E

COMMITTEE ON WORLD FOOD SECURITY

Forty-ninth Session ***"Making a Difference in Food Security and Nutrition"***
11-14 October 2021
THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD (SOFI) 2021: TRANSFORMING FOOD SYSTEMS FOR FOOD SECURITY, IMPROVED NUTRITION AND AFFORDABLE HEALTHY DIETS FOR ALL

Documents can be consulted at www.fao.org
NG773

Food and Agriculture Organization of the United Nations

IFAD International Fund for Agricultural Development

unicef

WFP World Food Programme

World Health Organization

2021

THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

TRANSFORMING FOOD SYSTEMS FOR FOOD SECURITY, IMPROVED NUTRITION AND AFFORDABLE HEALTHY DIETS FOR ALL

This flagship publication is part of **The State of the World** series of the Food and Agriculture Organization of the United Nations.

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

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the World Food Programme (WFP) or the World Health Organization (WHO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO, IFAD, UNICEF, WFP or WHO in preference to others of a similar nature that are not mentioned.

The designations employed and the presentation of material in the maps do not imply the expression of any opinion whatsoever on the part of FAO, IFAD, UNICEF, WFP or WHO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

All reasonable precautions have been taken by FAO, IFAD, UNICEF, WFP and WHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall FAO, IFAD, UNICEF, WFP and WHO be liable for damages arising from its use.

ISSN 2663-8061 (print)
ISSN 2663-807X (online)
ISBN 978-92-5-134325-8
© FAO 2021

Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; https://creativecommons.org/licenses/by-nc-sa/3.0/igo).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organization, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons licence. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original English edition shall be the authoritative edition."

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL) as at present in force.

Third-party materials. Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

Sales, rights and licensing. FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org.
Requests for commercial use should be submitted via: www.fao.org/contact-us/licence-request.
Queries regarding rights and licensing should be submitted to: copyright@fao.org.

COVER PHOTOGRAPH ©John Keates / Alamy Stock Photo

VIET NAM. A woman with a traditional conical hat selling fruit on the beach.

ISSN 2663-8061

2021

THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

TRANSFORMING FOOD SYSTEMS FOR FOOD SECURITY, IMPROVED NUTRITION AND AFFORDABLE HEALTHY DIETS FOR ALL

Food and Agriculture Organization of the United Nations
Rome, 2021

CONTENTS

FOREWORD vi
METHODOLOGY viii
ACKNOWLEDGEMENTS ix
ACRONYMS AND ABBREVIATIONS xi
KEY MESSAGES xii
EXECUTIVE SUMMARY xv

CHAPTER 1
INTRODUCTION 1

CHAPTER 2
FOOD SECURITY AND NUTRITION AROUND THE WORLD 7
2.1 Food security indicators – latest updates and progress towards ending hunger and ensuring food security 8
2.2 Nutrition indicators – latest updates and progress towards global nutrition targets 29
2.3 Ending hunger and all forms of malnutrition by 2030 38

CHAPTER 3
MAJOR DRIVERS OF RECENT FOOD SECURITY AND NUTRITION TRENDS 51
3.1 A food systems lens is critical to address the major drivers of recent food security and nutrition trends 52
3.2 Impact of major drivers on food security and nutrition 60

CHAPTER 4
WHAT NEEDS TO BE DONE TO TRANSFORM FOOD SYSTEMS FOR FOOD SECURITY, IMPROVED NUTRITION AND AFFORDABLE HEALTHY DIETS? 85
4.1 Six pathways to address major drivers behind recent food security and nutrition trends 87
4.2 Building coherent portfolios of policies and investments 109

CHAPTER 5
CONCLUSION 125

ANNEXES 129

ANNEX 1A
Statistical tables to Chapter 2 130

ANNEX 1B
Methodological notes for the food security and nutrition indicators 156

ANNEX 2
Methodologies Chapter 2 170

ANNEX 3
Country exposure to the drivers and PoU change point analysis in Chapter 3 179

ANNEX 4
Country group definitions and lists of countries affected by drivers in Chapter 3 181

ANNEX 5
Country group definitions for the analysis of food insecurity and drivers in 2020 186

ANNEX 6
Glossary 188

NOTES 194

TABLES

1 Prevalence of undernourishment (PoU) in the world, 2005–2020 11

2 Number of undernourished people in the world, 2005–2020 12

3 Prevalence of food insecurity at severe level only, and at moderate or severe level, based on the Food Insecurity Experience Scale, 2014–2020 17

4 Number of people experiencing food insecurity at severe level only, and at moderate or severe level, based on the Food Insecurity Experience Scale, 2014–2020 18

5 Healthy diets were still unaffordable for around 3 billion people in the world in 2019. The number of people unable to afford healthy diets increased in Africa and in Latin America and the Caribbean between 2017 and 2019 27

6 The global nutrition targets endorsed by the World Health Assembly and their extension to 2030 31

7 Most regions have made some progress, but not enough to achieve global targets if trends (before COVID-19) continue; no subregion is on track for the low birthweight target, and adult obesity has been worsening in all subregions 42

8 Key policy areas and goals for integrating humanitarian, development and peacebuilding efforts in conflict-affected areas 92

9 Key policy areas and goals for scaling up climate resilience across food systems 95

10 Key policy areas and goals for strengthening resilience of the most vulnerable to economic adversity 98

11 Key policy areas and goals for intervening along food supply chains to lower the cost of nutritious foods 101

12 Key policy areas and goals for tackling structural inequalities, ensuring interventions are pro-poor and inclusive 105

13 Key policy areas and goals for strengthening food environments and changing consumer behaviour to promote dietary patterns with positive impacts on human health and the environment 108

A1.1 Progress towards the Sustainable Development Goals (SDGs) and global nutrition targets: Prevalence of undernourishment, moderate or severe food insecurity, selected forms of malnutrition, exclusive breastfeeding and low birthweight 130

A1.2 Progress towards the Sustainable Development Goals (SDGs) and global nutrition targets: Number of people who are affected by undernourishment, moderate or severe food insecurity and selected forms of malnutrition; number of infants exclusively breastfed and number of babies born with low birthweight 143

A2.1 Ranges of PoU and NoU nowcasted in 2020 171

A2.2 Regression coefficients from three models estimated on historic CVy values (2000–2019) 175

A2.3 Rules for progress assessment against the global nutrition targets 177

A4.1 List of countries by combination of drivers 184

FIGURES

1 The number of undernourished people in the world continued to rise in 2020. Between 720 and 811 million people in the world faced hunger in 2020. Considering the middle of the projected range (768 million), 118 million more people were facing hunger in 2020 than in 2019 – or as many as 161 million, considering the upper bound of the range 10

2 More than half (418 million) of the people in the world affected by hunger in 2020 were in Asia and more than one-third (282 million) in Africa 13

3 All subregions of Africa and Latin America and the Caribbean, and most subregions of Asia, show increases in the prevalence of undernourishment from 2019 to 2020, with the sharpest increase in Western Africa 14

CONTENTS

4 Moderate or severe food insecurity has been climbing slowly for six years and now affects more than 30 percent of the world population 19

5 The concentration and distribution of food insecurity by severity differs greatly across the regions of the world 20

6 Globally and in every region, the prevalence of food insecurity is higher among women than men 22

7 Reaching the 2025 and 2030 global nutrition targets remains a challenge. In 2020, an estimated 22 percent of children under 5 years of age were affected by stunting, 6.7 percent by wasting and 5.7 percent by overweight. Nearly 30 percent of women aged 15 to 49 years were affected by anaemia in 2019 32

8 Stunting is the only indicator showing substantial improvements in multiple regions since 2000. Two indicators – child overweight and anaemia among women of reproductive age – have seen no progress in two decades. Adult obesity is rising sharply in all regions 34

9 Around 90 percent of countries surveyed reported changes in coverage of key nutrition services due to COVID-19 in August 2020. While 80 percent reported disruptions in coverage, a small proportion witnessed improved coverage 36

10 The COVID-19 scenario projects a small decrease in global hunger between 2021 and 2030, with wide variation in evolution across regions 40

11 Some progress has been made on malnutrition, but the pace must be accelerated, and trends in some forms of malnutrition must be reversed to achieve the 2025 and 2030 global nutrition targets 44

12 Around half of children live in countries that are not on track to reach one of the 2030 SDG targets for child stunting, wasting and overweight 46

13 Conservative estimates of the potential impacts of the COVID-19 pandemic indicate that an additional 5 to 7 million children may be stunted, and 570 thousand to 2.8 million more wasted, in low- and middle-income countries in the year 2030. However, the estimate of accumulated additional cases of wasting from 2020 to 2030 is 16 to 40 million 48

14 Impacts of various drivers are transmitted throughout food systems, undermining food security and nutrition 53

15 Low- and middle-income countries face increasing frequency and intensity of drivers 61

16 While poverty declines around the world, income inequality remains high, with an increase in 2020 in low- and middle-income countries 64

17 More than half of low- and middle-income countries experienced increasing PoU change points in correspondence with one or more drivers (conflict, climate extremes, and economic slowdowns and downturns) between 2010 and 2018 66

18 The 2020 increase in the number of undernourished was more than five times greater, than the highest increase in undernourishment in the last two decades, and the economic downturn was twice as severe, than previously recorded in low- and middle-income countries 68

19 In 2020, most low- and middle-income countries hit by economic downturns exhibit an increase in the PoU, but oftentimes economic downturns occur simultaneously with climate-related disasters and climate extremes 69

20 The majority of undernourished people and stunted children live in countries affected by multiple drivers (2019) 73

21 Hunger is higher and has increased more in countries affected by conflict, climate extremes or economic downturns, or with high inequality 74

22 Low-income countries affected by conflict and climate extremes show the largest increase in the PoU, while for middle-income countries, the largest increase occurs during economic downturns 76

23 Latin America and the Caribbean feature the highest increase in the PoU from multiple drivers, while Africa is the only region where the PoU increased under the influence of all three drivers from 2017 to 2019 78

24 In 2020, Africa, Asia, and Latin America and the Caribbean witnessed significant increases in the PoU while being hit by economic downturns combined with climate-related disasters, conflict, or a combination of both 79

25 The unaffordability of healthy diets in 2019 is strongly associated with higher levels of both severe and moderate or severe food insecurity 81

26 In 2019, countries affected by multiple drivers and countries affected by conflict (alone or combined with other drivers) exhibited among the highest percentage of the population who cannot afford a healthy diet and are moderately or severely food insecure 82

27 Possible pathways towards food systems transformation to address major drivers of food insecurity, malnutrition and unaffordability of healthy diets 88

28 Steps towards food systems transformation for more affordable healthy diets 89

29 Key elements of a portfolio of policies and investments 110

30 Ensuring coherence and complementarity among agri-food*, environmental, health, social protection and other** systems for food systems transformation for food security, improved nutrition and affordable healthy diets for all 111

A4.1 Countries by combination of drivers 183

BOXES

1 Major drivers and underlying factors challenging food security and nutrition in the world: a synthesis from the previous four editions of this report 3

2 Updates to the prevalence of undernourishment and methodology for the 2020 nowcast 9

3 Adapting FIES data collection in the context of the COVID-19 pandemic in 2020 16

4 Using the FIES to guide and target responses to the COVID-19 pandemic at subnational level 23

5 Assessment of progress towards 2030 targets for nutrition indicators 43

6 Methodology: estimates of potential additional cases of stunting and wasting due to the COVID-19 pandemic based on a scenario 47

7 Impact channels of the COVID-19 pandemic on food security and nutrition 56

8 Definition of countries affected by conflict, climate extremes, economic downturns and with high income inequality 71

9 Home-grown school feeding as a lever for food systems transformation 97

10 The Quito Agri-Food Pact: facilitating the transformation of the city's food systems 100

11 Accelerating food systems transformation by empowering women and youth 104

12 Protecting children from the harmful impacts of food marketing 106

13 Nutrition policy measures to enhance benefits and minimize risks of trade 107

14 Indigenous Peoples' systemic approaches provide extensive knowledge for the sustainable and inclusive transformation of food systems 122

FOREWORD

The world is at a critical juncture: it is very different to where it was six years ago when it committed to the goal of ending hunger, food insecurity and all forms of malnutrition by 2030. At the time, while we understood that the challenges were significant, we were also optimistic that with the right transformative approaches, past progress could be accelerated, at scale, to put us on track to achieve that goal. Nonetheless, the past four editions of this report revealed a humbling reality. The world has not been generally progressing either towards Sustainable Development Goal (SDG) Target 2.1, of ensuring access to safe, nutritious and sufficient food for all people all year round, or towards SDG Target 2.2, of eradicating all forms of malnutrition.

Last year's report stressed that the COVID-19 pandemic was having a devastating impact on the world's economy, triggering an unprecedented recession not seen since the Second World War, and that the food security and nutrition status of millions of people, including children, would deteriorate if we did not take swift action. Unfortunately, the pandemic continues to expose weaknesses in our food systems, which threaten the lives and livelihoods of people around the world, particularly the most vulnerable and those living in fragile contexts.

This year, this report estimates that between 720 and 811 million people in the world faced hunger in 2020 – as many as 161 million more than in 2019. Nearly 2.37 billion people did not have access to adequate food in 2020 – an increase of 320 million people in just one year. No region of the world has been spared. The high cost of healthy diets and persistently high levels of poverty and income inequality continue to keep healthy diets out of reach for around 3 billion people in every region of the world. Moreover, new analysis in this report shows that the increase in the unaffordability of healthy diets is associated with higher levels of moderate or severe food insecurity.

While it is not yet possible to fully quantify the impact of the COVID-19 pandemic in 2020, we are concerned by the many millions of children under 5 years of age who were affected by stunting (149.2 million), wasting (45.4 million) or overweight (38.9 million). Child malnutrition continues to be a challenge, particularly in Africa and Asia. Adult obesity also continues to increase, with no reversal in the trend in sight at global or regional levels. Efforts to eradicate malnutrition in all its forms have been challenged by disruptions in essential nutrition interventions and negative impacts on dietary patterns during the COVID-19 pandemic. On the health front, the interaction between the pandemic, obesity and diet-related non-communicable diseases has underlined the urgency of ensuring access to affordable healthy diets for all. Such myriad setbacks hide some important achievements – such as the increasing prevalence of exclusive breastfeeding of infants under 6 months.

The situation could have been worse without governments' responses and the impressive social protection measures they have put in place during the COVID-19 crisis. However, not only have measures to contain the spread of the pandemic resulted in an unprecedented economic recession, but also other important drivers are behind recent setbacks in food security and nutrition. These include conflict and violence in many parts of the world as well as climate-related disasters all over the world. Given the past and present interactions of these drivers with economic slowdowns and downturns, as well as high and persistent (and in some countries growing) levels of inequality, it is not surprising that governments could not keep the worst-case scenario for food security and nutrition from materializing and affecting millions of people all over the world.

Hence, the world is at a critical juncture, not only because we have to overcome more significant challenges to ending hunger, food insecurity and all forms of malnutrition, but also because, with the fragility of our food systems widely exposed, we have an opportunity to build forward better and get on track towards achieving SDG 2. The UN Food Systems Summit, to be held later this year, will bring forward a series of concrete actions that people, food system actors and governments from all over the world can take

to support a transformation of the world's food systems. We must build on the momentum that the run-up to the Summit has already generated and continue to build the evidence base on interventions and engagement models that best support the transformation of food systems. This report aims to contribute to this global effort.

We are aware that transforming food systems so that they provide nutritious and affordable food for all and become more efficient, resilient, inclusive and sustainable has several entry points and can contribute to progress across the SDGs. Future food systems need to provide decent livelihoods for the people who work within them, in particular for small-scale producers in developing countries – the people who harvest, process, package, transport and market our food. Future food systems also need to be inclusive and encourage the full participation of Indigenous Peoples, women and youth, both individually and through their organizations. Future generations will only thrive as productive actors and leading forces in food systems if decisive action is taken to ensure that children are no longer deprived of their right to nutrition.

While this broader food systems transformation is currently at the centre of global attention, this report identifies the transformation pathways needed to specifically address the key drivers behind the recent rise in hunger and slowing progress towards reducing all forms of malnutrition. The report recognizes that these transformation pathways are only feasible if they help meet certain conditions, including creating opportunities for traditionally marginalized people, nurturing human health and protecting the environment. Getting on track towards ending hunger and all forms of malnutrition will require a move away from silo solutions towards integrated food systems solutions, as well as policies and investments that address the global food security and nutrition challenges immediately.

This year offers a unique opportunity for advancing food security and nutrition through transforming food systems with the upcoming UN Food Systems Summit, the Nutrition for Growth Summit and the COP26 on climate change. The outcomes of these events will certainly shape the actions of the second half of the UN Decade of Action on Nutrition. We stand firmly committed to take advantage of the unprecedented opportunity for these events to generate commitments towards transforming food systems to eradicate food insecurity and malnutrition in all its forms and deliver affordable healthy diets for all, and to build forward better from the COVID-19 pandemic.

Qu Dongyu
FAO Director-General

Gilbert F. Houngbo
IFAD President

Henrietta H. Fore
UNICEF Executive Director

David Beasley
WFP Executive Director

Tedros Adhanom Ghebreyesus
WHO Director-General

METHODOLOGY

The State of Food Security and Nutrition in the World 2021 has been prepared by the FAO Agrifood Economics Division in collaboration with the Statistics Division of the Economic and Social Development Stream and a team of technical experts from FAO, IFAD, UNICEF, WFP and WHO.

A senior advisory team consisting of designated senior managers of the five UN publishing partners guided the production of the report. Led by FAO, this team decided on the outline of the report and defined its thematic focus. It further gave oversight to the technical writing team composed of experts from each of the five co-publishing agencies. Background technical papers were prepared to support the research and data analysis undertaken by the members of the writing team. This year's report also included a global call for *"best practices in transforming food systems for affordable healthy diets and addressing key drivers of food insecurity and malnutrition"*, which generated inputs from more than 80 development institutions and individuals worldwide. Further inputs were derived from an online webinar organized through the Global Forum on Food Security and Nutrition (FSN Forum), which included an expert panel discussion and reflection on the report's theme.

The writing team produced a number of interim outputs, including an annotated outline, first draft and final draft of the report. These were reviewed, validated and cleared by the senior advisory team at each stage in the preparation process. The final report underwent a rigorous technical review by senior management and technical experts from different divisions and departments within each of the five UN agencies, both at headquarters and decentralized offices. Finally, the report underwent executive review and clearance by the heads of agency of the five co-publishing partners.

ACKNOWLEDGEMENTS

The State of Food Security and Nutrition in the World 2021 was jointly prepared by the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the World Food Programme (WFP) and the World Health Organization (WHO).

The publication was carried out under the direction of Marco V. Sánchez Cantillo and José Rosero Moncayo, with the overall coordination of Cindy Holleman, the Editor of the publication, and the overall guidance of Máximo Torero Cullen, all of whom are from the FAO Economic and Social Development Stream (ES). The development of the report was guided by a Steering Committee consisting of agency representatives from the five co-publishing partners: Marco V. Sánchez Cantillo (Chair), Sara Savastano (IFAD), Victor Aguayo (UNICEF), Arif Husain (WFP) and Francesco Branca (WHO). Alessandra Garbero and Tisorn Songsermsawas (IFAD), Chika Hayashi and Jo Jewell (UNICEF), Eric Branckaert and Saskia de Pee (WFP) and Marzella Wüstefeld (WHO) contributed to the coordination and provided technical support. Valuable comments and final approval of the report were provided by the executive heads and senior staff of the five co-authoring agencies.

Chapter 1 of the report was written by Cindy Holleman with inputs from Marco V. Sánchez Cantillo and José Rosero Moncayo (FAO).

Chapter 2 of the report was coordinated by Anne Kepple (FAO). Section 2.1 was prepared by Carlo Cafiero with inputs from Piero Conforti, Valentina Conti, Juan Feng, Cindy Holleman, Anne Kepple and Sara Viviani (FAO). Section 2.2 was prepared by Chika Hayashi, Richard Kumapley, Vrinda Mehra and Ann Mizumoto (UNICEF) and Elaine Borghi and Monica Flores Urrutia (WHO), with input from Anne Kepple (FAO), Julia Krasevec (UNICEF), and Katrina Lundberg, Juan Pablo Peña-Rosas and Marzella Wüstefeld (WHO). Section 2.3 was prepared by Carlo Cafiero (FAO); Chika Hayashi, Julia Krasevec, Richard Kumapley, Vrinda Mehra (UNICEF); and Elaine Borghi (WHO), with input from Anne Kepple (FAO), Saskia de Pee (WFP) and Monica Flores Urrutia and Katrina Lundberg (WHO). Olivier Lavagne d'Ortigue (FAO) provided support for data visualization and José Rosero Moncayo (FAO) provided editorial support and input to Sections 2.1 and 2.3. Nona Reuter (UNICEF) provided support for data visualization in Sections 2.2 and 2.3.

Chapter 3 of the report was coordinated and written by Cindy Holleman and Valentina Conti (FAO), with input from Aurelien Mellin and Trudy Wijnhoven (FAO); Aslihan Arslan, Romina Cavatassi, Ilaria Firmian, Stefania Gnoato, Caterina Ruggeri Laderchi, Tisorn Songsermsawas, Isabelle Stordeur and Sakiusa Tubuna (IFAD); Chika Hayashi and Jo Jewell (UNICEF); Eric Branckaert, Saskia de Pee, Simone Gie and Sarah Piccini (WFP); and Elaine Borghi, Karen McColl, Leanne Margaret Riley and Marzella Wüstefeld (WHO). Updated agro-climate analysis and prevalence of undernourishment change point detection were provided by Maria Dimou, Michele Meroni, Felix Rembold, Anne-Claire Thomas, Andrea Toreti, Ferdinando Urbano and Matteo Zampieri (European Commission – Joint Research Centre), while updates to climatology indicators were provided by Christopher Jack with inputs from Olivier Crespo and Pierre Kloppers (University of Cape Town). Marco V. Sánchez Cantillo provided editorial support to the sections of this chapter.

Chapter 4 of the report was coordinated and written by Mark Smulders and Giovanni Carrasco Azzini (FAO), with input from Melisa Aytekin, Luisa Castañeda, Mariana Estrada, Yon Fernandez de Larrinoa, Ileana Grandelis, Cindy Holleman, Julius Jackson, Susan Kaaria, Lourdes Orlando, Marzia Pafumi, Luana Swensson, Mikaila Way and Trudy Wijnhoven (FAO); Tarek Ahmed, Daniel Anavitarte, Ilaria Bianchi, Antonella Cordone, Isabel de la Peña, Aolin Gong, Caterina Ruggeri Laderchi, Joyce Njoro, Karla Sofia

Pita Vidal and Tisorn Songsermsawas (IFAD); Jo Jewell (UNICEF); Eric Branckaert, Saskia de Pee, Simone Gie and Sarah Piccini (WFP); and Maria De Las Nieves Garcia Casal, Katrin Engelhardt, Hyun Jin Kim, Karen McColl, Benn McGrady, Kathryn Robertson and Marzella Wüstefeld (WHO). Further inputs to Chapter 4 were received from FAO, IFAD, UNICEF, WFP and WHO colleagues, as well as technical experts around the world in response to a global call for "best practices in transforming food systems for affordable healthy diets and addressing key drivers of food insecurity and malnutrition". Inputs were also provided by Grahame Dixie and Erin Sweeney from Grow Asia. More than 80 development institutions and individuals worldwide responded to a similar call for best practices in transforming food systems through the Global Forum on Food Security and Nutrition (FSN Forum), facilitated by Svetlana Livinets and Elise Polak (FAO). Chapter 4 also drew lessons from an expert panel through an online webinar organized by the FSN Forum. The panellists included: Tim Benton (Chatham House), Michael Carter (University of California, Davis), Jessica Fanzo (Johns Hopkins University), Ndidi Nwuneli (Sahel Consulting), David Spielman (International Food Policy Research Institute [IFPRI]) and Robert Townsend (World Bank). Marco V. Sánchez Cantillo provided editorial support to the sections of this chapter.

Chapter 5 of the report was written by Marco V. Sánchez Cantillo with inputs from Cindy Holleman and José Rosero Moncayo (FAO).

Numerous colleagues from different technical units and departments across the five co-publishing agencies provided valuable technical comments and input to the report. An agency-wide technical clearance process facilitated a comprehensive review by many technical experts from the five co-authoring agencies. Listing each of the contributions would be challenging and furthermore increase the risk of important omissions.

