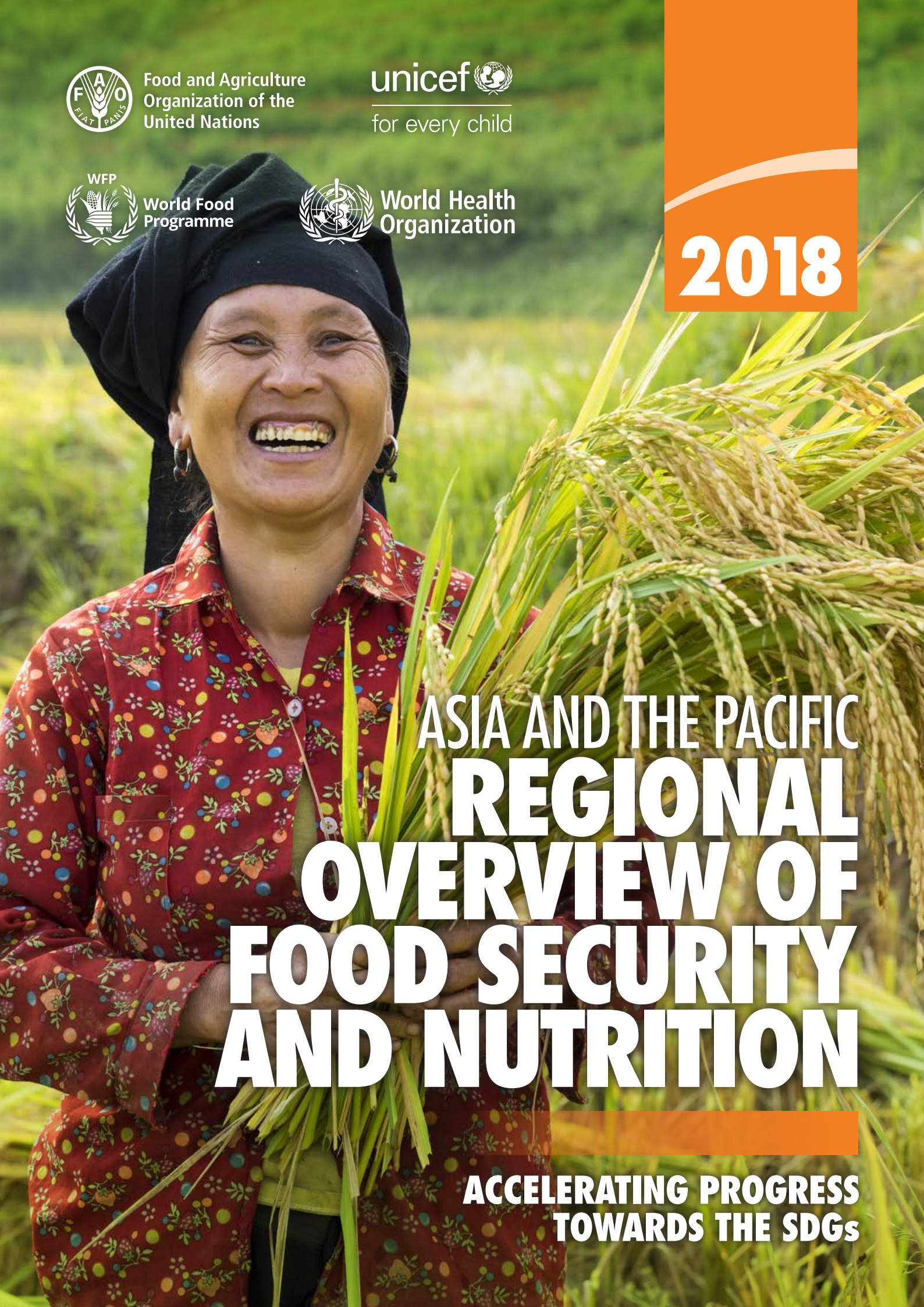

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for every child

WFP
World Food Programme

World Health Organization

2018

ASIA AND THE PACIFIC REGIONAL OVERVIEW OF FOOD SECURITY AND NUTRITION

ACCELERATING PROGRESS TOWARDS THE SDGs

2018

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CONTENTS

Foreword vii

Acknowledgements viii

Key messages ix

Abbreviations and acronyms x

The setting 1

Part 1: Food security and nutrition in Asia and the Pacific: An update 5

- Prevalence of undernourishment and experienced food insecurity 6
  - Prevalence of undernourishment 7
  - Food insecurity as experienced by people 9
- Malnutrition trends 10
  - Stunting among children under five years of age 11
  - Wasting among children under five years of age 13
  - Overweight among children under five years of age 17
  - Adult overweight and obesity 21
  - Exclusive breastfeeding for infants under six months of age 22
  - Anaemia in women of reproductive age 22

Part 2: Food security and malnutrition: Drivers and determinants 27

- Climate-related disasters and their impact 29
  - The nature and scale of the impact of climate related disasters on agriculture, food security and nutrition 32
  - Consequences of climate-related disasters on food security 35
  - Responding to the challenge of climate-related disasters 38
- Water, sanitation and hygiene (WASH) 42
- WASH realities in Asia and the Pacific 45

Part 3: Urban malnutrition 59

- Urban food insecurity and malnutrition in Asia and the Pacific 61
- Understanding urban food security and nutrition 63
- Salient features of the urban food complex 65

References 72

BOXES, FIGURES AND TABLES

BOXES

Box 1: World health assembly six global nutrition targets for 2025 for maternal, infant and young child nutrition and one NCD target 11

Box 2: Cost of diets in Asia and the Pacific 16

Box 3: Determinants of stunting in indonesian children: Evidence from a cross-sectional survey indicate a prominent role for the wash sector in stunting reduction 44

Box 4: Water quality in cambodia undermining the full development of young children 50

Box 5: Swachh Bharat Abhiyan 53

Box 6: Urban governance of food issues in Seoul, Republic of Korea 66

FIGURES

Figure 1: Prevalence of undernourishment in Asia and the Pacific 8

Figure 2: Prevalence and number of severely food insecure based on FIES, 2014 to 2017 10

Figure 3: Prevalence of stunting in children under five years of age in Asia and the Pacific 12

Figure 4: Economic growth and progress in reduction of stunting rates 13

Figure 5: Prevalence of wasting in children under five years of age in Asia and the Pacific 14

Figure 6: Cost and affordability of healthy diets in selected countries 16

Figure 7: Coverage of 90+ iron folic acid supplements among pregnant women (by percent) 18

Figure 8: Prevalence of overweight in children under five years of age in 2000 and 2017 19

Figure 9: Growing burden of stunting and overweight among children under five years of age 20

Figure 10: Prevalence of overweight only and concurrent stunting and overweight in selected countries 20

Figure 11: Trends in the prevalence of overweight and obesity 21

Figure 12: Prevalence of exclusive breastfeeding in infants younger than 6 months in Asia and the Pacific 23

Figure 13: Prevalence of anaemia in women of reproductive age in Asia 24

Figure 14: Prevalence of anaemia in women of reproductive age in the Pacific 24

Figure 15: Trends in the occurrence of climatic hazards in the Asia-Pacific region 30

Figure 16: Total damage per disaster in Asia and the Pacific 31

Figure 17: Distribution of total loss and damage in agriculture by three main sub-sectors in selected Asian countries 34

Figure 18: Proportion of households without access to an improved latrine and prevalence of child stunting in children aged 0-59 months in Indonesia 44

Figure 19: SDG 6 targets and indicators for drinking water, sanitation and hygiene 45

Figure 20: Regional drinking water trends 47

Figure 21: Safely managed drinking water (2015) in South Asia and East Asia and the Pacific 47

Figure 22: Access to safely managed drinking water by service level 48

Figure 23: Number of people without piped water supply in premises 49

Figure 24: Coliforms (CFU/100ml) at point of use 50

Figure 25: E. coli (CFU/100ml) at point of use 50
Figure 26: Basic sanitation coverage in the Asia-Pacific region: 2015 52
Figure 27: Proportion of populaton with at least basic sanitation by household wealth quintile 53
Figure 28: Number of open defecators 54
Figure 29: Percentage of population accessing handwashing facilities 56
Figure 30: Population of Asia and the Pacific 60
Figure 31: Prevalence of stunting in urban and rural areas by wealth quintiles 63
Figure 32: Percent of female caregivers, aged 15-49 years, meeting minimum dietary diversity and consuming various foods, Marshall Islands 68
Figure 33: Urban population living in slums (2005 and 2014) 71

TABLES

Table 1: Trends in the prevalence of undernourishment and the number of undernourished people in Asia and the Pacific 8
Table 2: Matrix of cross-country correlations among the eight indicators of food security and nutrition 25
Table 3: Average annual number of natural hazards and percent increase, 1992-1999 and 2009-2017 31
Table 4: Estimated damage and loss in ten PDNA reports reviewed 33
Table 5: Impact of climate-related shocks on employment and wages 36
Table 6: SDG defined service level for drinking water 46
Table 7: SDG defined service level for sanitation 51
Table 8: Prevalence of stunting, wasting, and overweight and obesity among under-five children (as a percentage of the total under-five population) 62
Table 9: Some prominent features of the urban nutrition complex 64

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FOREWORD

Progress in reducing undernourishment has slowed tremendously. FAO's estimates show that the number of hungry people has barely changed during the past two years, making it increasingly difficult to achieve the Zero Hunger target of SDG 2. The situation is similarly challenging in nutrition and health areas, where a large majority of countries in the region risk missing the SDG and World Health Assembly targets. These developments in food security and nutrition are at odds with the region's continuing high level of economic growth.

The other sad reality is that an unacceptably large number of children in the region continue to face the multiple burden of malnutrition despite decades of economic growth. This is a colossal human loss given the association between undernutrition and poor cognitive development, with severe lifelong consequences for the future of these children. Rapid growth in the number of overweight children is also a growing concern in the region with serious consequences for children's future health and well-being. Investing in measures to eliminate child malnutrition, both overweight and undernutrition, is an economic and moral imperative, and we all need to face this challenge together.

At the same time, the region is increasingly impacted by climatic shocks. Besides damaging farming infrastructure and properties, such shocks have significant impacts on economic access to food by disrupting jobs and cutting wage incomes, with the impact disproportionately higher on the poor. Studies also show such shocks worsen child malnutrition and health by damaging vital infrastructure supporting health and water systems, sanitation and hygiene. This report synthesizes a range of response measures including early warning systems, insurance and safety nets, and highlights the need for an integrated package of these measures aimed at strengthening the resilience of communities and households.

'Urban Malnutrition' is the special theme of this year's report. Experience across the world has shown that while urbanization promotes social and economic advancement, and improves quality of life, poorly planned and managed urbanization can also have severe negative consequences for food security and nutrition. This report synthesizes our understanding of urban food environments, which, due to their heavier reliance on markets, complex logistics and distribution systems, and heterogeneous and mobile populations, require more nuanced and carefully articulated responses. Local city and municipal governments must play a central role in improving urban food systems by providing essential urban infrastructure, improving food systems, and promoting targeted interventions. Food, nutrition and health-related agencies need to join hands with them in strengthening their technical capacity in these areas.

With four UN agencies coming together for the first time in the Asia-Pacific region in reporting on the progress towards the elimination of hunger and malnutrition, we hope to better serve the member countries in the coming years. It is our hope that this report will contribute to a more informed dialogue and more concerted action by all partners in accelerating progress towards the goal of a healthy and hunger-free Asia and the Pacific.

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KEY MESSAGES

- The SDGs provide governments and other stakeholders with an unprecedented opportunity to reduce the serious burden of food insecurity and malnutrition in Asia and the Pacific. But the progress toward achieving the SDG 2; Zero Hunger targets continues to be slow, and immediate and urgent actions need to be taken.

- FAO estimates that some 486 million people remain undernourished in Asia and the Pacific, and little changed from the past two years. Progress has stagnated in all sub-regions.

- More than half of the world's malnourished children live in Asia and the Pacific. It is also home to the fastest growing prevalence of childhood obesity in the world. This paradox is attributed to a nutrition transition with children increasingly exposed to cheap and convenient unhealthy processed foods rich in salt, sugar and fat but poor in essential nutrients. This double burden of malnutrition sees undernourished and overweight children living in the same communities and households and it can even occur in the same child.

- There are multiple causes of child malnutrition – poverty, poor access to food markets and health services, and poor knowledge and practices for nutrition, health, water and sanitation. This complexity means that eradicating child malnutrition cannot be addressed through one sector alone and requires shared actions implemented through multi-sectoral approaches that cut across food systems, health, sanitation, social protection and education.

- The frequency of climate-related disasters and the damage they cause have been rising in the region, negatively affecting food security and nutrition. There is a need for continued research to mitigate the impact of climatic shocks, further advance risk-informed and shock-responsive social protection systems and strengthen the resilience of livelihoods and food systems to climate variability and extremes.

- Limited or poor access to safe water, sanitation and hygiene (WASH) is one of the key drivers of malnutrition among children. To contribute substantially to reducing malnutrition, WASH improvements and coverage must be heightened and implemented throughout the whole community.

- In urban areas, undernutrition is high, and obesity is rising rapidly. Given rapid rates of urbanization, it is important to ensure that rapidly expanding cities in the Asia-Pacific region are planned in an inclusive, sustainable and nutrition-sensitive manner. Local city governments and urban planners must become the new nutrition partners and nutrition policy advocators in tackling these challenges.

ABBREVIATIONS AND ACRONYMS

ASEAN	Association of Southeast Asian Nations
BMI	body mass index
CERF	Central Emergency Response Fund
CGIAR	Consultative Group on International Agricultural Research
CoD	Cost of the Diet
CREWS	Climate Risk and Early Warning Systems
EM-DAT	Emergency Events Database
ESCAP	Economic and Social Commission for Asia and the Pacific
EWEA	Early Warning–Early Action
FAO	Food and Agriculture Organization
FbF	Forecast-based Financing
FIES	Food Insecurity Experience Scale
IUGR	intrauterine growth restriction
JME	WHO/UNICEF/World Bank Group Joint Child Malnutrition Estimates
JMP	WHO/UNICEF Joint Monitoring Programme on Drinking Water, Sanitation and Hygiene
MDG	Millennium Development Goal
NCD	non-communicable disease
PDNA	Post-Disaster Needs Assessment
PoU	prevalence of undernourishment
SAARC	South Asian Association for Regional Cooperation
SAM	severe acute malnutrition
SDG	Sustainable Development Goal
SUN	Scaling Up Nutrition
UN	United Nations
UNICEF	United Nations Children's Fund
WASH	water, sanitation and hygiene
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization
WMO	World Meteorological Organization

THE SETTING

Recent trends in food insecurity and malnutrition in Asia and the Pacific are at odds with the region's high economic growth. The region has maintained its leadership position as the economically fastest-growing region with declining poverty. However, progress towards the targets for the 2030 Sustainable Development Goals (SDGs) is less than satisfactory. The 2016 Asia-Pacific regional report on Food Security and Nutrition indicated that only a handful of countries were likely to meet the 2030 SDG 2 target with the recent rates of hunger reduction (FAO, 2016a). Data for the last few years show that, rather than improving, the rate of hunger reduction is slowing down and even reversing for some countries. The situation is similarly challenging for a number of other nutrition indicators and a large majority of countries in the region risk missing the SDG 2 and World Health Assembly (WHA) global nutrition targets.

Poverty and inequity remain the principal causes of hunger and malnutrition. According to the World Bank's *Poverty and Shared Prosperity 2016* report, the global poor are predominantly rural, mostly employed in agriculture, young, poorly educated, and living in larger households with more children (World Bank, 2016a). It finds, based on data from household surveys, that the share of the total poor living in rural areas was 75 percent in East Asia and the Pacific, and 83 percent in South Asia. Poverty rates are more than three times higher among rural than urban residents and agricultural workers are over four times more likely to be poor relative to people employed in other sectors of the economy.

This means that agriculture and the rural economy still deserve the attention they received in the past despite the shrinking share of agriculture in national economies. The 2016 edition of the FAO Asia-Pacific regional report had pointed out that most countries in the region were under-spending on agriculture relative to its contribution in the economy. Likewise, public expenditures on agricultural research, a vital driver of productivity growth, were also below recommended levels in a large number of countries, jeopardizing the ability of countries to adequately provide safe and nutritious food to the region's growing and rapidly urbanizing population (FAO, 2016a).

The role of agriculture in Asia is transforming when it comes to meeting the food security and nutrition challenge. It is no longer sufficient to see agriculture as an independent sector with the objective of maximizing production. Agriculture has become just one part of an integrated and more globalized food system. This can pose a huge challenge for producers (particularly for small farmers) in many countries where even the most efficient producers can be excluded from parts of the value chain as they may lack the mechanisms to integrate into a new marketplace. This requires food and agricultural systems to improve their inclusiveness by linking smaller producers (farmers, foresters and fishers, and their respective organizations) with agribusiness enterprises and supply chains for more effective participation in rapidly changing global, regional and national markets. This also requires a more enhanced understanding of food flows and an appreciation of nutritional needs so as to inform more rational management of local, regional and global food systems.

While sustainable food systems remain at the core of efforts towards ending hunger and all forms of malnutrition, it is clear that malnutrition derives from a series of interlinked factors, including child feeding practices, dietary practices, women's education, sedentary lifestyles, enabling sector policy environments, institutional stability, quality health care, sanitation and hygiene. Given its multiple dimensions and drivers, it is quite clear that a response strategy dealing with food insecurity and nutrition requires a comprehensive and integrated understanding of the dynamics at play, as well as a coordinated package of interventions. This also requires more integrated monitoring based on a wide range of indicators. Accordingly, this year, the regional offices from four UN agencies – FAO, UNICEF, WFP and WHO – join hands in an attempt to present a more integrated picture of the status and determinants of food insecurity and malnutrition in the Asia-Pacific region, drawing from their specialized yet complementary knowledge and expertise.

The structure of this report is as follows:

- Part I reviews food security and nutrition in the region covering multiple indicators, including (i) indicators of hunger and food insecurity, the prevalence of undernourishment (PoU), and the Food Insecurity Experience Scale (FIES); (ii) malnutrition among under-5 children – stunting, wasting and overweight/obesity; and (iii) obesity among adults, anaemia in women of reproductive age, and exclusive breastfeeding. The discussion in this part also integrates the narrative on the drivers of malnutrition and ongoing innovations and responses at the country level.

- Part II delves deeper into two selected themes, each covering a set of drivers (i) climatic shocks and disasters, and their linkages with food security and nutrition, and (ii) the state of access to water, sanitation and hygiene.

- Finally, in view of rapid urbanization in the region and its implications for food systems and nutrition, Part III presents a review of issues and responses on the special topic of Urban Malnutrition.

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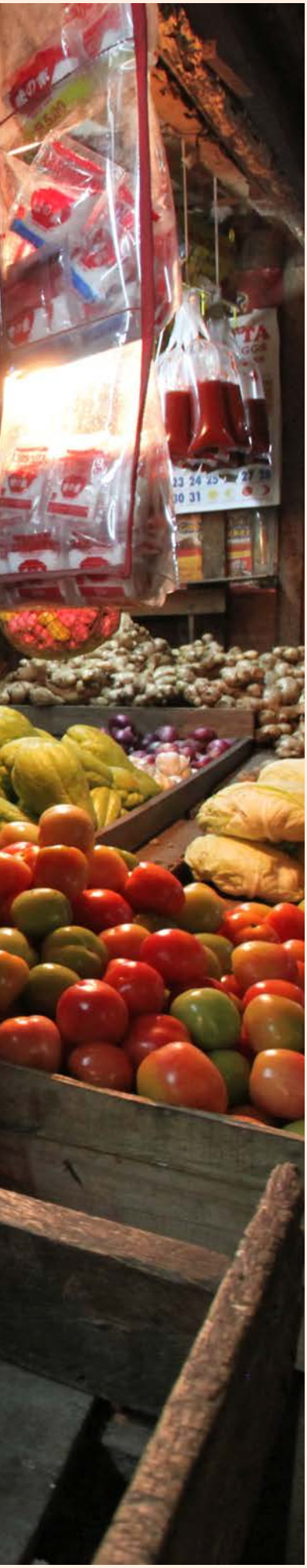

Part 1

FOOD SECURITY AND NUTRITION IN ASIA AND THE PACIFIC: AN UPDATE

Part 1

FOOD SECURITY AND NUTRITION IN ASIA AND THE PACIFIC: AN UPDATE

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Achievements in the Asia-Pacific region have a strong bearing on the global progress towards SDGs. Past progress in reducing poverty, hunger and undernutrition notwithstanding, recent trends raise serious concerns. Progress in hunger reduction is slowing down and most countries in the region are off course to achieving a number of targets under SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture. The region is also failing in promoting good sanitation, and child and maternal nutrition practices. At the same time, obesity prevalence is rising, leading to a growing double burden of malnutrition.

PREVALENCE OF UNDERNOURISHMENT AND EXPERIENCED FOOD INSECURITY

PoU and FIES are two indicators used for monitoring progress in hunger reduction under the SDGs. PoU was also the main indicator used to monitor the World Food Summit target and the Millennium Development Goal (MDG) 1C target: Eradicate extreme hunger and poverty. The PoU estimates are based on average national dietary energy supply, minimum dietary energy requirements for an average individual, and a measure of the distribution of food within a country.

Unlike many other indicators of hunger and food insecurity derived from national food balance, household food consumption or similar data, the FIES establishes a metric for the severity of the food insecurity condition of individuals or households. The metric is calculated based on people's direct responses to questions regarding their access to food of adequate quality and quantity. The FIES is an experience-based scale indicator which captures the access dimension of food security.[1]

The 2017 Asia-Pacific regional report noted a substantial slowdown in the rate of reduction in the PoU during the period 2010-2015 compared with the five years before that (FAO, 2017a). Furthermore, the projections for 2016 had shown that both the PoU and the total number of undernourished people may have actually begun to rise in the region. During 2015-2016, South Asia and East Asia sub-regions were estimated to have experienced a reduction in the absolute number of undernourished people, while in Southeast Asia there was an estimated increase in the PoU in both percentage and absolute terms. Unfortunately, recent estimates of the PoU and FIES confirm continued signs of worsening hunger and food insecurity in the region as reviewed below.

Prevalence of undernourishment

As per the latest FAO estimates, there has been virtual stagnation in the number of undernourished people (in terms of dietary energy supply) in Asia and the Pacific between 2016 and 2017 (see Figure 1). In 2017, the number of hungry people in the region stood at 486.1 million against 486.5 million in 2016. Within the Asia-Pacific sub-regions, South Asia continued to witness some progress in reducing the number of undernourished people, although clearly not sufficient to achieve the zero hunger target by 2030. In South Asia, the number of undernourished people declined by less than a million between 2016 and 2017. East and Southeast Asia witnessed no improvement and Oceania added another 200 000 people (see Table 1).

[1] Further details on FIES can be found at http://www.fao.org/in-action/voices-of-the-hungry/en/#.Wv0-UU1ILcs

FIGURE 1: PREVALENCE OF UNDERNOURISHMENT IN ASIA AND THE PACIFIC

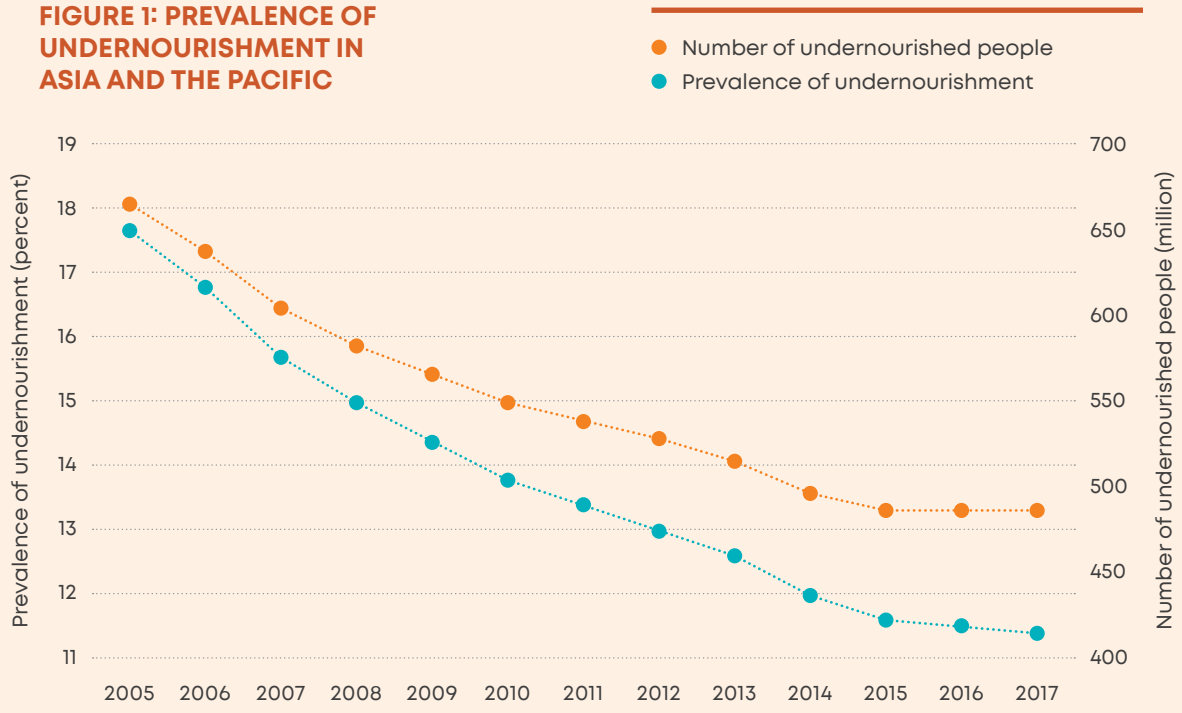

TABLE 1: TRENDS IN THE PREVALENCE OF UNDERNOURISHMENT AND THE NUMBER OF UNDERNOURISHED PEOPLE IN ASIA AND THE PACIFIC

	PREVALENCE OF UNDERNOURISHMENT (PERCENT)					NUMBER OF UNDERNOURISHED PEOPLE (MILLION)				
	2005	2010	2015	2016	2017	2005	2010	2015	2016	2017
Asia and the Pacific	17.7	13.8	11.6	11.5	11.4	667.1	550.2	486.8	486.5	486.1
East Asia	14.1	11.2	8.5	8.5	8.5	219.1	178.4	138.3	139.5	139.6
South Asia	21.5	17.2	15.6	15.1	14.8	339.8	293.1	284.3	278.1	277.2
Southeast Asia	18.1	12.3	9.3	9.9	9.8	101.7	73.7	59.2	63.6	63.7
Oceania	5.5	5.2	6.3	6.6	7.0	1.8	1.9	2.5	2.6	2.8

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Although similar trends were signalled in the 2016 and 2017 reports, the numbers were small and it was not clear if that marked the beginning of an upward trend or it was just a transitory uptick. Indeed, both East and Southeast Asia experienced rapid reductions in the number of undernourished people during 2005-2015. However, both sub-regions have experienced rising hunger since 2015 (see Table 1). While hunger levels have continued to decline in South Asia, the rate of reduction has slowed down considerably in recent years. These trends are symptomatic of serious structural factors adversely affecting the agricultural sector, including the impact of climate and weather-related extreme events. We return to a discussion on climate-related natural disasters and agriculture sector growth in Part II of the report. Suffice it to say at this point that if the average annual decline of PoU continues as it has been since the year 2000, the region will surely miss the SDG 2 target of zero hunger.

