** 2017. Watershed Management in South Asia: A Synoptic Review. *Journal of Hydrology*, 551: 4–13. https://doi.org/10.1016/j.jhydrol.2017.05.043

184 **Gayatri, S. and Gauri, G.** 2017. *Navigating Informality: Perils And Prospects In Metro Manila's Slums*. Washington DC, World Bank. https://thedocs.worldbank.org/en/doc/564861506978931790-0070022017/original/NavigatingInformalityMetroManila72617web.pdf; **UNICEF.** 2020. Building Food And Nutrition Resilience In Quezon city: A Case Study On Integrated Food Systems. Manila, UNICEF. https://www.unicef.org/documents/building-food-and-nutrition-resilience-quezon-city-case-study-integrated-food-systems

185 **Rikolto.** 2022. [COMPLETED] Towards a safe and sustainable food system in Da Nang. In: *Rikolto*. Leuven, Belgium. Cited 3 January 2023. https://www.rikolto.org/en/project/completed-towards-safe-and-sustainable-food-system-da-nang

186 **International Panel of Experts on Sustainable Food Systems (IPES-Food).** 2007. What makes urban food policy happen? Insights from five case studies. Brussels, IPES-Food. https://www.ipes-food.org/_img/upload/files/Cities_full.pdf

187 **WHO.** 2020. *Healthy cities effective approach to a rapidly changing world*. Geneva, WHO. https://www.who.int/publications/i/item/9789240004825

188 **Committee on World Food Security (CFS).** 2021. *CFS voluntary guidelines on gender equality and women's and girls' empowerment in the context of food security and nutrition-First draft*. Rome, CFS. https://www.fao.org/fileadmin/templates/cfs/Docs2122/Gender/CFS_GEWE_VGs_First_Draft_en.pdf

189 **Aragrande, M. and Argenti, O.** 2001. Chapter 1. Food Supply and Distribution Systems to Cities. In: *Studying Food Supply and Distribution Systems to Cities in Developing Countries and Countries in Transition - Methodological and Operational Guide (Revised Version)*. Rome, FAO. https://www.fao.org/3/X6996E/x6996e08.htm

190 **The Stone Family Foundation.** 2022. Innovative Finance for Water, Sanitation and Hygiene: Cambodia Revenue Finance Facility. In: *The Stone Family Foundation*. London, UK. Cited 9 January 2023. https://www.thesff.com/featured-projects/cambodia-revenue-finance-facility/; **The Stone Family Foundation.** 2022. Scaling for impact: Lessons learnt from funding water and sanitation enterprises. In: *The Stone Family Foundation*. London, UK. Cited 9 January 2023. https://www.thesff.com/insights/

191 **Global Partnership for Sustainable Development Data.** 2021. *Data for Food Security-How can the international community drive transformative change?* Washington, DC, Global Partnership for Sustainable Development Data. https://www.data4sdgs.org/sites/default/files/2021-06/DataFoodSecurity_Report_June-2021.pdf

192 **Global Partnership for Sustainable Development Data.** 2021. *Data for Food Security-How can the international community drive transformative change?* Washington, DC, Global Partnership for Sustainable Development Data. https://www.data4sdgs.org/sites/default/files/2021-06/DataFoodSecurity_Report_June-2021.pdf

193 **Local Burden of Disease Child Growth Failure Collaborators.** 2020. Mapping child growth failure across low- and middle-income countries. *Nature*, 577:231–234. https://doi.org/10.1038/s41586-019-1878-8

194 **Ministry of Finance of Samoa.** 2021. *Samoa 2040: Transforming Samoa to a higher growth path*. Samoa. https://www.mof.gov.ws/wp-content/uploads/2021/03/Samoa-2040-Final.pdf

195 Download link for Maua app, cited 16 December 2022: https://play.google.com/store/apps/details?id=com.app.buyer

196 **United Nations.** 2017. *New Urban Agenda*. New York, United Nations. https://habitat3.org/the-new-urban-agenda/

197 **Liu, Y.W. and Fan, Z.X.** 2022. The Digital Divide and COVID-19: Impact on the Socioeconomic Development in Asia and the Pacific. UNESCAP Working paper series. Bangkok, UNESCAP Information and Communications Technology and Disaster Risk Reduction Division. Cited 16 December 2022. https://www.unescap.org/kp/2022/digital-divideand-covid-19-impact-socioeconomic-developmentasia-and-pacific

198 **WFP and Dikoda.** 2021. *Overview 4 deep dive case studies*. Internal WFP report. Unpublished

199 **Ernst, J. and Soerakoesoemah, R.** 2021. Enhancing poverty measurement through big data. In: *UNESCAP*. Bangkok, UNESCAP. Cited 16 December 2022. https://www.unescap.org/blog/enhancing-poverty-measurement-through-big-data