Juan Feng, Abdul Sattar and Sara Viviani were responsible for preparing undernourishment and food security data with input from Verónica Boero, Marinella Cirillo, Filippo Gheri, Adeeba Ishaq, Talent Manyani, Ana Moltedo, María Rodríguez, Firas Yassin and under the supervision of Carlo Cafiero in Section 2.1. Supporting data were provided by the Food Balance Sheets team, led by Salar Tayyib of the FAO Statistics Division (ESS). Valentina Conti and Cindy Holleman (FAO) were responsible for preparing the analysis of the cost and affordability of healthy diets in Section 2.1, with input from Yan Bai, Leah Costlow, Alissa Ebel, Anna Herforth, William A. Masters and Aishwarya Venkat (Tufts University), and Piero Conforti, Jean Marie Vianney Munyeshyaka and Michele Vollaro (FAO). Richard Kumapley (UNICEF) was responsible for consolidating the nutrition data in Section 2.2, with input from Chika Hayashi, Julia Krasevec and Vrinda Mehra (UNICEF), and Elaine Borghi, Monica Flores Urrutia and Leanne Riley (WHO). Carlo Cafiero prepared the 2030 projections of undernourishment with input from Juan Feng, Adeeba Ishaq and Abdul Sattar (FAO) in Section 2.3. David Laborde generated key input for the 2030 projected scenarios of undernourishment as part of a research collaboration with IFPRI. Chika Hayashi and Richard Kumapley (UNICEF) and Elaine Borghi and Giovanna Gatica Dominguez (WHO) were responsible for the analyses in Section 2.3 and Annex 2, including on progress towards global nutrition targets and of the potential impact of the COVID-19 pandemic on child stunting and wasting by 2030, with input from Julia Krasevec and Vrinda Mehra (UNICEF).

Support for report production came from Giovanni Carrasco Azzini, Andrew Park (consulting editor) and Daniela Verona in the FAO Economic and Social Development Stream.

The FAO Meeting Branch and Language Services Branch of Governing Bodies Servicing Division (CSG) carried out the translations, in addition to the contributors mentioned above.

The Publishing Group (OCCP) of the FAO's Office of Communications provided editorial support, design and layout, as well as production coordination, for editions in all six official languages.

ACRONYMS AND ABBREVIATIONS

AARR	Average annual rate of reduction
ADER	Average dietary energy requirement
ASAP	Anomaly Hotspots of Agriculture Production
ASEAN	Association of Southeast Asian Nations
BMI	Body mass index
CGE	Computable general equilibrium
CH	Cadre Harmonisé (harmonized framework)
CHIRPS	Climate Hazards Group Infrared Precipitation with Stations
CPI	Consumer price index
CRED	Centre for Research on the Epidemiology of Disasters
CSA	Climate-smart agriculture
CV	Coefficient of variation
CV|r	CV due to energy requirements
CV|y	CV due to income
DEC	Dietary energy consumption
DES	Dietary energy supply
ECMWF	European Centre for Medium-Range Weather Forecasts
FAO	Food and Agriculture Organization of the United Nations
FBDGs	Food-based dietary guidelines
FBS	Food Balance Sheet
FIES	Food Insecurity Experience Scale
$FI_{mod+sev}$	Prevalence of moderate or severe food insecurity
FI_{sev}	Prevalence of severe food insecurity
GDP	Gross domestic product
GHG	Greenhouse gas
GWP	Gallup World Poll
HCES	Household Consumption and Expenditure Survey
HDP	Humanitarian-development-peace
HGSF	Home-grown school feeding
IDP	Internally displaced person
IFAD	International Fund for Agricultural Development
ILO	International Labour Organization
IMF	International Monetary Fund
IPC	Integrated Food Security Phase Classification
IQ	Intelligence quotient
JME	Joint Malnutrition Estimates
LIFDCs	Low-income food-deficit countries
LMICs	Low- and middle-income countries
MDD	Minimum Dietary Diversity
MDD-W	Minimum Dietary Diversity for Women
MDER	Minimum dietary energy requirement
MIRAGRODEP	Modelling International Relations under Applied General Equilibrium
MPP	Mountain Partnership Products
NCD	Non-communicable disease
NoU	Number of undernourished
PoU	Prevalence of undernourishment
PPP	Purchasing power parity
PPPP	Public-private-producer partnership
SD	Standard deviation
SDGs	Sustainable Development Goals
SMEs	Small and medium-sized enterprises
UCDP	Uppsala Conflict Data Program
UNICEF	United Nations Children's Fund
USD	United States dollar
VCC	Virtual call centre
WEAI	Women's Empowerment in Agriculture Index
WEO	World Economic Outlook
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization

KEY MESSAGES

➔ Well before the COVID-19 pandemic, we were already not on track to meet our commitments to end world hunger and malnutrition in all its forms by 2030. Now, the pandemic has made this significantly more challenging. This report presents the first global assessment of food insecurity and malnutrition for 2020 and highlights the need for a deeper reflection on how to better address the global food security and nutrition situation.

➔ World hunger increased in 2020 under the shadow of the COVID-19 pandemic. After remaining virtually unchanged for five years, the prevalence of undernourishment (PoU) increased 1.5 percentage points in just one year – reaching a level of around 9.9 percent, heightening the challenge of achieving the Zero Hunger target by 2030.

➔ It is projected that between 720 and 811 million people in the world faced hunger in 2020. Considering the middle of the projected range (768 million), around 118 million more people were facing hunger in 2020 than in 2019 – or as many as 161 million more, considering the upper bound of the range.

➔ More than half of the world's undernourished are found in Asia (418 million) and more than one-third in Africa (282 million). Compared with 2019, about 46 million more people in Africa, 57 million more in Asia, and about 14 million more in Latin America and the Caribbean were affected by hunger in 2020.

➔ New projections confirm that hunger will not be eradicated by 2030 unless bold actions are taken to accelerate progress, especially actions to address inequality in access to food. All other things constant, around 660 million people may still face hunger in 2030 in part due to lasting effects of the pandemic on global food security – 30 million more people than in a scenario in which the pandemic had not occurred.

➔ While the global prevalence of moderate or severe food insecurity (measured using the Food Insecurity Experience Scale) has been slowly on the rise since 2014, the estimated increase in 2020 was equal to that of the previous five years combined. Nearly one in three people in the world (2.37 billion) did not have access to adequate food in 2020 – an increase of almost 320 million people in just one year.

➔ Close to 12 percent of the global population was severely food insecure in 2020, representing 928 million people – 148 million more than in 2019.

➔ At the global level, the gender gap in the prevalence of moderate or severe food insecurity has grown even larger in the year of the COVID-19 pandemic, with the prevalence of moderate or severe food insecurity being 10 percent higher among women than men in 2020, compared to 6 percent in 2019.

➔ The high cost of healthy diets coupled with persistent high levels of income inequality put healthy diets out of reach for around 3 billion people, especially the poor, in every region of the world in 2019. This number is slightly less than in 2017 and will likely increase in most regions in 2020 due to the COVID-19 pandemic.

➔ Shifting to healthy diets that include sustainability considerations can contribute to reducing health and climate change costs by 2030, because the hidden costs of these diets are lower compared with those of current consumption patterns.

➔ Globally, malnutrition in all its forms also remains a challenge. Although, it is not yet possible to fully account for the impact of the COVID-19 pandemic due to data limitations, in 2020 it is estimated that 22.0 percent (149.2 million) of children under 5 years of age were affected by stunting, 6.7 percent (45.4 million) were suffering from wasting and 5.7 percent (38.9 million) were overweight. The actual figures, particularly for stunting and wasting, are expected to be higher due to the effects of the pandemic.

➔ Most children with malnutrition live in Africa and Asia. These regions account for more than nine out of ten of all children with stunting, more than nine out of ten children with wasting and more than seven out of ten children who are affected by overweight worldwide.

➔ An estimated 29.9 percent of women aged 15 to 49 years in 2019 around the world are affected by anaemia – now a Sustainable Development Goal (SDG) Indicator (2.2.3). However, the data reveal stark regional differences: more than 30 percent of women in Africa and Asia were affected by anaemia, compared with only 14.6 percent of women in Northern America and Europe. Adult obesity is increasing sharply in all regions.

➔ Globally, the world is not on track to achieve targets for any of the nutrition indicators by 2030. The current rate of progress on child stunting, exclusive breastfeeding and low birthweight is insufficient, and progress on child overweight, child wasting, anaemia in women of reproductive age and adult obesity is stalled or the situation is worsening.

➔ The COVID-19 pandemic has likely impacted the prevalence of multiple forms of malnutrition, and could have lasting effects beyond 2020, as we are already seeing in 2021. These will be compounded through the intergenerational effects of malnutrition and the resulting impacts on productivity. Exceptional efforts are required to address and overcome the effects of the pandemic as part of accelerating progress towards achieving SDG Target 2.2.

➔ Conflict, climate variability and extremes, and economic slowdowns and downturns (now exacerbated by COVID-19 pandemic) are major drivers of food insecurity and malnutrition that continue to increase in both frequency and intensity, and are occurring more frequently in combination.

➔ The reversal in the PoU trends in 2014 and continuous increase, especially pronounced in low- and middle-income countries from 2017, are largely attributed to countries affected by conflict, climate extremes and economic downturns, and to countries with high income inequality.

➔ Between 2017 and 2019, the PoU increased by 4 percent in countries affected by one or more of these major drivers while it decreased by 3 percent in countries not affected by them. While middle-income countries affected by these drivers registered only a 2 percent increase in the PoU, the increase for those with high income inequality was double – 4 percent.

➔ In the same period, countries affected by multiple drivers exhibited the highest increases in the PoU, 12 times larger than those in countries affected by only a single driver.

➔ Drivers that are external (e.g. conflicts or climate shocks) and internal (e.g. low productivity and inefficient food supply chains) to food systems are pushing up the cost of nutritious foods which, combined with low incomes, are increasing the unaffordability of healthy diets. The percentage of the population who cannot afford a healthy diet in countries affected by multiple drivers in 2019 was 39 percent and 66 percent higher, respectively, than in countries affected by a single driver or no driver at all. Increases in the unaffordability of a healthy diet are associated with higher levels of food insecurity, especially among lower-middle-income countries.

➔ In 2020, almost all low- and middle-income countries were affected by pandemic-induced economic downturns, and the increase in their number of undernourished was more than five times greater than the highest increase in undernourishment in the last two decades. When those countries were also affected by other drivers, particularly climate-related disasters, conflict, or a combination, the largest increase in undernourishment was seen in Africa, followed by Asia.

KEY MESSAGES

➔ Because these major drivers are negatively affecting food security and nutrition by creating multiple, compounding impacts throughout our food systems – as well as through the interaction between these and other systems – a food systems lens is therefore essential to better understand these interactions and identify entry points for interventions to address them.

➔ When transformed with greater resilience to major drivers, including conflict, climate variability and extremes, and economic slowdowns and downturns, food systems can provide affordable healthy diets that are sustainable and inclusive, and become a powerful driving force towards ending hunger, food insecurity and malnutrition in all its forms, for all.

➔ Depending on context, there are six pathways to follow towards food systems transformation: integrating humanitarian, development and peacebuilding policies in conflict-affected areas; scaling up climate resilience across food systems; strengthening resilience of the most vulnerable to economic adversity; intervening along the food supply chains to lower the cost of nutritious foods; tackling poverty and structural inequalities, ensuring interventions are pro-poor and inclusive; and strengthening food environments and changing consumer behaviour to promote dietary patterns with positive impacts on human health and the environment.

➔ Given that most food systems are affected by more than one driver, and also impact on food security and nutrition outcomes in multiple ways, the formulation of comprehensive portfolios of policies, investments and legislation may be elaborated along several pathways simultaneously. This will allow for maximizing their combined effects on food systems transformation, exploiting win-win solutions and mitigating undesirable trade-offs.

➔ Coherence in the formulation and implementation of policies and investments among food, health, social protection and environmental systems is also essential to build on synergies towards more efficient and effective food systems solutions to deliver affordable healthy diets, sustainably and inclusively.

➔ Effective and inclusive governance mechanisms and institutions, in addition to access to technology, data and innovation, should serve as important accelerators in the comprehensive portfolios of policies, investments and legislation aimed at transforming food systems.

➔ Systems approaches are needed to build coherent portfolios of policies, investments and legislation and enable win-win solutions while managing trade-offs; these include territorial approaches, ecosystems approaches, Indigenous Peoples' food systems approaches and interventions that systemically address protracted crisis conditions.

➔ While 2020 was an immense challenge for the world, it may also be a warning of unwelcome events to come if the world does not commit to more resolute actions to change course. The major drivers that lie behind recent food security and nutrition trends each have their own trajectory or cyclicality, which ensures they will continue to occur and could even worsen in the coming years.

➔ The UN Food Systems Summit 2021 will bring forward a series of concrete actions that people from all over the world can take to support a transformation of the world's food systems. The six transformation pathways identified in this report are needed for greater resilience to specifically address the negative impacts of the major drivers behind the recent rise in hunger and slowing progress to reduce malnutrition in all its forms.

EXECUTIVE SUMMARY

Well before the COVID-19 pandemic, we were already not on track to ending world hunger and malnutrition in all its forms by 2030. Now, the pandemic has made this goal significantly more challenging. This report presents the first global assessment of food insecurity and malnutrition for 2020 and offers some indication of what hunger and malnutrition would look like by 2030, in a scenario further complicated by the enduring effects of the pandemic. These trends highlight the need for deeper reflection on how to better address the global food security and nutrition situation.

One of the key questions posed in this year's report is – How did the world get to this critical point? To answer, the report draws on the analyses of the past four editions, which have produced a vast, evidence-based body of knowledge of the major drivers behind the recent changes in food security and nutrition. This is updated with new data to feed into a broader analysis of how these drivers interact, allowing for a holistic view of their combined effects both on each other and on food systems. In turn, this informs an in-depth look at how to move from silo solutions to integrated food systems solutions that specifically address the challenges posed by the major drivers, highlighting also the types of policy and investment portfolios required to transform food systems for food security, improved nutrition and affordable healthy diets for all.

FOOD SECURITY AND NUTRITION AROUND THE WORLD

Food security indicators – latest updates and progress towards ending hunger and ensuring food security

The number of people in the world affected by hunger continued to increase in 2020 under the shadow of the COVID-19 pandemic. After remaining virtually unchanged from 2014 to 2019, the PoU increased from 8.4 percent to around 9.9 percent between 2019 and 2020, heightening the challenge of achieving the Zero Hunger target in 2030. The 2020 estimate ranges from 9.2 to 10.4 percent, depending on the assumptions made to reflect the uncertainties around the assessment.

In terms of population, it is estimated that between 720 and 811 million people in the world faced hunger in 2020. Considering the middle of the projected range (768 million), 118 million more people were facing hunger in 2020 than in 2019, with estimates ranging from 70 to 161 million.

The numbers show enduring and troubling regional inequalities. About one in five people (21 percent of the population) was facing hunger in Africa in 2020 – more than double the proportion of any other region. This represents an increase of 3 percentage points in one year. This is followed by Latin America and the Caribbean (9.1 percent) and Asia (9.0 percent), with increases of 2.0 and 1.1 percentage points, respectively, between 2019 and 2020.

Of the total number of undernourished people in 2020 (768 million), more than half (418 million) live in Asia and more than one-third (282 million) in Africa, while Latin America and the Caribbean accounts for about 8 percent (60 million). Compared with 2019, 46 million more people in Africa, almost 57 million more in Asia, and about 14 million more in Latin America and the Caribbean were affected by hunger in 2020.

Moderate or severe food insecurity (based on the Food Insecurity Experience Scale) at the global level has been slowly on the rise, from 22.6 percent in 2014 to 26.6 percent in 2019. Then in 2020, the year the COVID-19 pandemic

spread across the globe, it rose nearly as much as in the previous five years combined, to 30.4 percent. Thus, nearly one in three people in the world did not have access to adequate food in 2020 – an increase of 320 million people in just one year, from 2.05 to 2.37 billion. Nearly 40 percent of those people – 11.9 percent of the global population, or almost 928 million – faced food insecurity at severe levels. Close to 148 million more people were severely food insecure in 2020 than in 2019.

The increases in moderate or severe food insecurity from 2019 to 2020 were sharpest in Latin America and the Caribbean (9 percentage points) and Africa (5.4 percentage points), compared with a 3.1-point increase in Asia. Even in Northern America and Europe, where the lowest rates of food insecurity are found, the prevalence of food insecurity increased for the first time since the beginning of Food Insecurity Experience Scale (FIES) data collection in 2014.

At the global level, the gender gap in the prevalence of moderate or severe food insecurity has grown even larger in the year of the COVID-19 pandemic, with the prevalence of moderate or severe food insecurity being 10 percent higher among women than men in 2020, compared with 6 percent in 2019.

Tracking the cost and the number of people who cannot afford a healthy diet provides valuable metrics to better understand the link between these important determinants of access to food and the trends in the multiple forms of malnutrition. As a result of the high cost of healthy diets, coupled with persistent high levels of income inequality, it is estimated that around 3 billion people were unable to afford a healthy diet in 2019. Most of these people live in Asia (1.85 billion) and Africa (1.0 billion), although a healthy diet is also out of reach for millions living in Latin America and the Caribbean (113 million) and Northern America and Europe (17.3 million).

Nutrition indicators – latest updates and progress towards global nutrition targets

Due to the physical distancing measures taken to contain the spread of the pandemic, data on nutrition outcomes were limited in 2020. Consequently, the latest estimates do not account for the effects of the COVID-19 pandemic.

Globally, 149.2 million (22.0 percent) of children under the age of five years suffered from stunting (SDG Indicator 2.1.1) in 2020. The prevalence of stunting has decreased from 33.1 percent in 2000 to 26.2 percent in 2012 and further to 22.0 percent in 2020. In 2020, nearly three-quarters of the world's stunted children lived in just two regions: Central and Southern Asia (37 percent) and sub-Saharan Africa (37 percent).

In 2020, 45.4 million children under five years (6.7 percent) were wasted. Nearly one-quarter lived in sub-Saharan Africa and more than half lived in Southern Asia, the subregion with the highest prevalence of wasting – above 14 percent.

In the same year, around 5.7 percent (38.9 million) of children under five years were affected by overweight. There has been little change at global level in two decades – 5.7 percent in 2020 compared with 5.4 percent in 2000, and trends in some regions and in many settings are on the rise.

Adult obesity continues to rise, with the global prevalence increasing from 11.7 percent in 2012 to 13.1 percent in 2016. All subregions showed increasing trends in the prevalence of adult obesity between 2012 and 2016 and are off track to meet the 2025 World Health Assembly target to halt the rise by 2025.

One in seven live births, or 20.5 million (14.6 percent) babies globally, suffered from low birthweight in 2015. Low birthweight newborns have a higher risk of dying in the first

28 days after birth; those who survive are more likely to suffer from stunted growth and lower intelligence quotient (IQ), and face increased risk of overweight and obesity and adult-onset chronic conditions, including diabetes, later in life.

Optimal breastfeeding practices, including exclusive breastfeeding for the first 6 months of life, are critical for child survival and the promotion of health and brain and motor development. Globally, 44 percent of infants under 6 months of age were exclusively breastfed in 2019 – up from 37 percent in 2012.

Anaemia in women of reproductive age has been newly designated as an SDG indicator (SDG Indicator 2.2.3). Nearly one in three (29.9 percent) women of reproductive age globally were still affected by anaemia in 2019, and no progress has been made since 2012. Wide variations exist between regions, with the prevalence in Africa being nearly three times higher than that of Northern America and Europe.

Countries worldwide are facing many challenges as they strive to ensure that health, food, education and social protection systems maintain essential nutrition services while simultaneously responding to the COVID-19 pandemic. Based on a survey tracking the situation of children during the pandemic, 90 percent of countries (122 of 135) reported a change in the coverage of key nutrition services in August 2020. Overall, essential nutrition services coverage declined by 40 percent, and nearly half of the countries reported a drop of 50 percent or more for at least one nutrition intervention.

Although data on nutritional outcomes are missing for 2020, research based on modelled scenarios can contribute valuable insights to illustrate the impact of the COVID-19 pandemic at least until new empirical data are available to allow for an official assessment at global and regional levels. Results of one such analysis indicate that, under a moderate scenario, an additional 11.2 million children under five years of age in low- and middle-income countries would be affected by wasting from 2020 to 2022 as a consequence of the pandemic – 6.9 million in 2020 alone. Under a more pessimistic scenario, this estimate rises to 16.3 million additional children affected by wasting. For child stunting, the model predicts that 3.4 million additional children will be stunted due to the effects of the pandemic in 2022.

Ending hunger and all forms of malnutrition by 2030

With less than a decade left to reach the end of the time horizon set for achieving the SDGs, this report presents updated assessments of the likelihood that SDG Targets 2.1 and 2.2 will be achieved by 2030.

This year's projections of the PoU up to 2030 were estimated using a structural approach based on a global dynamic general equilibrium model. Two scenarios were modelled: a scenario aimed at capturing the impact of the COVID-19 pandemic, and a no-COVID-19 scenario. Both scenarios assume that the trajectories are not disrupted by any of the main drivers of food insecurity and that momentous actions needed to transform food systems for food security and decrease inequalities in access to food are not implemented.

Under the COVID-19 scenario, following a projected peak of around 768 million (9.9 percent of the population) in 2020, global hunger would decrease to around 710 million in 2021 (9 percent), and then continue to decrease marginally to less than 660 million (7.7 percent) in 2030. However, the evolution from 2020 to 2030 is quite different across regions. While a substantial reduction is projected for Asia (from

418 million to 300 million people), a significant increase is forecast for Africa (from more than 280 million to 300 million people), placing it on par with Asia by 2030 as the region with the highest number of undernourished people.

Under the COVID-19 scenario, about 30 million more people may face hunger in 2030 than if the pandemic had not occurred, revealing persistent effects of the pandemic on global food security. Greater inequality in access to food is mostly responsible for the observed difference.

Globally, progress is being made for some forms of malnutrition, but the world is not on track to achieve targets for any of the nutrition indicators by 2030. The current rates of progress on child stunting, exclusive breastfeeding and low birthweight are insufficient, and progress on child overweight, child wasting, anaemia in women of reproductive age and adult obesity is stalled (no progress) or the situation is worsening.

As the economic and other impacts of the COVID-19 pandemic continue to unfold, the trajectory over the next years is difficult to foresee. Evidence is still scarce on the actual effects of the pandemic on various forms of malnutrition, including on the prevalence of child stunting, wasting, overweight; adult obesity; anaemia in women of reproductive age; low birthweight; and exclusive breastfeeding. These effects will be compounded through the intergenerational effects of malnutrition and the resulting impacts on productivity and, hence, economic recovery. However, it is clear that the COVID-19 pandemic has likely impacted the prevalence of multiple forms of malnutrition, and could have lasting effects beyond 2020, as we are already seeing in 2021. Therefore, exceptional efforts are required to address and overcome the effects of the pandemic as part of accelerating progress towards achieving SDG Target 2.2.

MAJOR DRIVERS OF RECENT FOOD SECURITY AND NUTRITION TRENDS

A food systems lens is critical to address the drivers of recent food security and nutrition trends

Conflict, climate variability and extremes, and economic slowdowns and downturns (now exacerbated by the COVID-19 pandemic) are behind recent rises in hunger and slowing progress in reducing all forms of malnutrition. Their adverse influence is made all the more difficult by high and persistent levels of inequality. In addition, millions of people around the world suffer from food insecurity and different forms of malnutrition because they cannot afford the cost of healthy diets. These major drivers are unique but not mutually exclusive, as they interact to the detriment of food security and nutrition by creating multiple, compounding impacts at many different points within our food systems.

For example, conflict negatively affects almost every aspect of a food system, from production, harvesting, processing and transport to input supply, financing, marketing and consumption. Direct impacts can include the destruction of agricultural and livelihood assets and can severely disrupt and restrict trade and movements of goods and services, with a negative effect on the availability and prices of food, including nutritious foods.

Similarly, climate variability and extremes create multiple and compounding impacts on food systems. They negatively affect agricultural productivity, and also affect food imports as countries try to compensate for domestic production losses. Climate-related disasters can lead to significant impacts across the food value chain, with negative consequences on sector growth and on food and non-food agro-industries.

On the other hand, economic slowdowns and downturns primarily impact food systems through their negative effects on people's access to food, including the affordability of healthy diets, as they lead to rises in unemployment and declines in wages and incomes. This is the case irrespective of whether they are driven by market swings, trade wars, political unrest, or a global pandemic, such as COVID-19.

The unaffordability of healthy diets is a result of the effects of other drivers or factors on people's income and on the cost of nutritious foods throughout the food system. As such, it is a driver that acts within food systems to negatively affect food security and nutrition.

Poverty and inequality are critical underlying structural factors that amplify the negative impact of the major drivers. Their impacts are felt throughout food systems and food environments, ultimately affecting the affordability of healthy diets and food security and nutrition outcomes.

Beyond their direct impacts on food systems, these major global drivers and underlying structural factors weaken food security and nutrition through interconnected and circular impacts on other systems, including environmental and health systems.