Food insecurity as experienced by people

While the PoU is strongly influenced by the trends in aggregate food availability derived from national-level food balance sheets, FIES, a new source of additional evidence on the state of food security, is based on direct responses regarding people's access to adequate food. FAO has been producing FIES estimates since 2014 through data collected by the Gallup World Poll in over 140 countries and territories.[2]

Experience-based food security indicators complement the existing suite of food security indicators by better capturing the access dimension of food security. People may be in a situation of food insecurity yet still meet their dietary energy needs by consuming low-quality, energy-dense foods, for example, or cutting back on other basic needs, with potentially negative consequences for their health and general well-being.

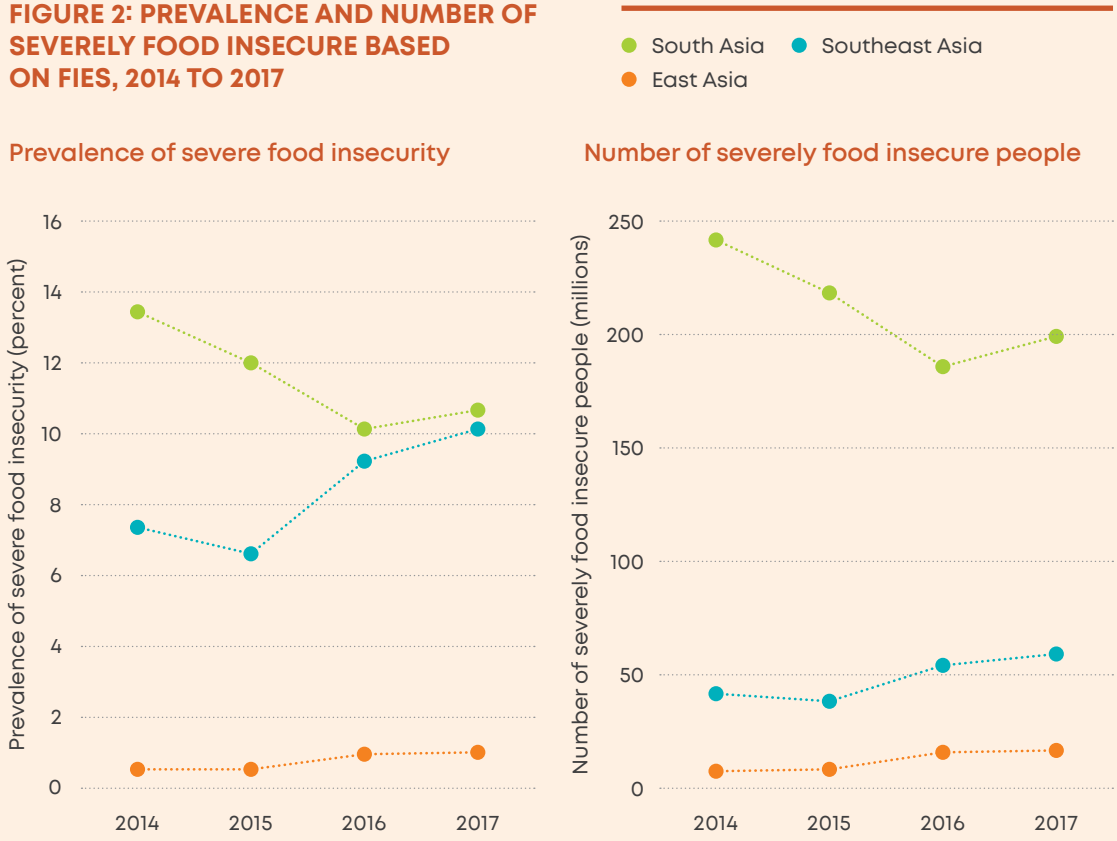
The indicators can also provide disaggregated information, such as the severity of food insecurity by place of living (e.g. rural and urban) and gender when data is collected through adequately representative surveys. When available, data from national household surveys, including a module on food insecurity experiences that is compatible with the FIES, are used to calculate the prevalence of food insecurity.

The updated estimates of Severe Food Insecurity (FIsev) are presented in Figure 2. As can be seen, the trends over the last three years broadly mirror the trends in the PoU, reconfirming the worsening of hunger and food insecurity in the region. Relative to 2017, almost 20 million more people experienced severe food insecurity compared to 2016.[3] The sub-regional trends also mirror the PoU trends. This consistency is remarkable considering the methodological differences. At a more general level, this reflects the continuing and increasing difficulties people are experiencing in accessing sufficient food.

[2] Further details of FIES, including the details of the methodology, can be found at http://www.fao.org/in-action/voices-of-the-hungry/en/#.V8ZfkvI96V4

[3] Severe food insecurity is measured by the deprivation of food, wherein people might have gone without eating for the whole day because they could not afford to buy food due to a lack of money or other resources.

FIGURE 2: PREVALENCE AND NUMBER OF SEVERELY FOOD INSECURE BASED ON FIES, 2014 TO 2017



MALNUTRITION TRENDS

SDG 2, Target 2.2, calls for an end to "all forms of malnutrition" by 2030. Malnutrition covers a broad spectrum ranging from severe undernutrition to overweight and obesity. It affects populations throughout the lifecycle, from conception through childhood and into adolescence, adulthood and older age. Undernutrition can be acute – resulting from an immediate crisis in food access, inadequate nutrient intake and/or infection – or chronic, with cumulative deleterious effects over long periods. At the other end of the spectrum, overweight and obesity can be attributed to an excessive intake of calories, and/or limited energy expenditure resulting in increased body weight and fat accumulation, which may increase the risk of diet-related non-communicable diseases (NCDs) and other health problems.

A multiple burden of malnutrition where undernutrition and overweight, and associated NCDs coexist is a serious and growing concern in Asia and the Pacific, with an increasing prevalence of both undernutrition and overweight found in countries, households and even the same person.

TRACKING MALNUTRITION

To track global progress on ending malnutrition, several nutrition indicators are measured consistently – three that form part of the SDG monitoring framework, six that refer to global nutrition targets agreed by the WHA for 2025, and one from the WHO global voluntary NCD targets (WHO, 2013; WHO, 2014a) (see Box 1).[4] These indicators are described in the following section to highlight the multiple burdens of malnutrition that affect the region and progress towards achieving global targets.

[4] The global nutrition targets have now been extended to 2030 (http://apps.who.int/gb/ebwha/pdf_files/WHA71/A71_22-en.pdf).

BOX 1: WORLD HEALTH ASSEMBLY SIX GLOBAL NUTRITION TARGETS FOR 2025 FOR MATERNAL, INFANT AND YOUNG CHILD NUTRITION AND ONE NCD TARGET

	WHA targets
1. Stunting	40 percent reduction in the number of children under five who are stunted
2. Anaemia	50 percent reduction of anaemia in women of reproductive age
3. Low birth weight	30 percent reduction in low birth weight
4. Childhood overweight	No increase in childhood overweight
5. Breastfeeding	Increase the rate of exclusive breastfeeding in the first six months up to at least 50 percent
6. Wasting	Reduce and maintain childhood wasting to less than 5 percent
	NCD target
Adult obesity	Halt the rise in obesity

Source: WHO, 2014a; FAO, 2018a.

Stunting among children under five years of age

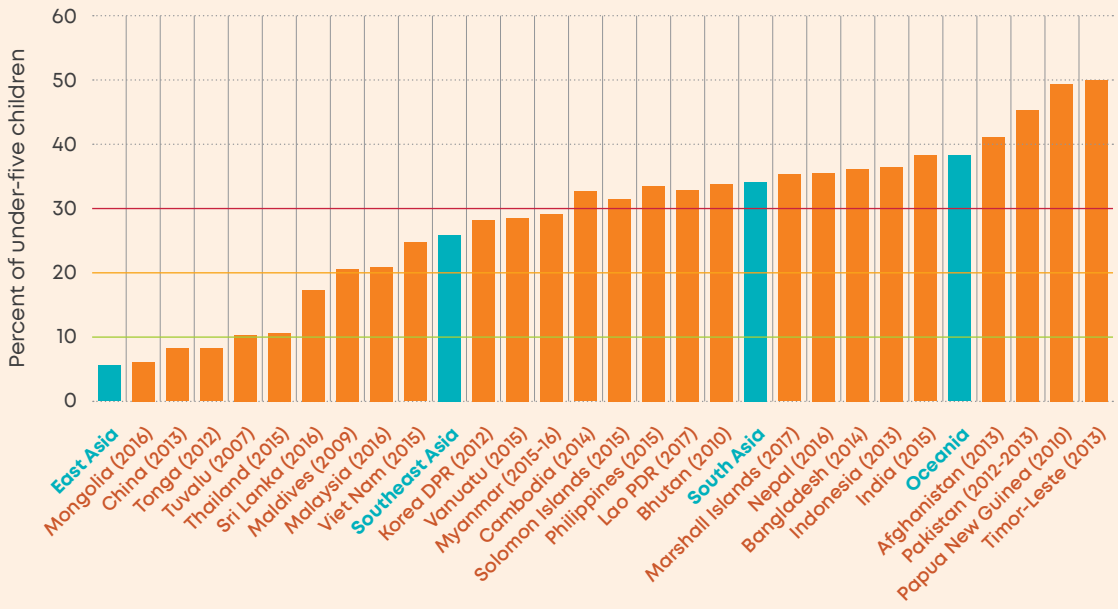
Stunting is a reflection of children failing to achieve their genetic potential for height, with stunted children too short for their age. Stunting is the cumulative effect of the irreversible physical and cognitive damage caused by chronic undernutrition, repeated infections and inadequate child care and feeding practices, which can be prevented by improving nutrition for women and children in the first 1 000 days – from conception through the first two years of life. Children who are stunted before the age of two are at risk of failing to reach their developmental potential with higher risk of disease and reduced cognitive and physical development that can affect their learning potential. Early stunting may also increase a child's risk of being overweight and developing NCDs during adolescence and adulthood (Victora *et al.*, 2008). These combined factors affect a child's future labour productivity, income earning potential and social skills later in life with consequences beyond the individual level. If the prevalence of stunting is widespread, it can have dramatic consequences on a country's human and economic development with an estimated cost benefit of USD 16 in economic return for every USD 1 invested in nutrition interventions (McGovern *et al.*, 2017; and Hoddinott *et al.*, 2013).

In 2017, 79 million children under five years of age were stunted in the Asia-Pacific region (UNICEF, WHO and World Bank Group, 2018a; Development Initiatives, 2017). While prevalence of stunting is very high in the Pacific, the largest number of stunted children is in South Asia with 61 million children suffering from stunted growth (see Figure 3). China, Mongolia and Tonga have a low prevalence of stunting, while all other countries in the region have a medium to a very high level of stunting as defined by WHO.[5]

[5] Country prevalence of stunting was obtained from the UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates 2018 edition and updated for recent published surveys from Mongolia, the Republic of the Marshall Islands and Lao PDR.

FIGURE 3: PREVALENCE OF STUNTING IN CHILDREN UNDER FIVE YEARS OF AGE IN ASIA AND THE PACIFIC

≥30% – WHO category: very high prevalence
20-30% – WHO category: high prevalence
10-20% – WHO category: medium prevalence

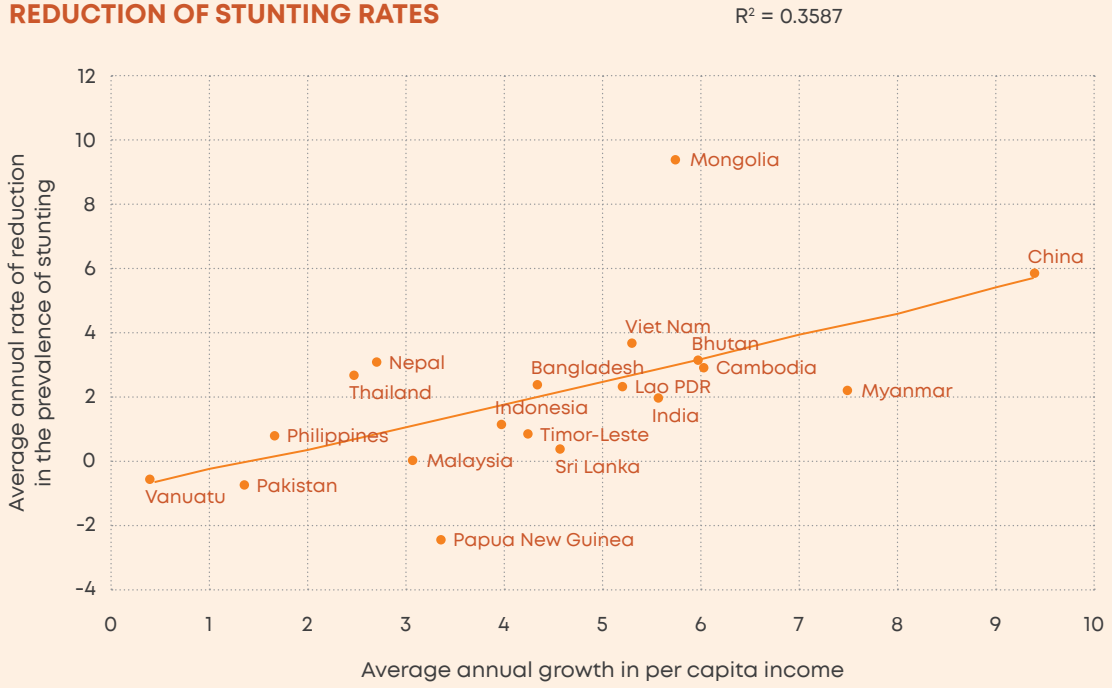


Source: Country prevalence of stunting obtained from the UNICEF, WHO and World Bank Group Joint Child Malnutrition Estimates 2018 edition and updated for recent published surveys from Mongolia, the Republic of the Marshall Islands and Lao PDR; regional estimates obtained from the Global Nutrition Report 2017 (Development Initiatives, 2017).

While the levels are high, the region has made good progress in reducing stunting. The largest reduction has been noted in East Asia with a 71 percent reduction between 2000 and 2016 (UNICEF, WHO and World Bank Group, 2018a). On average, stunting has reduced by about 30 percent in both South and Southeast Asia while no reduction was evident in the Pacific. While progress varies in the region, only two countries, Bangladesh and Mongolia, are currently on track to meet the WHA 2025 target. Several countries, such as Nepal, are making progress on stunting reduction. However, the current rate of reduction is insufficient to meet the target.

Over the long term, it is obvious that higher levels of per capita income may help to improve nutrition outcomes via improvements in the composition of diets. As can be seen from Figure 4, countries that registered rapid economic growth in recent years also observed, on average, more rapid declines in stunting rates. Similar evidence is also available from some in-country studies. While it is understood that income growth is only one of the many factors that determine nutritional outcomes, it is evident from such analysis that along with increased coverage of targeted nutrition interventions, household incomes have to rise, especially in rural areas, to accelerate progress against undernutrition. As can be seen from Figure 4, countries such as Bangladesh, Mongolia, Nepal, Thailand and Viet Nam did better in reducing stunting than what the average economic growth predicted, whereas countries below the line performed worse than was predicted by economic growth. Such variability in performance means there is ample opportunity to build on the experiences within the region to accelerate progress.

FIGURE 4: ECONOMIC GROWTH AND PROGRESS IN REDUCTION OF STUNTING RATES



Source: Based on the per capita income data from World Development Indicators and stunting data from UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates database.

Beyond economic growth, the drivers of child stunting vary from country to country and even within countries. In an analysis of the major drivers of child stunting in South Asia, Aguayo and Menon (2016) found the key drivers of child stunting to be poor dietary quality and quantity for children under two years, poor nutrition of women before and during pregnancy, and poor sanitation and hygiene practices in households and communities. Further, multi-country analysis in Afghanistan, Bangladesh, India, Nepal and Pakistan confirmed the primary importance of both good maternal nutrition and appropriate child feeding practices with timely introduction of diverse complementary foods (Kim, *et al.*, 2017). Similar findings were observed in Southeast Asia and the Pacific, with poor maternal nutrition being a major driver of stunting in Myanmar and the Republic of the Marshall Islands, and poor sanitation practices being a leading driver in Indonesia (Torlesse *et al.*, 2016). While not addressed as a direct driver of stunting in these analyses, household food security and access to affordable nutritious foods remain a vital component of good dietary quality for children and women.

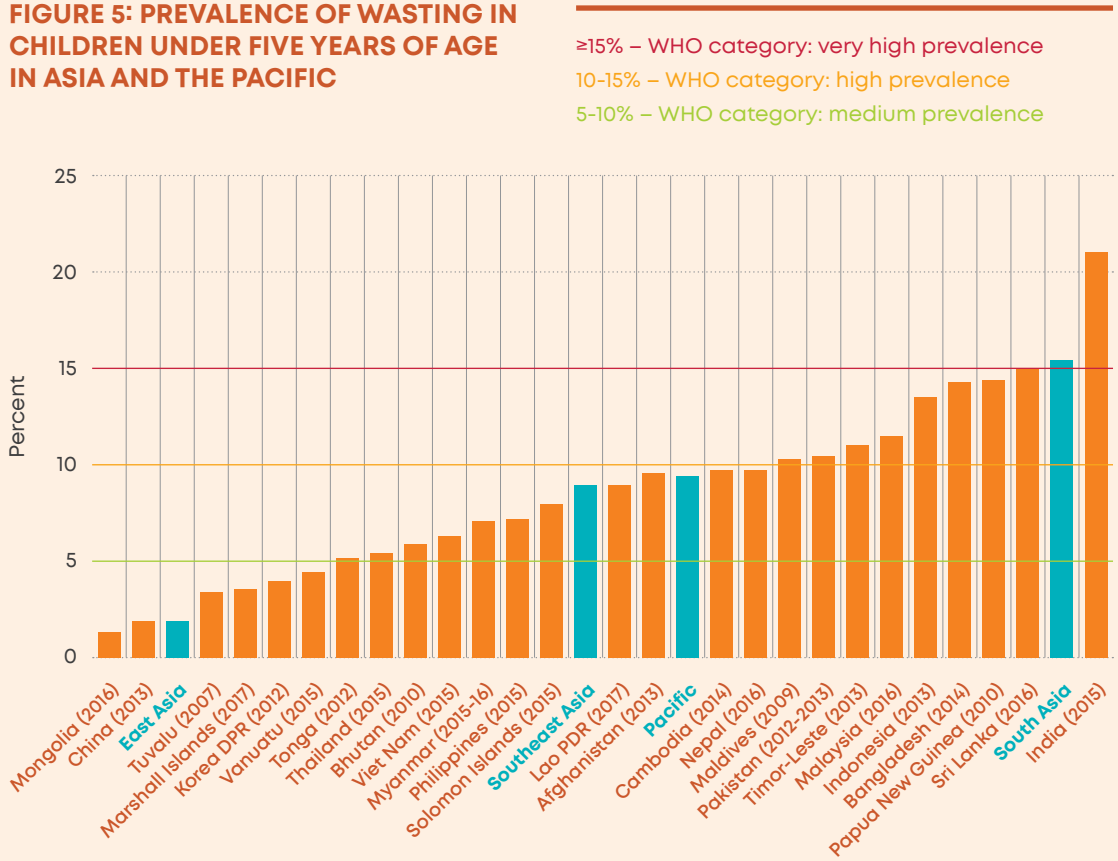
Reducing child stunting in Asia and the Pacific requires a multi-sectoral approach to deliver interventions at critical periods during the first one thousand days between a woman's pregnancy and her child's second birthday. Preventative actions to address child stunting include ensuring that pregnant and lactating mothers receive prenatal care and are adequately nourished with a diverse diet, that infants receive exclusive breastfeeding during the first six months of life, and that complementary foods are available, affordable and fed to children aged 6-23 months in adequate quantities, quality and variety. To prevent infections and illnesses that can contribute to child stunting, interventions to improve access to safe water are essential, as well as initiatives focused on ending open defecation practices, encouraging the use of improved sanitation facilities and improving basic hygiene practices. It is imperative to have specific policies and programmes in place to improve the availability and affordability of nutritious foods, child feeding practices, women's nutrition, and household and community sanitation and hygiene (WHO, 2014d; FAO and WHO, 2014).

Wasting among children under five years of age

Childhood wasting is a reflection of acute malnutrition in children, with wasted children being too thin for their height. It occurs when children rapidly lose weight and is often the result of illness coupled with inadequate care and feeding practices with diets that do not meet the child's nutritional needs. Wasting, particularly prolonged severe wasting, is a life-threating condition that has serious adverse effects on the growth and brain development of children (UNICEF, WHO and World Bank Group, 2018a). As a global target in the SDGs and a key indicator in the WHA 2025 global nutrition targets, wasting has attracted growing calls for accelerated prevention and treatment efforts. However, global progress towards the WHA 2025 target to reduce and maintain wasting to less than 5 percent has been slow or absent.

The Asia-Pacific region has the highest prevalence and burden of wasted children in the world, with nearly one in ten children at an increased risk of death due to wasting. The largest burden of wasting is found in South Asia where more than half of all wasted children in the world live. An estimated 15.4 percent of children under five years of age in South Asia, 9.4 percent in the Pacific, 8.9 percent in Southeast Asia and 1.9 percent in East Asia are wasted at any given time (Prado and Dewey, 2014). This is equivalent to 67 percent (35 million) of the total number of wasted children globally. At the country level, the prevalence of wasting is above the threshold of public health concern (>5 percent) in three out of every four countries in the region (see Figure 5).

FIGURE 5: PREVALENCE OF WASTING IN CHILDREN UNDER FIVE YEARS OF AGE IN ASIA AND THE PACIFIC



Source: Country prevalence of wasting obtained from the UNICEF, WHO and World Bank Group Joint Child Malnutrition Estimates 2018 edition and updated for recent published surveys from Mongolia, the Republic of the Marshall Islands and Lao PDR.

In South Asia, a 68 percent reduction in the prevalence of wasting is needed to meet the respective WHA target, with every country in the region above the threshold of 5 percent. This reduction, equivalent to 19 million children, relies heavily on the reduction of wasting in India, where over 1 in 5 young children are wasted.

In Southeast Asia, a 44 percent reduction in the prevalence of wasting, amounting to 2.3 million children, is needed to meet the respective WHA target. The majority of wasted children in this region are in Indonesia, accounting for 63 percent of all wasted children in Southeast Asia.

The prevalence of wasting is highly variable in the Pacific with very high rates in Papua New Guinea (14 percent) and the Solomon Islands (8 percent), with comparatively low prevalence in the Marshall Islands, Tuvalu and Vanuatu. In the Pacific, an overall reduction of 47 percent or 47 000 wasted children is needed to meet the WHA targets.

Severe wasting, known as severe acute malnutrition (SAM), is a disease that requires urgent treatment for children to survive and thrive. Of the 34 million children who are wasted in Asia and the Pacific, 11.7 million suffer from SAM. Children with SAM have drastically increased risk of death, with SAM attributing to an estimated 1-2 million child deaths per year. Even if they survive, repeated cases of SAM can have adverse effects.

SAM is curable with early detection and treatment, with children from the age of 6 months often able to be treated with ready-to-use therapeutic foods from their own homes. However, despite the high burden of SAM cases in the region and knowledge of well-established clinical protocols and effective treatments for SAM, the Asia-Pacific region is lagging on access to treatment for SAM children. Only 1 in 20 children with SAM in Asia and the Pacific have access to treatment.

Wasting and stunting share several common causes, including poor maternal nutrition before and during pregnancy, poor diets of young children, poor personal hygiene, poor household sanitation, and household poverty (Harding *et al.*, 2017).

Maternal nutrition status before and during pregnancy is a key determinant for the healthy development of a child. However, in many countries in Asia and the Pacific, nutritional needs of women before, during and post-partum are not being met. Indicators of poor maternal nutrition status include low pre-pregnancy body mass index (BMI), short maternal height, inadequate gestational weight gain and anaemia. These factors are, in turn, important contributors to intrauterine growth restriction (IUGR) and low birth weight, both leading risk factors for stunting in children globally (Danaei *et al.*, 2016).

Poor maternal nutrition drives the intergenerational cycle of undernutrition. In Asia and the Pacific, pregnant women who are short, underweight or low maternal weight during pregnancy are more likely to have children who are born too early, small or become stunted and wasted in early childhood (Aguayo and Menon, 2016). An estimated 32 percent of child stunting and 30 percent of child wasting may be attributed to IUGR during gestation (Black *et al.*, 2013). A meta-analysis of data from 54 countries identified an inverse association between maternal height, as a proxy for IUGR, and the prevalence of child stunting, with an increased risk for all mothers shorter than 160 cm (Ozaltin *et al.*, 2010). This creates a vicious cycle, with stunted children having an increased risk of short stature and overweight as adults and, therefore, an increased risk of having stunted children themselves.

While maternal short stature and low pre-pregnancy BMI is associated with child stunting, these women may give birth to healthy infants if they are well-nourished and receive appropriate care before pregnancy, and through pregnancy and delivery. Meeting the high-nutrient needs of pregnant and lactating women in many countries in Asia and the Pacific, however, is challenging because diets are dominated by staple foods with low nutrient density and poor mineral bioavailability. Poor households often struggle to afford to buy micronutrient-dense foods, which tend to be more expensive (see Box 2). Cultural taboos and misconceptions also drive food choices (Kavle and Landry, 2017), and women may purposively reduce food intake due to traditional beliefs that eating less ensures an easy, fast and inexpensive (natural) delivery.

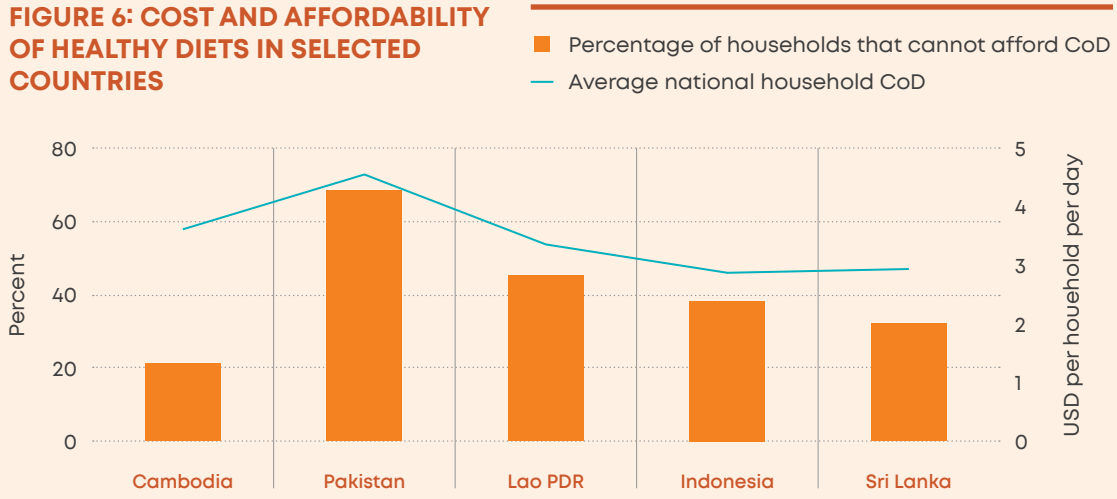
BOX 2: COST OF DIETS IN ASIA AND THE PACIFIC

Diversified healthy diets are often costly for lower-income households that bear the brunt of malnutrition. To better understand the affordability of a diversified healthy diet, Save the Children UK developed a method known as the 'Cost of the Diet' (CoD) that can model the cost of a simulated diet (food basket) which satisfies all nutritional requirements of a household (of specific composition of interest) at the minimal possible cost, based on availability, price and the nutrient content of local foods. CoD applies linear optimization to hypothesized diets at the lowest cost possible with a combination of foods that meet basic energy and nutrient requirements according to WHO/FAO recommendations and local socio-economic data.