200 **UNICEF.** 2021. *Unhealthy digital food marketing to children in the Philippines*. Manila and Bangkok, UNICEF. https://www.unicef.org/eap/media/9571/file/Unhealthy%20Digital%20Food%20Marketing%20-%20Philippines.pdf

201 **Onag, G.** 2021. IoT sensors enable urban farming in Singapore. *Futureiot*. 17 August 2021. Singapore. Cited 16 December 2022. https://futureiot.tech/iot-sensors-enable-urban-farming-in-singapore/

202 **Sephton. C.** 2020. Singapore is betting blockchain can cure its food safety crisis. *Modern Consensus*, 27 August 2020. Washington, DC. Cited 16 December 2022. https://modernconsensus.com/technology/singapore-is-betting-blockchain-can-cure-its-food-safety-crisis/

203 **Rejeb, A., Keogh, J.G., Zailani, S., Treiblmaier, H. and Rejeb, K.** 2020. Blockchain Technology in the Food Industry: A Review of Potentials, Challenges and Future Research Directions. *Logistics*, 4(4):27. https://doi.org/10.3390/logistics4040027

204 **Bell, C., Latu, C., Coriakula, J., Waqa, G., Snowdon, W., and Moodie, M.** 2020. Fruit and vegetable import duty reduction in Fiji to prevent obesity and non-communicable diseases: A case study. *Public Health Nutrition*, 23(1): 181-188. doi:10.1017/S1368980019002660

205 **Teng, A.M., Jones, A.C., Mizdrak, A., Signal, L., Genç, M. and Wilson, N.** 2019. Impact of sugar-sweetened beverage taxes on purchases and dietary intake: Systematic review and meta-analysis. *Obesity Reviews*, 20(9):1187-1204. https://doi.org/10.1111/obr.12868; **Wright, A., Smith, K.E. and Hellowell, M.** 2017. Policy lessons from health taxes: a systematic review of empirical studies. *BMC Public Health*, 17(583). https://doi.org/10.1186/s12889-017-4497-z

206 **Phulkerd, S., Thongcharoenchupong, N., Chamratrithirong, A., Gray R.S. and Prasertsom, P.** 2020. Changes in Population Level Consumption of Taxed and Non-Taxed Sugar Sweetened Beverages (SSB) after Implementation of SSB Excise Tax in Thailand: A Prospective Cohort Study. *Nutrients*,12(11):3294. doi: 10.3390/nu12113294

207 **Kelly, B., Kairey, L., King, L. and Xiao Y., Yu, Y., He, G., Li, L., Zeng, L., Hadi, H., Karupaiah, T., Hoe, N.S., Noor, M.I., Yoon, J. and Kim, H.** 2016. Children's exposure to food advertising on free-to-air television: An Asia-Pacific perspective. *Health Promotion International*, 31(1):144-152. doi: 10.1093/heapro/dau055

208 **UNICEF.** 2021. *Unhealthy digital food marketing to children in the Philippines*. Manila and Bangkok, UNICEF. https://www.unicef.org/eap/media/9571/file/Unhealthy%20Digital%20Food%20Marketing%20-%20Philippines.pdf

209 **Smith, R., Kelly, B., Yeatman, H. and Boyland, E.** 2019. Food Marketing Influences Children's Attitudes, Preferences and Consumption: A Systematic Critical Review. *Nutrients*,11(4):875. https://doi.org/10.3390/nu11040875; **Cairns. G., Angus. K. and Hastings. G.** 2009. *The extent, nature and effects of food promotion to children: a review of the evidence to December 2008*. Geneva, WHO. https://apps.who.int/iris/handle/10665/44237; **Sadeghirad,B., Duhaney, T., Motaghipisheh, S., Campbell, N.R.C. and Johnston, B.C.** 2016. Influence of unhealthy food and beverage marketing on children's dietary intake and preference: a systematic review and meta-analysis of randomized trials. *Obesity Reviews*, 17(10):945-959. https://doi.org/10.1111/obr.12445

210 **Carpentier, F.R.D., Correa, T., Reyes, M. and Taillie, L.S.** 2020. Evaluating the impact of Chile's marketing regulation of unhealthy foods and beverages: pre-school and adolescent children's changes in exposure to food advertising on television. *Public Health Nutrition*, 23(4):747-55. doi: 10.1017/S1368980019003355; **Ofcom.** 2010. HFSS advertising restrictions: Final Review. London, UK. Cited 19 December 2022. https://www.ofcom.org.uk/research-and-data/tv-radio-and-on-demand/broadcast-advertising/hfss-final-review