Impact of major drivers on food security and nutrition

In the last ten years, the frequency and intensity of conflict, climate variability and extremes, and economic slowdowns and downturns have increased and are undermining food security and nutrition around the world. Of particular concern are low- and middle-income countries because the negative impacts on food security and nutrition are greatest in these countries and they carry the biggest burden of the world's population who are undernourished, food insecure and suffer from one or more forms of malnutrition.

More than half of the low- and middle-income countries experienced an increase in the PoU in correspondence with one or more drivers (conflict, climate extremes and economic downturns) between 2010 and 2018. Moreover, several of these countries faced recurring increases in correspondence with these drivers during this period.

Analysis shows that the reversal in the PoU trends in 2014 and the continuous increase, especially pronounced from 2017, are largely attributed to low- and middle-income countries affected by conflict, climate extremes and economic downturns, and to countries with high income inequality. The PoU is higher and has increased more in countries affected by these drivers.

Focusing on the most recent period of increase before the COVID-19 pandemic, between 2017 and 2019, low- and middle-income countries affected by one or more of the drivers saw an increase in the PoU, while countries not affected by any driver saw a decrease. In contrast, the prevalence of child stunting shows a continuing declining trend from 2017 to 2019 and an analysis of countries affected by drivers did not reveal any notable patterns, indicating the presence of other stronger drivers behind this trend.

There are also important differences in trends depending on whether a country is affected by more than one driver (multiple drivers) and depending on the country income-group and region. Countries affected by multiple drivers consistently show the highest increases in the PoU, 12 times larger than those countries affected by only a single driver. For all three regions analysed (Africa, Asia, and Latin America and the Caribbean), around 36 percent of low- and middle-income countries were affected by multiple drivers.

Low-income countries affected by conflict and climate extremes show the largest increase in the PoU, while for middle-income countries, the largest increase occurs during economic downturns. Africa is the only region with PoU increases from 2017 to 2019 associated with all three drivers (conflict, climate extremes and economic downturns). Countries affected by economic downturns in Africa, Asia, and Latin America and the Caribbean show the highest increase in the PoU compared with countries affected by climate extremes and conflict, with the largest increase seen in Africa and Latin America and the Caribbean.

In 2020, almost all low- and middle-income countries were affected by economic downturns. The increase in the number of undernourished was more than five times greater than the highest increase in undernourishment in the last two decades, and the economic downturn was twice as severe as any previously recorded in the same period. When economic downturns occurred along with other drivers (either climate-related disasters, conflict, or a combination of both), the largest increase in the PoU was seen in Africa, followed by Asia.

In last year's edition of this report, it was shown that the unaffordability of healthy diets in 2017 was strongly associated with undernourishment and different forms of malnutrition, including child stunting and adult obesity. These results are reconfirmed for 2019, and new analysis shows that high levels of unaffordability in 2019 are strongly associated with higher levels of both severe and moderate or severe forms of food insecurity, as measured by the FIES.

Countries affected by multiple drivers exhibit the highest percentage of the population who cannot afford a healthy diet (68 percent), which is, on average, 39 percent higher than countries affected by a single driver, and 66 percent higher than countries not affected by any driver. Those countries also show higher levels of moderate or severe food insecurity (47 percent) – 12 percent higher than countries affected by a single driver and 38 percent more than countries not affected by any driver. The unaffordability of healthy diets tends to be higher where there is conflict.

WHAT NEEDS TO BE DONE TO TRANSFORM FOOD SYSTEMS FOR FOOD SECURITY, IMPROVED NUTRITION AND AFFORDABLE HEALTHY DIETS?

Six pathways to address major drivers behind recent food security and nutrition trends

There are six possible recommended pathways through which food systems could be transformed to address the major drivers of food insecurity and malnutrition and ensure access to affordable healthy diets for all, sustainably and inclusively. These are: 1) integrating humanitarian, development and peacebuilding policies in conflict-affected areas; 2) scaling up climate resilience across food systems; 3) strengthening the resilience of the most vulnerable to economic adversity; 4) intervening along the food supply chains to lower the cost of nutritious foods; 5) tackling poverty and structural inequalities, ensuring interventions are pro-poor and inclusive; and 6) strengthening food environments and changing consumer behaviour to promote dietary patterns with positive impacts on human health and the environment.

As many countries are affected by multiple drivers, several pathways will apply simultaneously, calling for coherence among these pathways to ensure efficiency in implementation. Comprehensive portfolios of policies, investments and legislation are therefore are central to enabling the transformation of food systems through these pathways.

Under conditions of conflict, entire food systems are often severely disrupted, challenging people's access to nutritious foods. Deep economic crises can unfold where the root causes of conflict situations are linked to competition over natural resources, including productive land, forest, fisheries and water resources. It is imperative that policies, investments and actions to reduce immediate food insecurity and malnutrition be implemented simultaneously with those aimed at a reduction in the levels of conflict and aligned with long-term socio-economic development and peacebuilding efforts.

The ways we produce food and use our natural resources can help deliver a climate-positive future in which people and nature can coexist and thrive. This is important, not only because food systems are affected by climate events, but also because food systems themselves impact on the state of the environment and are a driver of climate change. Central to this effort are priorities to protect nature, to sustainably manage existing food production and supply systems, and to restore and rehabilitate natural environments. These sustainability efforts will also strengthen resilience to climate shocks to ensure food security and improved nutrition.

Economic and social policies, legislation and governance structures should be in place well in advance of economic slowdowns and downturns to counteract the effects of adverse economic cycles when they do arrive, and to maintain access to nutritious foods, especially for the most vulnerable population groups, including women and children. In the immediate term, these must include social protection mechanisms and primary healthcare services.

Interventions along food supply chains are needed to increase the availability of safe and nutritious foods and lower their cost, primarily as a means to increase the affordability of healthy diets. This calls for a coherent set of policies, investments and legislation from production to consumption aimed at realizing efficiency gains and cutting food losses and waste to help achieve these objectives.

Empowerment of poor and vulnerable population groups, often smallholders with limited access to resources or those living in remote locations, as well as the empowerment of women, children and youth, who may otherwise be excluded, represents a major lever in transformative change. Measures of empowerment include increased access to productive resources, including access to natural resources, agricultural inputs and technology, financial resources, as well as knowledge and education. Other empowerment measures relate to strengthened organizational skills and, importantly, access to digital technology and communication.

Changing dietary patterns have had both positive and negative impacts on human health and the environment. Based on the specific country context and prevailing consumption patterns, there is a need for policies, laws and investments to create healthier food environments and to empower consumers to pursue dietary patterns that are nutritious, healthy and safe and with a lower impact on the environment.

Building coherent portfolios of policies and investments

A key challenge that restricts successful transformation of food systems is that existing national, regional and global policies, strategies, legislation and investments are compartmentalized into distinct dialogues. These challenges can be overcome through the formulation and implementation of cross-sectoral portfolios of policies, investments and legislation that comprehensively address the negative food security and nutrition effects of the multiple drivers impacting on food systems.

These portfolios need to be well targeted and provide incentives for all actors to engage constructively in innovative and systemic changes that will lead to transformed food systems. Drawing upon best practices and lessons learned from a series of case studies worldwide, this report provides many illustrative examples of what it takes – in very practical and innovative ways – to transform food systems at local, country, regional and global levels to become more resilient to the drivers behind rising levels of food insecurity and malnutrition, and to improve access to affordable healthy diets.

The performance of food systems depends on their coherence and interaction with several other systems, including especially the wider agri-food systems, in addition to environmental, health and social protection systems. Other systems, such as education systems, play a critical role throughout the food system, from providing nutritious school meals, the necessary knowledge and skills in food production to nutrition education for school-aged children and raising consumer awareness towards minimizing the negative impacts of food consumption on human health and the environment.

Health systems and their services are vital in ensuring that people are able to consume foods and utilize the necessary nutrients for their health and well-being. Food systems may exert both positive and negative impacts on human health through multiple interrelated pathways, which are influenced by factors arising from within and outside food systems, including social, economic and environmental determinants of health.

Investments in social protection systems have served as powerful instruments for strengthening people's access to nutritious food, including during the COVID-19 pandemic. Importantly, social protection is more than a short-term response to acute situations of food insecurity and malnutrition. When predictable and well targeted, social protection can support households to engage in new economic activities, and to capitalize on opportunities created by the continued economic dynamism of food systems, thereby bringing about longer-term improvements in access to healthy diets.

The effective and efficient implementation of portfolios of policies and investments requires an enabling environment of governance mechanisms and institutions that facilitate consultation across sectors and key stakeholders. Scaling up the availability of technologies, data and innovative solutions is key to accelerating the transformation of food systems, while ensuring that possible trade-offs are minimized as a consequence of the transformative process.

The successful transformation of food systems towards greater affordability of healthy diets for all, sustainably produced and with improved resilience to identified drivers, calls for win-win solutions to be fully exploited. As with all systemic changes, there will be winners and losers, while the introduction of new technologies, improved access to data and innovations, and the subsequent changes in food systems performance, will produce both positive and negative spillover effects. Coherence among systems, as well as the cross-cutting accelerators, play a key role in maximizing the benefits and minimizing negative consequences of transformation.

CONCLUSION

With less than a decade to 2030, the world is not on track to ending world hunger and malnutrition; and in the case of world hunger, we are moving in the wrong direction. This report has shown that economic downturns as a consequence of COVID-19 containment measures all over the world have contributed to one of the largest increases in world hunger in

decades, which has affected almost all low- and middle-income countries, and can reverse gains made in nutrition. The COVID-19 pandemic is just the tip of the iceberg, more alarmingly, the pandemic has exposed the vulnerabilities forming in our food systems over recent years as a result of major drivers such as conflict, climate variability and extremes, and economic slowdowns and downturns. These major drivers are increasingly occurring simultaneously in countries, with interactions that seriously undermine food security and nutrition.

The UN Food Systems Summit 2021 will bring forward a series of concrete actions that people from all over the world can take to support a transformation of the world's food systems. This report has identified six transformation pathways that, alone or frequently in combination, depending on context, are needed for greater resilience to specifically address the negative impacts of the major drivers behind the recent rise in hunger and slowing progress to reduce malnutrition in all its forms, while ensuring that everyone can afford a healthy diet.

The coherence in policies and actions to transform food systems, and among systems, as well as the cross-cutting accelerators play a key role in maximizing the benefits and minimizing negative consequences of transformation through these six pathways. That is why policy coherence, understood as a situation where the implementation of policies in one area does not undermine others (and where policies even reinforce each other where feasible), will be critical to building transformative multisectoral portfolios. Systems approaches are needed for building coherent portfolios of policies, investments and legislation that become win-win solutions; these include territorial approaches, ecosystems approaches, Indigenous Peoples' food systems approaches and interventions that systemically address protracted crisis conditions. ■

INDIA
A fruit vendor weighing mangoes using a manual scale during the COVID-19 pandemic.
©Mnjpkulkarni | Dreamstime.com

CHAPTER 1
INTRODUCTION

Since well before the COVID-19 pandemic, several major drivers have put the world off track to ending world hunger and malnutrition in all its forms by 2030. Now, the COVID-19 pandemic and related containment measures have made it significantly more challenging to achieve this goal. But they have also highlighted the need for deeper reflection on how to better address the major drivers that are resulting in the global food insecurity and malnutrition situation we are experiencing right now.

In 2014, the long decline in world hunger that had begun in 2005 came to a halt. The number of people experiencing undernourishment began to slowly increase until, in 2020, the world witnessed an unprecedented setback in its hunger eradication efforts, as the latest estimates in this year's report indicate. Moreover, progress in reducing child stunting has slowed significantly, and adult overweight and obesity continue to increase in rich and poor countries alike.

What have we learned from past editions?

How did the world get to this critical point? – is one of the key questions posed in this year's report. In answering it, the report draws on the analyses of the past four editions, which have produced a vast, evidence-based body of knowledge of the major drivers behind the recent changes in food security and nutrition. This is updated with new data to feed into a broader analysis of how these drivers interact, allowing for a holistic view of their combined effects both on each other and on food systems. The knowledge accumulated from these past editions is grounded in evidence. The development and monitoring of food

security and nutrition indicators have made it possible to make clear diagnoses at global, regional and country levels.[a] Furthermore, analysis of these indicators has allowed us to statistically associate major drivers with recent setbacks in ending world hunger and malnutrition in all its forms by 2030. This has been fundamental in helping us to understand entry points for policy to address these drivers.

Three of the major drivers behind the recent changes in food security and nutrition identified in the past four editions are conflict, climate variability and extremes, and economic slowdowns and downturns, which are exacerbated by the underlying causes of poverty and very high and persistent levels of inequality (for example in terms of income, productive capacity, assets, technology, education and health) (Box 1).

In addition, millions of people around the world suffer from food insecurity and different forms of malnutrition because they cannot afford the cost of healthy diets. Unaffordability of healthy diets is the result of myriad factors driving up the cost of nutritious food and reducing people's incomes. This fourth driver is associated with increasing food insecurity and all forms of malnutrition, including stunting, wasting, micronutrient deficiencies, overweight and obesity, and non-communicable diseases (NCDs). Last year, this report also presented a preliminary assessment that warned us about the potentially unprecedented effects of the COVID-19 pandemic on food security and nutrition in 2020. This year's report confirms this evidence, presenting the first global assessment of food insecurity and malnutrition for 2020, which makes use of the most recent data collected around the world in this challenging year.

There are, of course, a myriad of other drivers of food insecurity and malnutrition;[b] moreover, drivers can also be outcomes of other drivers.[c] This report, however, focuses on the drivers outlined in Box 1, and how they interact to affect food security and nutrition. These are the major drivers behind the recent global rise in hunger and slowing progress in reducing malnutrition in all its forms. Unless they are addressed more boldly, they will continue to drive observed trends in food security and nutrition for many years to come.

The selected major drivers as well as the underlying causes of poverty and inequality are occurring throughout the world in many countries, often at the same time, creating compounding effects that are analysed in this report. The COVID-19 pandemic and the measures to contain it have of course led to an unprecedented economic downturn. Moreover, some parts of the world also continue to experience conflict, while, globally, climate-related events remain an ever-present threat. Particularly worrying is that, as we show in this report, several of the countries most affected by the COVID-19 pandemic were already struggling with high levels of undernourishment and different forms of malnutrition before the pandemic. »

a In the 2017 edition of this report, FAO's traditional indicator of the extent of hunger, the prevalence of undernourishment (PoU) – also an indicator for monitoring SDG Target 2.1 – began to be complemented by the Prevalence of Severe Food Insecurity, which is estimated based on data collected using the Food Insecurity Experience Scale (FIES). Importantly, as the report began to monitor progress not only towards the target of ending hunger (SDG Target 2.1), but also that of ending all forms of malnutrition (SDG Target 2.2), indicators for all forms of malnutrition also began to be monitored and analysed. The SDG indicators of malnutrition were complemented with indicators that monitor other related targets endorsed by the World Health Assembly in 2012. Subsequently, the 2019 edition of this report introduced a second indicator for monitoring SDG Target 2.1: the Prevalence of Moderate or Severe Food Insecurity, also based on the FIES. Another innovation was made a year later, in the 2020 edition, with the introduction of indicators of the cost and unaffordability of healthy diets.

b Other important drivers of food insecurity and malnutrition are not considered in this report. Many of these are more localized, affecting specific regions or countries, or occur infrequently or with limited long-term effects on world hunger and malnutrition. These include food price hikes, locust outbreaks and localized disease outbreaks, among others. Human population growth patterns are drivers at a broader intergenerational scale. There are also more specific global drivers of malnutrition, for example, poor sanitation, health services and childcare feeding practices. But these are more systematically covered in other global nutrition reports, such as the *Global Nutrition Report*.

c All drivers can also be seen as outcomes of other drivers. For example, economic slowdowns and downturns can be driven by a global financial crisis or global health pandemic, and the unaffordability of healthy diets can be driven by income changes and supply and demand factors that affect food prices.

BOX 1 MAJOR DRIVERS AND UNDERLYING FACTORS CHALLENGING FOOD SECURITY AND NUTRITION IN THE WORLD: A SYNTHESIS FROM THE PREVIOUS FOUR EDITIONS OF THIS REPORT

CONFLICT

©FAO/Cengiz Yar

CONFLICT (2017 edition) is a major threat to food security and nutrition and the leading cause of global food crises. Marked increases in the number and complexity of conflicts in the last ten years have eroded gains in food security and nutrition, leading several countries to the brink of famine. Internal conflicts have surpassed the number of interstate conflicts, but with a significant rise in internationalized internal conflicts. More than half of the people who are undernourished and almost 80 percent of stunted children live in countries struggling with some form of conflict, violence or fragility.[1,2]

CLIMATE VARIABILITY AND EXTREMES

©FAO/J. Thompson

CLIMATE VARIABILITY AND EXTREMES (2018 edition) are a key driver behind the recent rise in global hunger, one of the leading causes of severe food crises, and a contributing factor to the alarming levels of malnutrition seen in recent years. Increasing climate variability and extremes, linked to climate change, are negatively affecting all dimensions of food security and nutrition. Hunger is significantly worse in countries with agri-food systems highly sensitive to rainfall and temperature variability and extremes, and where a high proportion of the population depends on agriculture for livelihoods. Alarmingly, countries are increasingly exposed to multiple types of climate extremes.[3,4]

ECONOMIC SLOWDOWNS AND DOWNTURNS

©FAO/Giuseppe Bizzarri

ECONOMIC SLOWDOWNS AND DOWNTURNS (2019 edition) are a key driver behind rises in hunger and food insecurity. They hinder progress towards elimination of malnutrition in all its forms, irrespective of whether they are driven by market swings, trade wars, political unrest or a global pandemic, such as that driven by COVID-19. Most countries where hunger has increased have experienced these economic slowdown and downturn episodes. Economic slowdowns and downturns can also result in people purchasing cheaper, less nutritious foods – contributing to poor nutritional quality of diets. These episodes are statistically related to rising food insecurity as well.[5,6]

UNAFFORDABILITY OF HEALTHY DIETS

©FAO/Vyacheslav Oseledko

The **UNAFFORDABILITY OF HEALTHY DIETS (2020 edition of this report)** is associated with increasing food insecurity and all forms of malnutrition, including stunting, wasting, overweight and obesity. Several factors are driving the cost of nutritious foods throughout food systems, in the realms of food production, food supply chains, food environments, as well as consumer demand and the political economy of food. These, combined with low incomes, explain why around three billion people cannot afford even the cheapest healthy diet, one that includes foods from several groups and has greater diversity within food groups.[7,8,9]

BOX 1 (CONTINUED)

UNDERLYING CAUSES OF POVERTY AND INEQUALITY

POVERTY AND INEQUALITY (2019 and 2020 editions) are underlying structural causes of food insecurity and malnutrition in all its forms, which amplify the negative impacts of the global drivers above. Poverty negatively impacts on the nutrition quality of diets. Unsurprisingly, healthy diets are unaffordable for the poor in every region of the world.[7,8,9] Food insecurity and malnutrition in all its forms are made worse by high and persistent levels of inequality – in terms of income, productive assets and basic services (e.g. health, education), as well as access to information and technology (e.g. digital divide) and, more generally, wealth. Income inequality in particular increases the likelihood of food insecurity – especially for socially excluded and marginalized groups – and undercuts the positive effect of any economic growth on individual food security. Structural vulnerabilities, including inequalities related to gender, youth, ethnicity, Indigenous Peoples and people with disabilities, tend to exacerbate poverty, food insecurity and malnutrition during periods of economic slowdowns and downturns, or following conflict and climate-related disasters.[5,6] Furthermore, these levels of inequality are being accelerated by the COVID-19 pandemic.[7,8,9]

» From synthesis to the way forward

The COVID-19 pandemic was a powerful wake-up call that exposed the fleeting nature of our progress on food security and nutrition. At the same time, however, it has provided us with the opportunity to re-evaluate how we tackle the major drivers of hunger and malnutrition and refocus our efforts to build forward better. To make the most of this opportunity, though, requires that we understand the interconnected nature of these drivers through a food systems lens and that we inform our actions on the evidence that emerges from doing so.

As we further elaborate in this report, conflict, climate variability and extremes, economic slowdowns and downturns, and poverty and inequality are external forces acting on food systems, while the cost and affordability of diets is an internal force acting within food systems. These external and internal drivers are negatively affecting food security and nutrition through their impact on food systems and the circular interconnected impacts of these drivers on other systems, including environmental and health systems, among others.

Thus, food systems will not become a powerful force contributing to ending hunger and malnutrition in all its forms in the world, unless they are transformed with strengthened resilience to the major drivers identified in the four past editions of this report and are incentivized to provide affordable healthy diets sustainably and inclusively. While the calls for broader food systems transformation for efficiency, resilience, environmental sustainability and inclusivity are currently the centre of global attention, this report identifies the transformation pathways needed to specifically address the major drivers behind the recent rise in hunger and slowing progress towards reducing malnutrition in all its forms.

This year's report comprises three main chapters. It starts with a description of the latest updates and trends in food security and nutrition, and offers some indication of what hunger would look like by 2030, in a scenario further complicated by the enduring effects of the COVID-19 pandemic. The next chapter provides a synthesis of understanding and empirical analysis of the major drivers behind these trends, alone and in combination, through a food systems lens. This is followed by a chapter that offers an in-depth look at how to move from silo solutions to integrated food systems solutions that specifically address the challenges posed by the major drivers, highlighting also the types of portfolios of policies, investments and legislation required to transform food systems for food security, improved nutrition and affordable healthy diets for all. The three chapters are followed by an overall conclusion. ■

ETHIOPIA
A local woman collects yield after her crops have been heavily affected by invading locust swarms.
©FAO/Petterik Wiggers

CHAPTER 2 FOOD SECURITY AND NUTRITION AROUND THE WORLD

This chapter presents the first global assessment of food insecurity and malnutrition for 2020, the year the COVID-19 pandemic spread rapidly across the globe. Prior to the pandemic, progress was already stalled towards meeting SDG Targets 2.1 and 2.2: ending hunger and ensuring access to safe, nutritious and sufficient food for all people all year round; and eradicating all forms of malnutrition. While the pandemic has caused major setbacks, there is much to be learned from the vulnerabilities and inequalities it laid bare. If taken to heart, these new insights and wisdom can help get the world back on track towards achievement of SDG Targets 2.1 and 2.2. This global assessment provides a clear diagnostic to put in place the policies needed.

Section 2.1 presents a comprehensive assessment of the state of food security and progress towards achieving the hunger and food insecurity targets (SDG 2.1). It includes global, regional and subregional assessments for 2020 based on the most recent data collected around the world. Also included are new estimates of the cost and affordability of healthy diets, which provide an important link between the food security indicators in Section 2.1 and the nutrition indicators in Section 2.2. First presented in *The State of Food Security and Nutrition in the World 2020*, these indicators are systematically updated and disseminated annually in this report.

Section 2.2 presents the latest available evidence on the state of nutrition and progress towards the global nutrition targets defined by the World Health Assembly in 2012 and the Sustainable Development Agenda (SDG 2.2). Updated estimates for four of the nutrition indicators are provided.

Section 2.3 looks ahead to 2030 with new projections regarding the state of food security and nutrition in a scenario further complicated by the COVID-19 pandemic. Estimates of what the prevalence of undernourishment may be in 2030 are provided, based on a general equilibrium model that derives trajectories of food supply, economic growth, poverty rates and real price of food. While projections for the nutrition indicators do not take the COVID-19 pandemic into account, modelled projections of its potential impact on the prevalence of child undernutrition (stunting and wasting) are presented. ■

2.1 FOOD SECURITY INDICATORS – LATEST UPDATES AND PROGRESS TOWARDS ENDING HUNGER AND ENSURING FOOD SECURITY

KEY MESSAGES

➔ World hunger increased in 2020 under the shadow of the COVID-19 pandemic. After remaining virtually unchanged for five years, the prevalence of undernourishment (PoU) increased from 8.4 to around 9.9 percent in just one year, heightening the challenge of achieving the Zero Hunger target by 2030.

➔ It is projected that between 720 and 811 million people in the world faced hunger in 2020. Considering the middle of the projected range (768 million), around 118 million more people were facing hunger in 2020 than in 2019 – or as many as 161 million more, considering the upper bound of the projected range.

➔ Hunger affects 21.0 percent of the population in Africa, compared with 9.0 percent in Asia and 9.1 percent in Latin America and the Caribbean. In terms of numbers, more than half of the world's undernourished are found in Asia (418 million) and more than one-third in Africa (282 million).

➔ Compared with 2019, about 46 million more people in Africa, 57 million more in Asia, and about 14 million more in Latin America and the Caribbean were affected by hunger in 2020.

➔ While the global prevalence of moderate or severe food insecurity (measured using the Food Insecurity Experience Scale) has been slowly on the rise since 2014, the estimated increase in 2020 was equal to that of the previous five years combined. Nearly one in three people in the world (2.37 billion) did not have access to adequate food in 2020 – an increase of almost 320 million people in just one year.