Recent national-level studies conducted by WFP in Cambodia, Indonesia, Lao PDR, Pakistan and Sri Lanka have shown that the ability of populations to afford the cheapest staple-adjusted diversified healthy diet is extremely low in the region, ranging from 21-68 percent (see Figure 6). Furthermore, large inequalities exist within countries. For example, in Cambodia, 20 percent of the people in the region of Battambang could not afford a diversified healthy diet, while the comparable figure in Ratanak was more than three times as high (66 percent). These studies also illustrated how quantity is less of a concern, whereas the quality and diversity of household diets are challenging.

By being able to measure the economic access of different groups to nutritious food, CoD provides important guidance for policy and programme advice. For instance, by calculating the CoD with different supplements, micronutrient powders or fortified foods providing these limiting nutrients, the potential of decreasing the CoD, and therefore improving access to a diversified healthy diet, can be modelled. For example, in Indonesia, an area like Timor Tengah Selatan, with extremely high stunting prevalence and where only about 20 percent of households are able to afford a low-cost diet that meets the average energy and recommended nutrient requirements, will require not only behaviour change communication, but also specialized food transfers targeted at the most vulnerable groups (Baldi *et al.*, 2013). Context-specific integrated packages of nutrition interventions are necessary to improve the affordability of a diversified healthy diet: e.g. food vouchers and iron/folic acid supplementation, fortification, cash transfers, and social safety nets.

FIGURE 6: COST AND AFFORDABILITY OF HEALTHY DIETS IN SELECTED COUNTRIES



Source: WFP, 2015-2017; Cost of Diet and Fill the Nutrient Gap Studies.

Recent research in Cambodia provides a snapshot of the some of the barriers to achieving adequate diets for pregnant women. In a sample of pregnant women in Cambodia, 21 percent were malnourished with a mid-upper arm circumference measurement of <23cm (Som *et al.*, 2018). These pregnant women were found to consume poor-quality diets heavily dependent on nutrient-poor staple foods, with 74 percent of their diets composed of cooked rice.[6] Overall consumption of micronutrients essential to fetal growth was also poor, with most pregnant women not consuming adequate amounts of folate, zinc, iron, calcium and vitamin A to meet their nutrient requirements during pregnancy. While poor availability and affordability of nutritious foods may contribute to poor dietary consumption in pregnant women, in Cambodia, a lack of knowledge about healthy eating during pregnancy was also a key barrier. A majority of pregnant women identified eating nutritious foods and attending antenatal visits as appropriate behaviours during pregnancy, however they could not identify what constitutes a healthy diet for pregnant women or how much food should be consumed (Save the Children, 2016).

Improving the nutrition status of pregnant women can have a dramatic effect on their own health and on the health of their future children. Global guidance exists on the minimum package of nutrition interventions during pregnancy (WHO, 2016). These guidelines highlight the importance of a positive experience for women during pregnancy and prioritize the provision of nutrition education and counselling through antenatal care contacts.

While nearly all countries in the region have policies and guidelines that include interventions to improve maternal nutrition, these policies and guidelines have not been updated to reflect global guidance and do not fully align with the nutrition recommendations in the WHO 2016 recommendations on antenatal care and other applicable WHO guidelines. Additionally, while guidelines may exist for maternal nutrition interventions, there are considerable disparities in the coverage of these interventions between countries, within countries and between socio-economic groups. For example, while iron-folate supplementation is a well-established intervention in all countries, too few women take adequate supplements to protect against anaemia in most countries (see Figure 7). To meet the global and national nutrition targets for women and children, all countries must address poor maternal nutrition with greater urgency. The importance of maternal nutrition must be elevated and prioritized within national and regional efforts to prevent stunting and all other forms of malnutrition in children.

Overweight among children under five years of age

Childhood overweight, or being too heavy for one's height, reflects a result of chronic excessive weight gain. Overweight children are at a higher risk of developing serious health problems later in life, including type 2 diabetes, high blood pressure, asthma and other respiratory problems, sleep disorders, and liver disease. Childhood overweight also increases the risk of obesity, premature death and disability in adulthood. The economic costs of the rising epidemic of childhood overweight and obesity are considerable, both in terms of the financial strain on healthcare systems and of lost productivity. Reversing obesity and overweight is a serious challenge and so the emphasis should be on prevention. As dietary and physical activity habits are set early in life, and early childhood obesity and excess weight gain predict adult obesity (Simmonds *et al.*, 2016), interventions targeted at young children to prevent overweight and obesity are an essential component of obesity prevention as they can have a lasting lifelong effect.

In Asia and the Pacific, an estimated 14.5 million children under five years of age were overweight in 2017 (UNICEF, WHO and World Bank Group, 2018a). There is considerable variation in both the current prevalence of overweight in the region and in the change in prevalence since 2000. Overweight has increased in all sub-regions with the exception of East Asia where there has been a 16 percent reduction since 2000 (see Figure 8).[7] The most dramatic increase in overweight has been observed in Southeast Asia with a 128 percent increase since 2000. Currently, the prevalence of overweight is highest in the Pacific, where nearly 1 in 10 children under five years of age is overweight, and in Southeast Asia, where 7 percent of children are overweight.

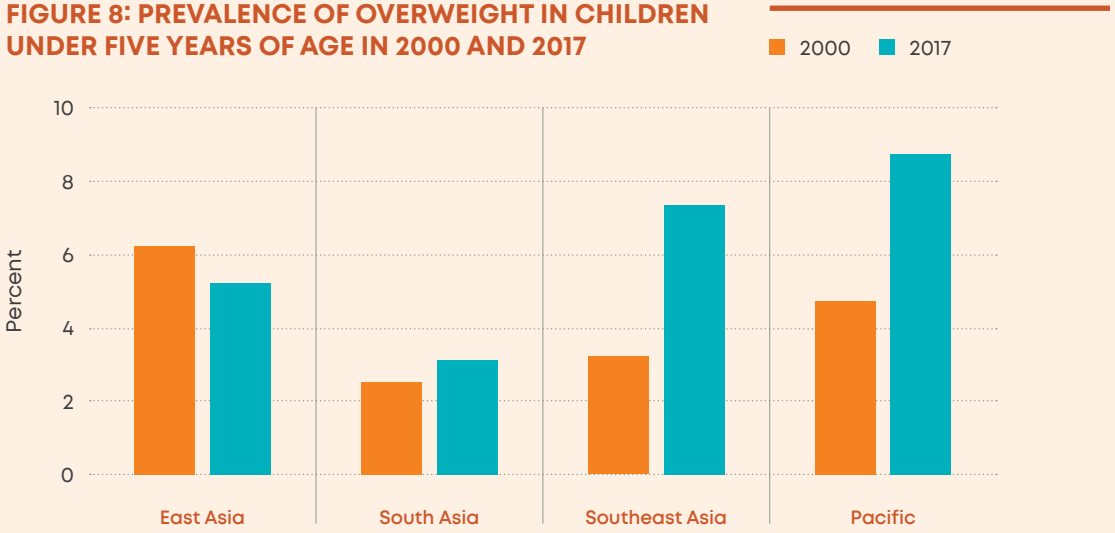
[6] UNICEF Cambodia. Unpublished research.
[7] UNICEF, WHO and World Bank Group, 2017.

FIGURE 7: COVERAGE OF 90+ IRON FOLIC ACID SUPPLEMENTS AMONG PREGNANT WOMEN (BY PERCENT)[8]

Source: UNICEF, 2014; Afghanistan National Nutrition Survey 2013 (MoH Afghanistan and UNICEF, 2013); India National Family Health Survey, 2015-16 (IIPS and ICF, 2017); Nepal Demographic and Health Survey 2016 (MoH Nepal, New ERA and ICF, 2017); Pakistan National Nutrition Survey 2011 (MoPD Pakistan and MoNHSRC, 2011); Bangladesh Demographic and Health Survey 2014 (NIPORT, Mitra and Associates, and ICF International, 2016); Maldives Demographic and Health Survey 2009 (MOHF Maldives and ICF Macro, 2010); and Sri Lanka Demographic and Health Survey 2016 (DCS, MoHNIM Sri Lanka and World Bank Group, 2016).

[8] During pregnancy, women should receive iron folic acid supplementation within the first trimester of their pregnancy and for a minimum of 90 days to prevent anaemia. The receipt of any iron folic acid supplementation and the receipt of 90+ days of iron folic acid supplementation are global indicators used to track progress in anaemia reduction.

FIGURE 8: PREVALENCE OF OVERWEIGHT IN CHILDREN UNDER FIVE YEARS OF AGE IN 2000 AND 2017

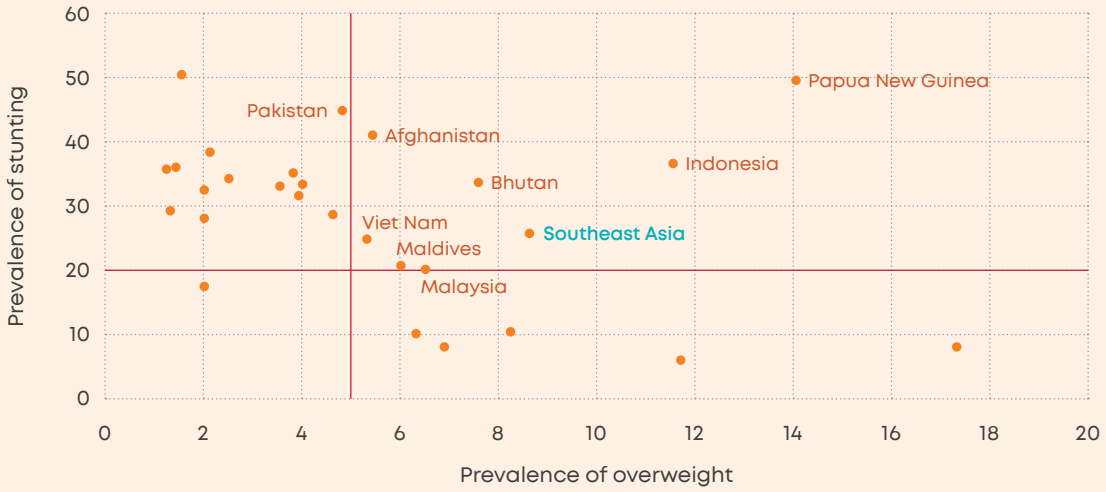


Source: UNICEF, WHO and World Bank Group, 2018a.

The previous sections on stunting, wasting and overweight among children show that most countries in Asia and the Pacific are undergoing a nutrition transition, with children increasingly exposed to energy-dense and micronutrient-poor foods, which are often high in fat, sugar and/or salt, convenient and low in cost (Kelly, 2016). These shifts in dietary patterns, along with low levels of physical activity, have resulted in sharp increases in childhood overweight while stunting continues to remain a significant public health concern. This multiple burden of high stunting and high overweight prevalence levels is on the rise in the region, with seven countries exceeding the threshold for public health concern for both stunting and overweight in young children and several more countries, such as Pakistan, closely approaching the threshold for overweight (see Figure 9).

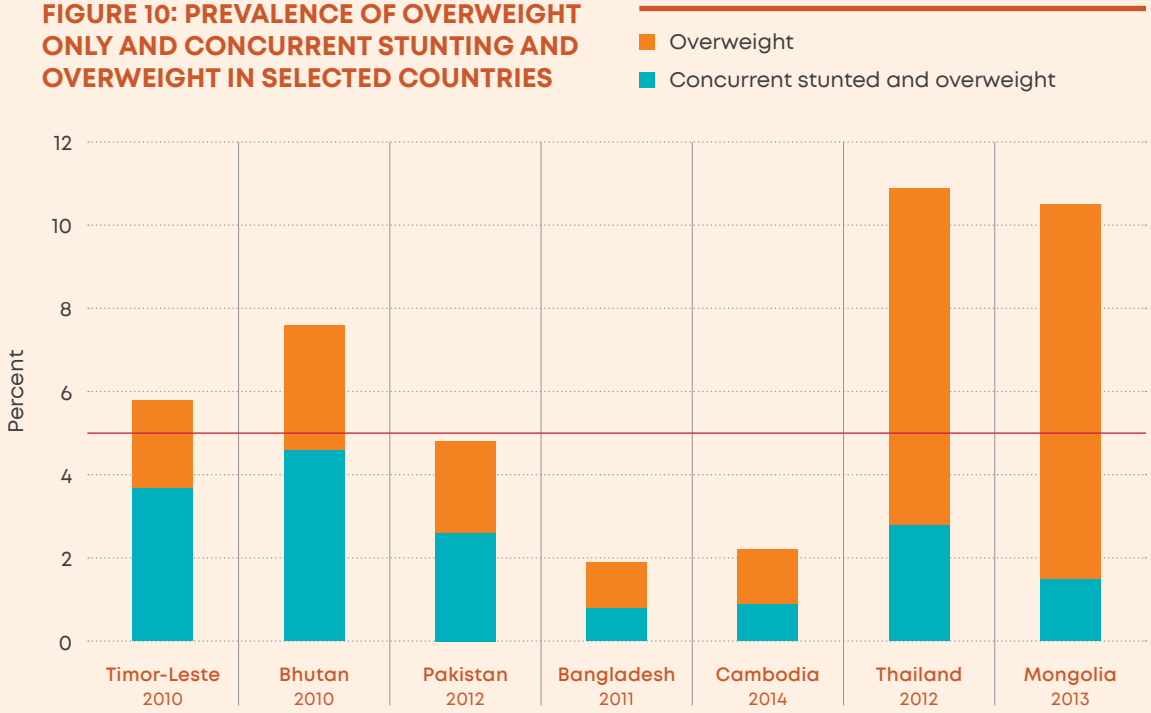
The multiple burden of stunting and overweight can also occur in the same child. In countries where low-nutrient and energy-dense food is widely available and affordable, stunted children are at higher risk of becoming overweight due to the physiological and metabolic changes they undergo (Hoffman, 2001; Taveras, 2011; Popkin, 2012; Yang, 2013). This form of double burden of malnutrition is found throughout low- and middle-income countries both globally and regionally (Bates, 2017). In Bhutan, Pakistan and Timor-Leste, and where both the prevalence of stunting and overweight is elevated, over 50 percent of overweight children are also stunted. In Bangladesh and Cambodia, the overall prevalence of overweight is low, however, 40 percent of overweight children are also stunted (see Figure 10). A high prevalence of concurrent stunting and overweight indicates that overweight is not only a concern for children in wealthier households but also is closely tied to early undernutrition in children. Upper middle-income countries with a high burden of overweight, such as Mongolia and Thailand, have a lower prevalence of concurrent stunting and overweight, mostly due to lower rates of stunting. It is notable however that in Thailand, 1 in 4 overweight children are also stunted, despite the overall population having a relatively low prevalence of stunting.

FIGURE 9: GROWING BURDEN OF STUNTING AND OVERWEIGHT AMONG CHILDREN UNDER FIVE YEARS OF AGE



Source: Country prevalence of overweight and stunting obtained from the UNICEF, WHO and World Bank Group Joint Child Malnutrition Estimates 2018 edition and updated for recent published surveys from Mongolia, the Republic of the Marshall Islands and Lao PDR.

FIGURE 10: PREVALENCE OF OVERWEIGHT ONLY AND CONCURRENT STUNTING AND OVERWEIGHT IN SELECTED COUNTRIES



Source: Country prevalence of overweight and stunting obtained from the UNICEF, WHO and World Bank Group Joint Child Malnutrition Estimates 2018 edition and updated for recent published surveys from Mongolia, the Republic of the Marshall Islands and Lao PDR.

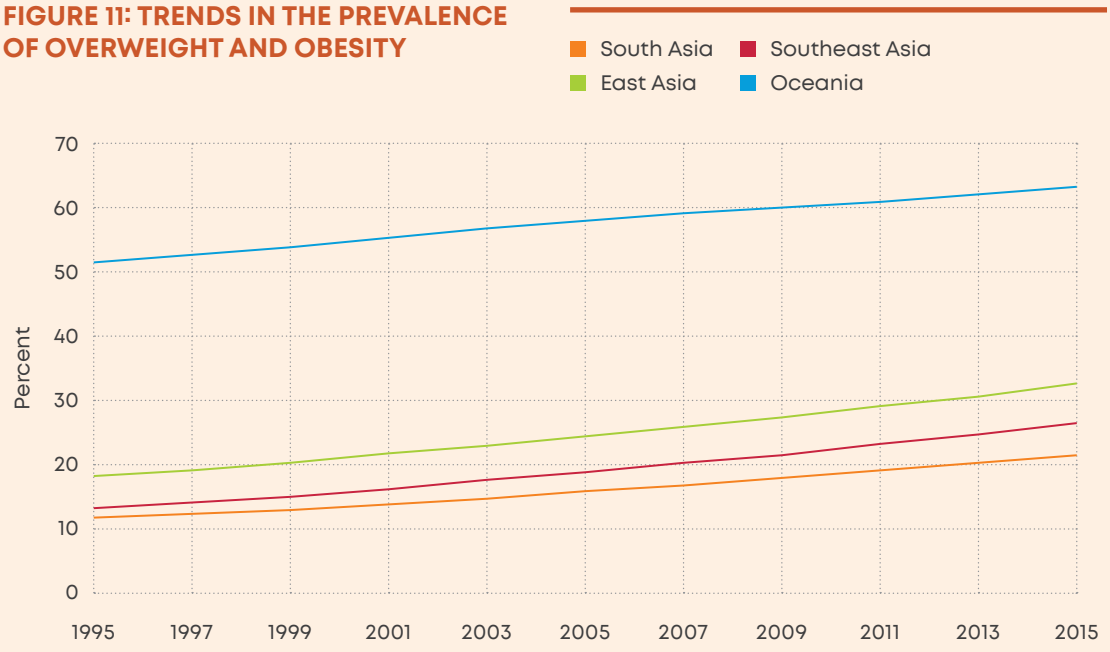
The nutrition transition is set to progress in most countries in Asia and the Pacific with a corresponding increase in the consumption of energy-dense, micronutrient-poor foods in children across all economic groups. Children, especially those from poorer socio-economic quintiles, are at risk of becoming concurrently stunted and overweight with potential life-long implications for their health and cognitive development. A joint effort to prevent both stunting and overweight/obesity is required to address the root causes of child stunting and overweight with the prevention of early undernutrition as a vital component of obesity prevention.

Adult overweight and obesity

NCDs, which include cardiovascular disease, diabetes, chronic respiratory diseases and cancer, are the leading global cause of death, causing a high level of premature mortality in Asian countries. Four major risk factors contribute to the majority of NCDs and, of these, unhealthy diets are a significant (and modifiable) contributor (WHO, 2017b). The Global Action plan for the Prevention and Control of NCDs 2013-2020 has set a voluntary target on adult obesity to be achieved by 2025 – halt the rise in obesity and diabetes. Overweight and obesity also impact SDG 3 target 3.4 to reduce by one-third premature mortality from NCDs through prevention and treatment and promote mental health and well-being (WHO, 2013).

Adult overweight (including obesity) is increasing in prevalence across most countries in Asia and the Pacific (see Figure 11) and is linked to increasing urbanization and the nutrition transition.[9] Apart from premature death, (i.e. death between ages 30-70), overweight and obesity are risk factors for many diseases and exert a high burden on individual communities and economies of countries. Regional estimates of direct (treating obesity-related illnesses) and indirect costs (losses due to lower productivity or poor quality of life due to overweight and obesity, including disabilities and absenteeism at work) of obesity are rare, but a recent Asian Development Bank (ADB) working paper estimated that overweight and obesity imposed a burden of approximately 0.78 percent of gross domestic product in the Asia-Pacific region (Helble and Francisco, 2017).

FIGURE 11: TRENDS IN THE PREVALENCE OF OVERWEIGHT AND OBESITY



Source: Regional estimates are population weighted estimates based on the country level data from Global Health Observatory data repository (http://apps.who.int/gho/data/view.main.GLOBAL2461A?lang=en accessed 25 March 2018).

[9] WHO definition (WHO, 2016), persons with a BMI greater than or equal to 25 are considered overweight while those with a BMI greater than or equal to 30 are considered obese.

The food environment has a vital role in promoting or impeding healthy eating habits. Although dietary intake is often seen as an individual responsibility, the food environment has a marked influence.[10] Success in changing attitudes and behaviours to reduce overweight, obesity and diet-related NCDs is unlikely unless environmental influences are modified. Poor maternal nutrition related to maternal undernutrition, obesity, gestational diabetes and suboptimal in-utero nutrition also play a role. Children undernourished in utero and stunted during early childhood are at a particular risk for overweight, obesity and NCDs later in life, especially when faced with unhealthy diets. The lack of supportive policies in sectors such as health, agriculture, transport, urban planning, environment, food processing, distribution, marketing and education have a huge impact on the rising prevalence of overweight and obesity.

The most effective policies to reduce adult obesity are those of prevention, especially prevention of childhood obesity. The WHO Global Strategy on Diet, Physical Activity and Health as well as the more recent recommendations of the Commission on Ending Childhood Obesity promote several strategies to improve diets and physical activity patterns at the population level.[11] The policy measures being promoted address the obesogenic environment as well as critical periods in the life course (WHO, 2017c). Life-course interventions in primary care settings include the prevention of childhood obesity through breastfeeding and appropriate complementary feeding, and appropriate weight gain at pregnancy. Policies to mitigate the obesogenic environment include behaviour-change communication, school-based interventions, and broader regulatory and fiscal policies, as well as the promotion of sustainable and healthy food systems.

Exclusive breastfeeding for infants up to six months of age

Exclusive breastfeeding, where infants receive nothing but breastmilk for the first six months of life, is part of optimal breastfeeding practices, and increasing the rate of exclusive breastfeeding by up to 50 percent in the first six months of life is one of the global nutrition targets endorsed by the WHA in 2012.

In 2017, 60 percent of infants younger than six months were exclusively breastfed in South Asia compared to 28 percent in East Asia and 33 percent of infants in Southeast Asia (see Figure 12). There is insufficient data in the Pacific for a regional estimate. While prevalence of exclusive breastfeeding in many South Asian countries exceeds the WHA target of at least 50 percent, there have been declines recently in Bangladesh, India and Nepal that threaten progress made in the region. Practice of exclusive breastfeeding is low in Southeast Asia and East Asia, with prevalence remaining at or below 30 percent for the past 15 years, and only two countries, Timor-Leste and Viet Nam, being on course to meet the WHA targets.

Investment in comprehensive breastfeeding strategies is required in the region to meet the respective WHA target and to obtain the vast benefits of breastfeeding. Walters *et al.* (2017) estimated that every year 12 400 child and maternal deaths could be attributed to inadequate breastfeeding in seven Southeast Asian countries.

Proven interventions to increase breastfeeding rates include counselling and support for mothers during pregnancy, at the time of birth and during the first two years, both in the community and in health facilities; pro-breastfeeding policies, such as the enforcement of the International Code of Marketing of Breast Milk Substitutes;[12] implementation of the Baby-Friendly Hospital Initiative and maternity protection measures, including maternity leave for mothers and paid breastfeeding breaks; and lastly, national breastfeeding promotion campaigns to raise awareness through the mass media to encourage breastfeeding (UNICEF and WHO, 2018b).

Anaemia in women of reproductive age

Anaemia impairs health and well-being in women and increases the risk of adverse maternal and neonatal outcomes.[13] Anaemia affects half a billion women of

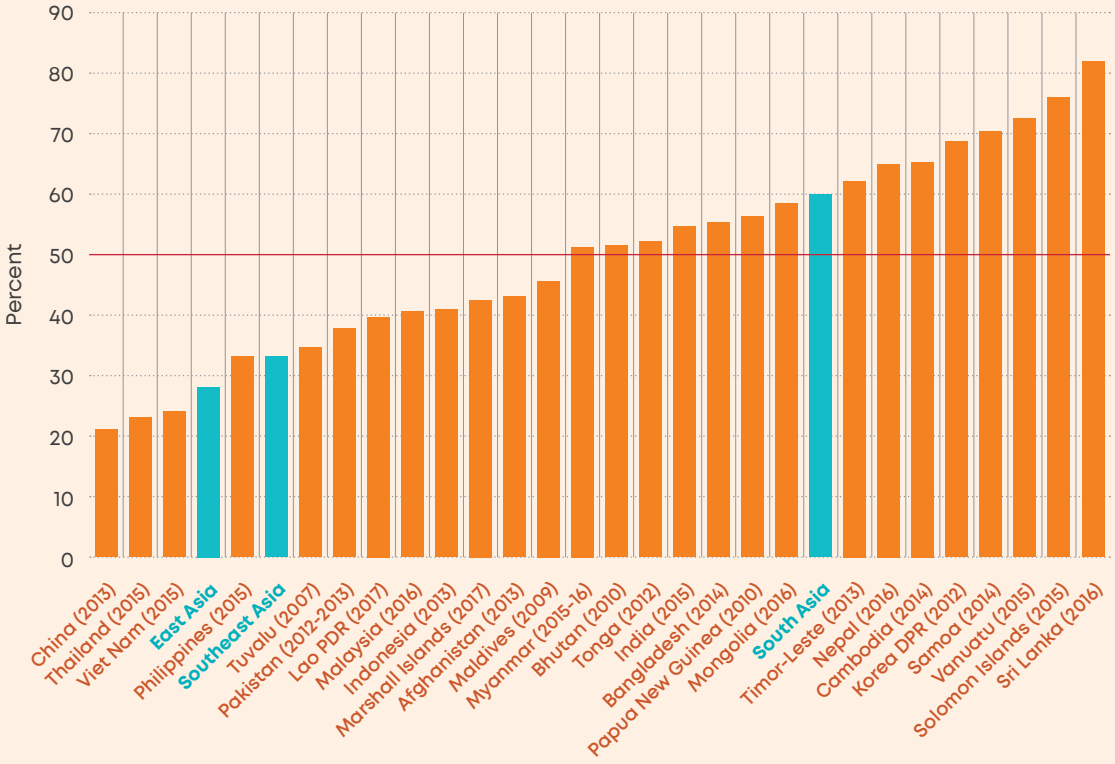
[10] The interface between the food system and consumers' diets is the food environment. It is referred to as the settings where foods are made available and accessible for purchase and consumption: supermarkets, small retail outlets, wet markets, street food stalls, cafes, tea houses, school and workplace premises (e.g. canteens, vending machines), restaurants and all the other places where people buy and eat food. The food environment determines what food consumers can access at a given moment in time, at what price and with what degree of convenience and desirability, thus greatly influencing their dietary intake. See http://www.fao.org/3/a-i6484e.pdf

[11] http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_web.pdf

[12] http://www.who.int/nutrition/publications/code_english.pdf; http://apps.who.int/iris/bitstream/handle/10665/272649/9789241565592-eng.pdf?ua=1

[13] Anaemia is a condition in which the number and size of red blood cells, or the haemoglobin concentration, falls below a threshold value, impairing the capacity of the blood to transport oxygen around the body. Anaemia is an indicator of both poor nutrition and poor health. As per WHO guidelines, anaemia in women of reproductive age is defined as haemoglobin lower than 120 g/L among non-pregnant women, and lower than 110g/L among pregnant women (adjusted for altitude and smoking in both cases) (WHO, 2014b).