211 **Song, J., Brown, M.K, Tan, M., MacGregor, G.A, Webster, J., Campbell, N.R.C., Trieu, K., Mhurchu, C.N., Cobb, L.K. and He, F.J.** 2021. Impact of color-coded and warning nutrition labelling schemes: A systematic review and network meta-analysis. *PLoS Medicine*. 18(10):e1003765. doi: 10.1371/journal.pmed.1003765

212 **Winarno, F.G. and Allain, A.** 1991. *Food, Nutrition and Agriculture: Street foods in developing countries: lessons from Asia*. Rome, FAO. https://www.fao.org/3/u3550t/u3550t08.htm

213 **Winarno, F.G. and Allain, A.** 1991. *Food, Nutrition and Agriculture: Street foods in developing countries: lessons from Asia*. Rome, FAO. https://www.fao.org/3/u3550t/u3550t08.htm

214 **Chia, R.G.** 2017. Asia's policies on street food. *Asian Geographic*, 4 October 2017. Singapore. Cited 19 December 2022. https://www.asiangeo.com/heritage/asia-policies-street-food/

215 **Chia, R.G.** 2017. Asia's policies on street food. *Asian Geographic*, 4 October 2017. Singapore. Cited 19 December 2022. https://www.asiangeo.com/heritage/asia-policies-street-food/

216 **British Red Cross.** 2012. *Learning from the City: British Red Cross Urban Learning Project Scoping Study*. London, UK, British Red Cross. Cited 19 December 2022. https://reliefweb.int/report/world/learning-city-british-red-cross-urban-learning-project-scoping-study; **Ghosh, S. and Shah, D.** 2004. Nutritional problems in urban slum children. *Indian Pediatrics*, 41(7):682-696.

217 **Ernst, K.C., Phillips, B.S. and Duncan, B.D.** 2013. Slums are not places for children to live. *Advances in Pediatrics*, 60(1):53-87. doi: 10.1016/j.yapd.2013.04.005

218 **Turley, R., Saith, R., Bhan, N., Rehfuess, E. and Carter, B.** 2013. Slum upgrading strategies involving physical environment and infrastructure interventions and their effects on health and socio-economic outcomes. *Cochrane Database of Systematic Reviews*, 1: CD010067. https://doi.org/10.1002/14651858.CD010067.pub2; **Ernst, K.C., Phillips, B.S. and Duncan, B.D.** 2013. Slums are not places for children to live. *Advances in Pediatrics*, 60(1):53-87. doi: 10.1016/j.yapd.2013.04.005

219 **Hawkes, C., Ruel, M.T., Salm, L., Sinclair, B. and Branca, F.** 2020. Double-duty actions: seizing programme and policy opportunities to address malnutrition in all its forms. *The Lancet*, 395(10218):142-155. https://doi.org/10.1016/S0140-6736(19)32506-1

220 **Shekar, M., Eberwein J.D. and Kakietek J.** 2016. The costs of stunting in South Asia and the benefits of public investments in nutrition. *Maternal and Children Nutrition*, 12(Suppl 1):186-195. doi: 10.1111/mcn.12281

221 **Hawkes, C., Ruel, M.T., Salm, L., Sinclair, B. and Branca, F.** 2020. Double-duty actions: seizing programme and policy opportunities to address malnutrition in all its forms. *The Lancet*, 395(10218):142-155. https://doi.org/10.1016/S0140-6736(19)32506-1

222 Understanding the drivers of dietary choices and snack food environment of primary school children in Lao PDR and the Philippines: Regional landscaping analysis on dietary choices of primary school children. Final Report. April 22, 2022. This publication is produced for review by the World Food Programme and was prepared by Helen Keller International.

223 **WHO.** 2022. *Nudges to promote healthy eating in schools: policy brief*. Geneva, WHO. https://www.who.int/publications/i/item/9789240051300

224 **Bhutan Ministry of Health, WHO and UNICEF.** 2016. *National Health Promotion Strategic Plan 2015-2023*. Thimphu, Royal Government of Bhutan. Cited 19 December 2022. https://cdn.who.int/media/docs/default-source/searo/nhpsp-2015-2023-bhutan.pdf?sfvrsn=60024826_1; **Department of Youth and Sports, Bhutan Ministry of Education.** 2015. National Strategic Framework for School Sports and Physical Activity (NSFSSPA). Thimphu, Royal Government of Bhutan. Cited 19 December 2022. https://www.dys.gov.bt/wp-content/uploads/2016/05/NSFSSPA.pdf

225 **WFP.** 2020. *State of School Feeding Worldwide 2020*. Rome, World Food Programme