➔ The sharpest increases in moderate or severe food insecurity in 2020 occurred in Latin America and the Caribbean and in Africa. In Northern America and Europe, food insecurity increased for the first time since the beginning of FIES data collection in 2014.

➔ Of the 2.37 billion people facing moderate or severe food insecurity, half (1.2 billion) are found in Asia, one-third (799 million) in Africa, and 11 percent (267 million) in Latin America and the Caribbean.

➔ Close to 12 percent of the global population was severely food insecure in 2020, representing 928 million people – 148 million more than in 2019.

➔ At the global level, the gender gap in the prevalence of moderate or severe food insecurity has grown even larger in the year of the COVID-19 pandemic, with the prevalence of moderate or severe food insecurity being 10 percent higher among women than men in 2020, compared with 6 percent in 2019.

➔ The high cost of healthy diets coupled with persistent high levels of income inequality put healthy diets out of reach for around 3 billion people, especially the poor, in every region of the world in 2019 – slightly less than in 2017.

➔ Notably, only Africa and Latin America show an increase in the unaffordability of heathy diets between 2017 and 2019, but it is likely that increases will be seen in most regions in 2020 due to the COVID-19 pandemic.

Grappling with uncertainty in the face of the COVID-19 pandemic

One thing is certain: 2020 was a year of great economic and human losses, provoked by the onset of a global pandemic that deprived millions of people of their health, lives and livelihoods throughout the world. However, the physical distancing measures taken to contain the spread of the pandemic also resulted in the disruption of data collection activities around the world, posing data and methodological challenges for the assessment of the state of food security in 2020. As a result, the task of estimating how many people were thrust into hunger and food insecurity globally is fraught with more uncertainty this year than in past years. »

BOX 2 UPDATES TO THE PREVALENCE OF UNDERNOURISHMENT AND METHODOLOGY FOR THE 2020 NOWCAST

The PoU series is revised annually prior to the publication of each new edition of *The State of Food Security and Nutrition in the World*. This is done to take into account any new information that FAO has received since the release of the previous edition. As this process usually implies backward revisions of the entire PoU series, readers are warned to refrain from comparing series across different editions of these reports. Readers should always refer to the most current edition of the report, including for values in past years.

ROUTINE REVISIONS

The new data used to conduct the routine revisions/updates to the PoU series are reflected in new series of the three underlying parameters that inform the PoU: the average dietary energy consumption (DEC), the inequality in access to dietary energy (CV) and the minimum dietary energy requirement (MDER) (see **Annex 1B** for details on the methodology). For this edition of the report, updated Food Balance Sheet (FBS) series for all countries up to 2018 and for 56 priority countries up to 2019 were used to revise the series of the parameter referring to the average value of DEC at country level. More specifically, updated data on production and trade was used, as a result of increased interaction with national data providers, together with new data of stocks coming from external sources such as specialized commodity institutions. Furthermore, a new methodological approach to treat stocks and non-food industrial utilization was implemented. In the same way, food consumption data from household consumption and expenditure surveys from 17 countries and various years that became available to FAO since last year* were used to revise the parameter referring to inequality in access to dietary energy due to income (CV|y).

NOWCAST OF THE PoU IN 2020

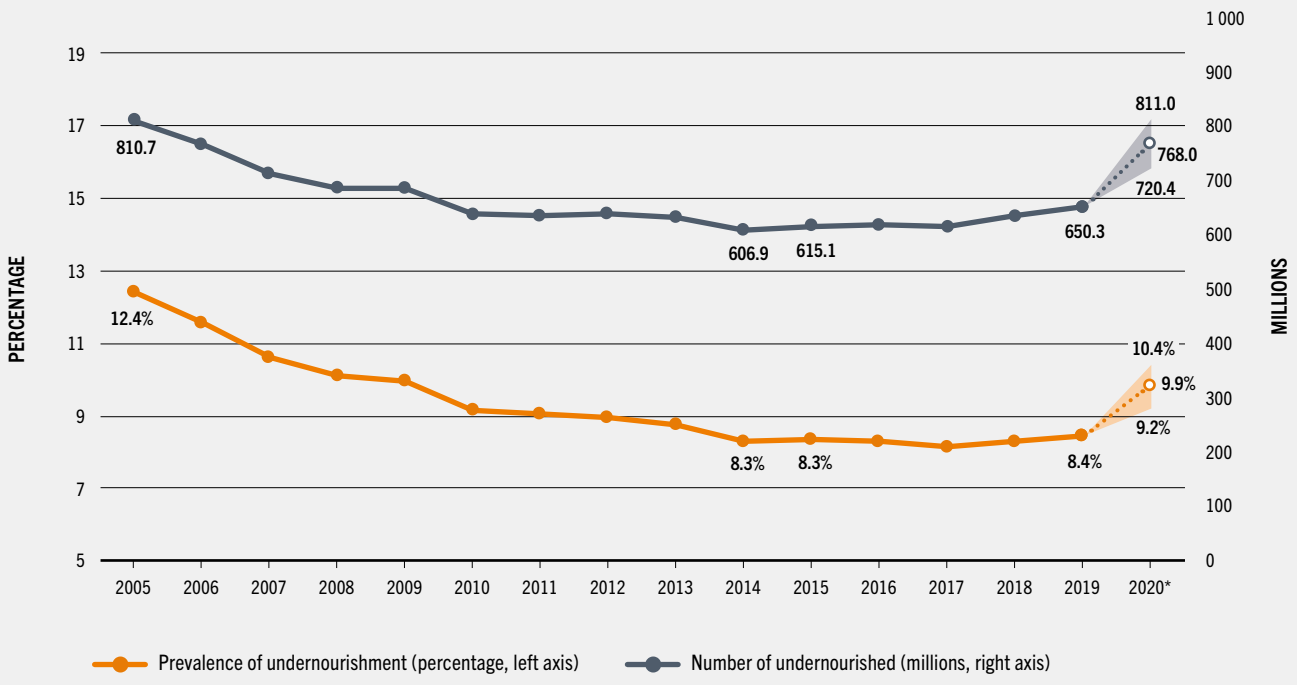
The exceptional nature of the COVID-19 pandemic made it particularly challenging to produce reliable estimates for 2020, a year like no other in recent history. For this reason, a range is presented for the value of the 2020 global PoU.

The uniqueness of the 2020 situation makes the time series-based forecasting methods used in past editions of this report inappropriate. Considering the lack of official data or projections of the level and inequality in food consumption at country level in 2020, different methods were developed this year to nowcast the 2020 values of DEC and CV|y. The following specific data and procedures were used to project these two parameters for 2020:

- Current estimates of per capita, average dietary energy supply (DES) in 2020, compiled on the basis of the short-run market outlook exercises conducted by FAO to inform the World Food Situation,[15] were used to nowcast the **2020 value of DEC** for each country, starting from the last available year in the FBS series.
- FIES data collected by FAO in 2020 (see section on SDG 2.1.2 below) were used to nowcast the values of **CV|y up to 2020**. As in past editions of this report, FIES data collected by FAO from 2014 to 2019 were used to project the changes in the CV|y from 2015 (or from the year of the last food consumption survey) up to 2019, based on a smoothed (three-year moving average) trend in severe food insecurity. However, recognizing that reliance on three-year moving averages would very likely underestimate the actual change in CV|y from 2019 to 2020, the 2020 nowcast was instead based on the change estimated by considering the actual, unsmoothed change in the prevalence of severe food insecurity from 2019 to 2020. In addition, recognizing that the COVID-19 pandemic has created additional constraints that may have exacerbated an overall inequality in the ability of people to access food, an additional component was considered in the estimates of the total CV of the distribution of dietary energy consumption in 2020 that is independent of both monetary incomes and dietary energy requirements. In practice, the range of values for the nowcast 2020 CV|y is obtained by parametrically varying the contribution of the change in CV to the change in PoU estimates from one-third (as modelled in the past), which provides the lower bound, to 100 percent of the observed change in severe food insecurity, which provides the upper bound. Further details and the ranges of the PoU at the regional and subregional levels can be found in **Annex 2.**

* Afghanistan (2019), Armenia (2018), Bolivia (Plurinational State of) (2014 and 2018), Botswana (2017), Brazil (2018), Burkina Faso (2018), Ethiopia (2016), Kiribati (2020), Malawi (2017), Mongolia (2016 and 2018), Namibia (2016), Nigeria (2013, 2016 and 2019), Pakistan (2018), Rwanda (2015), Samoa (2018), Solomon Islands (2013), Uganda (2017).

FIGURE 1 THE NUMBER OF UNDERNOURISHED PEOPLE IN THE WORLD CONTINUED TO RISE IN 2020. BETWEEN 720 AND 811 MILLION PEOPLE IN THE WORLD FACED HUNGER IN 2020. CONSIDERING THE MIDDLE OF THE PROJECTED RANGE (768 MILLION), 118 MILLION MORE PEOPLE WERE FACING HUNGER IN 2020 THAN IN 2019 – OR AS MANY AS 161 MILLION, CONSIDERING THE UPPER BOUND OF THE RANGE



NOTES: * Projected values for 2020 in the figure are illustrated by dotted lines. Shaded areas show lower and upper bounds of the estimated range.
SOURCE: FAO.

» In this edition of the report, the nowcast (prediction of the recent past) for 2020 of the global prevalence of undernourishment (SDG Indicator 2.1.1) is presented as a range to reflect the added uncertainty around the hunger estimates induced by the unprecedented shock of the COVID-19 pandemic. It is important to note that the 2020 PoU estimates are not based on data reported by countries for 2020. Rather, they are derived by nowcasting the parameters used in the estimation of the PoU, using the best data available to FAO regarding the food supply and reasonable assumptions on the extent of inequality in access to food (Box 2).

In contrast, the 2020 assessments of the prevalence of moderate or severe food insecurity based on the Food Insecurity Experience Scale (SDG Indicator 2.1.2), also presented in this section, are informed mainly by survey data collected by FAO through the Gallup® World Poll (GWP) in over 140 different countries, and conducted mostly via telephone interviews due to the restrictions imposed by the pandemic (Box 3).

SDG Indicator 2.1.1 Prevalence of undernourishment (PoU)

There is no doubt that the number of people in the world affected by hunger continued to increase in 2020 under the shadow of the

TABLE 1 PREVALENCE OF UNDERNOURISHMENT (PoU) IN THE WORLD, 2005–2020

	Prevalence of undernourishment (%)							
	2005	2010	2015	2016	2017	2018	2019	2020*
WORLD	**12.4**	**9.2**	**8.3**	**8.3**	**8.1**	**8.3**	**8.4**	**9.9**
AFRICA	**21.3**	**18.0**	**16.9**	**17.5**	**17.1**	**17.8**	**18.0**	**21.0**
Northern Africa	8.5	7.3	6.1	6.2	6.5	6.4	6.4	7.1
Sub-Saharan Africa	24.6	20.6	19.4	20.1	19.5	20.4	20.6	24.1
Eastern Africa	33.0	28.4	24.8	25.6	24.9	25.9	25.6	28.1
Middle Africa	36.8	28.9	28.7	29.6	28.4	29.4	30.3	31.8
Southern Africa	5.0	6.2	7.5	7.9	7.3	7.6	7.6	10.1
Western Africa	14.2	11.3	11.5	11.9	11.8	12.5	12.9	18.7
ASIA	**13.9**	**9.5**	**8.3**	**8.0**	**7.8**	**7.8**	**7.9**	**9.0**
Central Asia	10.6	4.4	2.9	3.2	3.2	3.1	3.0	3.4
Eastern Asia	6.8	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
South-eastern Asia	17.3	11.6	8.3	7.8	7.4	6.9	7.0	7.3
Southern Asia	20.5	15.6	14.1	13.2	13.0	13.1	13.3	15.8
Western Asia	9.0	9.1	14.3	15.0	14.5	14.4	14.4	15.1
Western Asia and Northern Africa	*8.8*	*8.2*	*10.5*	*10.9*	*10.7*	*10.6*	*10.7*	*11.3*
LATIN AMERICA AND THE CARIBBEAN	**9.3**	**6.9**	**5.8**	**6.8**	**6.6**	**6.8**	**7.1**	**9.1**
Caribbean	19.2	15.9	15.2	15.4	15.3	16.1	15.8	16.1
Latin America	8.6	6.2	5.1	6.2	6.0	6.1	6.5	8.6
Central America	8.0	7.4	7.5	8.1	7.9	8.0	8.1	10.6
South America	8.8	5.7	4.2	5.4	5.2	5.4	5.8	7.8
OCEANIA	**6.9**	**5.3**	**6.1**	**6.2**	**6.3**	**6.2**	**6.2**	**6.2**
NORTHERN AMERICA AND EUROPE	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**

NOTES: * Projected values based on the middle of the projected range. The full ranges of the projected 2020 values can be found in **Annex 2**.
For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables inside the back cover.
SOURCE: FAO.

COVID-19 pandemic. The long decline in undernourishment from 2005 to 2014 had already come to a halt, as described in previous editions of *The State of Food Security and Nutrition in the World*. After remaining virtually unchanged from 2014 to 2019, the PoU increased from 8.4 percent to around 9.9 percent between 2019 and 2020 (Figure 1), heightening the challenge of achieving the Zero Hunger target by 2030. The 2020 estimate ranges from 9.2 to 10.4 percent, depending on the assumptions made to reflect the uncertainties around the assessment (Box 2).

In terms of population, it is estimated that between 720 and 811 million people in the world faced hunger in 2020. Considering the middle of the projected range (768 million), 118 million more people were facing hunger in 2020 than in 2019 (Figure 1), with estimates ranging from 70 to 161 million. The 2020 estimates presented in Tables 1 and 2 are *based on the middle of the projected range*. The full ranges can be found in **Annex 2**.

While the COVID-19 pandemic surely was a contributing factor, changes observed from 2019 to 2020 cannot be attributed only to the pandemic given the many other factors at play, as described in Chapter 3. Notwithstanding, the increase in hunger in 2020 is consistent with existing evidence of the economic hardships induced by

TABLE 2 NUMBER OF UNDERNOURISHED PEOPLE IN THE WORLD, 2005–2020

	Number of undernourished (millions)							
	2005	2010	2015	2016	2017	2018	2019	2020*
WORLD	**810.7**	**636.8**	**615.1**	**619.6**	**615.0**	**633.4**	**650.3**	**768.0**
AFRICA	**195.0**	**187.4**	**199.7**	**212.0**	**212.3**	**227.1**	**235.3**	**281.6**
Northern Africa	15.8	14.8	13.6	14.2	15.0	15.1	15.5	17.4
Sub-Saharan Africa	179.2	172.6	186.1	197.8	197.3	212.0	219.8	264.2
Eastern Africa	97.3	96.3	96.5	102.5	102.3	109.6	111.3	125.1
Middle Africa	41.2	38.0	44.3	47.1	46.5	49.7	52.9	57.1
Southern Africa	2.7	3.6	4.7	5.1	4.7	5.0	5.1	6.8
Western Africa	38.0	34.7	40.5	43.2	43.8	47.8	50.6	75.2
ASIA	**553.6**	**400.1**	**369.9**	**356.1**	**352.1**	**354.6**	**361.3**	**418.0**
Central Asia	6.2	2.7	2.0	2.2	2.2	2.2	2.2	2.6
Eastern Asia	106.0	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
South-eastern Asia	97.0	69.0	52.7	49.9	48.1	45.3	46.0	48.8
Southern Asia	325.9	267.9	256.9	243.8	243.8	247.6	255.2	305.7
Western Asia	18.5	21.1	37.0	39.3	38.6	38.9	39.8	42.3
Western Asia and Northern Africa	*34.4*	*35.9*	*50.5*	*53.6*	*53.7*	*54.0*	*55.3*	*59.7*
LATIN AMERICA AND THE CARIBBEAN	**51.9**	**40.7**	**36.4**	**42.9**	**42.2**	**43.7**	**45.9**	**59.7**
Caribbean	7.6	6.5	6.5	6.6	6.6	6.9	6.8	7.0
Latin America	44.3	34.2	29.9	36.3	35.7	36.7	39.1	52.7
Central America	11.7	11.7	12.7	13.9	13.7	14.0	14.4	19.0
South America	32.7	22.5	17.2	22.4	22.0	22.7	24.7	33.7
OCEANIA	**2.3**	**1.9**	**2.4**	**2.5**	**2.6**	**2.6**	**2.6**	**2.7**
NORTHERN AMERICA AND EUROPE	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**

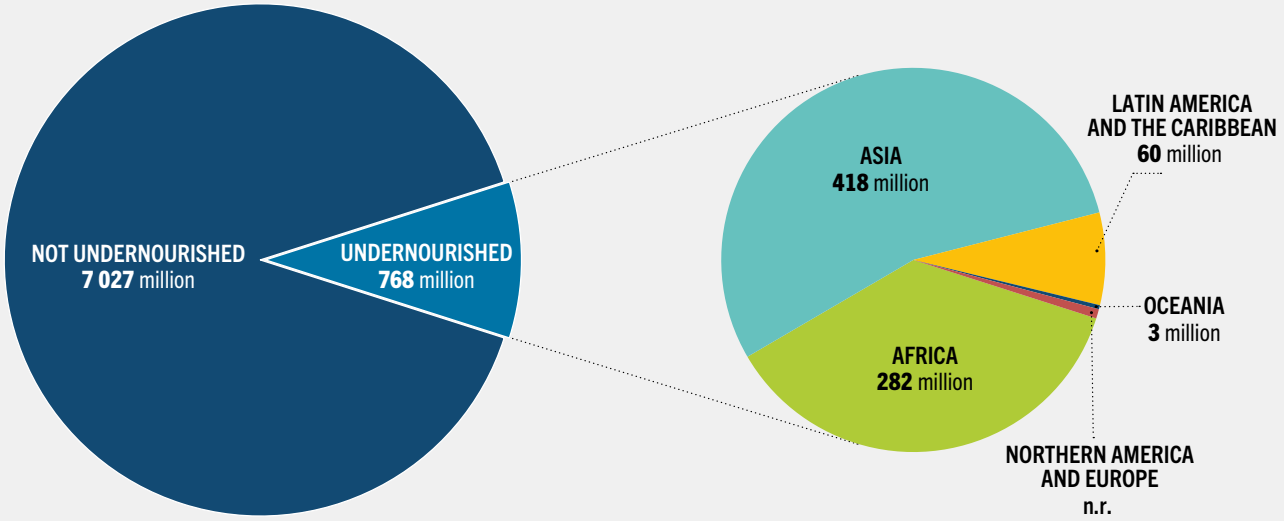
NOTES: * Projected values based on the middle of the projected range. The full ranges of the projected 2020 values can be found in **Annex 2**.
n.r. = not reported, as the prevalence is less than 2.5 percent. Regional totals may differ from the sum of subregions, due to rounding and non-reported values. For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables inside the back cover.
SOURCE: FAO.

the COVID-19 crisis that have likely aggravated inequalities in access to food. The World Bank estimates that the COVID-19 pandemic pushed an additional 119 million to 124 million people into extreme poverty in 2020.[10] Surveys by the World Bank and others reveal staggering proportions of both urban and rural households that reported a decrease in their income after the beginning of the COVID-19 crisis.[11,12]

This is despite an unprecedented response by countries worldwide to implement social protection measures. However, the speed, coverage, generosity and duration of the social protection responses varied across regions and countries, as did their effectiveness in mitigating the impacts of the pandemic on poverty. With some exceptions, data suggest that coverage has been relatively short-lived. On average, responses lasted just over three months, and roughly 40 percent of programmes consisted of one-time payments.[13,14]

The numbers show enduring and troubling regional inequalities. About one in five people (21 percent of the population) was facing

FIGURE 2 MORE THAN HALF (418 MILLION) OF THE PEOPLE IN THE WORLD AFFECTED BY HUNGER IN 2020 WERE IN ASIA AND MORE THAN ONE-THIRD (282 MILLION) IN AFRICA



NOTES: Number of undernourished in millions. Projected values based on the middle of the projected range. The full ranges of the projected 2020 values can be found in **Annex 2**. n.r. = not reported, as the prevalence is less than 2.5 percent.
SOURCE: FAO.

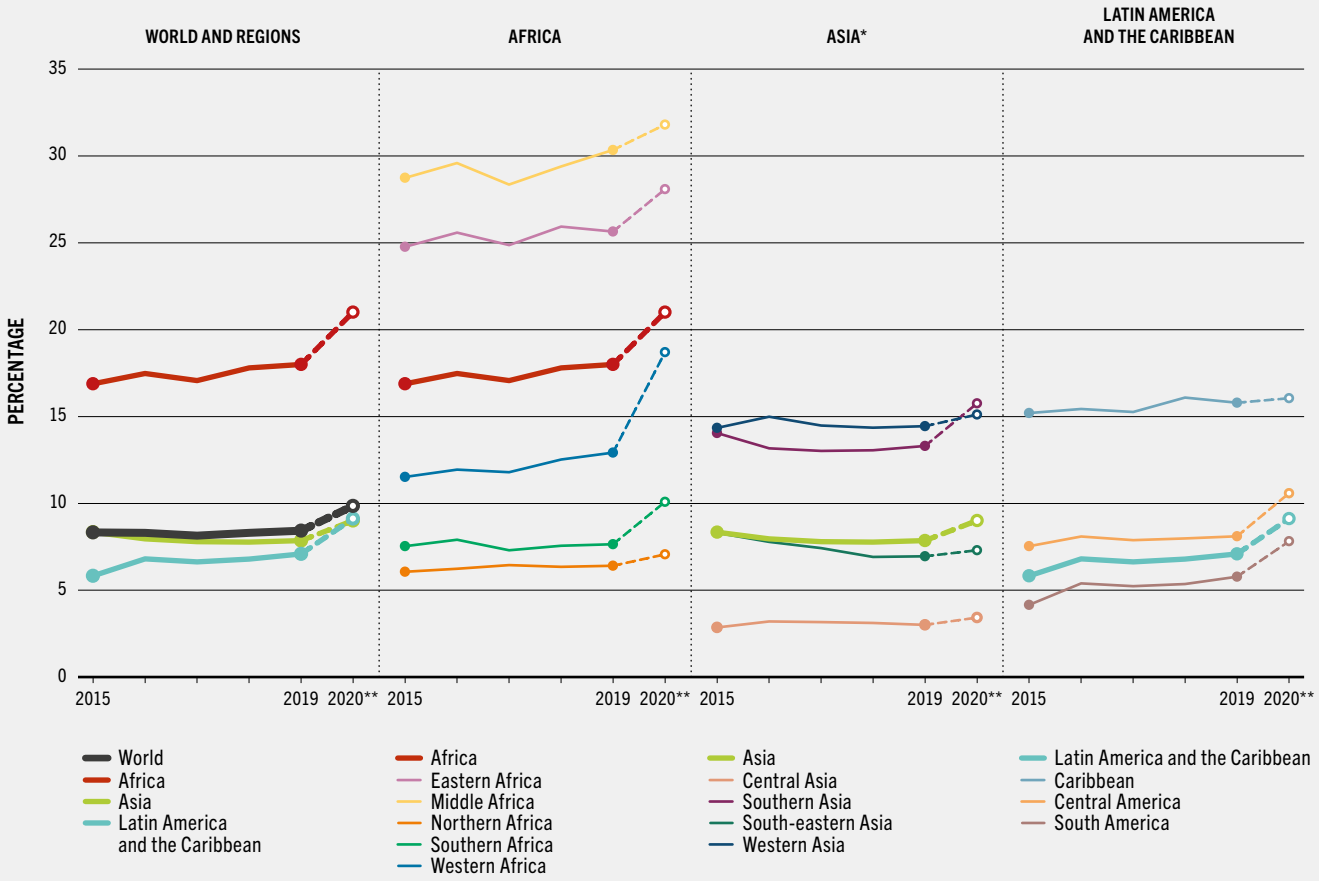
hunger in Africa in 2020 – more than double the proportion of any other region. This represents an increase of 3 percentage points in one year. This is followed by Latin America and the Caribbean (9.1 percent) and Asia (9.0 percent), with increases of 2.0 and 1.1 percentage points, respectively, between 2019 and 2020 (Table 1).

While the regional prevalence estimates reveal the depth of hunger in each region, translating them into numbers of people gives a sense of where most of the people facing hunger in the world live (Table 2). Of the total number of undernourished people in 2020 (768 million), more than half (418 million) live in Asia and more than one-third (282 million) in Africa, while Latin America and the Caribbean accounts for about 8 percent (60 million) (Figure 2). Compared with 2019, 46 million more people in Africa, almost 57 million more in Asia, and about 14 million more in Latin America and the Caribbean were affected by hunger in 2020.