FIGURE 12: PREVALENCE OF EXCLUSIVE BREASTFEEDING IN INFANTS YOUNGER THAN 6 MONTHS IN ASIA AND THE PACIFIC



Source: Country prevalence of breastfeeding obtained from the UNICEF, WHO and World Bank Group Joint Child Malnutrition Estimates 2018 edition and updated for recent published surveys from Mongolia, the Republic of the Marshall Islands and Lao PDR; regional estimates obtained from the Global Nutrition Report 2017 (Development Initiatives, 2017).

reproductive age worldwide and about 400 million of them are in the Asia-Pacific region. Anaemia in women and children is a public health problem in most countries in Asia and the Pacific. It disproportionately affects children and women of reproductive age with far-reaching health consequences, such as cognitive dysfunction and an inability to reach their full potential. Maternal anaemia is associated with higher risks of mortality and morbidity in expectant mothers, as well as low birth weight, prematurity and risks for impaired physical and cognitive development for babies.

The most common cause of anaemia worldwide is iron deficiency, resulting from prolonged negative iron balance. This can be caused by inadequate dietary iron intake or absorption, increased needs for iron during pregnancy or growth periods, and increased iron losses as a result of menstruation and helminth (intestinal worms) infestation. An estimated 50 percent of anaemia in women worldwide is due to iron deficiency. Other important causes of anaemia worldwide include infections, other nutritional deficiencies (especially folate and vitamins B12, A and C) and genetic conditions (including sickle cell disease, thalassaemia – an inherited blood disorder – and chronic inflammation). Anaemia is also common in severe malaria and may be associated with secondary bacterial infection. Achieving the WHA 2025 goal of reduction in anaemia in women requires an integrated approach that includes dietary improvements and fortification to increase the consumption of iron and other essential micronutrients; the supplementation of iron and multiple micronutrients in pregnant women; and public health measures for infection and disease

FIGURE 13: PREVALENCE OF ANAEMIA IN WOMEN OF REPRODUCTIVE AGE IN ASIA

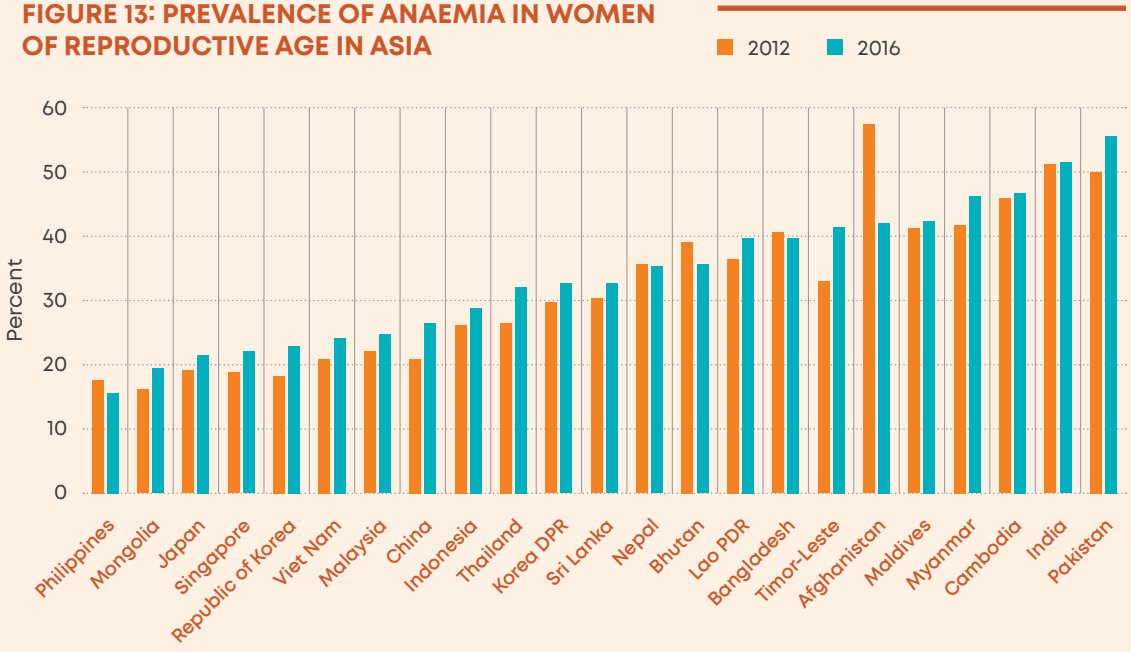


FIGURE 14: PREVALENCE OF ANAEMIA IN WOMEN OF REPRODUCTIVE AGE IN THE PACIFIC

Source: WHO. Prevalence of anaemia in women of reproductive age - Estimates by country Global Health Observatory data repository http://apps.who.int/gho/data/node.main.ANEMIA3?lang=en (accessed 25 March 2018).

TABLE 2: MATRIX OF CROSS-COUNTRY CORRELATIONS AMONG THE EIGHT INDICATORS OF FOOD SECURITY AND NUTRITION

	PoU	FIES severe	Stunting	Wasting	Under-five overweight	Adult (18+) obesity	Anaemia	Exclusive breastfeeding
Prevalence of undernourishment	1							
FIES severe	0.23 (0.001)	1						
Stunting	0.26 (0.02)	0.38 (0.02)	1					
Wasting	0.245 (0.38)	0.52 (0.04)	0.60 (0.001)	1				
Under-five overweight	-0.21 (0.04)	-0.27 (0.07)	-0.31 (0.09)	-0.20 (0.35)	1			
Adult (18+) obesity	-0.32 (0.05)	-0.20 (0.09)	-0.61 (0.009)	-0.43 (0.02)	0.30 (0.01)	1		
Anaemia	0.23 (0.20)	0.43 (0.09)	0.55 (0.003)	0.59 (0.001)	-0.46 (0.02)	-0.43 (0.019)	1	
Exclusive breastfeeding	0.08 (0.48)	0.58 (0.39)	0.59 (0.05)	0.26 (0.39)	-0.44 (0.45)	0.13 (0.68)	0.24 (0.43)	1

Notes: i) The data used are for the latest years/periods available; ii) The number of observations (countries) for computing correlations vary, depending on data availability for the pair in question, (iii) Figures in the parentheses are p-values.

control. Understanding the etiology of anaemia is crucial for ensuring that anaemia reduction programmes address the leading causes of anaemia and target the most vulnerable populations (WHO, 2014b).

While there has been some reduction in the prevalence of anaemia in a few countries in Asia and the Pacific (see Figures 13 and 14), overall progress has been insufficient. Indeed, prevalence levels have risen in most countries in the region, including in high-income countries. Achieving a 50 percent reduction in the prevalence of anaemia among women of reproductive age by 2025 will require a reduction in the prevalence in this group of more than 6 percent per year, a large reduction that will be difficult to achieve.

Although the discussion in this part of the report has presented an indicator-by-indicator assessment of food security and nutrition situations in the region, it bears emphasizing that these indicators share multiple common drivers and determinants and, in that sense, tend to be correlated. Food insecurity as measured by PoU and FIES, is correlated with a number of nutrition outcomes (see Table 2). Since food insecurity implies inadequate consumption, the PoU shows positive correlations with stunting and negative correlations with both adult obesity (-0.32) and under-five overweight (-0.21). Similarly, FIES shows high correlation with wasting and anaemia, and negative correlation with under-five overweight and obesity. The integrated nature of these indicators suggests that to achieve maximum impact on reducing malnutrition, an integrated cross-sectoral approach is required at all levels (local, regional and international). Sectors including agriculture, health, nutrition, social protection and many others must work together more closely and effectively in order to make rapid advancements towards the elimination of food insecurity and all forms of malnutrition.

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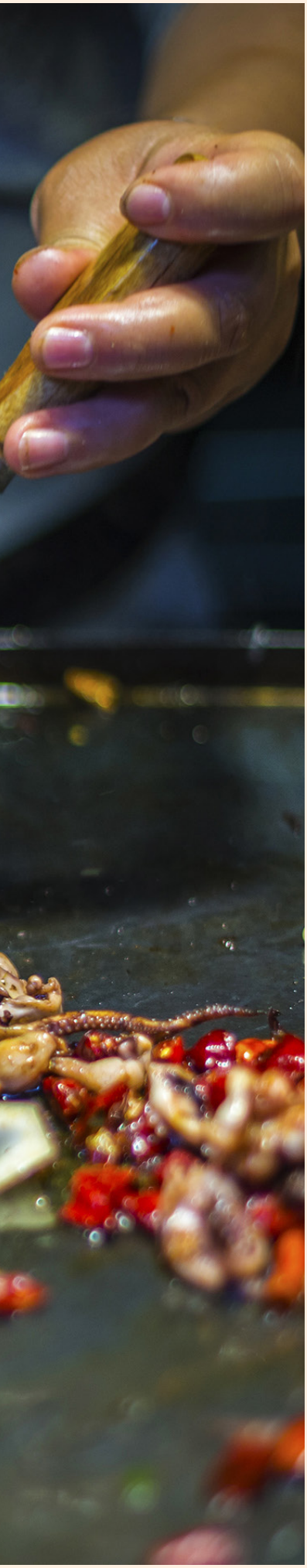


Part 2

FOOD SECURITY AND MALNUTRITION: DRIVERS AND DETERMINANTS

Part 2

FOOD SECURITY AND MALNUTRITION: DRIVERS AND DETERMINANTS

There is a large body of literature on the determinants and drivers of food security and malnutrition going back many decades. Much of this literature derives from the UNICEF framework that identified three different sets of causes – immediate, underlying and structural –affecting child and maternal malnutrition. The immediate causes are dietary intake and diseases (representing nutrient intake, and nutrient needs and utilization) and reflect the direct causes of a problem at the individual level. The underlying causes refer to more complex, contextual issues at the household level, such as household food and nutritional security status, care practices, and access to health services and facilities. Finally, the structural or basic causes refer to resource allocation at the societal level and reflect problems that require long-term interventions to change policies and societal attitudes (UNICEF, 1997).

This report does not attempt a comprehensive analysis of all the drivers and determinants of food security and nutrition in the region. While recognizing the importance of understanding the immediate, underlying and structural causes in specific contexts, in this part of the report we elaborate on two selected sets of factors that affect food security and nutrition:

1 climate-related disasters and

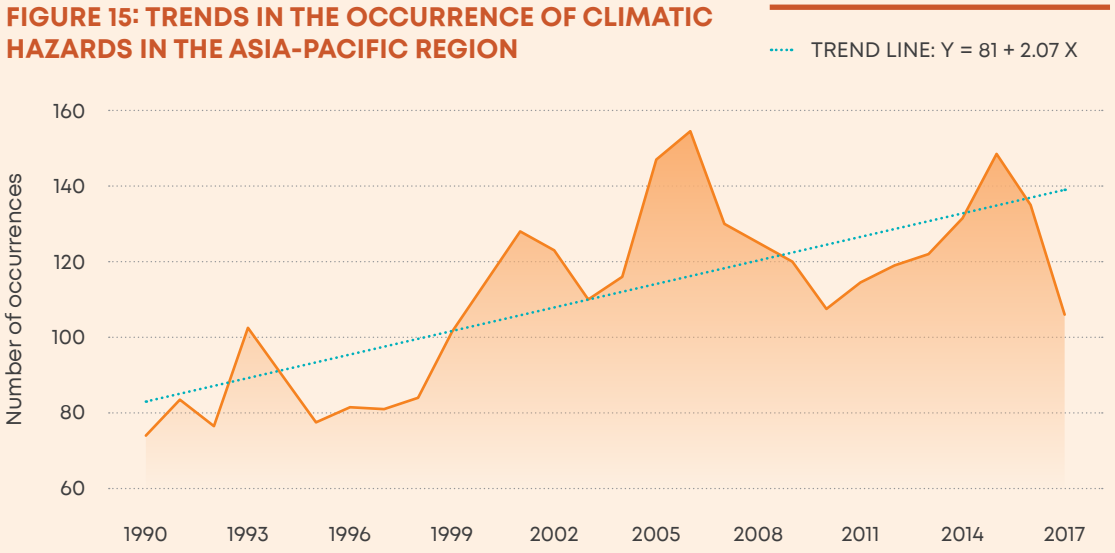
2 access to WASH services.

These drivers have significant implications for food availability, access, stability and utilization. FAO's 2017 global and regional flagship reports on the state of food security and nutrition identified increasing severity and incidences of weather extremes and climate-related disasters as one likely reason for the recent slowdown in the reduction of PoU and impact on food availability and access (FAO, 2017a; FAO, 2017b). Therefore, in this report we present an assessment of the evidence on the intensity and incidences of climate-related disasters and their possible links with various dimensions of food insecurity and nutrition. Going beyond food availability and access, inadequate investments in WASH and its impact on nutrition remains a key concern in the Asia-Pacific region. In view of the persisting high levels and inequities in nutritional outcomes, and the close relationship between these outcomes and poor WASH, this report also examines the evidence in nutrition-WASH interface, including in national and international responses.

CLIMATE-RELATED DISASTERS AND THEIR IMPACT

Incidences of climate-related disasters have been rising in the region. Natural disasters impact food security and nutrition through reduced food production, which can then cascade down to the entire food value chain, affecting livelihoods and causing economic and agricultural loss. Beyond the short term, disasters can impact the agriculture sector through loss of assets and rural infrastructure, and through increased disease outbreaks. The extent of these impacts is, at least in part, determined by the intensity and frequency of such disasters. According to FAO (2017b) estimates, Asia suffered a staggering loss of USD 48 billion during 2005-2015.

FIGURE 15: TRENDS IN THE OCCURRENCE OF CLIMATIC HAZARDS IN THE ASIA-PACIFIC REGION



Source: Based on EM-DAT.

The Emergency Events Database (EM-DAT) shows that annual occurrences of climatic hazards have been rising in recent decades in the Asia-Pacific region (see Figure 15).[14,15] For the region as a whole, the number of hazard events increased from around 80 per year during 1990-1992 to 130 during 2015-2017 after peaking at 144 during 2005-2007. This growth corresponds to a linear trend of about two additional hazard events per year during 1990-2017. Within Asia and the Pacific, all sub-regions witnessed rising trends, although the rate of rise was highest in the Pacific, followed by Southeast Asia, East Asia and South Asia (see Table 3).

Figure 16 shows that the total damage caused by the disasters has also risen in the region during 1990-2017, growing at a linear trend rate of USD 922 million per year during 1990-2017, albeit with large variations during the last 10 years.[16] Total damage increased over the years, not only because total climate-related disaster events rose, but also because there was a modest positive growth in damage intensity (total damage per disaster).

[14] Hazard is defined by United Nations Office for Disaster Risk Reduction as a process or phenomenon that may cause loss of life, injury or other health impacts, property damage, social or economic disruption, or environmental degradation (UNISDR, 2017). Hazards may be natural, anthropogenic or socio-natural. This report refers to hazards of natural origin only.

[15] EM-DAT is a global database for disasters and includes all disasters that exceed the thresholds of 10 deaths and 100 people affected, or where there was call for international assistance (Guha-Sapir, 2018). It is maintained by the Centre for Research on the Epidemiology of Disasters at the Université catholique de Louvain, Belgium (www.emdat.be). The database classifies disasters according to the type of hazard. Three such hazards – hydrological, meteorological and climatological – are collectively known as weather-related disasters and are covered in the analysis. These cover six types of climatic disasters – floods, drought, wildfire, storms, landslide and extreme temperatures. For analysis of impact by disaster type, the six are reduced to three by merging wildfire with drought, landslides with flood, and extreme temperatures with storms. The EM-DAT is accessible at www.emdat.net

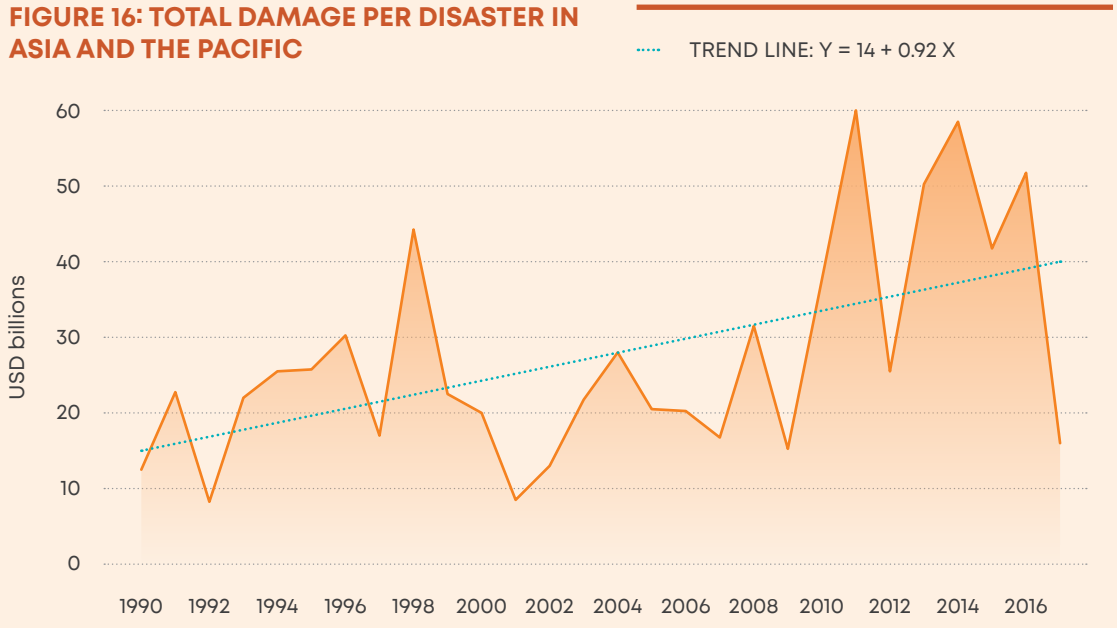
[16] Damage refers to the monetary value of total or partial destruction of physical assets and infrastructure in disaster-affected areas, expressed as replacements and/or repair costs. In the agriculture sector, damage is considered in relation to standing crops, farm machinery, irrigation systems, livestock shelters, fishing vessels, pens and ponds, etc. (EU, UNDG and World Bank Group, 2013; UNISDR, 2017).

TABLE 3: AVERAGE ANNUAL NUMBER OF NATURAL HAZARDS AND PERCENT INCREASE, 1992-1999 AND 2009-2017

Region/sub-region	Number of natural hazards per year		Percent increase
	1992-1999	2009-2017	
East Asia	26	38	46
Southeast Asia	26	41	58
South Asia	31	37	19
Pacific	4	7	75
Asia-Pacific	**87**	**123**	**41**

Source: Based on EM-DAT.

FIGURE 16: TOTAL DAMAGE PER DISASTER IN ASIA AND THE PACIFIC



Source: Based on EM-DAT.

Generally, the impacts of droughts tend not to be assessed adequately. This region suffered heavily from droughts in 2014 and 2015, triggered by the severe El Niño, which began in 2014. Agriculture in India was impacted heavily by droughts with back-to-back sub-par monsoon seasons in terms of total rainfall. Likewise, droughts caused considerable losses in Cambodia, Thailand and Timor-Leste. Mongolia also suffered from a severe drought in 2015, which halved wheat harvests and severely impacted the livestock sector. By late 2015, drought warnings were in force in several countries in the Pacific sub-region. The data show that droughts affected large numbers of people. During 2009-2017, the population affected per event was 12 times more for droughts than for floods, and 24 times more than for storms. Likewise, total loss per event due to drought was almost double that by flood and three times that by storm.[17]

According to the 2013 Global Assessment Report (GAR, 2013), global public disaster databases, such as the EM-DAT, may not be recording the full extent of the losses and damages because the databases often miss out on smaller, localized and recurring weather hazards, especially in low- and middle-income countries. Such information is often available in national disaster databases but are not easily accessible. The report illustrates this point by showing the losses for 40 lower- and middle-income countries in the EM-DAT database and national sources. It shows that the combined loss could be 50 percent higher, especially for lower-income countries, whereas the coverage of the EM-DAT seemed to be more complete for middle-income countries.

The nature and scale of the impact of climate-related disasters on agriculture, food security and nutrition

The nature of the impact of climate-related events and natural disasters on agriculture, food security and nutrition cannot be understated. In regions that depend on traditional agriculture, climate variability can be devastating for farmers who are unable to foresee changing trends in rain patterns.

The most direct result of climate-related disasters on agriculture is reduced production, resulting in economic loss to farmers, in turn cascading along the entire value chain and affecting agricultural growth and rural livelihoods. In the long term, loss of harvest and livestock, outbreaks of disease, and the destruction of rural infrastructure and irrigation systems can have devastating effects on production capacity and the ability of affected communities to recover. If the drought is long term, it can cause heat stress in crops, which can damage yields if they occur during certain times of the plant's lifecycle. Flooding can erode topsoil from prime growing areas, resulting in irreversible habitat damage. Storms, hurricanes and tornadoes can destroy forests and damage irrigation systems, silos and barns, as well as other structures involved in agriculture production (FAO, 2017b). At the household level, the short- and long-term impacts of these events can be greater on women and children who may be more vulnerable to illness and more likely to suspend paid work and education activities in the aftermath of flood events (Hallegatte, *et al*., 2016 and 2017). FAO warns that, "while climate change and extreme weather events are impacting the environment in many ways, agriculture and food production in Asia and the Pacific are among those hardest hit and must be first in line to defend."[18]

To better understand the scale of climate-related disasters on food security, one valuable source for disaggregated information is Post-Disaster Needs Assessment (PDNA) reports which estimate damage and loss by sectors such as agriculture, industry and business, as well as social sectors.[19] PDNA reports have been widely used to study the impact of disasters, although they are often criticized for inadequate coverage of forestry, fisheries and aquaculture sub-sectors (FAO, 2017b). A further limitation of PDNA reports is that they mainly cover larger disasters and reveal little on the impact of smaller shocks. However, they remain a valuable source of information through which to assess the scale of impact associated with specific disaster events and the channels by which these disasters can impact food security and nutrition.

[17] It is generally believed that loss due to drought is much higher but not necessarily damage.

[18] http://www.fao.org/asiapacific/news/detail-events/en/c/1106925/

[19] PDNA is a government-led exercise supported by the United Nations, the World Bank Group and other national and international actors, including donors and civil society organizations. The objective is to harmonize the assessment, analysis and prioritization of damages, losses and needs in the aftermath of a disaster. It pulls together into a single, consolidated report, information on the physical impacts of a disaster, the economic value of the damages and losses, the human impacts as experienced by the affected population, and the resulting early and long-term recovery needs and priorities. The PDNA methodology assesses 'damage' in terms of the total or partial destruction of physical assets and infrastructure in the disaster-affected areas, in terms of their monetary value, expressed as replacement costs; and 'losses' in terms of changes in economic flows arising from the disaster, such as declines in output in crops, livestock and fisheries production.

TABLE 4: ESTIMATED DAMAGE AND LOSS IN TEN PDNA REPORTS REVIEWED

Country	Type	Year	Damage and loss (USD million)	
			All total	Agriculture
Thailand	Flood	2011	47 517	1 346
Lao PDR	Typhoon	2011	58	16
Pakistan	Flood	2011	3 730	1 840
Philippines	Typhoon	2013	2 963	1 424
Solomon Islands	Flood	2014	108	18
Myanmar	Flood	2015	1 508	554
Fiji	Cyclone	2016	1 327	239
Viet Nam	Flood	2016	227	104
Nepal	Flood	2017	585	172
Sri Lanka	Flood	2017	469	80

Source: Eight of the ten PDNA reports reviewed (other than for Nepal and the Philippines) are maintained at the website of the Global Facility for Disaster Reduction and Recovery (GFDRR) (https://www.gfdrr.org/post-disaster-needs-assessments). The PDNA for Nepal is available on the government website (https://www.npc.gov.np/images/category/PFRNA_Report_Final.pdf). The PDNA for the Philippines is from the National Disaster Risk Reduction and Management Council (NDRRMC) of the Government of the Philippines (http://www.ndrrmc.gov.ph/).

A review of ten PDNA reports from the Asia-Pacific region conducted between 2009 to 2017 (seven of them on floods and three on cyclones), shows that agriculture absorbed approximately 26 percent of all damage and loss combined (see Table 4), but 42 percent of the total loss. The majority of the loss and damage detailed in the PDNAs covered in this review were sustained by the crop sub-sector – about 70 per cent on average for the ten disaster events reviewed (see Figure 17).

While the direct effects of large-scale climate-related disasters are relatively easy to quantify in economic or social terms (e.g. loss of life, loss of property, destruction of infrastructure), the indirect effects of recurrent and smaller-scale events (such as drought, flooding, reduced rainfall, etc.) are much more difficult to measure, even though these phenomena can be equally destructive to vulnerable people in the long term. Considering that agriculture in the region is predominantly smallholder driven, these farmers disproportionately bear the burden of the loss and damage resulting from climate-related disasters. Food crises are driven by combinations of short-term events, such as conflicts and natural disasters, and long-term influencers of poverty and food insecurity. Smallholder farmers are particularly at risk of disruption from climate shocks, which have been found to lead to reduced consumption and the liquidation of productive assets, which in turn result in a deterioration of capacity to cope with future shocks (Porter *et al.*, 2014).

FIGURE 17: DISTRIBUTION OF TOTAL LOSS AND DAMAGE IN AGRICULTURE BY THREE MAIN SUB-SECTORS IN SELECTED ASIAN COUNTRIES

Source: Post Disaster Needs Assessments.

Consequences of climate-related disasters on food security

Climate-related disasters impact all four dimensions of food security (availability, access, utilization and stability), as well as other drivers of malnutrition. Some disasters have a bigger impact on food availability while others have a relatively larger impact on jobs and livelihoods of the poor, or on economic access to food. Others impact the spread of infectious diseases and thus impact child undernutrition. A good understanding of the impact channels and the scales of the impact is necessary for articulating effective responses.