226 **FAO.** 2020. *Urban food systems and COVID-19: The role of cities and local governments in responding to the emergency*. Rome. https://doi.org/10.4060/ca8600en

227 **United Nations.** 2020. *Policy Brief: The Impact of COVID-19 on Food Security and Nutrition*. New York, United Nations. https://unsdg.un.org/sites/default/files/2020-06/SG-Policy-Brief-on-COVID-Impact-on-Food-Security.pdf

228 **United Nations Food Systems Summit.** 2021. *A Small Business Agenda for the UN Food Systems Summit*. New York, United Nations. https://www.un.org/sites/un2.un.org/files/2021/07/unfss-small_business_agenda.pdf

229 **UN Department of Economic and Social Affairs (UNDESA).** 2022. The State of Food Security and Nutrition in the World 2022 (SOFI) Launch. In: *United Nations*. New York, USA, UN. Cited 4 November 2022. https://sdgs.un.org/events/state-food-security-and-nutrition-world-2022-sofi-launch-46637

230 **WHO.** 2018. *Information note: clarification on the classification of follow-up formulas for children 6-36 months as breastmilk substitutes*. Geneva, WHO. https://apps.who.int/iris/handle/10665/275875; **WHO, UNICEF.** 2022. *How the marketing of formula milk influences our decisions on infant feeding*. Geneva, WHO and New York, UNICEF. file:///C:/Users/LIUT/Downloads/9789240044609-eng.pdf

231 **Pesaresi, M., Guo, H.D., Blaes, X. *et al*.** 2013. A global human settlement layer from optical HR/VHR RS data: Concept and first results. *IEEE Xplore: IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 6(5): 2102–2131. https://ieeexplore.ieee.org/document/6578177

232 **Tickell, K.D., Atlas, H.E. and Walson, J.L.** 2019. Environmental enteric dysfunction: a review of potential mechanisms, consequences and management strategies. *BMC Medicine*, 17, 181 (2019). https://doi.org/10.1186/s12916-019-1417-3; **Budge, S., Parker, A., Hutchings, P.T. and Garbutt, C.** 2019. Environmental enteric dysfunction and child stunting. *Nutrition Reviews*, 77(4): 240-253. https://doi.org/10.1093/nutrit/nuy068

233 **National Research Council (US).** 2009. *The Public Health Effects of Food Deserts: Workshop Summary*. National Academies Press. Washington, DC. https://www.ncbi.nlm.nih.gov/books/NBK208016/

234 **FAO, IFAD, UNICEF, WFP and WHO.** 2020. *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO. https://doi.org/10.4060/ca9692en

235 **Global Alliance for Improved Nutrition (GAIN) and Johns Hopkins University.** 2020. About Food Systems. In: *Food Systems Dashboard*. Geneva, Switzerland. Cited 4 November 2022. https://www.foodsystemsdashboard.org/information/about-food-systems; **WFP Regional Bureau for Asia and the Pacific (WFP RBB) and Dikoda.** 2022. *Food security and diets in urban Asia: how resilient are food systems in times of COVID-19?* Bangkok, WFP. https://www.wfp.org/publications/food-security-and-diets-urban-asia-how-resilient-are-food-systems-times-covid-19

236 **FAO and WHO.** 2019. *Sustainable healthy diets – Guiding principles*. Rome. https://www.fao.org/3/ca6640en/ca6640en.pdf

237 **Singh, J.E., Illner, A.K., Dokova, K., Usheva. N., Kostadinova. T. and Aleksandrova, K.** 2020. Mapping the global evidence on nutrition transition: a scoping review protocol. *BMJ Open*, 10:e034730. https://bmjopen.bmj.com/content/10/6/e034730

238 **UN-Habitat.** 2018. *SDG Indicator 11.1.1 Training Module: Adequate Housing and Slum Upgrading*. United Nations Human Settlement Programme (UN-Habitat), Nairobi.

239 **Global Alliance for Improved Nutrition (GAIN) and Johns Hopkins University.** 2020. About Food Systems. In: *Food Systems Dashboard*. Geneva, Switzerland. Cited 19 November 2022. https://www.foodsystemsdashboard.org/

240 **WFP Regional Bureau for Asia and the Pacific (WFP RBB) and Dikoda.** 2022. *Food security and diets in urban Asia: how resilient are food systems in times of COVID-19?* Bangkok, WFP. https://www.wfp.org/publications/food-security-and-diets-urban-asia-how-resilient-are-food-systems-times-covid-19

2022

ASIA AND THE PACIFIC
REGIONAL OVERVIEW
OF FOOD SECURITY
AND NUTRITION

URBAN FOOD SECURITY
AND NUTRITION