Looking more closely at subregional differences (Tables 1 and 2), in **Africa**, the proportion of the population in Northern Africa affected by hunger in 2020 (7.1 percent) is much smaller compared with almost all subregions of sub-Saharan Africa, except for Southern Africa (10.1 percent). In the other subregions, the prevalence ranges from 18.7 percent in Western Africa to 31.8 percent in Middle Africa. The largest number of undernourished people live in Eastern Africa – more than 125 million.

In **Asia**, the PoU in 2020 ranges from below 2.5 percent in Eastern Asia to a high of 15.8 percent in Southern Asia, which also has the highest number of undernourished people – nearly 306 million. The prevalence of undernourishment in Western Asia (15.1 percent) is nearly on par with that of Southern Asia.

FIGURE 3 ALL SUBREGIONS OF AFRICA AND LATIN AMERICA AND THE CARIBBEAN, AND MOST SUBREGIONS OF ASIA, SHOW INCREASES IN THE PREVALENCE OF UNDERNOURISHMENT FROM 2019 TO 2020, WITH THE SHARPEST INCREASE IN WESTERN AFRICA



NOTES: * Eastern Asia is not shown because the PoU has been consistently below 2.5 percent since 2010. ** Projected values based on the middle of the projected range. The full ranges of the projected 2020 values can be found in **Annex 2**.
SOURCE: FAO.

In **Latin America and the Caribbean**, the estimates point to a PoU of 16.1 percent in the Caribbean, compared with 10.6 in Central America and 7.8 in South America.

As illustrated in Figure 3, all subregions of Africa and Latin America and the Caribbean, and most subregions of Asia, show increases in the PoU from 2019 to 2020, likely reflecting the way the COVID-19 pandemic exacerbated pre-existing drivers of food insecurity and impacted food access by the end of 2020 (see Chapter 3). The sharpest increase in undernourishment was in Western Africa, of 5.8 percentage points in just one year, corresponding to 24.6 million more people. If confirmed, it would be further evidence of the trends noted by FAO and WFP in 2020 for several countries in this subregion,[16] signalling the need for heightened attention as the situation evolves to prevent further deterioration.

SDG Indicator 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the FIES

SDG Target 2.1 challenges the world to go beyond just ending hunger. For optimal health and well-being, it is imperative to ensure access for all to safe, nutritious and sufficient food all year round. SDG Indicator 2.1.2 – the prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES) – has been specifically chosen to monitor progress towards ensuring access to adequate food for all.

The estimates of the prevalence of food insecurity at *severe levels only* provide a supplementary lens for monitoring hunger to complement the PoU. Although obtained using very different data and methods, they are expected to correlate with the PoU across populations. This is because people experiencing severe food insecurity are unlikely to be able to acquire enough food to continuously fulfil their dietary energy requirements, which is the concept of chronic undernourishment measured by the PoU.[5,7]

The food insecurity estimates in this report are based mainly on FIES data collected by FAO through the GWP (Box 3). However, a growing number of countries are adopting the FIES as a standard food security assessment tool, making FIES data increasingly available from official national sources. This year, FIES or equivalent experience-based food security data collected by national institutions were used for more than 40 countries, covering approximately a quarter of the world population (see **Annex 1B**). In addition, this year's report is informed by FIES data collected by FAO in 2020 for a preliminary assessment of the food insecurity situation in the context of the COVID-19 pandemic in a group of 20 countries facing food insecurity crises[17] (Box 4).

Since FAO first started collecting FIES data in 2014, moderate or severe food insecurity at the global level has been slowly on the rise, from 22.6 percent in 2014 to 26.6 percent in 2019 (Table 3 and Figure 4). Then in 2020, the year the COVID-19 pandemic spread across the globe, it rose nearly as much as in the previous five years combined, to 30.4 percent. Thus, nearly one in three people in the world did not have access to adequate food in 2020 – an increase of 320 million people in just one year, from 2.05 to 2.37 billion (Table 4).

Nearly 40 percent of those people – 11.9 percent of the global population, or almost 928 million – faced food insecurity at severe levels, indicating they had run out of food and, at worst, gone a day without eating. The increase in the prevalence of severe food insecurity from 2019 to 2020 was also equal to the total increase from 2014 to 2019; close to 148 million more people were severely food insecure in 2020.

Although severe food insecurity normally correlates with the PoU, it is worth noting that the increase in the number of severely food insecure people from 2019 to 2020 is somewhat greater than the increase in the estimated number of undernourished presented in the preceding section, based on the middle range estimate in Table 2. This is likely due mainly to the very different nature of the indicators. As explained, the FIES data were collected directly from respondents in surveys, with data collection beginning late in 2020 and extending into early 2021 when the impacts of the COVID-19 pandemic were already more apparent. The 2020 PoU estimates, on the other hand, are nowcasts based on data on food availability and access to food that may not yet reflect the full impact of the COVID-19 pandemic.

The increases in moderate or severe food insecurity from 2019 to 2020 were sharpest in Latin America and the Caribbean (9 percentage points) and Africa (5.4 percentage points), compared with a 3.1-point increase in Asia (Table 3 and Figure 4). However, Africa still has the highest prevalence of food insecurity at both levels of severity. Nearly 60 percent of the population of Africa was affected by moderate or severe food insecurity in 2020, and 26 percent faced severe food insecurity. In Latin America and the Caribbean, 41 percent of the population was moderately or severely food insecure in 2020, and 14 percent was severely food insecure. The food insecurity situation was comparatively better in Asia, where 26 percent of the population was

BOX 3 ADAPTING FIES DATA COLLECTION IN THE CONTEXT OF THE COVID-19 PANDEMIC IN 2020

FAO has collected FIES data annually since 2014 through the Gallup© World Poll (GWP) in nationally representative samples of the population in over 140 different countries, in the context of the *Voices of the Hungry* project.[18] A major difference in the 2020 round of GWP data collection is that data were collected almost exclusively via telephone, due to restrictions imposed in response to the COVID-19 pandemic that impeded face-to-face interviews. This represents an important change with respect to previous years. GWP data collection in 2020 targeted only countries where telephone coverage (mobile and/or landline) exceeded 70 percent. FAO collected additional FIES data in a group of 20 countries facing food insecurity crises (see Box 4). This information complemented the coverage of the GWP data and allowed for a more comprehensive assessment in 2020.

For the 2020 round of data collection, a modified version of the FIES survey module was used, with the objective of also understanding the additional impact that the COVID-19 pandemic might be having on food security. In addition to the standard eight questions, the extended module included follow-up questions to determine whether the respondent attributed the reported food insecurity experience mainly to the COVID-19 crisis. A similar module was used for the data collection in the countries facing food insecurity crises not covered by the GWP (Box 4).

In contrast to face-to-face interviewing, using telephone interviews in surveys that are intended to cover the general population may induce biases that needed to be addressed. Given the use of dual sampling frames (both landline and mobile telephone numbers) and the potential for the presence of dual-users in households where both landline and mobile phones are available, additional weights were constructed (when relevant) to correct for the unequal probability of selection of respondents. The population with access to telephones tends to be wealthier, more educated and mostly urban, which implies selection biases that may lead to underestimating the extent and severity of food insecurity. Thus, to minimize the risk of biased estimates, a weighting procedure based on the sample design was formulated and carried out in multiple stages. A probability weight factor (base weight) was constructed to account for selection of telephone numbers from each mobile stratum. In a next step, such base weights were further adjusted depending on the sex, age, employment and educational level of the respondent, to adjust for non-response and for the difference in the composition of the realized sample *vis-à-vis* the intended reference population using mostly country-level population censuses.

affected by moderate or severe food insecurity in 2020, and 10 percent was facing severe food insecurity. Nevertheless, because of the size of its population, Asia still accounts for half the moderately or severely food insecure people in the world (Figure 5).

Even in Northern America and Europe, where the lowest rates of food insecurity are found, the prevalence of food insecurity increased for the first time in 2020 since the beginning of FIES data collection in 2014 (Table 3). In 2020, 8.8 percent of the population of Northern America and Europe was moderately or severely food insecure, and 1.4 percent was severely food insecure, compared with 7.7 and 1.0 percent in 2019, respectively. The rates were slightly higher in Oceania: 12 percent of the population was affected by moderate or severe food insecurity in 2020, including 2.6 percent who were facing severe levels of food insecurity. It is interesting to note a small improvement in food security in this region in 2020, at both levels of severity – a trend that began in 2017 and seems not to have been altered by the pandemic.

Figure 5 shows that, from a total of 2.37 billion suffering from food insecurity, half (1.2 billion) are in Asia; one-third (799 million) are in Africa; and 11 percent (267 million) are in Latin America and the Caribbean. The figure also illustrates the difference across regions in the distribution of the population by food-insecurity severity level. For example, in addition to being the region with »

TABLE 3 PREVALENCE OF FOOD INSECURITY AT SEVERE LEVEL ONLY, AND AT MODERATE OR SEVERE LEVEL, BASED ON THE FOOD INSECURITY EXPERIENCE SCALE, 2014–2020

	Prevalence of severe food insecurity (%)							Prevalence of moderate or severe food insecurity (%)						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
WORLD	**8.3**	**8.1**	**8.3**	**8.7**	**9.6**	**10.1**	**11.9**	**22.6**	**22.8**	**23.6**	**24.9**	**25.9**	**26.6**	**30.4**
AFRICA	**17.7**	**18.3**	**19.8**	**20.5**	**20.6**	**21.9**	**25.9**	**47.3**	**48.0**	**50.9**	**52.5**	**52.7**	**54.2**	**59.6**
Northern Africa	10.2	9.0	10.4	10.6	9.3	8.8	9.5	29.7	26.4	30.0	33.1	31.1	28.9	30.2
Sub-Saharan Africa	19.4	20.4	22.0	22.7	23.2	24.9	29.5	51.4	53.0	55.8	57.0	57.6	59.9	66.2
Eastern Africa	23.7	24.1	25.8	25.3	25.0	26.0	28.7	57.7	58.1	62.2	62.1	61.6	63.4	65.3
Middle Africa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	35.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	70.0
Southern Africa	18.9	18.9	19.0	19.0	19.1	19.2	22.7	43.8	43.9	44.0	44.1	44.2	44.3	49.7
Western Africa	8.6	10.8	12.9	15.3	16.8	19.6	28.8	39.2	42.8	45.5	48.7	50.6	54.2	68.3
ASIA	**7.7**	**7.2**	**6.9**	**7.2**	**8.6**	**9.0**	**10.2**	**19.1**	**18.8**	**18.9**	**20.3**	**22.2**	**22.7**	**25.8**
Central Asia	1.6	1.4	2.0	2.8	2.2	2.3	4.7	8.5	9.1	10.0	13.9	13.6	13.2	18.0
Eastern Asia	0.8	0.8	1.5	1.7	1.9	1.3	2.0	6.0	5.9	6.3	10.0	9.6	7.4	7.8
South-eastern Asia	2.4	2.2	2.5	2.9	2.6	2.6	3.3	15.4	15.3	17.0	17.8	17.3	16.8	18.8
Southern Asia	15.9	14.8	13.1	13.3	16.9	18.3	19.9	31.6	30.8	30.1	29.4	34.6	37.6	43.8
Western Asia	8.2	8.5	8.6	9.6	9.2	8.8	8.9	27.5	27.4	26.3	28.2	27.5	27.9	28.3
Western Asia and Northern Africa	*9.1*	*8.8*	*9.4*	*10.1*	*9.2*	*8.8*	*9.2*	*28.5*	*27.0*	*28.0*	*30.5*	*29.2*	*28.3*	*29.2*
LATIN AMERICA AND THE CARIBBEAN	**7.7**	**7.5**	**9.0**	**10.0**	**9.6**	**10.1**	**14.2**	**24.9**	**27.5**	**31.3**	**33.2**	**31.7**	**31.9**	**40.9**
Caribbean	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	39.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	71.3
Latin America	5.7	5.6	7.2	8.1	7.6	8.2	12.4	22.0	24.9	28.8	31.0	29.2	29.6	38.7
Central America	6.5	6.7	6.2	6.3	6.9	7.3	11.2	30.2	30.3	27.5	27.9	27.3	28.2	37.5
South America	5.4	5.1	7.6	8.9	7.9	8.6	12.9	18.7	22.7	29.4	32.2	29.9	30.1	39.2
OCEANIA	**2.5**	**2.6**	**3.3**	**4.1**	**3.7**	**3.8**	**2.6**	**11.4**	**10.0**	**11.9**	**14.4**	**13.1**	**13.6**	**12.0**
NORTHERN AMERICA AND EUROPE	**1.4**	**1.4**	**1.3**	**1.2**	**1.0**	**1.0**	**1.4**	**9.3**	**9.3**	**8.7**	**8.4**	**7.6**	**7.7**	**8.8**
Europe	1.5	1.6	1.4	1.4	1.0	1.2	1.7	8.7	8.8	8.6	8.3	7.4	7.7	9.3
Eastern Europe	1.4	1.5	1.5	1.1	0.9	1.3	2.2	10.2	11.7	11.7	10.3	9.1	10.4	14.8
Northern Europe	1.8	1.8	1.7	2.2	1.0	0.9	1.2	6.7	6.8	6.6	6.0	5.5	5.1	4.1
Southern Europe	1.8	1.6	1.6	2.0	1.6	1.6	2.3	11.2	9.6	8.8	10.6	9.0	8.7	9.2
Western Europe	1.4	1.4	0.9	0.9	0.8	0.7	0.8	5.7	5.0	4.9	4.6	4.5	4.3	3.9
Northern America	1.0	1.0	1.0	0.8	0.8	0.8	0.8	10.5	10.3	9.0	8.6	8.0	7.6	7.8

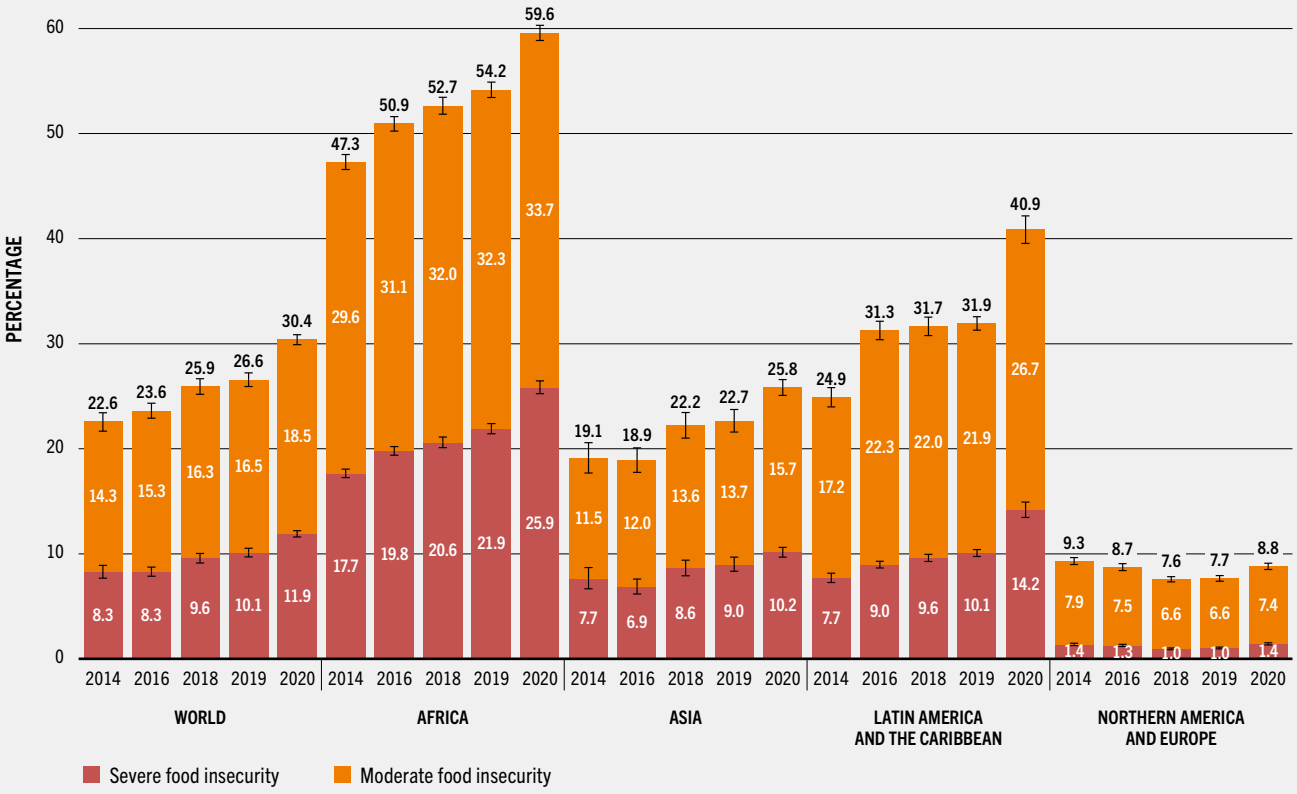
NOTES: n.a. = not available, as data are available only for a limited number of countries, representing less than 50 percent of the population in the region. The estimates for Latin America and the Caribbean from 2014 to 2019 include Caribbean countries whose combined populations represent only 30 percent of the population of that subregion, while the 2020 estimates include Caribbean countries whose combined populations represent around 60 percent of the population of the subregion. The countries included in the 2020 estimate for the Caribbean subregion are: Dominican Republic, Grenada, Haiti, Jamaica, Saint Lucia, and Saint Vincent and the Grenadines.
SOURCE: FAO.

TABLE 4 NUMBER OF PEOPLE EXPERIENCING FOOD INSECURITY AT SEVERE LEVEL ONLY, AND AT MODERATE OR SEVERE LEVEL, BASED ON THE FOOD INSECURITY EXPERIENCE SCALE, 2014–2020

	Number of severely food insecure people (millions)							Number of moderately or severely food insecure people (millions)						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
WORLD	**604.5**	**598.4**	**620.2**	**656.8**	**731.3**	**779.9**	**927.6**	**1 645.5**	**1 680.1**	**1 762.9**	**1 881.6**	**1 978.7**	**2 049.9**	**2 368.2**
AFRICA	**203.5**	**215.9**	**240.1**	**254.7**	**262.9**	**286.7**	**346.6**	**545.0**	**567.2**	**617.8**	**653.3**	**671.8**	**708.6**	**798.8**
Northern Africa	22.4	20.2	23.7	24.6	22.0	21.2	23.4	65.1	59.1	68.6	77.0	73.7	69.8	74.5
Sub-Saharan Africa	181.0	195.7	216.5	230.1	241.0	265.5	323.2	479.8	508.1	549.2	576.3	598.1	638.8	724.4
Eastern Africa	89.9	94.0	103.2	104.2	105.6	113.0	127.9	218.7	226.3	248.9	255.4	260.5	275.0	290.9
Middle Africa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	64.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	125.7
Southern Africa	11.7	11.9	12.1	12.3	12.6	12.8	15.3	27.2	27.7	28.1	28.6	29.0	29.5	33.5
Western Africa	29.6	38.0	46.8	56.9	63.9	76.7	115.7	134.0	150.5	164.4	180.7	192.8	212.0	274.3
ASIA	**337.2**	**319.9**	**308.0**	**323.7**	**394.5**	**414.7**	**471.1**	**840.1**	**834.6**	**846.8**	**918.2**	**1 014.0**	**1 043.2**	**1 198.7**
Central Asia	1.1	1.0	1.4	2.0	1.6	1.6	3.5	5.7	6.3	7.0	9.9	9.8	9.6	13.4
Eastern Asia	13.2	12.6	24.6	28.4	31.3	21.7	33.8	98.0	97.1	104.1	166.2	159.5	124.6	130.8
South-eastern Asia	15.2	13.6	16.1	18.5	17.1	16.9	22.1	96.3	96.8	109.1	115.5	113.6	111.0	125.5
Southern Asia	287.2	270.7	243.3	249.1	319.5	350.3	386.8	570.6	563.8	557.7	551.3	656.5	721.4	849.8
Western Asia	20.7	22.0	22.7	25.7	24.9	24.2	24.9	69.6	70.7	69.0	75.2	74.5	76.7	79.2
Western Asia and Northern Africa	*43.1*	*42.2*	*46.4*	*50.3*	*46.9*	*45.4*	*48.3*	*134.7*	*129.8*	*137.5*	*152.2*	*148.2*	*146.5*	*153.6*
LATIN AMERICA AND THE CARIBBEAN	**47.6**	**46.6**	**56.6**	**63.6**	**61.7**	**65.3**	**92.8**	**153.8**	**171.8**	**197.0**	**211.2**	**203.3**	**207.0**	**267.2**
Caribbean	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	17.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	31.0
Latin America	33.1	32.3	42.0	48.3	45.4	49.7	75.8	126.5	145.0	169.2	183.6	174.7	178.8	236.1
Central America	10.9	11.3	10.5	10.9	12.1	13.0	20.2	50.3	51.2	47.0	48.3	47.9	50.0	67.4
South America	22.2	21.0	31.5	37.3	33.3	36.7	55.6	76.2	93.8	122.2	135.3	126.8	128.8	168.7
OCEANIA	**1.0**	**1.1**	**1.3**	**1.7**	**1.5**	**1.6**	**1.1**	**4.5**	**4.0**	**4.8**	**5.9**	**5.5**	**5.7**	**5.1**
NORTHERN AMERICA AND EUROPE	**15.2**	**15.0**	**14.1**	**13.2**	**10.7**	**11.6**	**15.9**	**102.1**	**102.5**	**96.4**	**93.0**	**84.2**	**85.4**	**98.3**
Europe	11.4	11.6	10.4	10.4	7.7	8.7	12.8	64.9	65.7	64.2	61.9	55.0	57.4	69.5
Eastern Europe	4.1	4.5	4.3	3.2	2.6	3.8	6.3	29.9	34.4	34.4	30.4	26.8	30.4	43.3
Northern Europe	1.8	1.9	1.8	2.3	1.1	1.0	1.3	6.9	7.0	6.8	6.3	5.8	5.4	4.4
Southern Europe	2.8	2.5	2.5	3.1	2.5	2.4	3.6	17.1	14.7	13.5	16.2	13.8	13.3	14.1
Western Europe	2.8	2.7	1.8	1.8	1.5	1.4	1.6	10.9	9.7	9.5	8.9	8.8	8.4	7.7
Northern America	3.7	3.4	3.8	2.8	3.0	3.0	3.1	37.2	36.8	32.2	31.1	29.1	27.9	28.9

NOTES: n.a. = not available, as data are available only for a limited number of countries, representing less than 50 percent of the population in the region. The estimates for Latin America and the Caribbean from 2014 to 2019 include Caribbean countries whose combined populations represent only 30 percent of the population of that subregion, while the 2020 estimates include Caribbean countries whose combined populations represent around 60 percent of the population of the subregion. The countries included in the 2020 estimate for the Caribbean subregion are: Dominican Republic, Grenada, Haiti, Jamaica, Saint Lucia, and Saint Vincent and the Grenadines.
SOURCE: FAO.

FIGURE 4 MODERATE OR SEVERE FOOD INSECURITY HAS BEEN CLIMBING SLOWLY FOR SIX YEARS AND NOW AFFECTS MORE THAN 30 PERCENT OF THE WORLD POPULATION



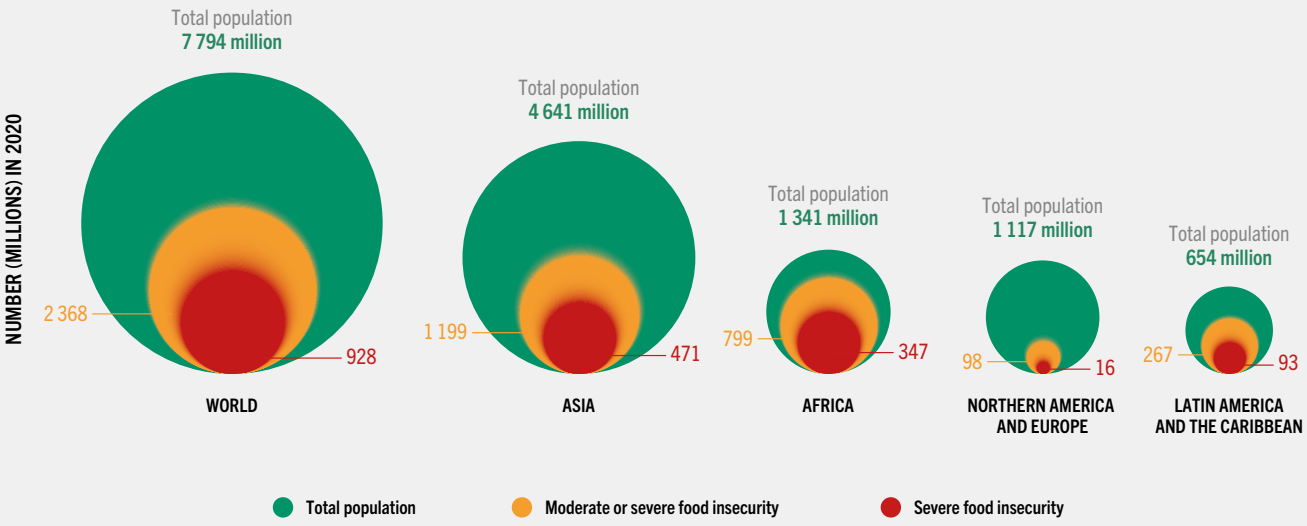
NOTE: Differences in totals are due to rounding of figures to the nearest decimal point.
SOURCE: FAO.