The standardized PDNA reports, led by governments in collaboration with domestic and international partners, are the most prominent documents identifying damage and loss in various sub-sectors and required recovery and rehabilitation measures. In many cases, governments report on damages and needs while local and international civil society organizations also undertake separate assessments in their areas of work. For agriculture, reports of the FAO/WFP crop and food security assessment mission are also valuable for understanding the extent of losses and required response measures. FAO has recently developed a new methodology for disaster damage and loss assessment for agriculture, including crop, livestock, fishery and forestry sub-sectors. The methodology has been endorsed by the United Nations General Assembly as part of the monitoring system established under the 2015 Sendai Framework for Disaster Risk Reduction to help monitor the achievement of global disaster risk reduction targets, as well as related targets under the 2030 Agenda.

CONSEQUENCES FOR FOOD AVAILABILITY VIA IMPACT ON PRODUCTION

The PDNA reports show wide variation in the extent of losses sustained by food and non-food crops such as plantation and tree crops. In general, cyclones and typhoons tend to damage tree crops more than field crops, while floods inflict more losses on field crops than on tree crops. Five of the ten PDNA reports provide disaggregated loss estimates by crop to show that food crops suffered higher losses (65 percent of the total loss in crops) than non-food crops (35 percent), while the case was almost the opposite when it came to damages. Thus, food crops had the most losses following Thailand's 2011 floods (87 percent of the combined loss and damage), Fiji's 2016 floods (79 percent), Nepal's 2017 floods (76 percent) and Sri Lanka's 2017 floods (66 percent). In each of these cases, losses to non-food crops were in the 15-25 percent range with the exception of the impact of typhoon Haiyan in the Philippines in 2013 when coconuts suffered the most loss (57 percent) followed by sugarcane (16 percent). Thus, based on the sample assessed, food crops often sustain greater loss but not necessarily always.

Although climatic events may inflict large losses in food production, the impact on the aggregate national production of various foods need not be necessarily large in all cases because the disaster may be location-specific or not damaging to all crops, livestock or fisheries. For developing countries as a whole, approximately USD 96 billion worth of crops and livestock production was estimated to be lost due to disasters between 2005 and 2015, amounting to about 4 percent of potential production (FAO, 2017b). Some sub-regions suffered larger losses, such as 7 percent of potential production in Polynesia and the overall group of Pacific Small Island Developing States. This imposed disproportionately higher losses to smaller and resource-poor farmers. When significant and regular food exporting countries are impacted by such disasters, they can have severe impacts on international markets and affect the global food supply, as was the case during the second global food price crisis of 2011.

CONSEQUENCES FOR ECONOMIC ACCESS TO FOOD VIA IMPACTS ON EMPLOYMENT AND WAGES

Beyond the immediate damage and losses, disasters have cascading impacts across sectors and over time/temporally. Climate-related disasters inflict considerable losses on employment and wage income as many economic sectors are disrupted and infrastructure is damaged. Most PDNAs provide some assessment of these losses as part of the social impact analysis. Some PDNAs also report pre-disaster poverty incidence in the areas affected and provide rough estimates of the change following the impact. Five of the ten PDNA reports reviewed provide some form of quantitative estimates of these impacts (see Table 5). Overall, climate-related disasters inflict large negative effects on jobs and incomes, as well as on assets and coping capacities of small holders and vulnerable households. These tend to disproportionately impact poor and low-income population groups due to their much higher level of vulnerability. This suggests that even if climate-related disasters may reduce national food production only modestly, they tend to have a larger and wider impact on the economic access to food of a sizable segment of the affected population.

TABLE 5: IMPACT OF CLIMATE-RELATED SHOCKS ON EMPLOYMENT AND WAGES

2009

Philippines

About 170 million workdays, equivalent to about 664 000 one-year jobs, were lost, with the total loss of income estimated at USD 1.07 billion, particularly affecting informal workers with family-based livelihoods; the income loss amounted to about 7 percent of the total farm income and 11 percent in the commercial sector.

2011

Thailand

At least USD 3.36 billion in wages were judged to have been lost in 2011 and an additional USD 633 million estimated for the three subsequent years, with the most affected being vulnerable populations with limited social protection; those employed in labour-intensive sectors, such as wholesale, retail trade and repairs; and hotels, restaurants and financial intermediaries.

2016

Fiji

Approximately 540 400 people, or about 62 percent of the population, were affected, resulting in estimated losses of 14.4 million work days and USD 163 million in personal incomes. Agriculture accounted for almost 90 percent of the work days and 85 percent of the personal income lost.

2017

Sri Lanka

Wage losses in agriculture were estimated to be USD 4.2 million, about 26 percent of all losses were in agriculture, and the impact was concentrated in areas inhabited by poor communities.

Myanmar

At least 1.6 million people were displaced and 5.4 million people were adversely affected with at least 9.4 million workdays and USD 16 million in personal wage incomes estimated to be lost, along with adverse effects disproportionately falling upon vulnerable population groups.

Source: Based on EM-DAT.

CONSEQUENCES FOR FOOD UTILIZATION VIA IMPACTS ON HEALTH, HYGIENE, WATER, SANITATION AND SIMILAR CHANNELS

Climate-related disasters damage farm crops, social infrastructure (e.g. health and water supplies, sanitation systems, etc.) and roads, hindering access to vital health services and raising the risk of infectious diseases. Some disasters cause population displacement or cut access to essential services. All PDNA reports estimate damages to vital social sectors and provide some commentary on observed or likely impacts on affected populations. As an example, during Pakistan's 2010 floods, 46 percent of the health facilities were damaged, 86 percent of the 326 water sources in Sindh Province were found contaminated and 80 percent of all diseases that were spreading following the disaster were water borne (Government of Pakistan, 2011). A review of the flood recovery conducted in 2011 found that after six months much of the population affected had not recovered their prior standard of living, and that rural households were more likely to be impacted and slower to recover (Kirsch *et al.*, 2012). In Lao PDR, the damages to rural infrastructure, such as roads and bridges, sharply cut access for pregnant and lactating women to maternal and child health services, while open defecation rose sharply as sanitation facilities were damaged. Disruption to clean water supplies was identified as a major health issue (Government of Lao PDR, 2011). Slow onset disasters (e.g. drought) result in different stress triggers such as water shortages or poor water quality, which could lead to water-borne diseases and food shortages.

Recent research explores the nature and scale of the impact of disasters on malnutrition. One review paper by Phalkey *et al.* (2015) found that over 80 percent of the 15 studies reviewed identified one or more weather shocks negatively impacting child anthropometry with statistical significance. Rodriguez-Llanes *et al.* (2011) found that children in households exposed to recurring flooding in rural Orissa, India, were more stunted and underweight than children living in non-flooded villages. Moreover, the age of the children mattered, with children exposed to floods in their first year being affected more than their older peers. The impact was attributed to lost household food production. Mani and Wang (2014) combined health and weather data from stations across Bangladesh and found statistically significant impacts of climate variability on incidences of diarrhoea, fever and acute respiratory infection. An earlier study on the 1998 floods in Bangladesh found more severe deterioration in the nutritional status of children exposed to floods than in children non-exposed (Del Ninno and Lundberg, 2005). A systematic review by Stanke *et al.* (2013) found that drought events have led to increased prevalence of stunting, wasting and micro-nutrient deficiencies worldwide, highlighting specific cases across Asia and the Pacific in countries such as Afghanistan, China, India, Indonesia and the Democratic People's Republic of Korea. Overall, most studies showed that disasters disrupt people's way of life, negatively affecting livelihoods and predisposing them to hazards with marked negative impacts on their health and nutritional well-being.

CONSEQUENCES FOR STABILITY VIA REDUCED HOUSEHOLD RESILIENCE AND DAMAGE TO PRODUCTIVE INFRASTRUCTURE

Climate-related disasters not only reduce outputs and incomes in the season in which the disasters occur, but also undermine the stability of the productive capacity in subsequent seasons. One pathway is the damage to a household's productive assets, such as soil degradation; accumulation of silt; loss of capital, such as livestock and perennial/tree crops, fishing gear, hatchery farms and ponds, and machinery and tools; as well as damages to public facilities such as rural roads, irrigation and flood protection. The consequences of the damage to agriculture due to Tropical Cyclone Winston in Fiji in 2016 are expected to last for many years, as far as 2021 for fisheries, as assets such as plantations, mangrove forests and coral reefs were destroyed. Climate-related disasters also increase indebtedness, as the repaying of loans becomes difficult while the affected population borrows for consumption needs during the distress periods. The scale of such damages becomes evident from subsequent government responses, such as the three-year debt suspension scheme for farmers in Thailand in the aftermath of the 2011 floods and the waves of loan waivers across several Indian States following the back-to-back droughts of 2014 and 2015. Another contributing factor undermining the resilience and growth of the productive system is increased risk and uncertainty. As investment becomes risky, farmers tend to resort to low-risk, low-return agricultural enterprises (Cole *et al.*, 2013).

Responding to the challenge of climate-related disasters

A holistic response cycle to disasters comprises elements of prevention, mitigation and response. In addition to post-disaster relief and rehabilitation, it is necessary to comprehensively consider disaster risk reduction, climate change adaptation and mitigation measures as more effective responses to climate-related disasters. This would include investments in anticipatory capacity (e.g. risk assessments and early warning systems), adaptive capacity (e.g. adapting agriculture to new climate trends with the use of new technologies and support for income diversification of vulnerable farmers) and absorptive capacity to reduce the devastating effect of shocks (e.g. social protection and insurance programmes). These measures, among others, are conceived as part of an integrated response package aimed at strengthening the resilience of communities, households, agriculture and the economy as a whole. The following sections consider various aspects of prevention, mitigation and response based on recent experiences and studies in the region (FAO, 2018a).

EARLY WARNING SYSTEMS

Early warning systems are defined as integrated systems of "hazard monitoring, forecasting and prediction, disaster risk assessment, communication, and preparedness activities systems and processes that enable individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events." (UNISDR, 2016). As such, early warning systems do not just provide weather forecasts, but may also serve as a platform for providing end-user customized information such as crop planning advisories based on risk and vulnerability assessment. These inform decisions on resource allocations or actions needed to prepare for impending disasters.

The Sendaï Framework for Disaster Risk Reduction has a target of substantially increasing the availability of and access to multi-hazard early warning systems and disaster risk information and assessments by 2030. Global and regional initiatives that are supporting this process include the Climate Risk and Early Warning Systems (CREWS), which brings together the Global Facility for Disaster Risk Reduction hosted by the World Bank Group, the World Meteorological Organization (WMO) and the UN Office for Disaster Reduction, in order to increase the national capacity for multi-hazard early warning systems. In Southeast Asia (Cambodia, Lao PDR, the Philippines, Thailand and Viet Nam), CREWS supports an ongoing project on building resilience to high-impact hydro-meteorological events through strengthening multi-hazard early warning systems. This is being implemented through the ASEAN Climate Outlook Forum, a sub-regional platform for discussing climate services and issues related to early warning systems, and for generating consensus-based seasonal climate outlooks. CREWS has also just commenced a project in Papua New Guinea aimed at building the capacity of the National Meteorological Service in order to create and strengthen an early warning system that could reduce the impacts of drought and other hazards.

In South Asia, the South Asian Seasonal Climate Outlook Forum discusses common issues on early warnings systems and prepares seasonal climate information on a regional scale which provides a basis for preparing national outlooks. South Asian countries also collaborate through the South Asian Association for Regional Cooperation (SAARC) Disaster Management Centre, which has formulated the SAARC Comprehensive Disaster Management Framework and as many as 12 Road Maps on different areas of disaster risk reduction and emergency management. In the Pacific sub-region, governments in Fiji, Papua New Guinea, Solomon Islands, Timor-Leste and Vanuatu are working with the WMO to develop a potential Green Climate Fund project that will support upgrading the early warning systems.

An emerging area of focus in resilience building is linking early warning systems to early actions, e.g. FAO's Early Warning–Early Action (EWEA) and the Forecast-based Financing (FbF) initiative. The EWEA programme was rolled out in 2016 in Mongolia, Myanmar, the Philippines, Timor-Leste and Viet Nam, as well as some countries in the Pacific sub-region. For early actions, a dedicated Early Action Fund was established within FAO's Special Fund for Emergency and Rehabilitation mechanism. WFP also has an internal funding instrument to provide funds to country programmes for preparedness and early action.

FbF is a risk-based financing initiative being spearheaded globally by the International Federation of Red Cross and Red Crescent Climate Centre in collaboration with national Red Cross/Red Crescent societies, WFP and some non-governmental organizations. It is being piloted by the Red Cross and WFP in several countries globally, including nine countries in Asia and the Pacific.[20] WFP also implements the Food Security Climate Resilience Facility (FoodSECuRE) to support community-centred actions for climate resilience, and implements part of the global FbF pilot project in the region, including in Bangladesh, Nepal and the Philippines.

Aside from building better information and early warning systems that can trigger early actions, ensuring financing for risk-based early actions is also critical in mitigating the impact of disasters and lowering the cost of responses. To this end, humanitarian pooled funds, such as the Central Emergency Response Fund (CERF), fund early action interventions that aim to mitigate the impact of shocks on crisis-affected populations. An independent review of the value added by CERF in mitigating the impact of El Niño concluded that CERF funding strengthened coordination, helped kick start emergency responses and filled specific funding gaps, thus helping to promote a coordinated multi-sectoral response.

While there is broad consensus on the valuable role that effective early warning systems play, there are large gaps between their current state and what is required for them to be effective. One area of major weakness is the poor state of national climate observation infrastructure and networks (Rogers and Tsikurnov, 2013). Weaknesses have also been identified in soft infrastructure, such as capacities for interpreting information and alerts, mapping hazards, identifying vulnerabilities, and adapting forecasts and likely impacts by various types of climate hazard events. Finally, public involvement and participation in early warning systems is necessary to ensure that the needs of the most vulnerable communities are taken into account when they are being designed and implemented.

[20] Bangladesh, Indonesia, Mongolia, Nepal, Pakistan, Papua New Guinea, the Philippines, Solomon Islands and Viet Nam.

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BUILDING RESILIENCE OF AGRICULTURE TO CLIMATE CHANGE AND VARIABILITY

Measures for building resilience of agricultural livelihoods encompass a wide range of activities and investments ranging from research and development of new crop varieties and technologies to public goods infrastructure and extension support for the rollout of more resilient practices. Research into stress-tolerant crop varieties and the tailored application of practices (including agro-meteorological advisories, conservation agriculture, agro-forestry, dryland farming systems, water-saving irrigation and crop diversification) have been found to deliver a range of benefits for agricultural productivity, resilience and climate adaptation (FAO, 2016b; World Bank, 2015).[21] Strengthening ecosystems that support agriculture is a crucial element of enhancing agriculture's resilience to disasters. Responses that incorporate ecosystem-based adaptation approaches (such as the protection and management of natural habitats or vegetation, the restoration and protection of mangroves and dunes, the management of flood plains in river basins, and farming systems that integrate natural vegetation through fallow systems or agroforestry) can reduce non-climate stressors on ecosystems and make them more able to adapt to changes in climate variability and extremes (Hallegatte *et al.*, 2016). Such actions need to be supported through integrated disaster risk reduction and management, and climate change adaptation policies, programmes and practices with short-, medium- and long-term visions (FAO, 2018a).

Many countries in the Asia-Pacific region are engaged in research, piloting and implementing these activities. For example, India's mega project, the *National Initiative on Climate Resilient Agriculture*, launched in 2010-2011, has components on new research and the application of improved production and risk-management technologies (in crops, livestock and fisheries), on adapting technology packages on farmers' fields, and on capacity building in aid of climate-resilient agricultural research and applications. In addition to government programmes, the Consultative Group on International Agricultural Research (CGIAR) system supports applied research in these areas through a Climate-Smart Village approach, the objective of which is to identify suitable climate-smart agricultural practices for scaling-up to larger areas (CCAFS, 2016). This approach was piloted in Bangladesh, India and Nepal in 2012 and extended to Cambodia, Lao PDR, the Philippines and Viet Nam in 2014.

[21] http://www.fao.org/climate-smart-agriculture-sourcebook/production-resources/en/

ASEAN's agricultural resilience programme provides an example of initiatives articulated at the regional level and this is now documented in two volumes of programme and project guidelines (ASEAN, 2015 and 2017). The ASEAN Climate Resilience Network played an important coordinating role by synthesizing lessons in member states as well as learnings from regional projects, such as the Mekong Adaptation and Resilience to Climate Change. The two volumes elaborate on the priority practices identified and the modality for scaling-up such practices. Identified priority practices include stress-tolerant maize and rice varieties, rice-shrimp farming, and alternate wetting and drying techniques.

As is the case with most new technologies and practices, the process of identifying new technologies and disseminating those resources to poor farmers is time-consuming (Aggarwal *et al.*, 2018). Given the growing threats from climatic shocks, wider dissemination of these climate resilience practices should also be prioritized. There is a role for subsidies to incentivize the adoption of these methods. Current subsidies in many countries implicitly encourage farmers to cultivate water-intensive crops, such as paddy and sugarcane, even in areas facing water shortages and depleting groundwater levels. In addition to reforming subsidies, public expenditure on research needs to be reallocated in favour of climate-smart practices.

SOCIAL PROTECTION

Social protection programmes are essential pillars for socio-economic resilience and include protective instruments such as classic food- and cash-based safety nets, insurance, social support schemes, and even labour market regulations that protect workers and wages (FAO, 2015a). Realizing the potential of social protection for enhanced efficacy in disaster response and overall resilience building, FAO, together with other UN agencies, are now supporting several countries in the Asia-Pacific region to adapt social protection to be risk-informed and responsive to disasters, building on pilot initiatives such as the use of existing social protection systems for humanitarian relief and response during Typhoon Haiyan in the Philippines in 2013. Targeting at-risk populations, linking social protection and disaster risk management information systems, coordinating institutions, and ensuring financial readiness for adapting social protection in time of disasters are a few key requirements for risk-informed and shock-responsive social protection. Having multiple instruments of protection as part of a package provides flexibility in effectively targeting them to specific needs, which are often context specific depending on the type of climatic shocks and vulnerability profile of the target group, as well as the target sub-sector in question (e.g. cereal crops or plantations), institutional capacities and so on.

Insurance is one of the most discussed and debated instruments of social protection. For a number of reasons, the penetration of classic indemnity insurance is very low in many developing countries, and more so in rural areas. Partly for this reason, index-based insurance linked to weather parameters is emerging as a potentially promising instrument for covering losses in agriculture, especially in areas where weather data collection and processing systems are advanced (Carter *et al.*, 2014). In this region, index-based insurance was first launched in India in 2003 (Micro Save, 2013). Experiences from Asia and elsewhere have been that the penetration of this product has been poor for a number of reasons, such as inadequate and poor quality of weather monitoring infrastructure and data, high premium cost and heavy dependence on government subsidy, higher initial investment for the insurer, and poor awareness among farmers.

In India, crop areas insured under index-based insurance plummeted to low levels in recent seasons. Among the reasons identified in a recent study were, in addition to the common problems noted above, delayed payments and unethical practices leading to the manipulation of temperature at weather stations for triggering claims (Gulati *et al.*, 2018). Several countries in the region (India and Viet Nam, for example) provide generous subsidies to insurance products. The high dependency on subsidies for this product is a risk to its survival over time. Improving the uptake of index-based insurance products faces a number of near-term challenges, including identifying technological, institutional and contractual options to improve data quality, minimizing information costs, and reducing basis risk, as well as improving insurance product structuring as part of a portfolio of risk-management options and awareness raising (Carter *et al.*, 2014; Clement *et al.*, 2018; Dick *et al.*, 2011).

A review of the experiences on various elements of social protection point to the following conclusions:

- It is important to have multiple instruments as part of a package of social protection.
- Government support and subsidies play a crucial role.
- Targeting needs to be improved so that schemes are more equitable.
- There is a need for continued research and piloting for identifying instruments appropriate for different climatic shocks and socio-economic settings.
- Index-based insurance and other safety nets should be treated as quasi-public goods that protect lives and livelihoods, and, therefore, they are worthy of subsidies.
- There is a need to develop risk-informed and shock-responsive social protection systems.

WATER, SANITATION AND HYGIENE

Water, sanitation and hygiene (WASH) are among the main underlying drivers of improved nutrition along with availability and consumption of nutritious food, child-care practices, maternal education and absence of infectious diseases. Poor water quality, use of unimproved water sources, limited access to basic sanitation and prevailing high rates of open defecation increase the burden of infectious disease (such as diarrhoea) which undermines the contribution of food intake. Faecal contamination of the environment and poor hygiene practices remain important causes of child mortality, morbidity, undernutrition and stunting. The degree to which these drivers impact child malnutrition are context specific, with a greater influence of some drivers in specific settings than others. This section of the report examines the WASH situation in relation to malnutrition in the region.

In the past ten years, as the global nutrition community committed to addressing the problem of chronic child undernutrition (stunting), researchers and analysts attempted to unpack the details of the relationship between poor WASH and stunting. The Lancet series on maternal and child undernutrition (2008) reviewed nine longitudinal studies demonstrating that a child's risk of stunting at 24 months of age was multiplied by a factor of 1.05 for each episode of diarrhoea the child had experienced in the first two years of life (Black *et al.*, 2013). Therefore, co-authors of the series (Bhutta *et al.*, 2008) included WASH interventions (hand washing, water quality treatment, sanitation and hygiene) among the recommended core interventions to improve nutritional status.

A 2013 econometric analysis of data from 140 surveys in 65 developing countries aimed to quantify the variations in child height that could be explained by sanitation (Spears, 2013). The analysis estimated that open defecation explains about 54 percent of the international variation in child height and the effect of open defecation is particularly harmful where population density is high, presenting conditions in which children (and adults) are more likely to be exposed to infections from faeces.

Other recent reviews and meta-analyses examined the potential impact of various WASH interventions on reducing infections and diarrhoea, and improving growth:

- Ziegelbauer *et al.* (2012) showed that improvements in sanitation can reduce risks of intestinal worm infection by 50 percent.
- A Cochrane review (Dangour *et al.*, 2013) showed that WASH interventions slightly but significantly improve height-for-age z-scores in children under five years of age.
- Freeman *et al.* (2014) showed that handwashing with soap reduces diarrhoea by 40 percent.
- Freeman *et al.* (2017) showed that sanitation is protective against diarrhoea and some soil-transmitted helminth infections, and improves height-for-age, with no protective effect for other anthropometric outcomes.

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Overall, the current body of evidence affirms the essentials for WASH programming (see Box 3). The evidence suggests that if WASH programmes are to contribute substantially to reducing stunting, they need to ensure that:

- WASH improvements reach high coverage throughout the whole community (not just the home or compounds of pregnant women and young children);
- water treatment technologies are effective against all known pathogens (not just some); and
- the long-term and complex nature of behaviour change related to WASH practices (e.g. handwashing, household water treatment, safe disposal of children's faeces, etc.) is addressed with ongoing innovation and creative new communication approaches to effect sustainable behaviour change.

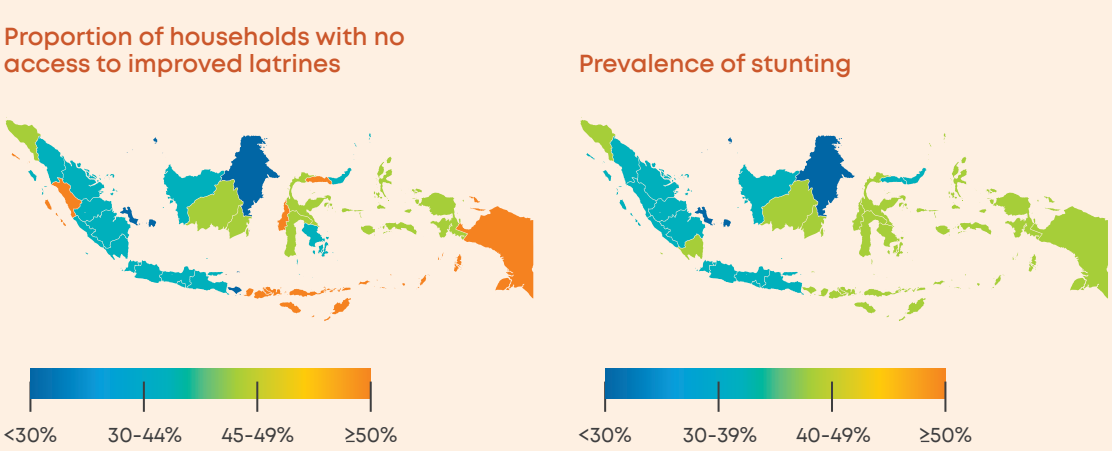
BOX 3: DETERMINANTS OF STUNTING IN INDONESIAN CHILDREN: EVIDENCE FROM A CROSS-SECTIONAL SURVEY INDICATE A PROMINENT ROLE FOR THE WASH SECTOR IN STUNTING REDUCTION

Secondary analysis of national and subnational survey data in Indonesia revealed important relationships between WASH and stunting. Analysis of the 2013 Basic Health Research Survey showed a high correlation between provincial estimates of the proportion of households with access to an improved latrine, and provincial estimates of the percentage of stunted children aged less than five years (see Figure 18).

A sub-national, cross-sectional survey in three districts (a baseline survey for a multi-sectoral stunting reduction initiative of the Government of Indonesia, UNICEF and the European Union) examined determinants of child stunting, including severe stunting. The study (Torlesse *et al.*, 2016) found that among the 0-23 month-old children, the prevalence of stunting and severe stunting was 28.4 percent and 6.7 percent, respectively. The analysis identified a significant interaction between household sanitary facilities and household water treatment after controlling for potential confounding factors. In households that drank untreated water, children were nearly three and a half times more likely to be stunted if the household also used an unimproved latrine ($p<0.001$). In households that drank treated water, the odds of being stunted were 27 percent higher ($p=0.06$) if the household used an unimproved latrine.

The study concluded that "the combination of unimproved latrines and untreated drinking water was associated with an increased risk of stunting in Indonesia compared with improved conditions. Policies and programmes to address child stunting in Indonesia must consider water, sanitation and hygiene interventions. Operational research is needed to determine how best to converge and integrate water, sanitation and hygiene interventions into a broader multi-sectoral approach to reduce stunting in Indonesia."