» the highest overall prevalence of food insecurity, Africa is also the region where severe levels represent the largest share of the combined total of moderate plus severe food insecurity – 43 percent, compared with 39 percent in Asia and 35 percent in Latin America and the Caribbean. In Northern America and Europe, the proportion of food insecurity experienced at severe levels is much smaller.

Within the regions, there are important differences in food insecurity at subregional level (Table 3). In **Africa**, moderate or severe food insecurity increased significantly in the Western subregion, from 54.2 percent in 2019 to 68.3 percent in 2020, surpassing the level observed in Eastern Africa (65.3 percent) where the increase was smaller. Severe food insecurity in those two subregions mirrored the same trends, increasing sharply in Western Africa from 19.6 to 28.8 percent during 2019–2020, but much less so in Eastern Africa, from 26 to 28.7 percent. Moderate increases were seen in Southern Africa, where the prevalence of moderate or severe food insecurity rose from 44.3 to 49.7 percent, and severe food insecurity increased from 19.2 to 22.7 percent. Much smaller increases of around 1 percentage point were observed in Northern Africa, where 30.2 percent of the population was affected by moderate or severe food insecurity in 2020, about one-third of whom were facing severe food insecurity (9.5 percent of the population).

In **Asia**, the largest increases occurred in the Southern subregion, where moderate or severe food insecurity jumped from 37.6 percent in

FIGURE 5 THE CONCENTRATION AND DISTRIBUTION OF FOOD INSECURITY BY SEVERITY DIFFERS GREATLY ACROSS THE REGIONS OF THE WORLD



SOURCE: FAO.

2019 to 43.8 percent in 2020. There was already a notable increase in this subregion since 2017 when the prevalence was 29.4 percent. Severe food insecurity also rose in Southern Asia in one year, from 18.3 percent to nearly 19.9 percent. There was a small increase in moderate or severe food insecurity in Western Asia, which has the second highest prevalence of food insecurity in the region – 28.3 percent in 2020. A small increase in severe food insecurity was also observed, from 8.8 percent in 2019 to 8.9 percent in 2020. Relatively large increases in food insecurity were observed from 2019 to 2020 in Central Asia, from 13.2 to 18 percent for moderate or severe, and 2.3 to 4.7 percent for severe only. Despite the increase, the subregion is second only to Eastern Asia in having the lowest food insecurity rates in the region, followed by South-eastern Asia. It is worth noting that the prevalence of moderate or severe food insecurity in Eastern Asia is below the average for Northern America and Europe.

Marked increases in food insecurity were observed in most subregions of **Latin America and the Caribbean**. In Central and South America, less than 40 percent of the population is facing moderate or severe food insecurity, and levels of severe food insecurity are 11 and 13 percent, respectively. However, both subregions registered 9-point increases in moderate or severe food insecurity, and 4-point increases in severe food insecurity, in 2020. In the Caribbean subregion,[d] for which estimates are being reported this year for the first time, the prevalence of moderate or severe food insecurity was 71.3 percent in 2020 – nearly three-quarters of the population. Of those, more than half faced severe food insecurity – 39 percent of the population.

d Estimates are being reported for the first time for the Caribbean subregion, as FIES data became available in 2020 for enough countries to achieve 50 percent of population coverage in the subregion. The countries included in the 2020 estimate for the Caribbean subregion are: Dominican Republic, Grenada, Haiti, Jamaica, Saint Lucia, and Saint Vincent and the Grenadines.

The lowest levels of food insecurity in **Northern America and Europe** – and in the world – are found in Northern and Western Europe, where about 4 percent of the population is affected by moderate or severe food insecurity. In fact, moderate or severe food insecurity declined slightly in these subregions in 2020. In Northern America and Southern Europe, however, moderate or severe food insecurity rose slightly from 2019 to 2020, reaching 7.8 and 9.2 percent, respectively. A notable rise in moderate or severe food insecurity was observed in Eastern Europe in the same period, from 10.4 to 14.8 percent. Severe food insecurity has remained low in all subregions, with increases from 2019 to 2020 in all but Northern America. The largest increases occurred in Eastern Europe (from 1.3 to 2.2 percent) and Southern Europe (from 1.6 to 2.3 percent).

Towards an assessment of the impact of the COVID-19 crisis on food security

In summary, the estimates based on the FIES point to a worse food security situation in 2020 compared with 2019 in most parts of the world. There is little doubt that the COVID-19 pandemic contributed to this deterioration of people's access to food. As mentioned in Box 3, a modified version of the FIES survey module was used in the GWP data collection to try to assess the impact of the COVID-19 pandemic on food security. On average, approximately 60 percent of respondents experiencing food insecurity at moderate or severe level, and 55 percent at severe level, attributed their poor access to food mainly to the COVID-19 pandemic. However, it is challenging to isolate and measure the impact of the pandemic alone on food insecurity, given the way it has exacerbated pre-existing vulnerabilities and affected so many aspects of people's lives. Therefore, the results should not be interpreted as referring to the isolated impact of the COVID-19 pandemic on food insecurity, but rather as an indication that people perceive it as being an important factor in their diminished access to food.

Another way to explore the impacts of the COVID-19 pandemic on food security is to examine the effects on specific drivers of food insecurity, such as loss of income. Questions related to the impacts of the COVID-19 pandemic on employment and income were included in the same 2020 GWP as the FIES module, providing the opportunity to explore the **relationship between food insecurity severity and income loss induced by the COVID-19 crisis**. Respondents were asked whether, due to the COVID-19 situation, they had: 1) temporarily stopped working at their job or business; 2) lost their job or business; 3) worked less hours at their job or business; and 4) received less money than usual from their employer or business. As expected, results of the analysis[e] point to a higher likelihood of being food insecure among respondents whose employment and income had been negatively impacted by the COVID-19 pandemic. Loss of job or business had the strongest negative effect on food security status, followed by receiving less money and temporary work disruptions (32, 20 and 19 percent higher odds of being moderately or severely food insecure, respectively).

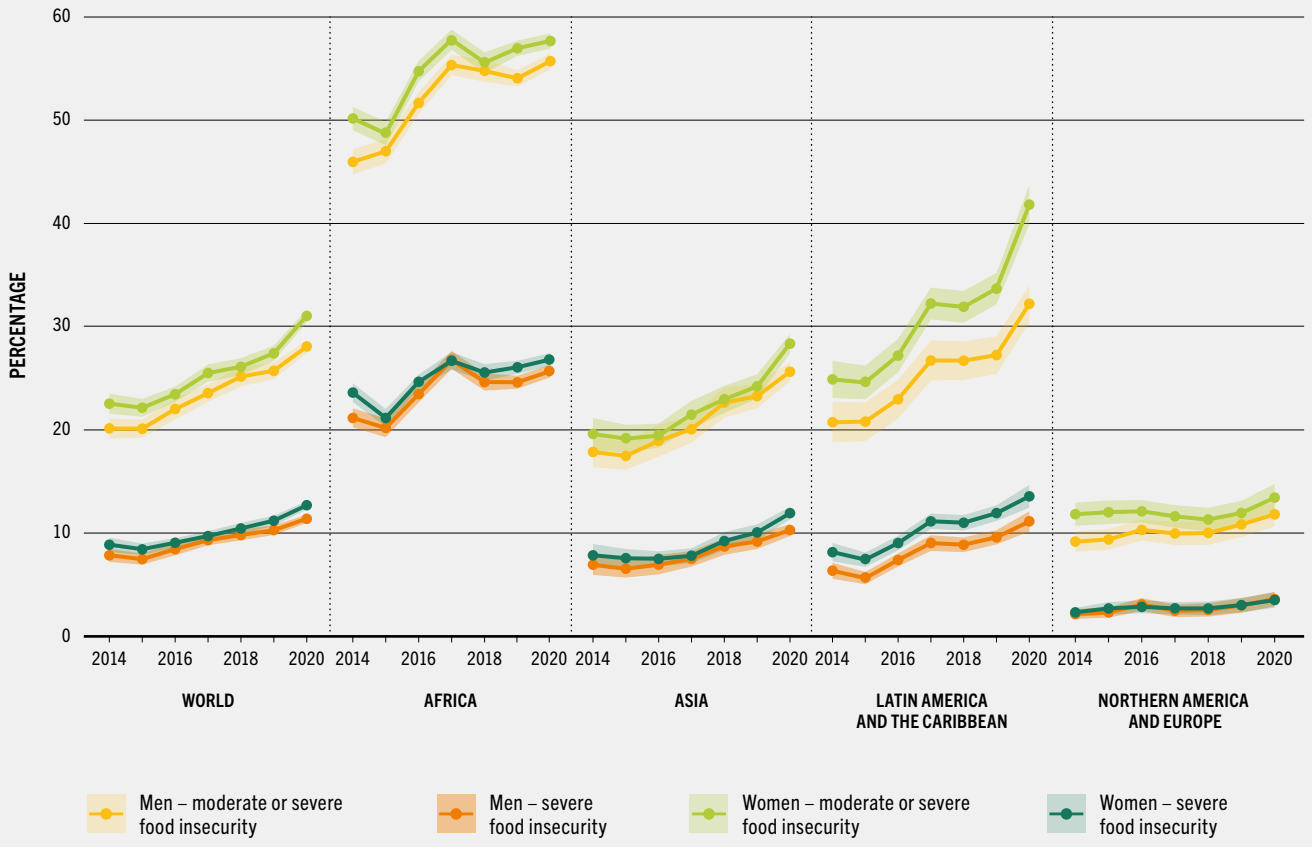
The effect was stronger for moderate or severe food insecurity than it was for severe food insecurity. Moreover, the higher the income of the respondent, the less food security was affected by the impacts of the COVID-19 pandemic on employment. These findings may reflect a strong negative impact of the pandemic on the food security of those in the middle-income range who normally count on stable employment, offering hope of rapid improvement in food security once people are able to resume normal work activities.

Gender differences in food insecurity

The individual-referenced questions that constitute the FIES survey module also enable a comparison between the food insecurity status of men and women. Figure 6 shows the prevalence of food insecurity at different levels of severity among adult men and women worldwide and in all regions, highlighting the evolution from 2014 to 2020. At the global level, the gender gap in the prevalence of moderate or severe

e The analysis was performed through a fixed effect regression model, using food insecurity status as outcome variable and responses to the four questions about the pandemic's impact on employment and income as explanatory variables. Education, employment status, gender, urban/rural area and world region were considered as controls. See **Annex 2** for more details.

FIGURE 6 GLOBALLY AND IN EVERY REGION, THE PREVALENCE OF FOOD INSECURITY IS HIGHER AMONG WOMEN THAN MEN



NOTE: The shaded area represents the margins of error around the estimates.
SOURCE: FAO.

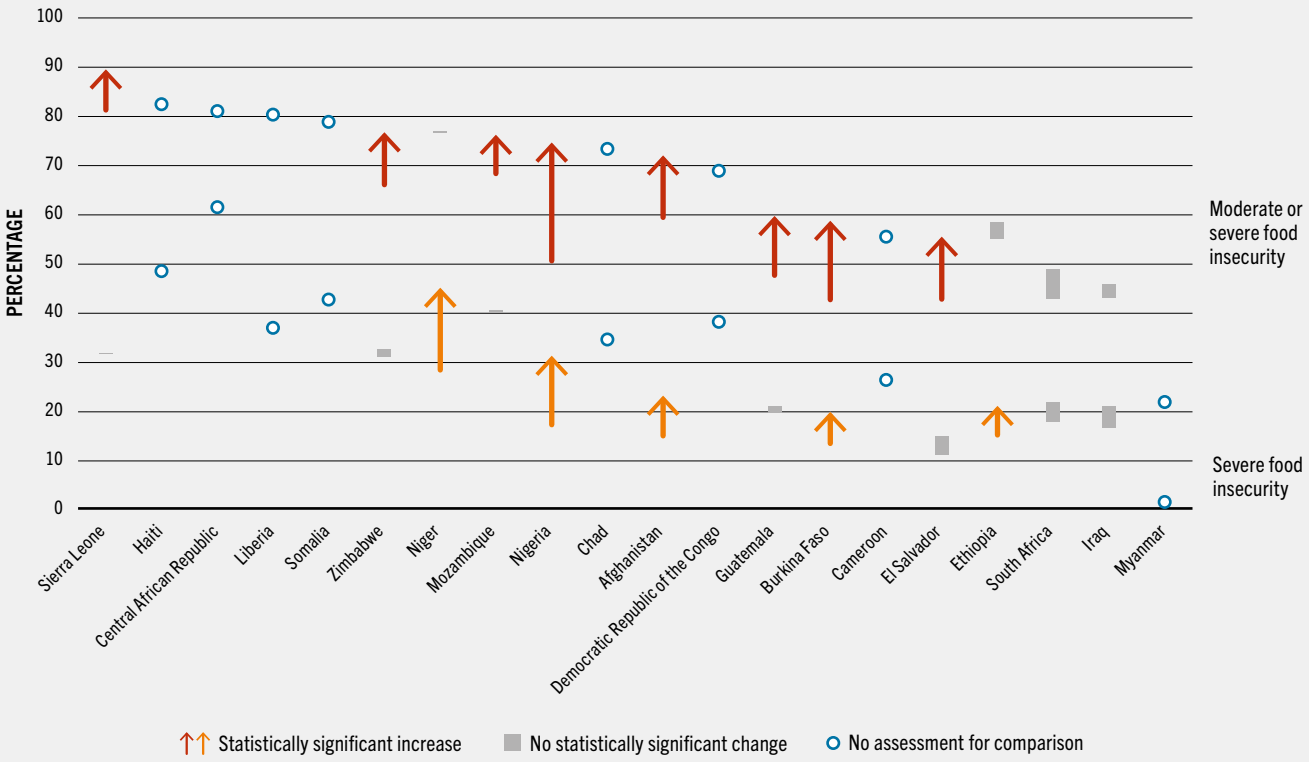
food insecurity grew even larger during the year the COVID-19 pandemic spread across the world, with the prevalence of moderate or severe food insecurity being 10 percent higher among women than men in 2020, compared with 6 percent in 2019. This is mostly due to the widening of the gap in Latin America and the Caribbean (30 percent in 2020 versus 24 percent in 2019) and Asia (10 percent in 2020 versus 4 percent in 2019). For severe food insecurity, the prevalence is also higher among women than men. The difference increased from 2019 to 2020, with women being 11 percent more food insecure than men in 2020 versus 9 percent more than men in 2019. Thus, the widening of the gap between men and women at the global level in a year impacted by the COVID-19 pandemic was more pronounced for moderate or severe food insecurity. »

BOX 4 USING THE FIES TO GUIDE AND TARGET RESPONSES TO THE COVID-19 PANDEMIC AT SUBNATIONAL LEVEL

The full potential of the FIES to generate information to guide policies is realized when applied in large national surveys that allow more detailed analyses of the food insecurity situation at subnational level. The surveys described in this box were conducted to provide food insecurity assessments useful to inform the planning of responses to the COVID-19 pandemic in 20 countries facing food insecurity crises, in addition to computing SDG Indicator 2.1.2.[17] Between October 2020 and January 2021, FIES data were collected in the following 20 countries: Afghanistan, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, El Salvador, Ethiopia, Guatemala, Haiti, Iraq, Liberia, Mozambique, Myanmar, Niger, Nigeria, Sierra Leone, Somalia, South Africa and Zimbabwe. The surveys were conducted via mobile telephone with samples intended to be representative at the national level as well as the first subnational administrative unit (admin-1) level. Approximately 200 interviews were conducted in each admin-1 area, resulting in samples ranging from slightly more than 1 000 to more than 8 300 across the 20 countries. A stand-alone FIES module was used with adaptations included to assess the degree to which the COVID-19 pandemic may have exacerbated food insecurity.[19] Post-hoc adjustments were applied to the sample data to control for the potential bias that might have arisen due to the relatively low mobile telephone penetration in some of the countries surveyed (see Box 3).

Results show that there was an increase in the prevalence of food insecurity in most countries for which previous assessments are available for comparison (Figure A). The increases were, on average, of about 10 percentage points for moderate or severe food insecurity and 5 percentage points for severe food insecurity.

FIGURE A FOOD INSECURITY IN 2020 COMPARED WITH 2019 (OR LAST AVAILABLE YEAR) IN COUNTRIES FACING FOOD INSECURITY CRISES

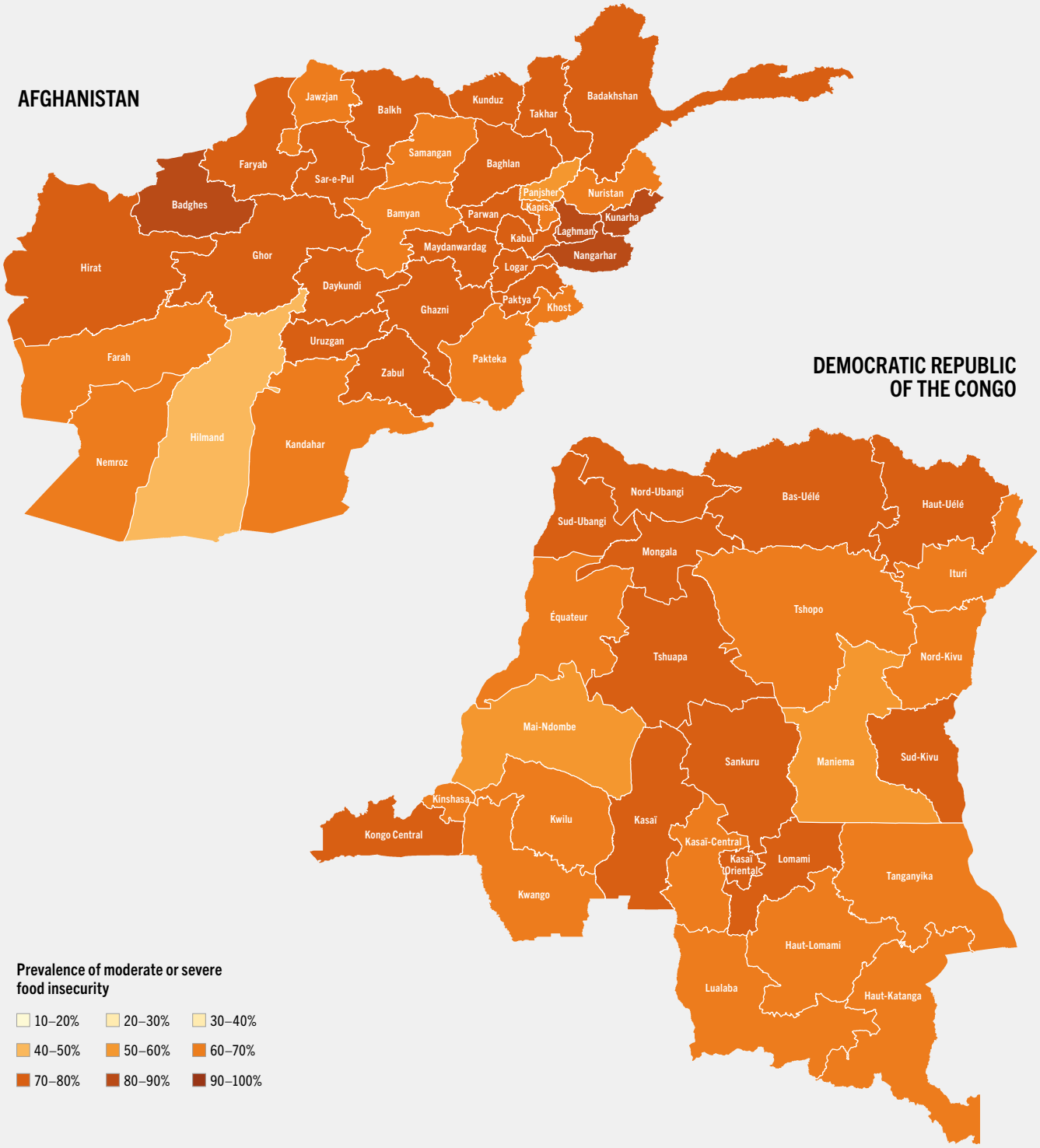


SOURCE: FAO.

The representativeness of the sample at the admin-1 level enabled a more detailed assessment of the food insecurity situation in the countries surveyed. Maps illustrating the geographical distribution of food insecurity, like the ones below for Afghanistan and the Democratic Republic of the Congo (Figure B), constitute a powerful tool to help policymakers and programme planners visualize which provinces or regions are most in need and, therefore, should be targeted for interventions aimed at guaranteeing the right to adequate food.

BOX 4 (CONTINUED)

FIGURE B PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN AFGHANISTAN AND THE DEMOCRATIC REPUBLIC OF THE CONGO BY PROVINCE IN 2020



NOTE: The boundaries and names shown and the designations used on these map(s) do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries.
SOURCE: FAO.

» Historically, women tend to be disproportionally affected by health and economic crises in a number of areas, including but not limited to food security and nutrition, health, time burden, and productive and economic dimensions. The results of this analysis support existing evidence of the disproportionate impact of the pandemic on women's economic opportunities and access to nutritious foods.[20]

Affordability of healthy diets: a link between food security and nutritional outcomes

The cost and affordability of healthy diets are important determinants of a person's food choices, and ultimately, of their food security, nutrition and health.[7,21] Cost refers to what people have to pay to secure a healthy diet, while affordability refers to the cost relative to a person's income, minus other required expenses.[f] Tracking the cost and the number of people who cannot afford a healthy diet provides valuable metrics to better understand the link between these important determinants of access to food and the trends in the multiple forms of malnutrition described in the next section. More importantly, they can be used to inform a wide range of policies and programmes at the global, national and subnational levels.

According to WHO, **healthy diets** protect against malnutrition in all its forms, including non-communicable diseases (NCDs) such as diabetes, heart disease, stroke and cancer. Healthy diets contain a balanced, diverse and appropriate selection of foods eaten over a period of time. In addition, a healthy diet ensures that a person's needs for macronutrients (proteins, fats and carbohydrates, including dietary fibre) and essential micronutrients (vitamins and minerals) are met, specific to their gender, age, physical activity level and physiological state. Healthy diets include less than 30 percent of total energy intake from fats, with a shift in fat consumption away from saturated fats to unsaturated fats and the elimination of industrial trans fats; less than 10 percent of total energy intake from free sugars (preferably less than 5 percent); consumption of at least 400 g of fruits and vegetables per day; and less than 5 g per day of salt (to be iodized). While the exact make-up of a healthy diet varies depending on individual characteristics, as well as cultural context, locally available foods and dietary customs, the basic principles of what constitutes a healthy diet are the same.[22,23]

Healthy diets can also play an important role in increasing the sustainability of food systems. As shown in the 2020 edition of this report, shifting to healthy diets that include sustainability considerations[g] can contribute to reducing health and climate change costs by 2030, because the hidden costs of these diets are lower compared with those of current consumption patterns. The adoption of healthy diets is projected to lead to a reduction of up to 97 percent in direct and indirect health costs and 41–47 percent in the social costs of greenhouse gas emissions (GHG) in 2030.[7]

Estimates of the cost and affordability of healthy diets around the world in 2017, by region and income group, were first presented in last year's edition of this report.[7] This year, the estimates were updated to 2019 using the latest available data to monitor the progress towards ensuring affordable, healthy diets for all. While the price and income distribution data needed to update the estimates to 2020 are not yet available, trends in consumer food prices and incomes are discussed with likely implications for the cost and affordability of healthy diets in 2020 and into 2021. For a full description of the methodology and data sources, see **Annex 2**.

Cost of healthy diets

As seen in last year's edition of this report, the cost of a diet increases as the diet quality increases, across all regions and country income groups. That analysis was based on three reference diets that simulate incremental levels of diet quality, starting from an "energy

f In this report, the cost of a diet refers to the sum of the value of all the least expensive food items needed to reach a given level of diet quality. The value, in turn, is the price per unit for each food item multiplied by the quantity of the food item.

g Healthy diets that include sustainability considerations are diets that are not only optimized for health, but also include environmental sustainability considerations. Not all healthy diets are sustainable and not all diets designed for sustainability are always healthy or adequate for all population groups. See the 2020 edition of this report for a full discussion and analysis.[7]

sufficient", to a "nutrient adequate" diet and then a "healthy" diet.[8] On average, the cost of a healthy diet was 60 percent more than a diet that just meets requirements for essential nutrients, and almost five times as much as a diet that just meets the minimum dietary energy needs through a starchy staple.

Updated results indicate that in 2019, at the global level, the cost of a healthy diet was USD 4.04 per person per day. However, the average cost of the diet and the change in the cost between 2017 and 2019 varies by region and country income group (Table 5).

The cost of a healthy diet increased by 7.9 percent globally between 2017 and 2019, but differences are notable across regions (Table 5). All regions except Africa present lower increases than the global average. Africa had the largest increase in the cost of a healthy diet from 2017 to 2019 – 12.9 percent.[h] The second largest increases were in Northern America and Europe and Latin America and the Caribbean, which both had an average regional increase of 6.8 percent. Asia registered marginal increases of 4.1 percent. Among the subregions, Eastern Africa had the highest increase (33 percent) followed by South America (9.2 percent).[i]

The analysis of the cost of a healthy diet by country income group shows that the largest increases in the cost of a healthy diet occurred in lower-middle-income and high-income countries (14.3 and 6.6 percent, respectively). Increases in the cost of a healthy diet are much smaller in low-income and upper-middle-income countries (5.4 and 5.7 percent, respectively).

Affordability of healthy diets prior to the COVID-19 pandemic

Affordability is a key component of food security and nutrition and is a measure of economic access to food and healthy diets. Because affordability is a measure of the cost of a diet relative to income, changes over time can be the result of changes in the cost of a diet, people's income, or both. Rising food costs, if not matched by rising income, could result in more people being unable to afford healthy diets. Moreover, wider problems in the economy, such as economic slowdowns and downturns that lead to increases in unemployment and declines in wages, could result in more people finding healthy diets unaffordable, irrespective of price trends.

As a result of the high cost of healthy diets, coupled with persistent high levels of income inequality, it is estimated that around 3 billion people were unable to afford a healthy diet in 2019 (Table 5). Most of these people live in Asia (1.85 billion) and Africa (1.0 billion), although a healthy diet is also out of reach for millions living in Latin America and the Caribbean (113.0 million) and Northern America and Europe (17.3 million).

The total number of people in the world who could not afford a healthy diet in 2019[j] is slightly lower than the 2017 estimate published in last year's report by around 21 million.[k] There are, however, important differences across regions, with Latin America and the Caribbean and Africa registering an increase, while Asia, Northern America and Europe and Oceania show a decrease. The highest increase in the number of people who cannot afford a healthy diet was seen in Latin America and the Caribbean (8.4 percent), which is largely driven by increases in South America (14.3 percent).[l] In Africa, the number of people who cannot afford a healthy diet increased by 5.4 percent between 2017 and 2019, ranging from 2.0 percent in Southern Africa to 6.8 percent in Middle Africa. »

h This increase is largely due to an increase in the cost of a healthy diet in Zimbabwe. The percentage increase for Africa would be 4.3 percent, excluding Zimbabwe.

i The increase in Eastern Africa was largely driven by an increase in the cost of a healthy diet in Zimbabwe; and for South America, by an increase in Argentina. The percentage change for Eastern Africa would be 2.7 percent, excluding Zimbabwe. The percentage change for South America would be 5.2 percent, excluding Argentina.

j 2019 estimates are updated using the 2019 food CPI-inflated cost and PovcalNet income distributions; see **Annex 2** for methodology and data sources.

k After March 2021 PovcalNet updates, sensitivity analysis was conducted on affordability computed in 2017, using different income distributions that showed similar results. The number reported in the 2020 edition of this report for 2017 is 3.02 billion; this number slightly decreases to 2.97 billion if the updated 2018 income data of PovcalNet are used, while the number is slightly higher (3.05 billion) if instead the 2017 income distribution is used. See background methods paper to *The State of Food Security and Nutrition in the World 2021* report.[302]

l This increase is largely attributable to Argentina, which had a 49 percent increase in the cost of a healthy diet between 2017 and 2019.

TABLE 5 HEALTHY DIETS WERE STILL UNAFFORDABLE FOR AROUND 3 BILLION PEOPLE IN THE WORLD IN 2019. THE NUMBER OF PEOPLE UNABLE TO AFFORD HEALTHY DIETS INCREASED IN AFRICA AND IN LATIN AMERICA AND THE CARIBBEAN BETWEEN 2017 AND 2019

	Cost of a healthy diet in 2019		People unable to afford a healthy diet in 2019		
	Cost (USD per person per day)	Change between 2017 and 2019 (percent)	Percent	Total number (millions)	Change between 2017 and 2019 (percent)
WORLD	**4.04**	**7.9**	**41.9**	**3 000.5**	**-0.7**
AFRICA	**4.37**	**12.9**	**80.2**	**1 017.0**	**5.4**
Northern Africa	4.35	5.6	60.5	141.8	4.2
Sub-Saharan Africa	4.37	13.7	84.7	875.2	5.6
Eastern Africa	4.88	33.0	85.0	342.2	5.3
Middle Africa	3.81	2.2	87.9	152.0	6.8
Southern Africa	4.07	2.1	61.8	41.2	2.0
Western Africa	4.30	6.8	86.8	339.7	5.9
ASIA	**4.13**	**4.1**	**44.0**	**1 852.8**	**-4.2**
Central Asia	3.42	0.9	16.9	5.8	-22.0
Eastern Asia	4.99	6.4	13.5	213.5	-7.4
South-eastern Asia	4.41	4.9	49.5	316.1	-2.9
Southern Asia	4.12	1.2	71.3	1 281.5	-4.2
Western Asia	3.77	5.3	20.3	35.9	8.1
LATIN AMERICA AND THE CARIBBEAN	**4.25**	**6.8**	**19.3**	**113.0**	**8.4**
Caribbean	4.49	6.7	48.5	12.9	-1.0
Latin America	4.00	6.8	17.9	100.1	9.7
Central America	3.93	3.1	20.0	32.0	1.2
South America	4.05	9.2	17.1	68.1	14.3
OCEANIA	**3.25**	**6.2**	**1.8**	**0.5**	**-14.9**
NORTHERN AMERICA AND EUROPE	**3.43**	**6.8**	**1.6**	**17.3**	**-3.6**
COUNTRY INCOME GROUPS					
Low-income	4.06	5.4	87.6	463.0	4.8
Lower-middle-income	4.49	14.3	69.5	1 953.2	-1.4
Upper-middle-income	4.20	5.7	21.1	568.5	-2.0
High-income	3.64	6.6	1.4	15.8	-9.9

NOTES: The table shows the cost and unaffordability of a healthy diet by region and country income group in 2019. The cost of a healthy diet is the 2017 USD cost per person per day (published in last year's edition of this report), updated using FAOSTAT country-level food consumer price index (CPI) and purchasing power parity (PPP) in 2019. Unaffordability of a healthy diet is the weighted percentage (%) and the total number (million) of population in each region and country income group who cannot afford the diet in 2019. For country income groups, the most recent 2019 World Bank income classification is used for both years 2017 and 2019. This implies that cost and affordability indicators shown by income groups in last year's edition of this report differ from this year's edition as some countries may have changed income status between 2017 and 2019. See **Annex 2** for methodology and data sources.
SOURCE: FAO.

» Both Asia and Northern America and Europe, on the other hand, had a decrease in the number of people who cannot afford a healthy diet between 2017 and 2019 (4.2 and 3.6 percent, respectively). All subregions in Asia, except Western Asia, show a decrease in the number of people who cannot afford a healthy diet, with large decreases in Central Asia (22 percent)[m] and Eastern Asia (7.4 percent). Western Asia shows an increase of 8.1 percent. South America experienced the largest decrease.

The comparison of cost and affordability over time points to the important roles of changes in income as well as prices in determining affordability. In Asia, the increased cost of a healthy diet coincided with higher incomes, so that the number of people unable to afford a healthy diet decreased. On the other hand, Africa[n] was one of the regions with the smallest increases in the cost of a healthy diet but where the highest increase was observed in the number of people unable to afford one, pointing to the role of declining incomes. Economic growth and increases in income were lower in Africa over this period.

In comparison, the large increase in the cost of healthy diets in Latin America and the Caribbean coincided with a growing number of people who were unable to afford them. This contrasts sharply with Northern America and Europe, which saw a similar increase in the cost of healthy diets, but with fewer people unable to afford them. In the case of Latin America and the Caribbean, the increased cost of the diet was compounded by falling incomes, resulting in a double hit to the unaffordability of healthy diets, whereas in Northern America and Europe, the rise in the cost was offset by rising incomes.

There are important dynamics at play behind these observed differences related to the context and structural features of a country, notably levels of poverty and income inequality. The poor spend a large proportion of their income on food, therefore small increases in the cost of a diet can be significant in countries where the poor make up a large percentage of the population. For example, small increases in the cost of the diet in Africa affect a larger proportion of the population – an estimated 80 percent of the population cannot afford a healthy diet.

The level of income inequality in a country is also critical, as income inequality shapes the impact of economic growth and deceleration on average incomes. As shown in the 2019 edition of this report, where inequality is greater, economic slowdowns and downturns have a disproportionate effect on low-income populations, since they use large portions of their income to buy food. In Latin America and the Caribbean, the combination of very high income inequality, an economic slowdown and downturn[o] and a high increase in the cost of a healthy diet had a compounding effect, leading to one of the highest increases in the unaffordability of a healthy diet between 2017 and 2019. In contrast, Asia, with lower levels of income inequality and economic growth during this same period, was able to offset high increases in the cost of the diet, leading to one of the highest improvements in affordability.

These findings illustrate that a broader policy approach is needed to improve the affordability of healthy diets, one which focuses not only on improving incomes and reducing the costs of healthy diets, but also on addressing inequality (see Chapters 3 and 4).

Affordability of healthy diets in 2020

There is no room for complacency about access to affordable healthy diets – especially given the emergence of the pandemic in 2020 – even in those regions where improvements are observed between 2017 and 2019. While it is not possible to update estimates to 2020 at this time, the number of people who cannot afford a healthy diet is

m This decrease is largely driven by Kyrgyzstan, where the percentage of the population who cannot afford a healthy diet decreased from 60 percent in 2017 to 48 percent in 2019. This was due in part to the income needed to afford a healthy diet (i.e. accounting for 63 percent of income spent on food), which decreased from USD 5.40 to USD 5.23.

n Excluding Zimbabwe, the percent increase for Africa would only be 4.3 percent.

o Latin America and the Caribbean has the highest level of income inequality in the world, both in terms of the Gini coefficient and the ratio between the income share of the richest and the poorest 20 percent of the population. See **Figure 34** in FAO, IFAD, UNICEF, WFP and WHO (2019).[5] The region also experienced economic slowdowns in 2017 and 2018, and downturns in 2016 and 2019. The annual percentage change in GDP per capita was -1.4 in 2016, 0.8 in 2017, 0.6 in 2018 and -0.1 percent in 2019.[319]

likely to have increased due to the compounding effects of inflation in consumer food prices and income losses, stemming from the economic impacts of the COVID-19 pandemic and the measures put in place to contain it.

By December 2020, global consumer food prices were at their highest for any month in the last six years, and they continued to increase into the first quarter of 2021. Consumer food prices in Latin America and the Caribbean, for example, increased by 16 percent between January and December 2020, with the largest increase in South America.[p]

The global economic recession that started in 2020 has extended into 2021, with record levels of unemployment, lost livelihoods and rising poverty levels in many countries around the world (see Chapter 3). One study using modelled estimates[q] of changes in income in 63 low- and middle-income countries (total population of 3.5 billion) points to a deeper affordability gap in 2020 due to the COVID-19 pandemic, putting healthy diets even further out of reach.[24,25] The analysis suggests that the pandemic led to an additional 141 million people being unable to afford a healthy diet in the countries studied. Strikingly, the number of people unable to afford even *half* the cost of a healthy diet was also estimated to have risen from 43 percent to 50 percent. Where the affordability gap is this large, filling nutrient intake gaps among the most nutritionally vulnerable during the first 1 000 days of life, from conception to the second birthday, should be an urgent priority, because of the severe and lasting consequences of undernutrition early in life.

p Calculated as the annual percentage change in the consumer price index for a country. See FAO (2020).[320]

q The methodology for this study differs significantly from the methods used to estimate the cost and affordability of the diet reported in **Table 5** of this report (and therefore are not comparable). While the study uses the 2017 cost estimates of diets from the 2020 edition of this report, the updated cost and affordability estimates are modelled estimates, which are derived after the authors have applied exogenous changes into IFPRI's global computable general equilibrium (CGE) model, MIRAGRODEP (Modelling International Relations under Applied General Equilibrium) model enhanced for the AGRODEP modeling consortium – www.agrodep.org/models/library). Such changes are implemented through a number of parameters to approximate the socio-economic impacts of the COVID-19 pandemic resulting from health impacts, physical distancing, restrictions on (labour) mobility, international transport and the closure of some business activities. In this way, the authors simulate endogenous impacts on economic growth, incomes, employment, consumption, prices, trade and, ultimately, poverty.[25]

Estimates of the cost and affordability of healthy diets will be updated annually and disseminated in this report, reflecting the most recent data as they become available. Once new data for 2020 are available, it will be possible to estimate the overall economic impact of the COVID-19 pandemic on the cost and affordability of healthy diets. Regional, subregional, national and even subnational differences are expected, given the different timing, duration and intensity of lockdowns, as well as differential impacts of economic shocks on countries. ■

2.2 NUTRITION INDICATORS – LATEST UPDATES AND PROGRESS TOWARDS GLOBAL NUTRITION TARGETS

KEY MESSAGES

➔ Globally, malnutrition in all its forms remains a challenge. Although it is not yet possible to fully account for the impact of the COVID-19 pandemic due to data limitations, in 2020, it is estimated that 22.0 percent (149.2 million) of children under 5 years of age were affected by stunting, 6.7 percent (45.4 million) were suffering from wasting and 5.7 percent (38.9 million) were affected by overweight. The actual figures, particularly for stunting and wasting, are expected to be higher due to the effects of the COVID-19 pandemic.

➔ Most children under five years with malnutrition live in Africa and Asia. These regions account for more than nine out of ten of all children with stunting, more than nine out of ten children with wasting and more than seven out of ten children who are overweight worldwide.

➔ There has been some progress towards increasing the percentage of infants 0–5 months of age who are fed exclusively with breastmilk – 44 percent in 2019 compared with 37 percent in 2012.

➔ Anaemia in women aged 15–49 years is now an SDG indicator (2.2.3). Globally, 29.9 percent of women aged 15 to 49 years are affected by anaemia; however, the data reveal stark regional differences. In 2019, more than 30 percent of women in Africa and Asia were affected by anaemia, compared with only 14.6 percent of women in Northern America and Europe.

➔ These estimates do not take into account the impact of the COVID-19 pandemic, given the challenges it posed for data collection in 2020. However, telephone surveys during 2020 showed disruptions in essential nutrition interventions and negative impacts on dietary patterns. The modelled impact of economic shocks and service disruptions show the pandemic's potential to increase all forms of malnutrition.

➔ With increased momentum towards the UN Food Systems Summit in September 2021 and the Tokyo Nutrition for Growth Summit in December 2021, now is the opportunity to secure concrete commitments and plans towards eliminating all forms of malnutrition over the second half of the UN Decade of Action on Nutrition by 2025 and towards the 2030 SDGs.

Global trends

This section assesses progress towards the seven global nutrition targets. These include the six nutrition targets endorsed by the World Health Assembly (WHA) in 2012 to be achieved by 2025, for which 2030 targets[26] were subsequently proposed (Table 6). Four out of the six indicators were also selected to monitor progress towards SDG Target 2.2, including anaemia in women 15–49 years which has been newly designated as an SDG indicator (SDG Indicator 2.2.3).[27] The seventh target is to halt the rise in adult obesity, which is part of the Global Action Plan for the Prevention and Control of Noncommunicable Diseases adopted by the WHA in 2013.[28]

Progress towards each of the seven nutrition targets is summarized in Figure 7. The latest estimates do not account for the effects of the COVID-19 pandemic because data on nutrition outcomes were not collected or have not yet been fully estimated. The 2020 estimates of childhood stunting, wasting and overweight presented in this edition are based almost entirely on data collected before 2020 as the collection of household survey data on child height and weight were limited this past year due to physical distancing measures to contain the spread of the pandemic; only four national surveys with at least some field work in 2020 are reflected in these updated estimates. Nevertheless, some observed and modelled impacts of the COVID-19 pandemic on nutrition are discussed at the end of this section.

One in seven live births, or 20.5 million (14.6 percent) babies globally, suffered from **low birthweight** in 2015.[29] Low birthweight newborns have a higher risk of dying in the first 28 days after birth; those who survive are more likely to suffer from stunted growth and lower intelligence quotient (IQ), and face increased risk of overweight and obesity and adult-onset chronic conditions, including cardiovascular diseases and diabetes, later in life.[30,31] Data show that little progress has been made to reduce low birthweight since 2012. New low birthweight estimates will be released in early 2022.

Optimal breastfeeding practices, including **exclusive breastfeeding** for the first 6 months of life, are critical for child survival and the promotion of health and of brain and motor development. Globally, 44 percent of infants under 6 months of age were exclusively breastfed in 2019 – up from 37 percent in 2012. Oceania (excluding Australia and New Zealand) demonstrated the highest levels of exclusive breastfeeding, at 61.3 percent. More than two in five infants under 6 months in Africa (43.6 percent) and Asia (45.3 percent) were exclusively breastfed in 2019, compared with only one in three infants in Northern America (34.7 percent). This practice, however, varies considerably among the subregions of Asia and Africa. Three out of five subregions in Asia have a higher prevalence than the global estimate. Southern Asia has the highest prevalence, with 57.2 percent of infants being exclusively breastfed compared with only 22.0 percent of infants in Eastern Asia. Similarly, in Africa, the prevalence of exclusive breastfeeding is nearly twice as high in Eastern Africa (60.7 percent) compared with Southern (33.5 percent) and Western Africa (32.3 percent). Though many regions have demonstrated progress, two subregions in particular have demonstrated

TABLE 6 THE GLOBAL NUTRITION TARGETS ENDORSED BY THE WORLD HEALTH ASSEMBLY AND THEIR EXTENSION TO 2030

	2025 Target	2030 Target
Stunting (SDG)	40 percent reduction in the number of children under five who are stunted.	50 percent reduction in the number of children under five who are stunted.
Anaemia (SDG)	50 percent reduction in anaemia in women of reproductive age.	50 percent reduction in anaemia in women of reproductive age.
Low birthweight	30 percent reduction in low birthweight.	30 percent reduction in low birthweight.
Childhood overweight (SDG)	No increase in childhood overweight.	Reduce and maintain childhood overweight to less than 3 percent.
Breastfeeding	Increase the rate of exclusive breastfeeding in the first six months up to at least 50 percent.	Increase the rate of exclusive breastfeeding in the first six months up to at least 70 percent.
Wasting (SDG)	Reduce and maintain childhood wasting to less than 5 percent.	Reduce and maintain childhood wasting to less than 3 percent.

NOTE: Targets were set considering the baseline year 2012.
SOURCES: WHO & UNICEF. 2017. *The extension of the 2025 Maternal, Infant and Young Child nutrition targets to 2030. Discussion paper.* Geneva, Switzerland, WHO. (also available at www.who.int/nutrition/global-target-2025/discussion-paper-extension-targets-2030.pdf).

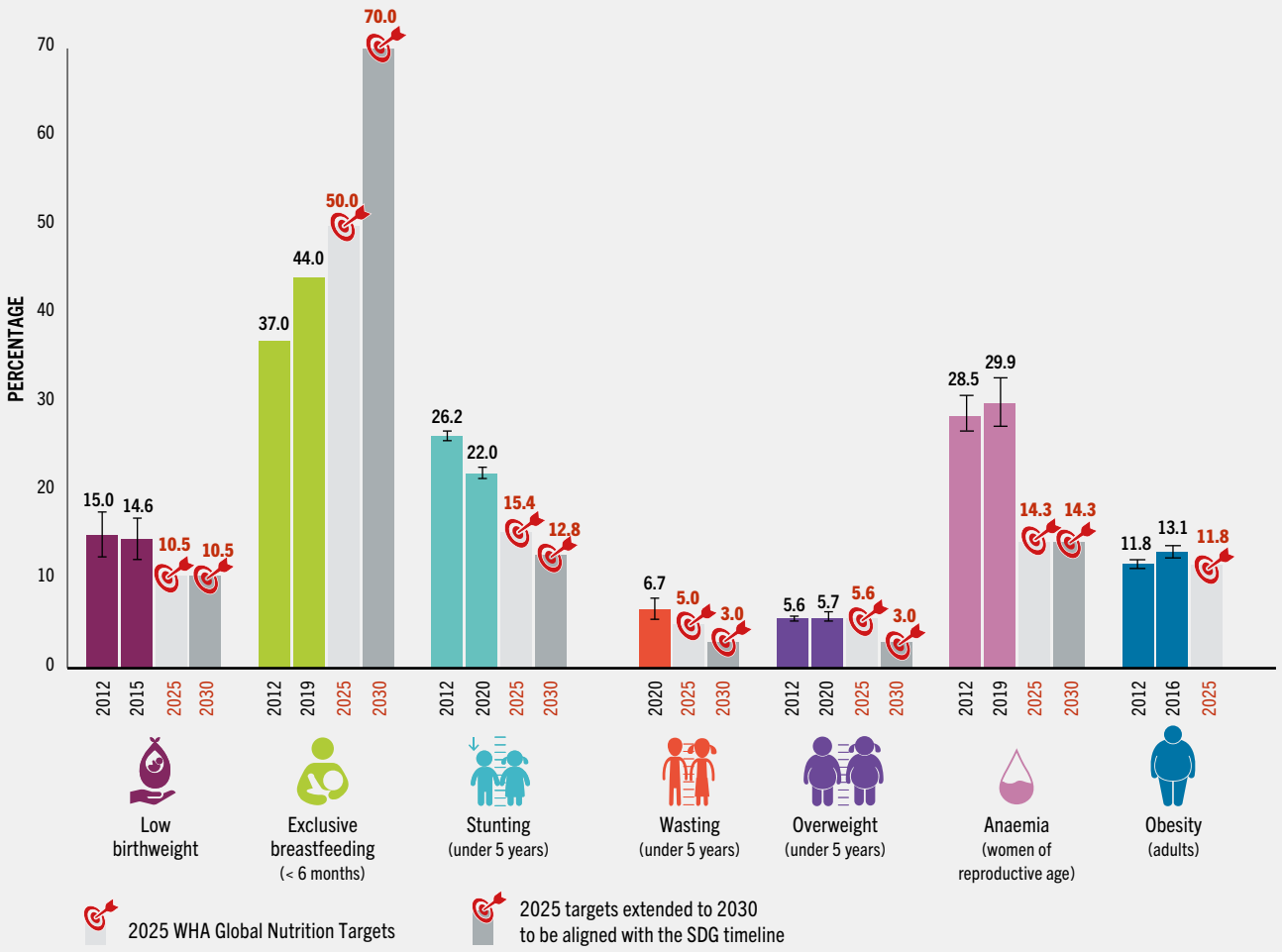
worrying declines in exclusive breastfeeding prevalence, with levels decreasing from 29.7 percent to 25.9 percent in the Caribbean and from 28.5 percent to 22.0 percent in Eastern Asia between 2012 and 2019.

Estimates of childhood stunting and overweight, presented below, have been generated using a new country-level model (see **Annex 1B** for details). However, as mentioned above, the full impact of the COVID-19 pandemic on child malnutrition is still unfolding and is not captured in the 2020 estimates.

Globally, 149.2 million (22.0 percent) children under the age of five years suffered from **stunting** (SDG Indicator 2.2.1) in 2020.[32] Stunting (defined as being too short for one's age) undermines children's physical growth and cognitive development and increases their risk of dying from common infections. It is also associated with increased risk of developing NCDs later in life. The prevalence of stunting has decreased from 33.1 percent in 2000 to 26.2 percent in 2012 and further to 22.0 percent in 2020. In 2020, nearly three-quarters of the world's stunted children lived in just two regions: Central and Southern Asia (37 percent) and sub-Saharan Africa (37 percent). Eastern Asia and South-eastern Asia have made the greatest progress over the past two decades, with stunting prevalence declining by nearly half, from 26.1 percent in 2000 to 13.4 percent in 2020. Progress on stunting has been slower in Africa, declining from 41.5 percent in 2000 to 30.7 percent in 2020 (only a 26 percent decline in relative terms); the slower decline in prevalence combined with population increases make it the only region where the number of children with stunting has increased since 2000. Some African subregions have shown slower progress. For example, Middle Africa and Southern Africa have decreased their stunting prevalence by less than 20 percent, in relative terms, since 2000.