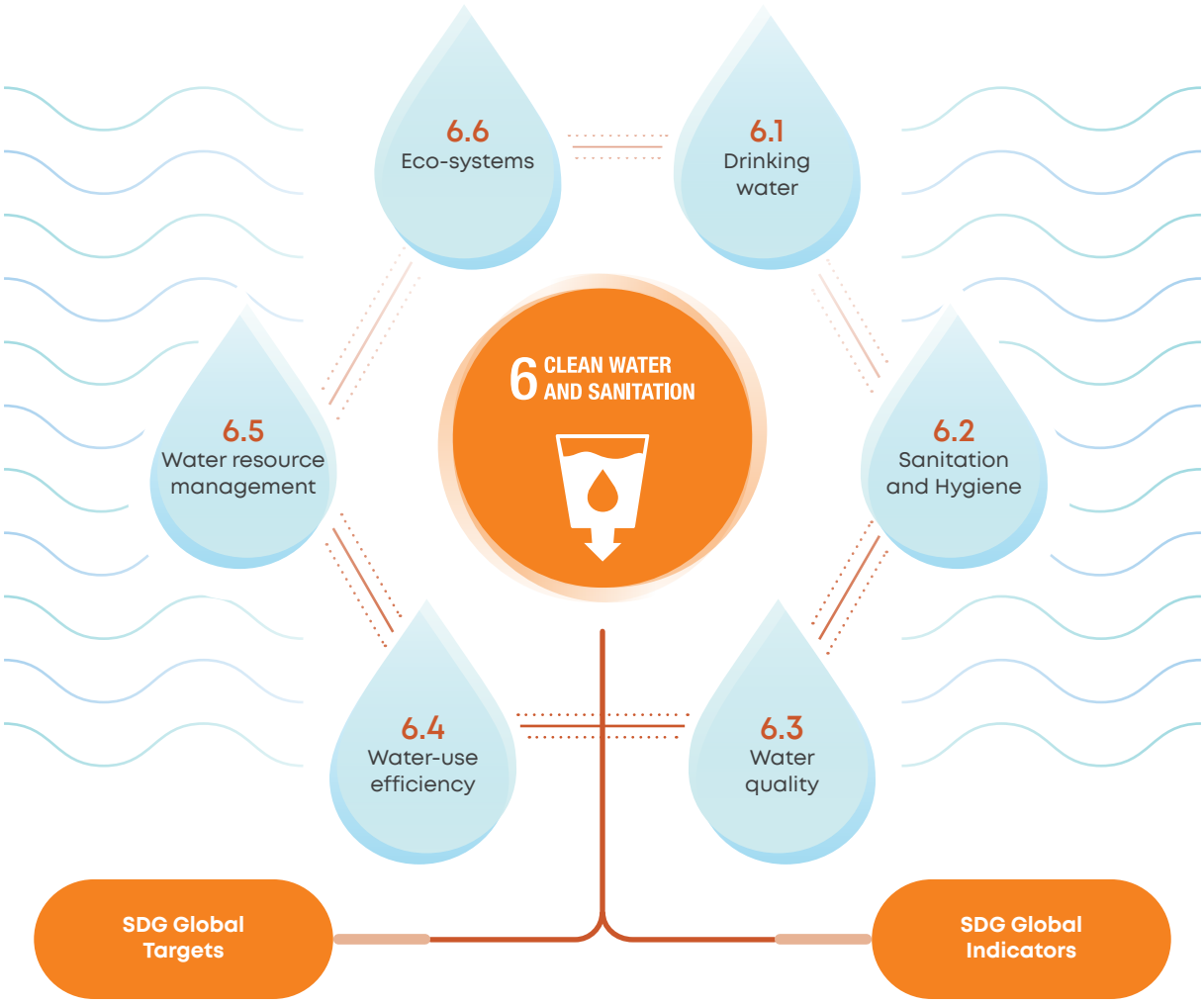
FIGURE 18: PROPORTION OF HOUSEHOLDS WITHOUT ACCESS TO AN IMPROVED LATRINE AND PREVALENCE OF CHILD STUNTING IN CHILDREN AGED 0-59 MONTHS IN INDONESIA



WASH REALITIES IN ASIA AND THE PACIFIC

The SDGs recognize the multiple adverse effects of particularly poor access to quality WASH services and affirms that improving access to quality water, sanitation and hygiene will be crucial to achieving many other SDGs, including those related to nutrition, health, education, poverty and economic growth, and gender equality. WASH is a key component of the ambitious 2030 Agenda for Sustainable Development, with a distinct sector goal (SDG 6) that aims to 'ensure availability and sustainable management of water and sanitation for all', with a clear but ambitious set of targets (see Figure 19).

FIGURE 19: SDG 6 TARGETS AND INDICATORS FOR DRINKING WATER, SANITATION AND HYGIENE



6.1 By 2030, achieve universal and equitable access to **safe and affordable drinking water for all**

6.1.1 Population using **safely managed drinking water services**

6.2 By 2030, achieve access to **adequate and equitable sanitation and hygiene** for all and **end open defecation**, paying special attention to the needs of women and girls and those in vulnerable situations

6.2.1a Population using **safely managed sanitation services**

6.2.1b Population practicing **open defecation**

6.2.1c Population using a **basic handwashing facility with soap and water** available on premises

TABLE 6: SDG DEFINED SERVICE LEVEL FOR DRINKING WATER

Service level	Definition
Safely managed	Drinking water from an improved water source that is located on premises, available when needed and free from faecal and priority chemical contamination
Basic	Drinking water from an improved source, provided collection time is not more than 30 miniutes for a round trip, including queuing
Limited	Drinking water from an improved source for which collection time exceeds 30 miniutes for a round trip, including queuing
Unimproved	Drinking water from an unprotected dug well or unprotected spring
Surface water	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal

Source: WHO and UNICEF, 2017.

The WHO/UNICEF Joint Monitoring Programme for Drinking Water, Sanitation and Hygiene (JMP) has monitored progress on drinking water and sanitation since 1990 and is the mandated organization for global monitoring and reporting on SDG Targets 6.1 and 6.2. The JMP defines benchmarks for water, sanitation and hygiene (service quality criteria) that need to be aspired to for maximum positive impact on health and nutrition, and on other SDG outcomes (WHO and UNICEF, 2017).

Overall, the Asia-Pacific region has made good progress in improving access to safe drinking water and sanitation in the past decade, but significant challenges remain. Access to water on premises and to piped-water facilities is lower than global averages in most countries in the region. There are also high disparities within countries.

SAFELY MANAGED DRINKING WATER

For a service level to qualify as a 'safely managed water supply', households should use an improved water source that meets three criteria. The water source should be:

1 located on the premises,

2 available when needed, and

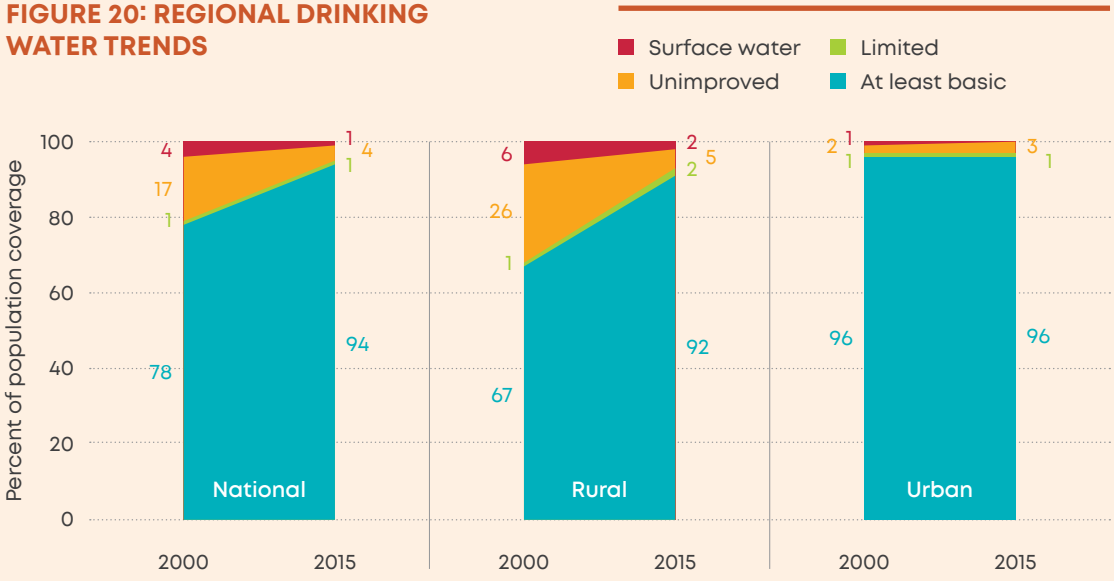
3 free from contamination.

These criteria help determine the level and quality of drinking water services and the potential impact on malnutrition.

'Improved' sources are those that are potentially capable of delivering safe water by nature due to their design and construction. These include piped water, boreholes or tube wells, protected dug wells, protected springs, and rainwater. While the MDGs focused on monitoring access to improved water sources, the SDGs set the bar higher by aiming for universal coverage of 'safely managed drinking water'.

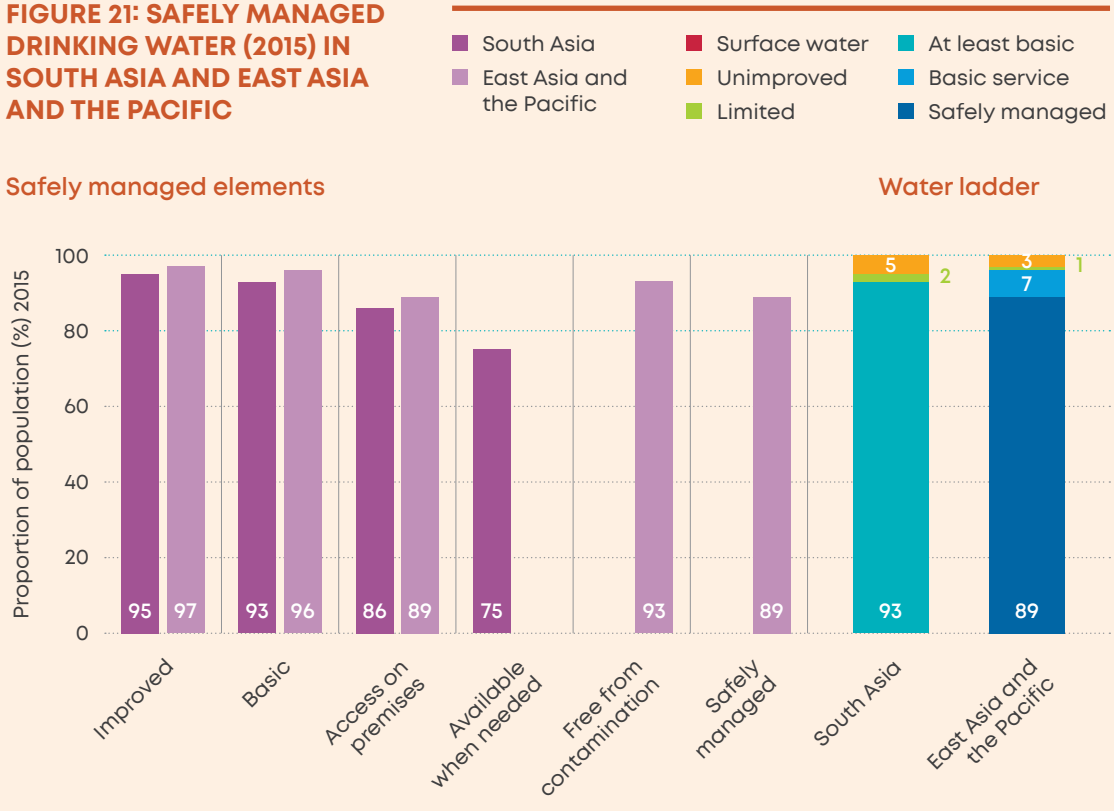
The Asia-Pacific region has made good progress since 2000 with 91.5 percent of the region's population now using at least basic drinking water facilities compared to 80.5 percent in 2000 (Figure 20). While higher than rural areas, coverage of at least a basic drinking water source has lagged in urban areas with no change between 2000 and 2015. The use of unimproved water sources has increased from 2.9% in 2000 to 3.3% in 2015. Sub-regionally, coverage of improved water sources is lowest in the Pacific with only 52 percent of the population of the Pacific sub-region using at least a basic drinking water source, which is much lower than regional and global averages (in part because Papua New Guinea has low coverage levels and accounts for the majority of the sub-region's population).

FIGURE 20: REGIONAL DRINKING WATER TRENDS



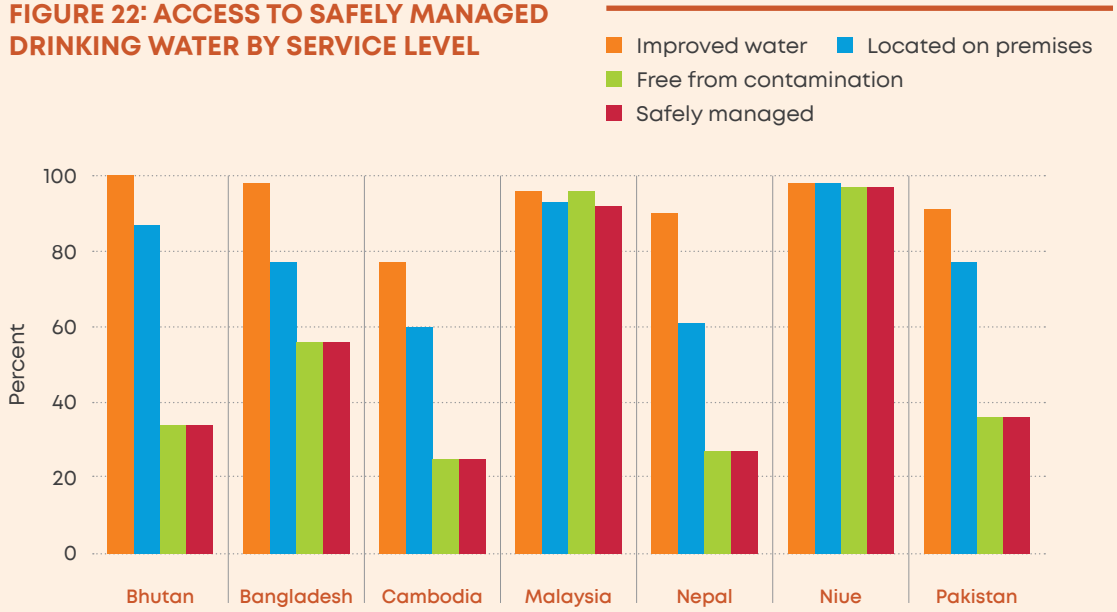
Source: WHO/UNICEF Joint Monitoring Programme database.

FIGURE 21: SAFELY MANAGED DRINKING WATER (2015) IN SOUTH ASIA AND EAST ASIA AND THE PACIFIC



Source: WHO/UNICEF Joint Monitoring Programme database.

FIGURE 22: ACCESS TO SAFELY MANAGED DRINKING WATER BY SERVICE LEVEL

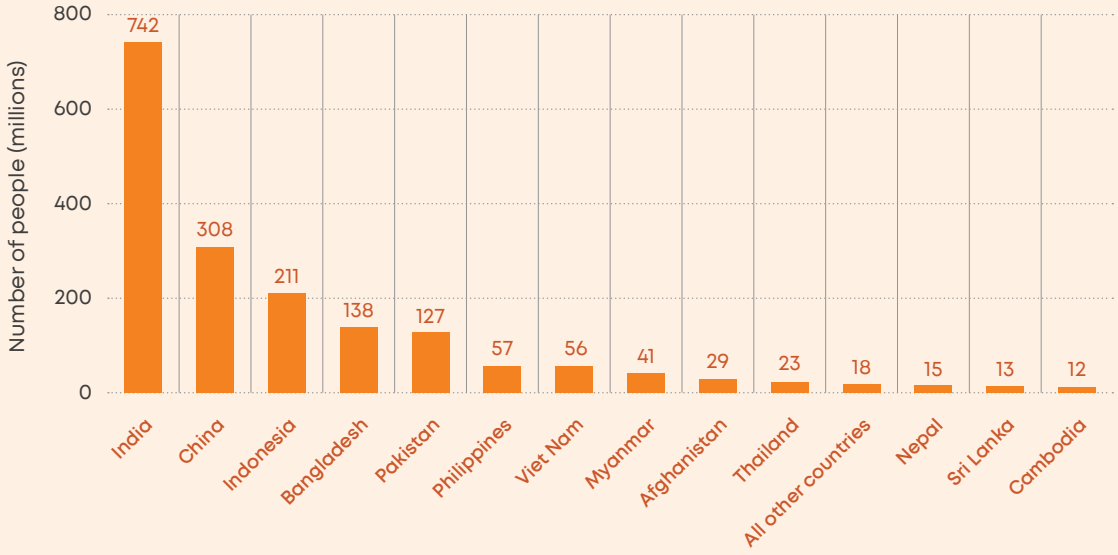


Source: WHO/UNICEF Joint Monitoring Programme database.

With the introduction of the new 'safely managed' category for monitoring drinking water and sanitation by the JMP, full data on safely managed drinking water supplies are limited in the region with data available only for urban areas. As per the latest available figures, 97 percent of the urban population in the East Asia and Pacific region and 95 percent of the urban population in the South Asia region has access to 'improved' water sources (see Figure 21). However, when considering the three criteria that define safely managed drinking water, this percentage drops in the East Asia and Pacific Region from 97 percent to 89 percent, pointing to larger issues around water quality (see Box 4). Data for 'safely managed' drinking water in urban areas from several countries in Asia show that access levels to 'safely managed' drinking water supply (including water quality) reduce dramatically compared to just 'improved' water access. In Bhutan for example, while the access to 'improved' drinking water sources is 100 percent, only 34 percent of the drinking water sources are free from contamination (see Figure 22).

Similarly, in Bangladesh, 97 percent of the population now relies on improved water infrastructure, but half of those water sources (48 percent) are contaminated by E. coli and/or arsenic, which would disqualify them from the SDG definition of 'safely managed' drinking water. Similarly, a 2015 water quality survey from Yogyakarta province, Indonesia, found that 67 percent of households were consuming water contaminated with E. coli bacteria. The presence of E. coli in water is a strong indicator of recent sewage or animal waste contamination and hence increases the risk of diarrhoea. While water quality is not routinely measured through national surveys, lack of access to piped water supply on premises is a good indicator of overall water quality. In Asia and the Pacific, 1.8 billion people do not have access to piped water supply on their premises (Figure 23).

FIGURE 23: NUMBER OF PEOPLE WITHOUT PIPED WATER SUPPLY IN PREMISES



Source: WHO/UNICEF Joint Monitoring Programme database.

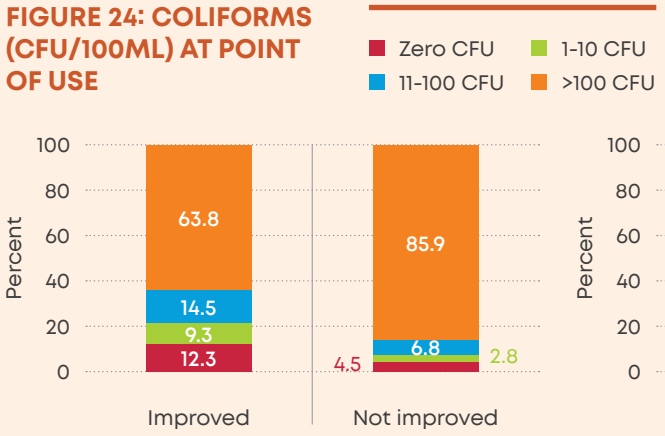
BOX 4: WATER QUALITY IN CAMBODIA UNDERMINING THE FULL DEVELOPMENT OF YOUNG CHILDREN

In Phnom Penh and the northeast region of Cambodia, a lack of consistent WASH practices was identified as a major driver of child stunting and wasting. To understand how water quality might impact the nutritional status of children, point-of-consumption water samples were collected from randomly selected households in a total of six districts (one in Phnom Penh, two in Kratie province and three in Rattanakiri province) in order to understand to what extent household drinking water, whether from an improved or non-improved source, is a pathway for the ingestion of faeces and other pathogens. The presence of coliform and E. coli bacteria were both measured as indicators of faecal contamination.

High levels of bacterial contamination were found in drinking water samples from the point of consumption (use): 89 percent of all samples had coliform bacteria and 55 percent of samples had E. coli (see Figures 24 and 25). Surprisingly, bacteria contamination was common even in water collected from improved water sources, with water quality decreasing between the point of collection and the point of consumption in the household. The high presence of coliform and E. coli bacteria suggested that household drinking water was a significant pathway for the ingestion of faeces and other pathogens by young children, further undermining children's health and growth. The findings also suggested that even the water from improved water sources can be contaminated, and poor water storage and management practices can lead to further deterioration in water quality once stored in the household. All forms of improved water, even bottled water, were found to have high levels of coliform contamination. Bottled water, marketed as safe for consumption, had a high contamination level, with 80 percent of bottled water containing some bacterial contamination, and nearly half of the bottled water containing high levels of coliform contamination (>100CFU/100ml).

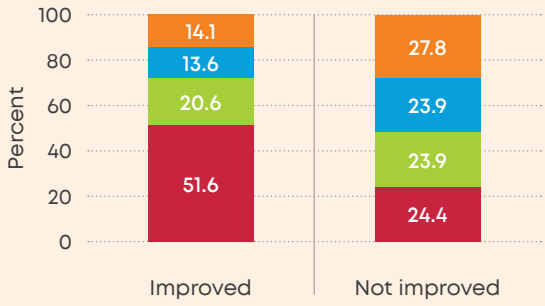
The results highlighted the importance of addressing unsafe drinking water as part of a comprehensive WASH programme to reduce faecal exposure and transmission, and diarrhoeal illnesses, and to improve health outcomes of children. Key public health priorities in Cambodia are increasing access to improved water sources, especially in rural areas; improving household water management and treatment practices through the adoption of good hygiene practices as a means to prevent household-level contamination; and ensuring more effective monitoring and enforcement of national and regional water quality standards for all water sources, including bottled water.

FIGURE 24: COLIFORMS (CFU/100ML) AT POINT OF USE



89% of all water samples were contaminated with coliforms

FIGURE 25: E. COLI (CFU/100ML) AT POINT OF USE



55% of all water samples were contaminated with E. coli

SAFELY MANAGED SANITATION

The SDG service levels for sanitation include five steps, starting from *open defecation* and gradually moving up to higher levels and quality of service: unimproved, limited, basic and safely managed (Table 7). For the highest level of *safely managed* sanitation, three main criteria must be met. People should use improved sanitation facilities that are not shared with other households, and the excreta produced should either be

1 treated and disposed of *in situ*;

2 stored temporarily and then emptied, transported and treated off-site; or

3 transported through a sewer with wastewater and then treated off-site.[22]

The 2017 JMP global SDG baseline report (WHO and UNICEF, 2017) notes that across East and Southeast Asia, whilst 69 percent of the rural population have access to 'basic' sanitation, only 42 percent have access to 'safely managed' sanitation.

'Basic' sanitation is still unavailable for a significant proportion of households in Asia (see Figure 26). Across the region, around 1.4 billion people are without access to basic sanitation and progress varies widely across the region.

Across Asia (of a weighted average of 28 countries), 72 percent of the population have access to 'basic' sanitation (80 percent in East Asia, 75 percent in Southeast Asia, 48 percent in South Asia and much lower in the Pacific). 'Basic' sanitation coverage is higher in urban areas than in rural areas, and the gap in coverage is high between the poorest and richest households in ten Asian countries (a difference of more than 40 percentage points).

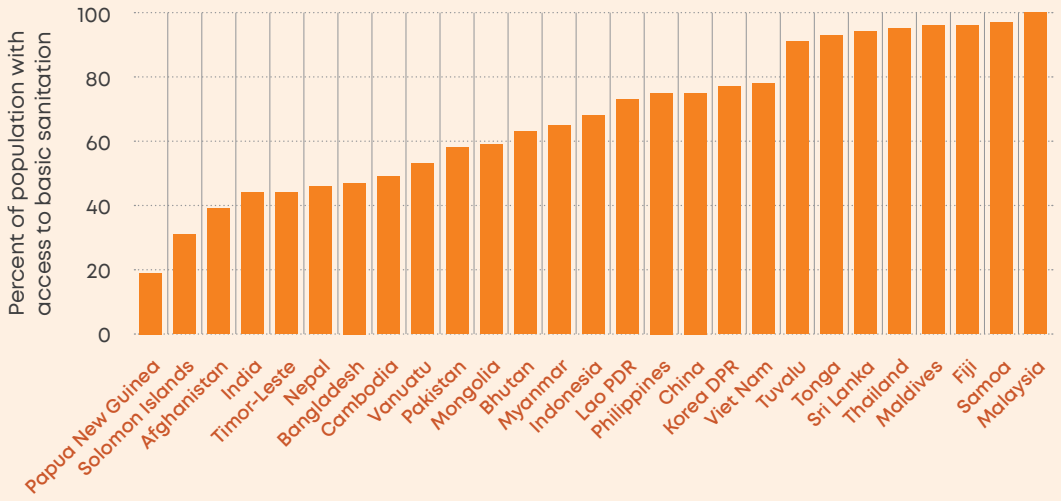
TABLE 7: SDG DEFINED SERVICE LEVEL FOR SANITATION

Service level	Definition
Safely managed	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or are transported and treated offsite
Basic	Use of improved facilities that are not shared with other households
Limited	Use of improved facilities shared between two or more households
Unimproved	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines (no hygienic separation of excreta from human contact)
Open defecation	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches or other open spaces, or together with solid waste

Source: WHO and UNICEF, 2017.

[22] If the excreta from *improved sanitation* facilities (the ones that hygienically separate excreta from human contact) are not *safely managed* then people who use those facilities will be classed as having a *basic sanitation* service (improved facilities which are not shared with other households). People with *improved facilities* which are shared with other households will be classified as having a *limited service*.

FIGURE 26: BASIC SANITATION COVERAGE IN THE ASIA-PACIFIC REGION: 2015



Source: WHO/UNICEF Joint Monitoring Programme database.

In three countries (Cambodia, Lao PDR and Pakistan), the gap in coverage exceeds 70 percentage points (see Figure 27). This means that interventions for improving basic sanitation need to reach poor segments of the population, particularly in rural areas.

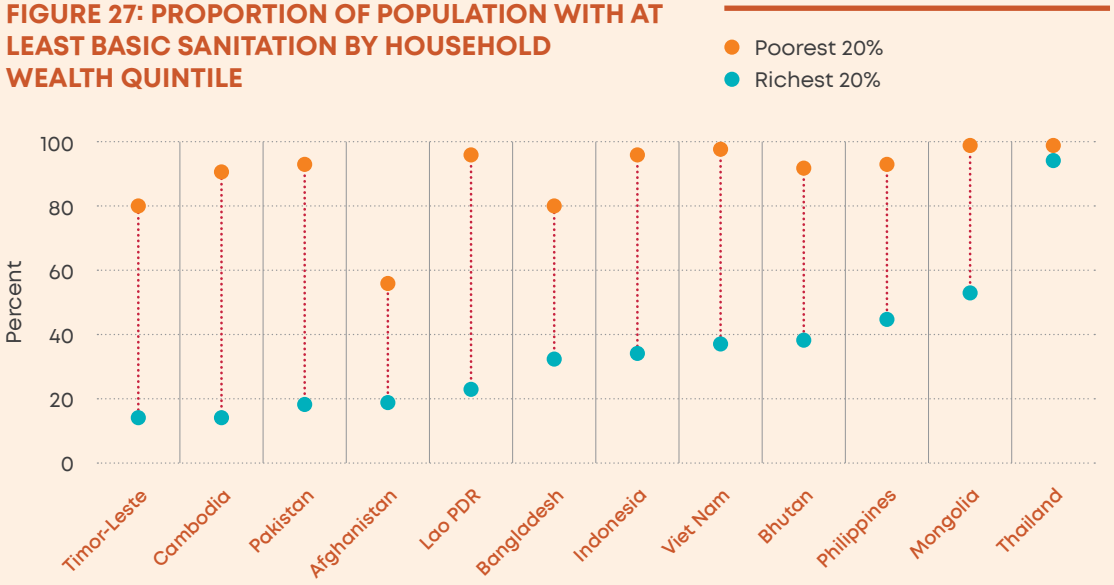
OPEN DEFECATION: A SIGNIFICANT CHALLENGE TOWARDS THE ATTAINMENT OF SAFELY MANAGED SANITATION

Open defecation remains a challenge in Asia. The region bears the highest burden of open defecation globally, with more than 630 million people undertaking this dangerous practice. Nine countries in Asia still have significant open defecation problems (above the world average of 12 percent). This increases health risks, affects individual dignity and is an inequitable burden on the poor. Safety, especially for women, is also an issue associated with open defecation.

India has the highest number of open defecators globally with 522 million people defecating in the open, followed by Indonesia with 32 million people (standing third globally as of 2015). Other countries in the region with more than 5 million people practicing open defecation are Pakistan (22 million), China (21 million), Nepal (9 million), Cambodia (6 million) and the Philippines (6 million) (see Figure 26). The percent of people practicing open defecation has actually increased recently in China, India and the Philippines. India has launched an ambitious plan – *Swachh Bharat Abhiyan* (see Box 5) – which aims, among other things, to eliminate open defecation by 2019.

There are several reasons why open defecation prevails. It is an acceptable, deeply ingrained traditional practice that persists as a norm in many communities, and communication about sanitation is often treated as a taboo. The practice is also linked to poverty: many of the poorest people cannot prioritize toilets. Building and owning a toilet may not be perceived as aspirational, and often the construction of toilets is seen as the government's responsibility, rather than cost that individual households should take responsibility for. A significant gap also exists between knowledge and practice. Even when people are aware of the health risks of not using a toilet, they continue with open defecation due to inherent issues such as poverty, affordability, or simply preference to defecate in the open, whether for comfort or due to cultural issues related to sharing toilets among family members. Open defecation in urban areas is driven by a lack of space to build toilets in high-density settlements and an unwillingness of tenants to invest in toilets where landlords do not provide them.

FIGURE 27: PROPORTION OF POPULATION WITH AT LEAST BASIC SANITATION BY HOUSEHOLD WEALTH QUINTILE

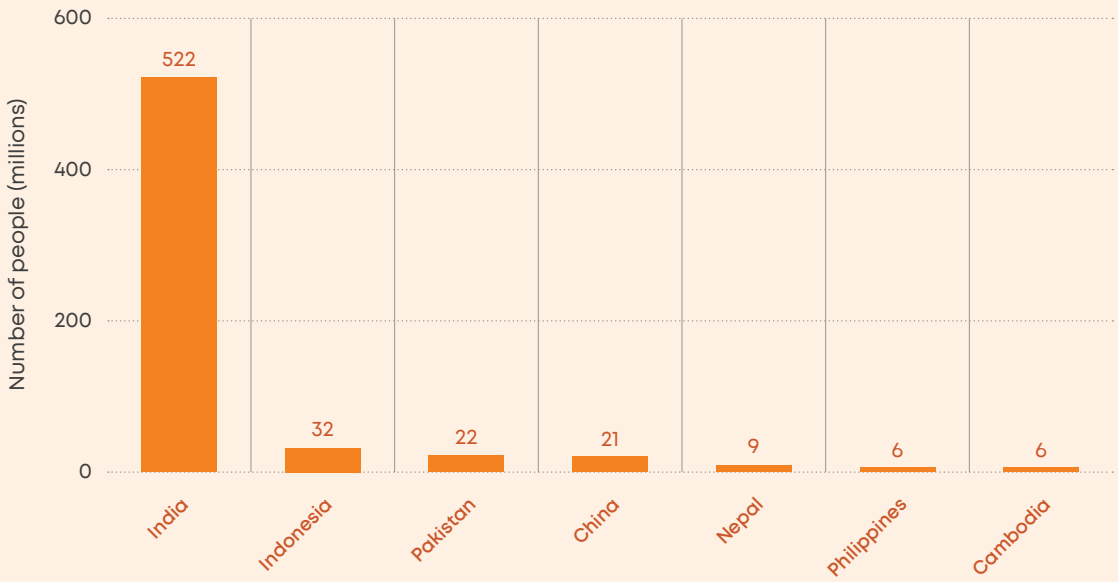


Source: WHO/UNICEF Joint Monitoring Programme database.

BOX 5: SWACHH BHARAT ABHIYAN

In 2014, India launched an ambitious national sanitation programme that aims, among other goals, to eliminate open defecation by 2019. The *Swachh Bharat Abhiyan* (Clean India Mission) mobilized nearly USD 25 billion from the Government, private sector and civil society (swachhbharatmission.gov.in). Its rural component promotes pour flush twin-pit toilets, which are designed to contain waste in situ until it is safe to handle. The programme has a significant component on behavioural change and community approaches to sanitation. As of June 2017, over 205 000 villages, 149 districts and five States had reported themselves to be open-defecation free. The Government has estimated that since the start of the programme in 2014 until June 2017, the coverage of latrines in rural India has increased from 42 percent to 65 percent, with the Government estimating that the number of rural Indians defecating in the open had come down from 550 to 330 million. According to the Office of the Registrar General and Census Commissioner, the proportion of households with access to latrine facilities within the premises was 95.2 percent in Kerala and 79.3 percent in Punjab, and as low as 22 percent in Jharkhand and Odisha. In urban India, 81.4 percent of households have latrine facilities on their premises, compared to 30.7 in rural India.

FIGURE 28: NUMBER OF OPEN DEFECATORS



Source: WHO/UNICEF Joint Monitoring Programme database.

Ending open defecation by 2030, paying special attention to the needs of women and girls, and those in vulnerable situations, is at the heart of SDG target 6.2 for sanitation and hygiene.

An analysis of the current rate of progress by country shows that only 11 countries globally, including Cambodia, Indonesia, Nepal and Pakistan in the region, are on track to eliminate open defecation by 2030. Moreover, approximately 70 percent of the world's open defecators live in South Asia and Southeast Asia, and 85 percent of the world's open defecators can be found in only 15 countries, several of these being either middle income on least developed countries. In Asia, these countries include Cambodia, China, India, Indonesia, Nepal, Pakistan and Philippines (UNICEF, 2018b) (see Figure 28). The trend of open defecation for the poorest quintile in almost all these countries seems stagnant or worse, rising. Recognizing that a dramatic shift is needed in these countries to significantly accelerate progress to end open defecation, and realizing that a significant change will only happen if given due attention, UNICEF outlined an 'end open defecation game plan',[23] tailored to the specific country context. Key elements of the plan include:

- Creating demand through institutionalizing community approaches to total sanitation, addressing behavioural barriers and creating a sustained social norm of not practicing open defecation at scale.
- Strengthening supply chains and markets so that they meet the demand for quality sanitation goods and services that are affordable to all, including to the lowest quintile and otherwise marginalized communities and individuals.
- Strengthening the enabling environment and national systems to deliver sustainable sanitation services with an equity focus. This includes support for bottleneck analyses and policy development – including financing of sanitation in sector plans, promoting sustainability checks, coordinating and monitoring.

[23] https://www.unicef.org/publicpartnerships/files/2017_UNICEF_ARR_WASH_ADVANCE_COPY(1).pdf

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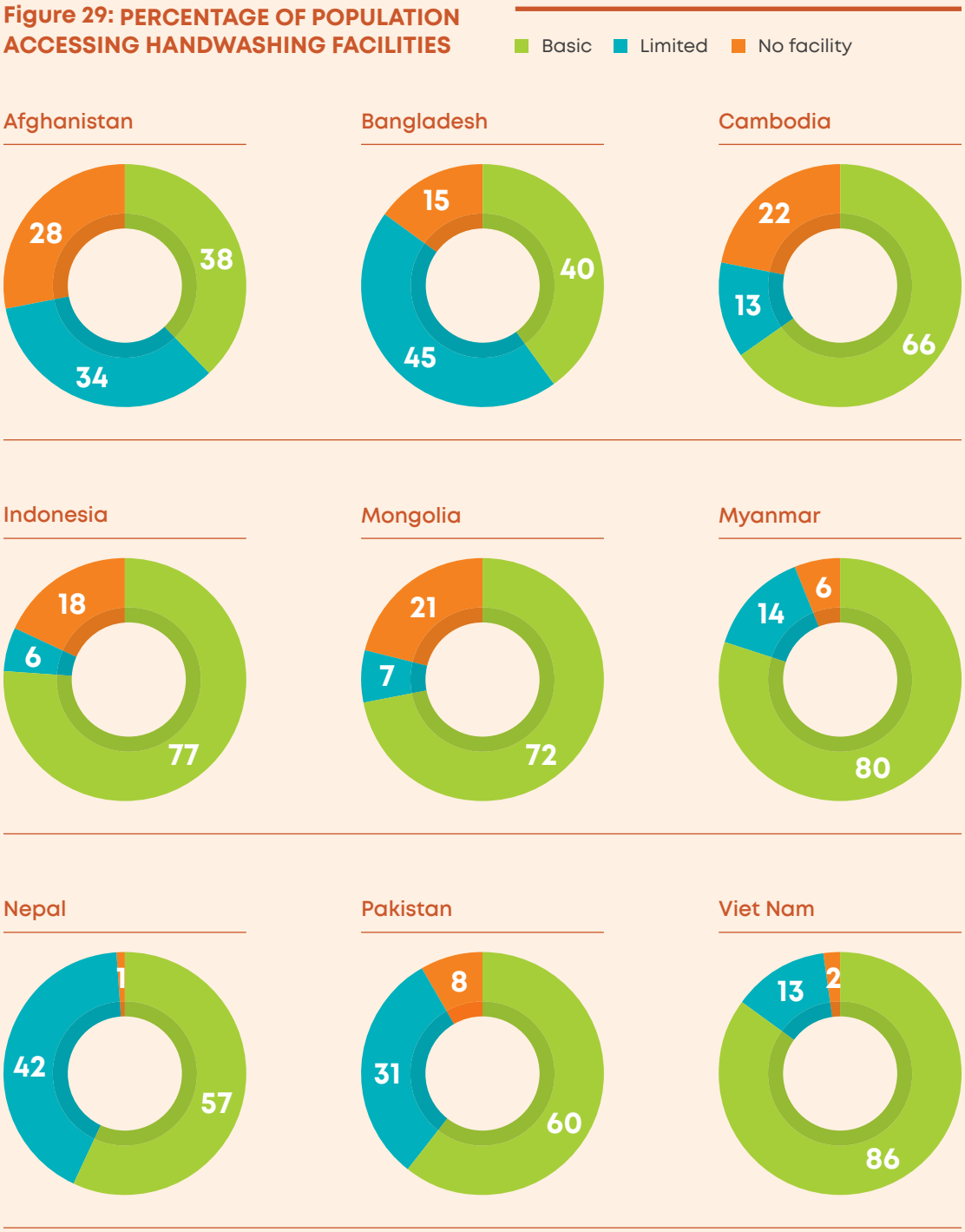
HYGIENE

Hygiene is a multi-faceted construct and includes handwashing, menstrual hygiene, safe disposal of children's faeces and food hygiene. For the purposes of the SDG monitoring, handwashing with soap and water is identified as the main indicator. Households that have a handwashing facility with soap and water available on premises are judged to meet the criteria for a basic hygiene facility (SDG targets 1.4 and 6.2). The other two categories below basic hygiene for handwashing are having limited access (availability of a handwashing facility on premises without soap and water) and no facility (no handwashing facility on premises).[24]

Information on access to handwashing with soap and water is available for only nine countries in the region for 2015 (see Figure 29) and there is no data for the Pacific region. Based on the available data, South Asian countries have lower rates of access to handwashing with soap than East Asian and Southeast Asian countries. Between 38 and 80 percent of households have access to a basic handwashing facility. In five of the nine countries, over 10 percent of households have no handwashing facilities.

[24] Households that have a facility but lack water or soap are classified as having a limited facility and are distinguished from households that have no facility at all. In some cultures, ash, soil, sand or other materials are used as handwashing agents, but these are less effective than soap and are therefore counted as limited handwashing facilities (https://washdata.org/monitoring/hygiene).

Figure 29: PERCENTAGE OF POPULATION ACCESSING HANDWASHING FACILITIES



Source: WHO/UNICEF Joint Monitoring Programme database.

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The importance of *safe* handling and disposal of child faeces is increasingly recognized given its potential role in disease transmission. Household surveys demonstrate that the burying of child faeces ('dig-and-bury') is common in several countries, especially in Southeast Asia. Disposal with garbage is widely practiced in middle- and high-income countries, and is becoming increasingly common in urban areas of low-income countries. The safety of these two approaches is difficult to assess given the limited evidence available, however, an expert consultation on the safety of these two child faecal disposal methods in 2015 came to an almost unanimous agreement that these methods be considered neither safe nor improved. In addition to handwashing with soap, safe disposal of children's faeces is currently one of the most critical hygiene behaviours requiring further attention.

In conclusion, it is important to re-emphasize that the WASH-nutrition interface is complex, and poor water, sanitation and hygiene can impact child and adult nutrition through multiple pathways. This necessitates cross-sectoral collaboration to address not only the basic challenges covered in this chapter (access to safely managed water and sanitation services, behaviour change, etc.), but also more complex and related challenges, such as municipal pollution, groundwater over-extraction, resilience to climate-induced events, and economic incentives to strengthen the financial viability of WASH service providers. Improved diagnostic efforts are also needed and a continued focus on geographic (including urban/rural) and economic disparities between and within countries and sub-national regions.

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Part 3

URBAN MALNUTRITION

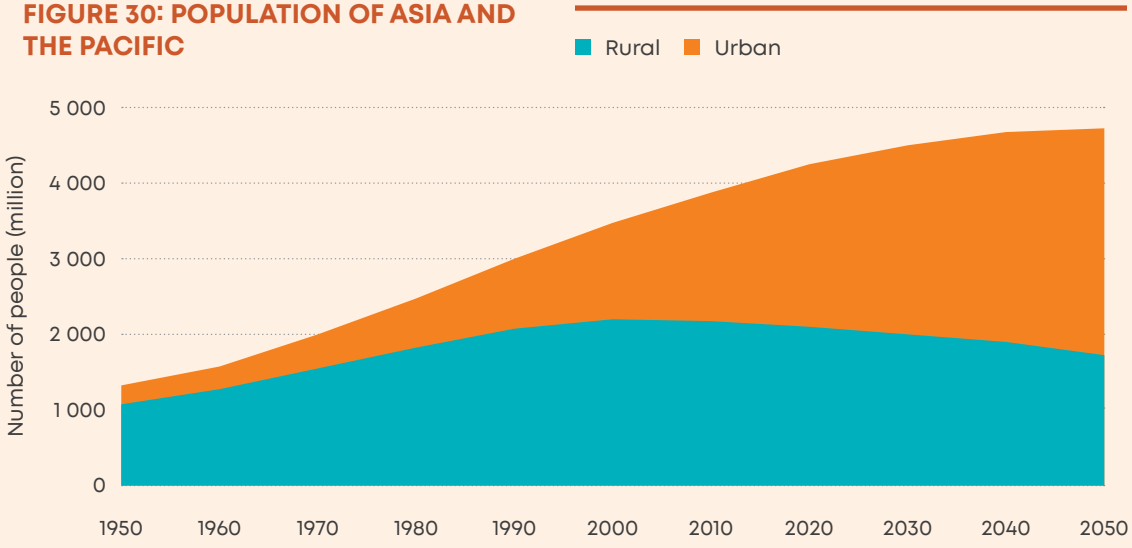
Part 3

URBAN MALNUTRITION

Asia is urbanizing rapidly. The rate of urbanization in Asia is the highest in the world at 1.5 percent per year, as measured by the average annual rate of change of the percentage of an urban population. At this rate, by 2030, more than 55 percent of the Asian population will be urban (see Figure 30). The two largest population centres in Asia, India and China, are expected to account for 28 percent of the projected growth of the world's urban population by 2050. India is projected to add 400 million urban dwellers and China 290 million (United Nations, 2014). The rise in urban population is also seen in the growth of megacities, or cities with over 10 million inhabitants. Of the world's 31 megacities in 2016, 17 are located in the Asia-Pacific region, and of the 10 additional cities that are projected to become megacities between 2016 and 2030, six will be from this region.

Historically, urbanization has been seen as a sign of social and economic transformation. Cities have been recognized as important drivers of development and urban living has often been associated with higher standards of living, including better health and nutrition. However, if not managed well, rapid urbanization can also lead to dysfunctional food systems, resulting in undernutrition and obesity occurring within the same city or even the same household. It is therefore important to ensure that the rapidly expanding cities in Asia and the Pacific are planned in an inclusive, sustainable and nutrition-sensitive manner.

FIGURE 30: POPULATION OF ASIA AND THE PACIFIC



Source: UN, 2014.

While cities have the potential to innovate and play an important role in shaping food and nutrition policies, there is a need to better understand the nature of malnutrition in urban areas, as well as its drivers and determinants. A number of questions need to be asked:

- Are drivers of urban malnutrition (undernourishment, undernutrition, obesity, etc.) any different from the drivers of malnutrition in rural areas?
- What is driving the obesogenic food environment in urban areas?
- What are known good practices and what are governments, civil society, the private sector and other stakeholders doing to address undernutrition and obesity and in urban areas?

In view of the growing importance and complexity of food systems and nutrition in urban areas, this year's report features 'Urban Malnutrition' as a special theme. The purpose is to highlight key characteristics of urban malnutrition, articulate some of the differences and similarities between drivers of malnutrition in rural and urban areas, and derive some key messages for policy makers and practitioners in the region.

URBAN FOOD INSECURITY AND MALNUTRITION IN ASIA AND THE PACIFIC

Traditionally, the levels of undernutrition and hunger have been higher in rural areas compared to urban areas and, consequently, the policy focus was concentrated on rural areas. In Asia and the Pacific, undernutrition still continues to be higher in rural than in urban areas (see Table 8). The data show that the prevalence of stunting and wasting, though high, is lower for urban than for rural children, and the difference in stunting exceeds 10 percentage points in countries as diverse as Cambodia, India, Lao PDR, Myanmar and Viet Nam. The prevalence of wasting is also lower among urban children relative to rural children with the exception of two countries, Bhutan and Myanmar. While the PoU is consistently higher in rural areas, urban prevalence of both stunting and wasting exceeds the thresholds set by the WHO for public health concern. Only three countries are below the WHO threshold for both stunting and wasting in urban areas – Mongolia, Thailand and Viet Nam. For overweight and obesity, the prevalence is higher in urban children for 11 of the 13 countries.

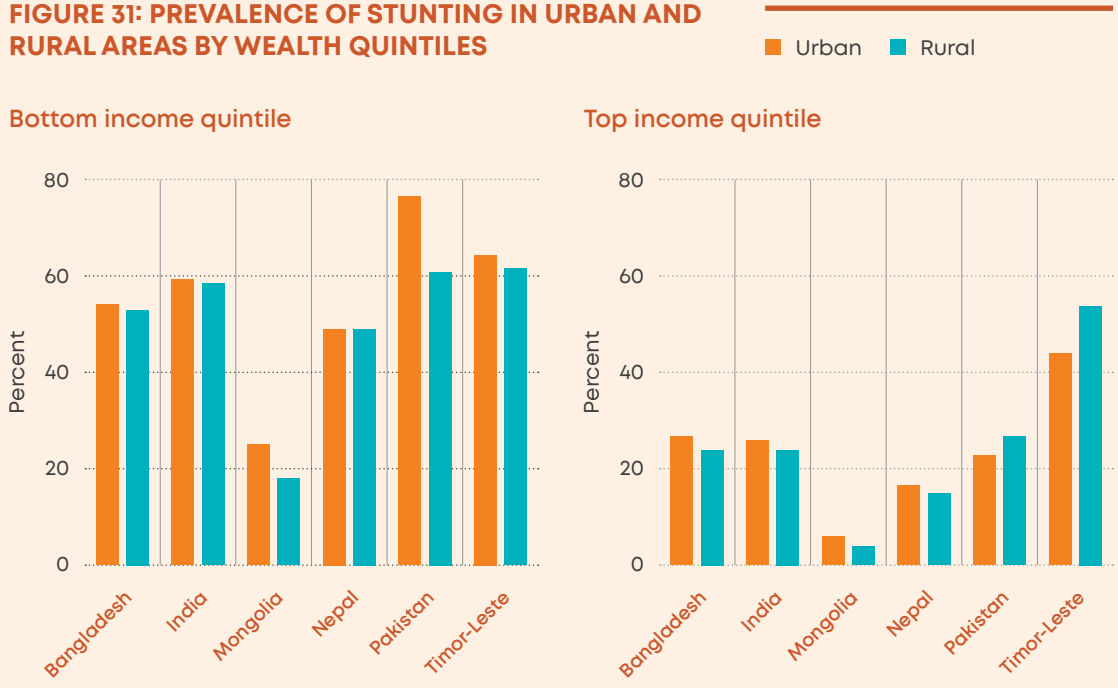
However, averages often hide as much as they reveal and, unfortunately, disaggregated data are not widely available. For stunting (an indicator that has received wider attention of the development community), the data are available by wealth quintiles in urban and rural areas. It is interesting to note that in some countries, the level of stunting in both the bottom and top wealth quintiles are actually higher in urban areas than in rural areas (although only marginally) (see Figure 31). What this suggests is that there are large disparities within urban areas and that the drivers of malnutrition, as well as their interactions, may differ between urban and rural areas, as well as within urban areas. A more nuanced understanding of the key drivers and their interactions is essential in transforming urban landscapes into resilient systems capable of fostering and supporting sustainable food systems.

TABLE 8: PREVALENCE OF STUNTING, WASTING, AND OVERWEIGHT AND OBESITY AMONG UNDER-FIVE CHILDREN (AS A PERCENTAGE OF THE TOTAL UNDER-FIVE POPULATION)

	STUNTING			WASTING			OVERWEIGHT AND OBESITY		
	Rural	Urban	Difference	Rural	Urban	Difference	Rural	Urban	Difference
Bangladesh	42.7	36.0	6.7	16.1	14.2	1.9	1.7	2.5	-0.7
Bhutan	35.8	28.0	7.8	5.6	6.5	-0.9	6.6	10.0	-3.4
Cambodia	33.8	23.8	10.0	10.1	8.2	1.9	2.1	3.2	-1.1
India	50.4	39..5	10.9	20.9	17.3	3.6	1.6	2.9	-1.3
Lao PDR	48.6	27.4	21.2	6.5	5.7	0.8	2.0	2.2	-0.2
Maldives	20.0	15.1	4.8	12.1	7.5	4.6	5.6	7.4	-1.8
Mongolia	14.5	8.4	6.1	1.1	0.9	0.2	9.6	11.1	-1.4
Myanmar	31.8	20.3	11.5	6.1	8.4	-2.2	1.3	2.4	-1.2
Nepal	40.3	32.0	8.3	10.2	9.2	1.0	0.9	1.5	-0.5
Pakistan	47.9	38.2	9.8	10.8	9.8	1.0	4.9	4.4	0.4
Thailand	17.4	11.5	5.8	4.8	4.6	0.2	6.6	11.6	-5.0
Timor-Leste	59.8	49.3	10.6	20.0	14.9	5.1	6.0	5.2	0.9
Viet Nam	26.8	11.8	15.0	4.5	4.1	0.4	3.1	8.0	-5.0

Source: UNICEF, WHO and World Bank Group, 2018a.

FIGURE 31: PREVALENCE OF STUNTING IN URBAN AND RURAL AREAS BY WEALTH QUINTILES



Source: UNICEF, WHO and World Bank Group, 2018a.

UNDERSTANDING URBAN FOOD SECURITY AND NUTRITION

The immediate determinants of an individual's food security and nutrition outcomes, and adequate intake of foods and essential nutrients do not differ based on whether one lives in a rural or urban area. However, the underlying drivers of these immediate determinants, which are spread across the four dimensions of food security (availability, access, stability and utilization), are likely to be different (Bloem and de Pee, 2017). A number of features and determinants of food security and nutrition that are specific to urban areas are discussed below. However, it is important to recognize the significance of national food systems for determining nutritional outcomes in urban and rural areas. Trying to address food issues specific to urban areas without addressing the overall national food systems will not be effective.

The SDG agenda has nutrition/food (SDG 2) and cities (SDG 11) as top priorities. The food system approach to addressing urban development issues was recognized in the *New Urban Agenda* adopted by the UN Habitat III in October 2016 in Quito, as well as in the Milan Urban Food Policy Pact (UN, 2017; Milano Food Policy, 2015). The former makes explicit commitments to improving food security and nutrition, strengthening food systems planning, working across urban-rural divides, and coordinating food policies with energy, water, health, transport and waste. It also calls for the promotion of coordinated policies for food security and nutrition across rural, urban and peri-urban areas in order to facilitate the production, storage, transportation, processing and marketing of food. The Milan Pact could be the trigger for empowered local governments to work towards healthy food environments in cities across the world and, through this, could bring positive changes in food environments in rural areas as well. The Zero Hunger Challenge will not be achieved if urban-specific issues of food and nutrition are not addressed.

TABLE 9: SOME PROMINENT FEATURES OF THE URBAN NUTRITION COMPLEX

Areas	Features
Availability of diverse foods	• Urban areas have diverse sources for access (supermarkets, convenience stores, restaurants, street foods) and a diverse range of foods including refrigerated/frozen foods, and value added and shelf-life enhancement through food processing. • Street foods provide a low-cost and convenient source for ready-made foods and are of greater significance for the low-income urban population.
Overconsumption of foods high in fat, salt and/or sugar	• Urban populations tend to consume more energy-dense, processed and micronutrient-poor foods, often high in fat, sugar and/or salt because of access, convenience and affordability. • Urban consumers are subjected to more intense marketing campaigns promoting 'junk' foods.
Economic/market shocks have larger impacts	• Urban households rely almost exclusively on markets and so are much more vulnerable to food price shocks. • Besides food price, the informality of the job market puts economic access to food for many urban poor at risk.
Safety nets	• Access to formal safety nets (subsidized foods, allowances, pensions, etc.) could be limited for the urban poor for reasons such as a lack of documents, residence permits and secure address.
Food safety concerns	• Supply chains serving urban areas are longer and more diverse, and so are subject to risks of contamination along the chain (in storage, processing, transport, retail, restaurants, etc.). • Street foods are often subject to high risk of contamination.
Poor living conditions	• Living environment for the urban poor can be challenging (high population density, pollution, open sewerage and poor solid waste disposal, insects and rodents, contaminants, etc.) and could be even worse than for the rural poor, thus negatively impacting on the utilization dimension of food security even if food is available and accessible.

SALIENT FEATURES OF THE URBAN FOOD COMPLEX

As mentioned earlier, the primary determinants of food security (availability, access, stability and utilization) and malnutrition are the same for both urban and rural areas. However, there are differences when it comes to the drivers of these determinants with prominent features of the urban nutrition complex shown in Table 9.

A review of initiatives and programmes across this region shows that national and local governments, civil society, the private sector, and regional and international communities are responding in a number of ways to address the multiple burden of food insecurity and undernutrition, and the growing prevalence of overweight and obesity (Health Promotion Board, 2018; Milano Food Policy, 2015; Ludher, 2016; Fonseca *et al*., 2018; Seoul Metropolitan Government, 2017; FAO, 2018b). However, much more is needed if we are to make real progress. Furthermore, a lack of city-level data that elucidates not just the outcomes, but also how the drivers of urban malnutrition interact in the diverse array of cities are lacking and require more investment in order to better design context-specific policies. What follows presents a synthesis of initiatives, policies and programmes, as well as insights from research to prominent food and nutrition issues facing urban households, such as those listed in Table 9. These are not exhaustive but do cover some of the main issues on urban food and nutrition.

DIVERSITY OF FOOD ENVIRONMENTS

Urban households attain, on average, higher rates of dietary diversity than those in the rural areas. At the same time, however, there is also often a large dose of inequity in access to these diverse diets. One recent survey from Pakistan found that although nutritious foods were available in urban markets across the country, they were often too expensive and/or not supplied in sufficient quantities, with only 4 percent of young children receiving a minimally acceptable diet (Government of Pakistan, 2016). It estimated that for urban Pakistan, 64 percent of the urban population could not afford a nutritious diet, with affordability as high as 81 percent in Baluchistan. The inability to afford nutritious foods may be a concern throughout urban Asia and the Pacific, with over 20 percent of large and relatively wealthy cities, such as Islamabad and Surabaya, not being able to afford a diversified healthy diet (Government of Pakistan, 2016; Baldi *et al*., 2013). Similarly, in Bangkok, over a third of children are not receiving a minimally acceptable diet (NSO and UNICEF, 2017). One message of findings such as these is that the averages conceal a great deal of information on food deprivation in urban areas, much more than in rural areas as there are greater disparities, and so food consumption and nutrition surveys need to pay special attention to unmask these deprivations. Most nutrition and food surveys are cluster surveys and have more difficulty capturing diversity in urban areas than the more homogenous rural areas.

Urban food environments are also more diverse in terms of sources for access (supermarkets, convenience stores, restaurants, street foods, etc.) and types of foods on offer. This brings in added complexity of managing food environments in urban areas. More research is needed to understand some of the context-specific behaviours that determine why urban residents choose to source various foods from various outlets and how to shift these to healthier eating habits.

For example, city residents have higher rates of eating food away from home. This growing trend is particularly high in East Asia and Southeast Asia. Cities such as Singapore and Seoul have already recognized this phenomenon and implemented policies in an effort to make food at these outlets more nutritious, accessible and sustainable. In Singapore, government bodies have worked with groupings of street food outlets, known as hawker centres, to have them formalized. Hawker centres are provided with essential infrastructure, such as clean water, enabled by regulatory and urban planning mechanisms to be situated in all neighbourhoods across the city at affordable costs. They also use healthier oils for cooking and serve as outlets to distribute subsidized meals. Seoul, as part of its new food plan, has launched a 'Seoul Food Master Plan' with a comprehensive set of strategies (Seoul Metropolitan Government, 2017). Seoul also implements a number of initiatives on safety nets and labelling for healthy foods such as logos for 'low salt' restaurants and certifications of 'smart meals' based on food energy (kcal) and fat (see Box 6).

BOX 6: URBAN GOVERNANCE OF FOOD ISSUES IN SEOUL, REPUBLIC OF KOREA

After launching a municipal 'Food Safety Working Group' in 2008 and 'Healthy Seoul Food Strategies' in 2013, Seoul, in 2017, launched its 'Seoul Food Master Plan' that declared every citizen's right to food (Seoul Metropolitan Government, 2017).

The city has an aging population, as well as an increasing number of people living alone (elderly or working age) who have different food habits. The frequency of skipping breakfast and eating out has increased and so has the intake of sugar from processed foods. Diabetes and hypertension have increased. Obesity rates for school-aged children and extreme obesity rates among men aged above 19 increased to 5.4 percent in 2013. Seoul, in its Food Master Plan, has outlined a comprehensive set of strategies. They include:

1 increasing the poor's access to food;

2 improving rural-urban linkages (e.g. connecting small- and medium-sized family farms to cities in win-win scenarios);

3 addressing food- and nutrition-related public health issues;

4 designing inclusive policies and implementing participatory governance strategies;

5 investing in social safety nets related to food;

6 a multi-sector approach linking public health, welfare, employment, housing and urban planning;

7 setting goals to make food systems more eco-friendly and sustainable; and

8 recognizing that there are various diverse food cultures that coexist in the city and designing policies around this diversity.

Some specific strategies that the city has started to pilot include increasing the amount of vegetable/fruit vending machines, fruit package retailers and fruit cafes at public transport hubs and public institutions. Seoul has also started piloting logos that identify restaurants as 'low salt'. Additionally, the city has experimented with certifying 'smart meals' at restaurants, child care centres, corporate cafeterias, and lunch packs and food sets distributed by convenience stores so that even youth opting for convenient, cooked or processed foods can still choose healthy options. Seoul defines a 'smart meal' as containing between 500 to 1 000 kcal where fat accounts for 15-20 percent of calories and sodium levels are lower than 1 400 mg. Some social safety nets that Seoul will implement include food vouchers and public kitchens. Seoul also identified some behaviour-change strategies to encourage urban inhabitants to opt for healthy food via promoting a nutritious Korean cuisine.

Another factor that adds to the diversity of urban food environments and feeding practices is the city size. Whether people live in highly dense megacities, intermediary cities or small towns shapes their retail environment and accessibility of foods in the market. For example, in Indonesia, it was found that infant feeding patterns were different in urban slum areas of Jakarta versus peri-urban slum areas surrounding the city of Yogyakarta in Bantul (Martha *et al.*, 2017). While some practices by caregivers were common in both areas (such as feeding rice with vegetable soup), in urban slum areas, caregivers had wider access to street food vendors and would purchase snack foods such as fried tofu, tempeh, banana and manufactured biscuits. The tendency to provide snack foods for kids made it more difficult to regulate eating patterns for children. Caregivers in high-density poor urban areas were more likely to buy side dishes and vegetables cooked in nearby streets stalls because either their houses were too small and/or they were not equipped with a kitchen, while caregivers living in semi-urban areas were more likely to cook foods and had more space for a kitchen. Caregivers in both areas perceived home cooked meals as healthier, however structural issues still caused urban poor caregivers to not cook. For these reasons, education campaigns in isolation are often not enough to change feeding practices.

OVERCONSUMPTION OF ENERGY-DENSE FOOD ITEMS HIGH IN FAT, SALT AND/OR SUGAR

Despite urban consumers being more likely to be able to access a more diversified diet, they are also more likely to consume energy-dense, highly processed and micronutrient-poor foods, often high in fat, sugar and/or salt, due to increased access and affordability, as well as marketing and cultural influences, such as the fact that some of these foods are considered status symbols. In this way, urban areas can be particularly vulnerable to the multiple burdens of malnutrition. For example, in low cost flats in Kuala Lumpur, 22 percent of children under five were found to be stunted and 23 percent were either overweight or obese, in large part due to poor child feeding practices. Households living in these low-cost flats reported that high food prices were the number one reason preventing them from preparing healthy meals for their children (UNICEF, 2018a).

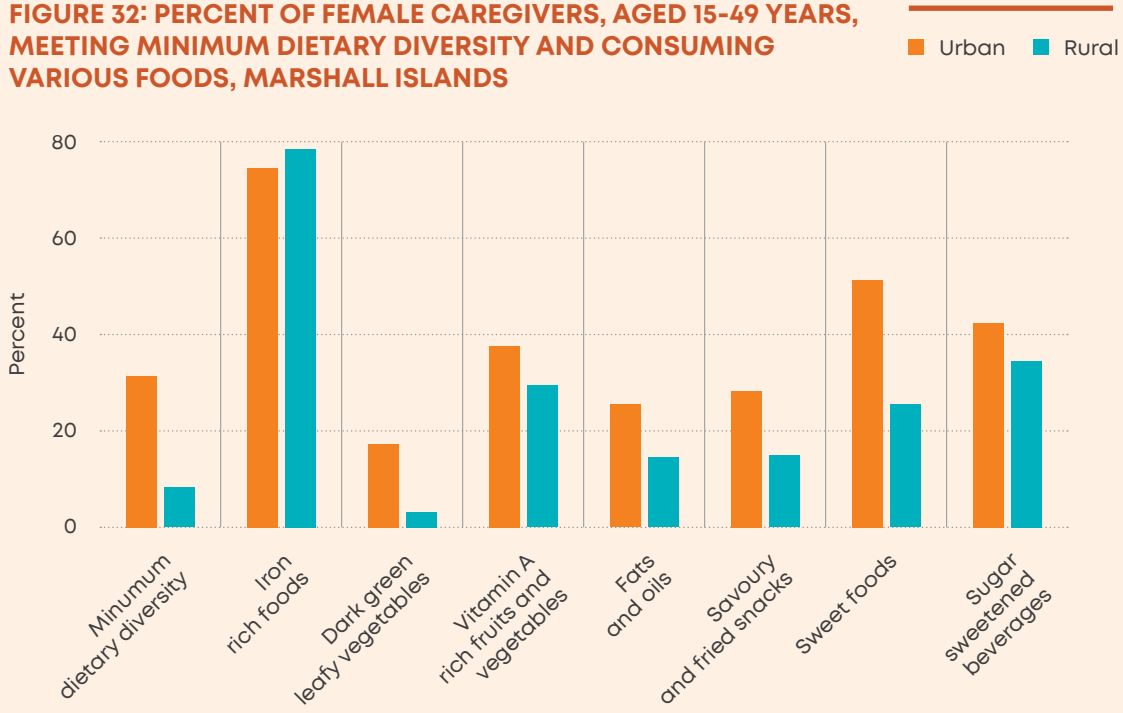
The multiple burden of malnutrition is particularly severe in the Pacific islands. In the Marshall Islands, one in four households have a stunted child with an overweight or obese mother. Child dietary diversity was poor, with only 31 percent of children receiving a minimally acceptable diet. While urban children were more likely than rural children to have a diversified diet, consumption of micronutrient-rich foods, such as dark green leafy vegetables, was very low at 12 percent. Urban children were also more likely to consume low-nutrient density foods such as sugar sweetened beverages, sugary foods, oils and fats. In adult women of reproductive age in the Marshall Islands, dietary diversity is poor, and overweight and obesity rates are amongst the highest in the world for both urban and rural areas. Over 70 percent of women are overweight and 46 percent are obese. While dietary diversity was higher for women in urban areas, it was still considered low. Furthermore, the benefits of dietary diversity are counterbalanced by the high consumption of low micronutrient density foods (see Figure 32).

VULNERABILITY TO MARKET SHOCKS

Price and market shocks have a greater impact on urban households than on rural households because urban households rely more on the market for food and other services, and the urban poor are impacted more than the urban non-poor. Numerous studies have documented this, including during the 2008 global food price crisis and the Asian financial crisis of the 1990s (Block, *et al.*, 2004; Cohen and Garrett, 2010; Tacoli and Vorley, 2015).

Recent experience from Nepal illustrates how the urban poor were more vulnerable to price and economic shocks than the rural poor. Nepal suffered from an earthquake in 2015 followed by severe disruptions of trade that lasted for six months in 2016. This led to shortages of foods and medicines, and food inflation soared to high levels. National health and nutrition surveys conducted in 2014 and 2016 showed sharp deterioration in key indicators of malnutrition among urban children (MoH Nepal, New ERA and ICF, 2017). The 2014 survey had shown that urban children were substantially better off in terms of malnutrition and access to a minimally acceptable diet (Central Bureau of Statistics, 2015). However, the 2016 survey showed a complete reversal of this, with a dramatic rise in stunting among urban children and reduction in the share of children with access to a minimally acceptable diet.

FIGURE 32: PERCENT OF FEMALE CAREGIVERS, AGED 15-49 YEARS, MEETING MINIMUM DIETARY DIVERSITY AND CONSUMING VARIOUS FOODS, MARSHALL ISLANDS



Source: Republic of the Marshall Islands Economic Planning and Statistics Office, and UNICEF, 2017.

One study from India showed how the rural and urban poor are affected differently by changes in relative prices of food and the pattern of growth. It found that lower cereal prices relative to milk/milk product and vegetable prices increased the probability of adult underweight, while the reverse relationship was seen in rural areas and at the national level (Kulkarni *et al.*, 2017). In urban areas, lower cereal prices relative to edible oils increased the probability of adult obesity. Furthermore, socio-economic influences on BMI were seen to be stronger in urban areas than in rural. This means that the policies that influence food prices and manage economic shocks need to be sensitive to food security and nutrition concerns of both urban and rural households.

One source of the economic shocks facing the urban poor is the informality of the job market, as the urban poor rely heavily on informal markets. The informal economy refers to all economic activities by workers that are, in law or in practice, not covered or insufficiently covered by formal employment arrangements. Informal job markets are characterized by weak protection of jobs and wages, unsatisfactory occupational health and safety conditions, and an absence of social benefits, sick pay and health insurance. Even where there are labour laws, these are often not enforced effectively.

There is a need for a greater understanding of the food insecurity risks facing the urban poor. While the impact of food price shocks are well documented, those emanating from the informality of the job market are not sufficiently documented for policies and targeted interventions. There is also a perception that national poverty lines do not always fully capture the costs of urban living, including costs for housing, health services, WASH and other necessities which may not be as prominent for rural households. Some recent initiatives in this area include the decision to use a separate poverty line for the urban poor in Indonesia and WFP surveys on the cost of healthy diets being conducted in some countries in the region.

MANAGING SAFETY NETS

The provision of food and income safety nets to individuals and households, and financial assistance to neighbourhoods, is a well-documented challenge. Cities are heterogeneous and many urban poor are difficult to identify because of the informality of their work and dwelling. One study based on household survey data from 112 countries found that, on average, only 21.3 percent of the urban population in low- and middle-income countries was covered by some form of safety net, versus 27.7 percent in rural areas, while the coverage was lower among the lowest income quintiles (16.6 percent urban poor and 23.4 percent rural poor) (Gentilini, 2015). Targeting interventions is difficult when residency is informal and unrecorded, notably in the slums, and where many jobs are informal.

Identifying the most deprived among the urban poor for targeting safety nets is difficult as there are often pockets of urban poor that elude surveys and statistics, especially in slum areas. One such example comes from Kuala Lumpur, a wealthy city where 7 percent of the households living in low-cost apartments in the city were reported to be below the poverty line, and over 10 percent of children consumed fewer than three meals a day (UNICEF, 2018a). In India, a large segment of the urban poor living in slums are deprived of assistance provided by the government (such as WASH, food, etc.) for the simple reason that they live in 'non-notified' slums, i.e. slums that are not legally recognized for government assistance (Nolan *et al.*, 2018). An estimated 59 percent of the Indian slum settlements are non-notified, and about 37 percent of all households living in slums are located in these non-notified slums. In China, many rural to urban migrants do not have an urban *'hukou'* (permit) and therefore do not have access to many public services in the cities where they live. Reforms to grant access to some of these migrants has taken place in the past years but many are still not able to access key social services. These examples illustrate that segments of the urban poor are still deprived of essential services and safety nets.

MANAGING PHYSICAL MARKETPLACES AND NETWORKS FOR FOOD SUPPLY

One issue of policy significance for urban food access, safety and the provision of diverse and nutritious foods is the management of marketplaces, notably wet markets, which specialize in fresh produce such as vegetables, fruit, meat, fish and poultry products. These outlets continue to be widespread in all countries despite the rapid growth of supermarkets. In Asia and elsewhere, a dilemma faced by some governments and city councils has been whether to discourage or close such outlets in favour of supermarkets or to help them to better manage food safety risks. In China, several municipal governments in large cities in the early 2000s launched a programme to convert wet markets into supermarkets (known as *nong gai chao*), but the initiative was not effective in many cities, as wet markets continued to dominate in fresh food retailing (Zhenzhong *et al.*, 2016). Wet markets are now formally recognized by local governments. In Shanghai, for example, the municipal government in its zoning plan requires city developers to build wet markets in designated areas on the principle of one wet market plus one small vegetable shop per square kilometre (Zhenzhong *et al.*, 2016).

A similar programme replacing wet markets with supermarkets was implemented in Viet Nam with food safety being the primary reason. One recent study assessed this programme with a case study of a fresh vegetable market in Hanoi and concluded that the programme was partly counter-effective in that the supermarket outlets reached only a minor segment of the population and drove a large group of shoppers, particularly poorer segments of the population, into informal vending markets, most probably also exposing them to unsafe foods (Wertheim-Heck *et al.*, 2015). The study argued for a flexible and gradual approach to restructuring markets for improved management of food safety risks rather than promoting supermarkets as a single and ideal form of food shopping.

In Singapore, the Hawker Centres Upgrading Programme was launched in 2001 to develop and maintain hawker centres as vibrant, communal spaces, offering a wide variety of affordable foods in a clean and hygienic environment. The programme improved the conditions under which street food vendors operate by improving sanitary facilities, including water and sewage pipes, toilets, waste management and ventilation (NEA, 2018).

There are also examples of local governments in some cities seeking to relocate street vendors out of sight, even for aesthetic reason (Taylor and Song, 2016). This can work similarly as stringent regulations, putting the food safety of the poorer segments at a greater risk as they are forced to source food from unregulated markets where food safety is often poorly managed (Wertheim-Heck *et al.*, 2015).

FOOD SAFETY

Risks to food safety in urban food systems in the region are particularly challenging to manage because of their complexity, the variety of fresh and processed products, and the diversity of the populations they serve. There are four notable challenges to urban food safety:

1. Overlaps in responsibilities among agencies responsible for food safety, especially between urban civic bodies, that are responsible for inspections and enforcement, and national food safety authorities.

2. Resource implications of monitoring and regulating the vast numbers of food businesses operating in urban areas, including street vendors and other informal providers.

3. Urban food chains are long and food safety is affected by activities throughout the chain. This requires effective risk-based food inspection and enforcement programmes to verify compliance.

4. Infrastructural and environmental issues such as waste disposal and sewage systems have profound effects on food safety. In such conditions, wet markets are at high risk of being the source of foodborne disease outbreaks.

These challenges need to be addressed in a comprehensive way, based on strengthening national food safety systems and taking a farm-to-table approach to identify food safety hazards and critical control points along the chain. Some food safety risks (such as pesticide residues) need to be managed at the farm level, while others (mycotoxins, pathogens, physical impurities) need to be addressed along the chain. The safety of fresh produce needs to be assured in the context of movement, storage and retail in urban environments. Wet markets and street food are prime locations for improving food safety through an integrated One Health approach. Strengthening food safety systems in urban settings can reduce the risk of food safety incidents and emergencies. This may include strengthening food safety policy and legislation, risk-based food inspection, incident and emergency responses, and information underpinning evidence and food safety communications and education. Improving food safety governance through participatory approaches and empowerment of food businesses and consumers, as well as implementing risk-based approaches, can reduce food safety risks in urban settings.

SLUMS NEED SPECIAL ATTENTION IN THE URBAN FOOD INSECURITY AND UNDERNUTRITION AGENDA

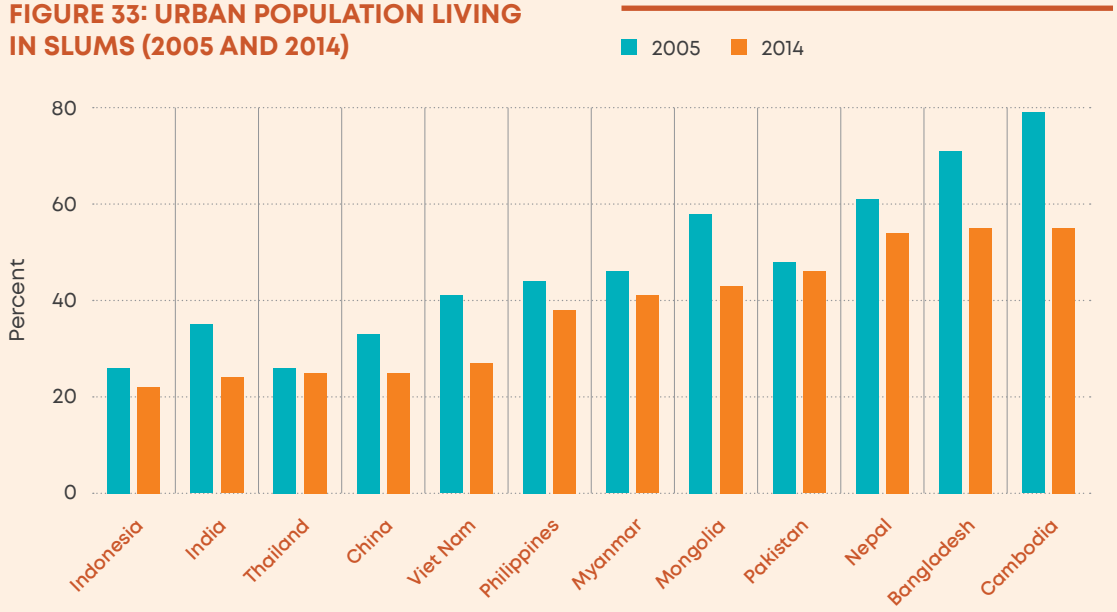
Roughly one-third of the urban population in the region lives in slums (see Figure 33). While the population living in slums declined as a proportion of the total urban population, the total number of slum residents increased in a number of countries between 2005 and 2014. Slums suffer from various deprivations that have significant impacts on food security, nutrition and livelihoods. For example, in Bangladesh, 30 percent of households were found to be severely food insecure in slum areas compared to only 13 percent in non-slum areas. Undernutrition is also significantly higher in urban slum areas of Bangladesh with 44 percent of young children stunted and 17 percent wasted compared to 31 percent and 12 percent, respectively, in non-slum areas. Maternal nutrition status was also significantly poorer in urban slum areas and a key driver of child undernutrition, with 21 percent of mothers having short stature compared to only 11 percent of mothers in non-slum areas (WFP, 2017d). Governments and civil societies across Asia have begun to respond robustly to the issue of housing, water, sanitation and hygiene in slum areas. Indonesia, for example, through their *National Slum Upgrading Project* (2015-2019), have recognized the need to support slum inhabitants, however, many initiatives so far remain focused on housing with little attention to shaping food environments.

URBAN FOOD AND NUTRITION GOVERNANCE

There is growing consensus that local governments, such as city councils, should play a more substantive role in managing urban food and nutrition issues. The reason is that effectively addressing urban food and nutrition issues requires the provision of multiple services in a coordinated and integrated manner, rather than through multiple ministries and agencies. Local governments are being seen as appropriate bodies for providing the required coordination. The Milan Urban Food Policy Pact and the New Urban Agenda, signed in October 2016 at the HABITAT III Conference, are important milestones in mainstreaming food issues in local governments.

New initiatives are being introduced to strengthen the capacity of city governments to be involved in food and nutrition areas. One example is FAO's NADHALI initiative, which is piloting projects in three cities,

FIGURE 33: URBAN POPULATION LIVING IN SLUMS (2005 AND 2014)



Source: The World Development Indicators database, World Bank Group.

Dhaka, Nairobi and Lima, with the objective of developing city-wide food system plans through:

1 establishing a multi-stakeholder food systems platform as a technical advisory group;

2 undertaking analytical work to prioritize interventions; and

3 building the capacity of local governments.

Inter-agency collaborative works are also underway for identifying priorities and means for operationalizing the New Urban Agenda (Fonseca *et al.*, 2018).

One key message of these initiatives is that urban planners must become new nutrition partners. They can affect the landscape of food outlets in cities and the creation of public green spaces for exercise and clean/healthy modes of transport, such as sidewalks and bike paths. Examples of such city-led initiatives include implementing policies banning the retailing of unhealthy foods in a 200-metre radius from schools in New Delhi (DTE Staff, 2015), and locating hawker centres in neighbourhoods across the city and providing low-cost food without being affected by varying real estate prices in Singapore. The city has also started increasing the amount of bike paths and has made it legal for cyclists to cycle on sidewalks (National Environment Agency, 2018; Siong, 2016). Such examples illustrate the need for a more holistic and multi-sectoral approach with the involvement of a diverse set of stakeholders.

Malnutrition is a serious problem in both rural and urban areas. However, rural and urban food environments are substantially different from one another. Thus, eradicating malnutrition will require different approaches in urban areas than those used in rural areas. Urban food policy will require more nuanced policy formulation that recognizes the diversity of urban food environments and can integrate food and nutrition interventions with wider areas of policy such as urban planning, transport, infrastructure, housing, education, and water and sanitation (Glopan, 2017). There is also a need to work more closely with informal food retailers to enhance the access, nutritional quality and safety of food products offered by them; supermarkets for formulating and implementing national policies and guidelines on product formulation, marketing and labelling; and other public and private institutions in promoting consumer education about healthier dietary choices, food quality and nutrition.

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Working for #ZeroHunger

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ASIA AND THE PACIFIC REGIONAL OVERVIEW OF FOOD SECURITY AND NUTRITION

ACCELERATING PROGRESS TOWARDS THE SDGs

During the last three years, progress at reducing undernourishment has slowed tremendously in Asia and the Pacific. After years of gains in combatting hunger, progress has stagnated in all parts of this vast region. Despite decades of economic growth, nearly half a billion people remain undernourished.

Children, in particular, continue to face the burden of malnutrition – this region is home to more than half of the world's malnourished children – with one child in every four below the age of five suffering from stunting. This is a colossal human loss, given the association between undernutrition and poor cognitive development, with severe lifelong consequences for these children. At the same time, and almost paradoxically, Asia and the Pacific has witnessed rapid growth in the number of overweight children and the serious consequences that entails for their future health and well-being. This double burden of malnutrition sees undernourished and overweight children living in the same communities and households and it can even occur within the same child.

Efforts to fight hunger and malnutrition must go hand in hand with those to build and sustain peace and there is an urgent need to accelerate and scale up actions that strengthen resilience and adaptive capacity of people and their livelihoods to climate variability and extremes.

As migration from rural to urban areas continues apace, particularly involving poorer families, urban malnutrition is another challenge facing many countries.

In summary, what is becoming increasingly clear is that the world cannot meet the 2030 target of zero hunger if Asia and the Pacific – the world's most populous region – is not leading the way. It is a hard reality but one that must be faced with a united determination to turn things around.

For the first time, four UN agencies have come together to jointly assess the state of food security and nutrition in Asia and the Pacific. Together, we hope that the findings of this report will contribute to a more informed dialogue. Without doubt, all stakeholders must make much greater efforts to accelerate progress toward the goals of a healthy and hunger-free Asia and the Pacific. Action is needed now. The sense of urgency cannot be overstated.

THE STATE OF THE WORLD

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