Child **wasting** (part of SDG Indicator 2.2.2) is a life-threatening condition resulting from poor nutrient intake and frequent or prolonged illnesses. Affected children are dangerously thin, have weakened immunity and face an increased acute risk of death. In 2020,[32] 45.4 million children under five years (6.7 percent) were wasted. Nearly one-quarter lived in sub-Saharan Africa and more than half lived in Southern Asia, the subregion with the highest prevalence of wasting – above 14 percent. This form of malnutrition is the most impacted by the COVID-19 pandemic in the short term, as it is an acute condition with potential to manifest quickly in the face of shocks. The pandemic has likely shifted the global prevalence even further from the global targets. As mentioned above, the estimate of 45.4 million »

FIGURE 7 REACHING THE 2025 AND 2030 GLOBAL NUTRITION TARGETS REMAINS A CHALLENGE. IN 2020, AN ESTIMATED 22 PERCENT OF CHILDREN UNDER 5 YEARS OF AGE WERE AFFECTED BY STUNTING, 6.7 PERCENT BY WASTING AND 5.7 PERCENT BY OVERWEIGHT. NEARLY 30 PERCENT OF WOMEN AGED 15 TO 49 YEARS WERE AFFECTED BY ANAEMIA IN 2019



NOTES: The potential impact of the COVID-19 pandemic is not reflected in the estimates. Wasting is an acute condition that can change frequently and rapidly over the course of a calendar year. This makes it difficult to generate reliable trends over time with the input data available – as such, this report provides only the most recent global and regional estimates.

SOURCES: Data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2020. UNICEF Global Database on Infant and Young Child Feeding. In: *UNICEF* [online]. New York, USA. [Cited 19 April 2021]. data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for anaemia are based on WHO. 2021. Global Health Observatory (GHO). In: *WHO* [online]. Geneva, Switzerland. [Cited 26 April 2021]. www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for adult obesity are based on WHO. 2017. Global Health Observatory (GHO). In: *WHO* [online]. Geneva, Switzerland. [Cited 2 May 2019]. www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-); data for low birthweight are based on UNICEF & WHO. 2019. *UNICEF-WHO Low Birthweight Estimates: Levels and trends 2000–2015* [online]. [Cited 4 May 2021]. data.unicef.org/resources/low-birthweight-report-2019

» children does not include the impact of the pandemic given the inability to measure children while physical distancing policies were in place. However, one study based on modelling indicates that wasting may have affected around 15 percent more children in 2020 than estimated, putting the lives of tens of millions of children at risk.[33]

Childhood overweight (part of SDG Indicator 2.2.2) has immediate impacts on children's health and well-being and increases the risk of diet-related NCDs later in life. It has been on the rise in many countries, boosted by industry-led marketing and greater access to highly processed foods, often high in energy, fats (particularly saturated and trans fats), free sugars and salt,[34] along with inadequate levels of physical activity. For example, a study in Europe found that over half of commercial complementary infant foods contained excessive levels of sugar.[35] In 2020, 5.7 percent (38.9 million) of children under five years were overweight.[32] There has been little change at the global level in two decades – 5.7 percent in 2020 compared with 5.4 percent in 2000 – and trends in some regions and in many settings are on the rise. While the prevalence of child overweight in Africa is similar to the global prevalence (5.3 percent in 2020), subregional levels show differences, reaching 13.0 and 12.1 percent in Northern Africa and Southern Africa, respectively. There have been notable increases in child overweight between 2000 and 2020,[32] especially in two regions, Eastern and South-eastern Asia, and Australia and New Zealand, where levels have increased from 5.2 to 7.7 percent and from 7.7 to 16.9 percent, respectively. A reversal in trajectory is needed to achieve the 3 percent global target for 2030.

New updates from 2019 on **anaemia in women of reproductive age** (SDG Indicator 2.2.3) are presented in this year's report. Nearly one in three (29.9 percent) women of reproductive age globally were still affected by anaemia and no progress has been made since 2012. Wide variations exist between regions, with the prevalence in Africa being nearly three times higher than that of Northern America and Europe. The prevalence is particularly high in Western Africa, representing 51.8 percent, with little progress since 2012 (52.9 percent). No region has shown a significant decline in the prevalence of anaemia among women of reproductive age, pointing to the need for consolidated attention and action. Similar patterns hold for anaemia in pregnant women, as well.[36]

Adult obesity is a diet-related risk factor for several NCDs. Adult obesity continues to rise, with the global prevalence increasing from 11.8 percent in 2012 to 13.1 percent in 2016. All subregions showed increasing trends in the prevalence of adult obesity between 2012 and 2016, and are off track to meet the 2025 WHA target. Northern America, Western Asia, and Australia and New Zealand had the highest levels, at 35.5 percent, 29.8 percent and 29.3 percent, respectively, as of 2016. Latin America and the Caribbean, and Oceania excluding Australia and New Zealand, also show levels above 20 percent. Updated adult obesity estimates will be released in late 2021.

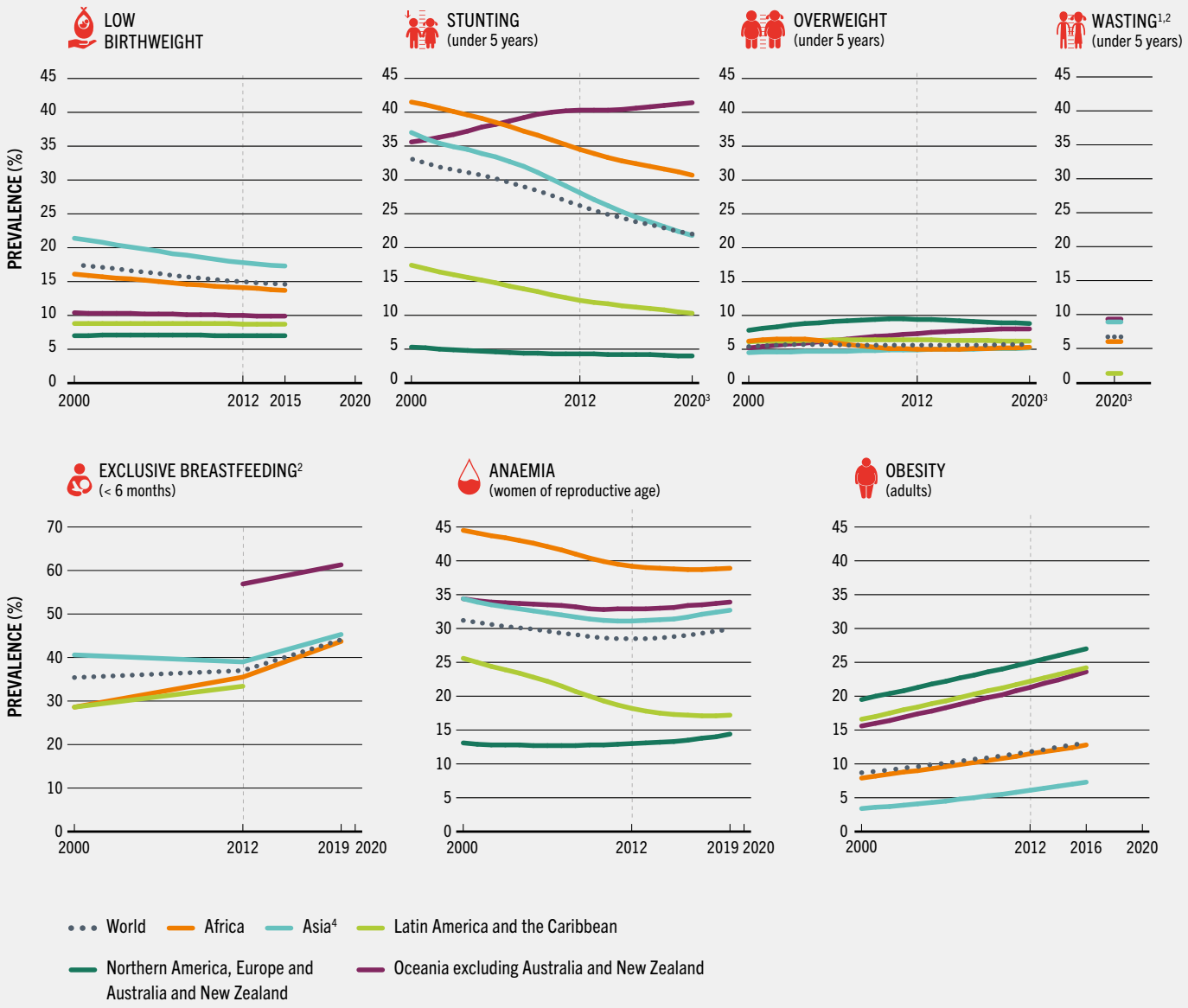
The regional trends described above are summarized in Figure 8 and subregional trends are presented in Table 7 in the next section.

As has been touched upon previously in this report, hundreds of millions of people were already suffering from hunger and malnutrition before the onset of the COVID-19 pandemic. In the long term, without large-scale coordinated action, the combined effects of COVID-19 infection, as well as corresponding mitigation measures and the emerging global recession, could disrupt the functioning of food systems with disastrous consequences for health and nutrition. In the following section, we examine some of the evidence of the impacts of the COVID-19 pandemic on nutrition.

Impact of the COVID-19 pandemic on nutrition

The COVID-19 pandemic has led to multiple economic, food and health system shocks that threaten to reverse the progress made to date in tackling all forms of malnutrition.[37] It will likely be some time before empirical data are available on a global scale that allow proper assessment of the impact of the pandemic on nutritional status. However, results of the studies described below provide insight into how the COVID-19 pandemic has impacted nutrition-related factors that ultimately influence nutrition outcomes. »

FIGURE 8 STUNTING IS THE ONLY INDICATOR SHOWING SUBSTANTIAL IMPROVEMENTS IN MULTIPLE REGIONS SINCE 2000. TWO INDICATORS – CHILD OVERWEIGHT AND ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE – HAVE SEEN NO PROGRESS IN TWO DECADES. ADULT OBESITY IS RISING SHARPLY IN ALL REGIONS



NOTES: [1] Wasting is an acute condition that can change frequently and rapidly over the course of a calendar year. This makes it difficult to generate reliable trends over time with the input data available and, as such, this report provides only the most recent global and regional estimates. [2] For wasting and exclusive breastfeeding, estimates are not shown for regions/years where population coverage was below 50 percent. [3] The collection of household survey data on child height and weight were limited in 2020 due to the physical distancing measures required to prevent the spread of COVID-19. Only four national surveys included in the database were carried out (at least partially) in 2020. The estimates on child stunting, wasting and overweight are therefore based almost entirely on data collected before 2020 and do not take into account the impact of the COVID-19 pandemic. [4] For wasting and low birthweight, the Asia estimate excludes Japan.

SOURCES: Data for low birthweight are based on UNICEF & WHO. 2019. UNICEF-WHO Low Birthweight Estimates: levels and trends 2000–2015, May 2019. In: *UNICEF data* [online]. New York, USA, UNICEF [Cited 19 April 2021]. data.unicef.org/resources/unicef-who-low-birthweight-estimates-levels-and-trends-2000-2015; data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2020. UNICEF Global Database on Infant and Young Child Feeding. In: *UNICEF* [online]. New York, USA. [Cited 19 April 2021]. data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for anaemia are based on WHO. 2021. Global Health Observatory (GHO). In: *WHO* [online]. Geneva, Switzerland. [Cited 26 April 2021]. www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for adult obesity are based on WHO. 2017. Global Health Observatory (GHO). In: *WHO* [online]. Geneva, Switzerland. [Cited 19 April 2021]. www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-)

» Changes in food and diet patterns

Some data collection efforts have continued during the pandemic through phone and online surveys, and through modified in-person surveys employing infection prevention and control measures. Many nutrition-related surveys undertaken in 2020 included questions on coping strategies adopted by households in the face of the COVID-19 pandemic, shedding light on changes in dietary patterns.

One national survey in Indonesia found that 31 percent of households reported food shortages and 38 percent reported eating less than usual, compared with 3 percent and 5 percent, respectively, the previous year.[11] Survey results show that foods consumed by households were neither sufficient in amount nor in diversity, increasing the risk of nutritional deficiencies and irreversible physical and cognitive deficits to children, as well as adult underweight, overweight and obesity, and of developing NCDs. Another study in Yemen found that the dietary diversity of households already consuming poor diets had deteriorated between February and April 2020, with the share of households consuming only three or fewer food groups increasing from 22 to 30 percent during that period. These households reported eating mainly cereals, fats and sugar, instead of nutritious foods.[38]

Conditions imposed by the COVID-19 pandemic, such as mobility restrictions, closures or limited operating hours of food markets, and price increases of perishable, often more nutritious foods,[39] have all provoked changes in dietary patterns. These conditions, along with reduced incomes, can induce families to choose cheaper, highly processed foods with a longer shelf life – often of high energy density and minimal nutritional value – over fresh and more nutritious foods. Forty-nine percent of survey respondents in Brazil reported that their food habits had changed during quarantine and social isolation periods. Among households with children and adolescents under 17 years, this proportion increased to 58 percent. Almost one-third (31 percent) of households with children increased their consumption of highly processed foods, compared with 18 percent of households without children, highlighting how deteriorations in diet quality are taking the greatest toll on children.[40]

The study revealed sociodemographic inequalities in dietary quality in Brazil: people in the lower wealth quintiles, those who became unemployed, people of colour and respondents from the poorer Northeastern region of the country reported increased consumption of highly processed food. The findings highlight the need for policies to focus on the promotion of healthy diets while providing social protection schemes to support vulnerable groups during the COVID-19 pandemic. Similar patterns were observed across the Latin America and Caribbean region as well.[41]

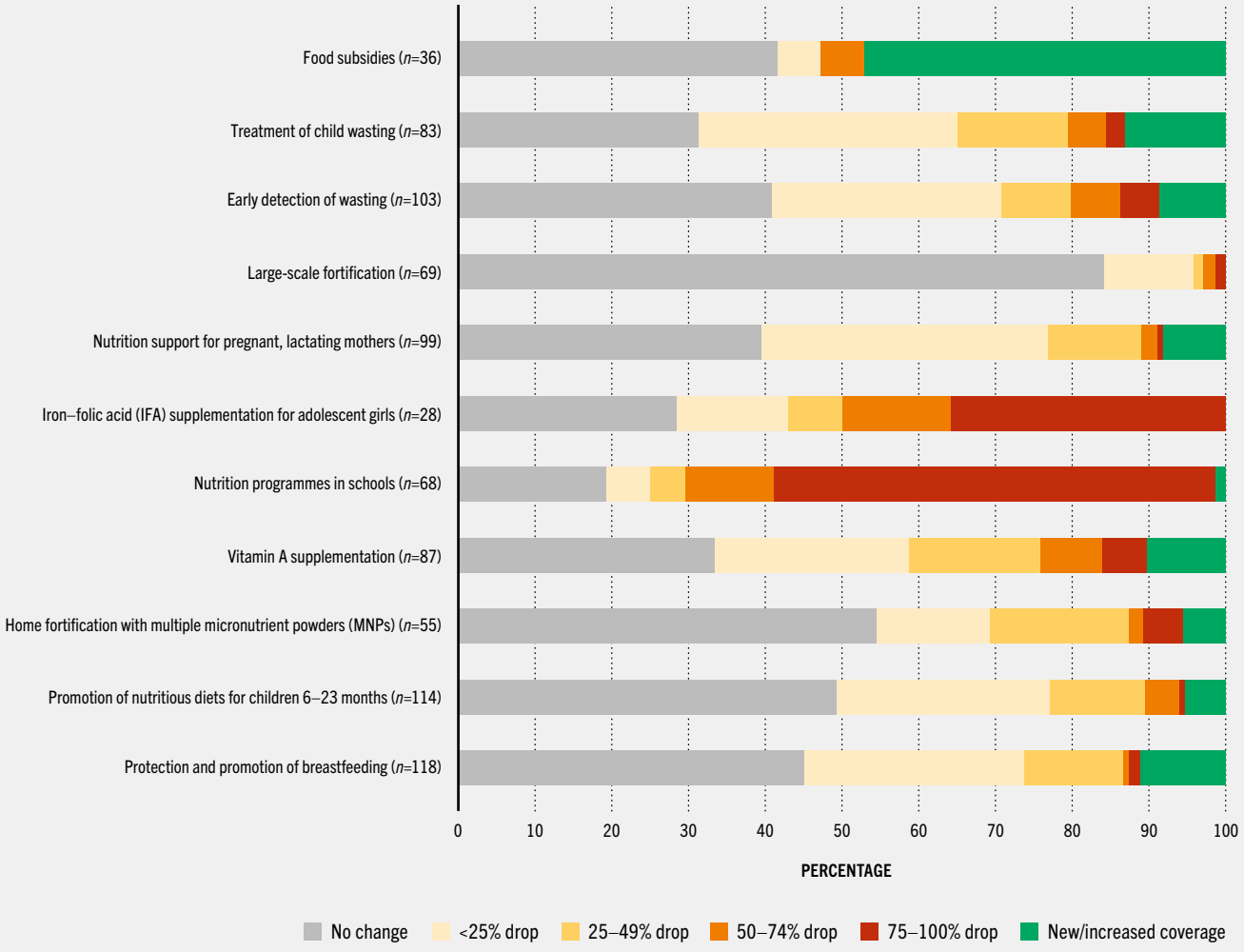
Disruption of essential nutrition services

Countries worldwide are facing many challenges as they strive to ensure that health, food, education and social protection systems maintain essential nutrition services while simultaneously responding to the COVID-19 pandemic. Based on a survey tracking the situation of children during the pandemic,[42] 90 percent of countries (122 of 135) reported a change in the coverage of key nutrition services in August 2020 (Figure 9). Overall, essential nutrition services coverage declined by 40 percent, and nearly half of the countries reported a drop of 50 percent or more for at least one nutrition intervention. Nutrition programmes in schools were the most affected, with an overall 60 percent reduction in service coverage, followed by iron–folic acid supplementation for adolescent girls (45 percent). In most countries reporting data on school-based nutrition programmes, including school feeding and take-home rations (39 of 68 countries with available data), school nutrition programmes were disrupted by as much as 75–100 percent due to COVID-19 mitigation measures (Figure 9).

The findings from the survey demonstrate that the most vulnerable regions were also the most affected by the COVID-19 pandemic. Africa and Asia, regions that bear the greatest share of all forms of child malnutrition, also reported the biggest overall drops in coverage of essential nutrition services of 27 percent and 49 percent, respectively. Similarly, over 90 percent of all countries in fragile[r] situations reported some level of service disruption compared with

r Based on World Bank FY19 List of Fragile and Conflict-affected Situations.

FIGURE 9 AROUND 90 PERCENT OF COUNTRIES SURVEYED REPORTED CHANGES IN COVERAGE OF KEY NUTRITION SERVICES DUE TO COVID-19 IN AUGUST 2020. WHILE 80 PERCENT REPORTED DISRUPTIONS IN COVERAGE, A SMALL PROPORTION WITNESSED IMPROVED COVERAGE



SOURCE: UNICEF. 2020. Tracking the situation of children during COVID-19. In: *UNICEF* [online]. [Cited 21 May 2021]. https://data.unicef.org/resources/tracking-the-situation-of-children-during-covid-19-august-2020

75 percent of countries not in fragile situations. Worldwide, countries attempted to adapt their programmes to continue to provide key nutrition interventions during the pandemic. For example, over 70 countries implemented measures, such as physical distancing at clinics, to ensure continuation of high-dose vitamin A supplementation for children. A small proportion of countries (11 percent) even reported increased coverage of nutrition services during this period.

The COVID-19 pandemic has not only disrupted health systems but also impacted the global community's ability to monitor nutrition outcomes for children and adults. While in 90 percent of countries, routine information systems continued

to function in some capacity, almost half of the countries reported an inability to implement surveys, which are the leading source of data for the monitoring of global nutrition targets.

In addition to key nutrition services being suspended, countries also reported disruptions to other health services such as mass vaccination campaigns, with measles campaigns suspended in 27 countries, putting children with suboptimal growth at a higher risk of death from such infections.[43,44] Moreover, three-quarters of countries reported a considerable degree of disruption of services aimed at the prevention or treatment of NCDs.[45] According to a survey on continuity of essential health services during the COVID-19 pandemic, management of moderate and severe malnutrition was one of the most frequently disrupted services in April 2021 under reproductive, maternal, newborn, child, and adolescent health and nutrition, affecting 41 percent of reporting countries.[46]

Impact on child malnutrition

Research based on modelled scenarios can contribute valuable insights, at least until new empirical data for 2020 and 2021 are available from a large enough number of countries to allow for an official assessment of the impact of the COVID-19 pandemic at the global and regional levels. One such effort by members of the Standing Together for Nutrition Consortium involved the application of a combination of modelling tools to estimate the joint effects of economic, food and health systems disruptions induced by the pandemic on various forms of maternal and child undernutrition in 118 low- and middle-income countries.[47] They estimated how many more children may be affected by wasting in 2020, 2021 and 2022 as a consequence of the COVID-19 pandemic. Potential additional cases of stunting due to the pandemic were estimated only for 2022 compared with 2019, given the cumulative nature of stunting. Increases in wasting among young children living in communities badly hit by pandemic-related disruptions in health services, food supply chains and/or loss of jobs and livelihoods are likely to be seen within a matter of months, and could disappear as soon as circumstances improve. Child stunting, on the other hand, reflects more chronic periods of undernutrition or frequent infection, resulting in early developmental deficits, and may not be as easily reversed.[7]

Three different scenarios were modelled based on trajectories of economic recovery and service disruptions from the COVID-19 pandemic in 2021 and 2022: a rapid recovery in 2021 (optimistic), a scenario with a second wave of infections in 2021 (moderate), and a scenario of persistent disruptions and protracted recovery (pessimistic). A global computable general equilibrium model[s] linked to country-specific household survey data was used to predict the effects of the pandemic's disruptions on gross national income (GNI) per capita, household incomes and USD 1.90/day poverty rates between 2020 and 2022 for each scenario. These were then used to predict country-specific changes in the prevalence of wasting based on observed historical associations. Estimates of poverty and wasting, and assumptions about levels of disruption of health and nutrition services, were imputed into the Lives Saved Tool (LiST) to predict changes in stunting. For the analysis presented below, the results of this model for 118 countries were extrapolated to estimate the potential impact if all 135 low- and middle-income countries experienced similar relative increases in malnutrition (see Box 6 in the next section).

For child wasting, under the moderate scenario, this modelling exercise predicts that an additional 11.2 million children under five years of age in low- and middle-income countries would be affected by wasting from 2020 to 2022 as a consequence of the pandemic – 6.9 million in 2020 alone. For the pessimistic scenario, the estimate of additional cases increases to 16.3 million. For child stunting, under the moderate scenario, the model predicts that 3.4 million more children will be stunted in 2022 due to the impacts of the COVID-19 pandemic – 4.5 million more in the pessimistic scenario.

Though not included in the above modelling study, concerns have been raised over the potential impact of the pandemic on micronutrient deficiencies, as well as on overweight and obesity and the risk of NCDs. The above-mentioned

s See further reference to this model (MIRAGRODEP) in the next section and in **Annex 2**. See also IFPRI (2011).[55]

negative impacts on the affordability of healthy diets and diet quality increase the likelihood of micronutrient deficiencies, and along with decreased physical activity, may exacerbate overweight and obesity, as well as NCDs, far beyond the duration of the pandemic. This is particularly concerning as the scientific evidence shows that patients with obesity (including young adults) hospitalized with COVID-19 experienced substantially higher rates of severe outcomes.[48]

2021 year of nutrition

In summary, malnutrition persists in multiple forms and the full impact of the COVID-19 pandemic is still unfolding. Many regions and countries are increasingly dealing with multiple forms of malnutrition simultaneously. This coexistence of undernutrition along with overweight and obesity, associated with diet-related NCDs, in individuals and within households and populations, is referred to as the "double burden of malnutrition".[49] For example, wasting and overweight in children under 5 years can coexist in a population at problematic levels. In Oceania (excluding Australia and New Zealand) in 2020, wasting prevalence was 9.0 percent while overweight prevalence was 8.0 percent. Different forms of malnutrition can also interact over the life course and across generations. In order to reach the global targets, malnutrition must therefore be addressed holistically in policies and programmes designed at regional and national level.[50,51] Identifying opportunities to achieve multiple malnutrition goals and targets with single interventions by scaling up so called Double-duty Actions will be key to achieve this goal.[52,50]

Various nutrition initiatives and efforts have culminated in notable progress achieved globally in exclusive breastfeeding and stunting. However, accelerated actions are needed, not only to maintain progress, but also to make greater strides towards the global nutrition targets – particularly in the wake of the COVID-19 pandemic. With increased momentum towards the UN Food Systems Summit in September 2021 and the Tokyo Nutrition for Growth Summit in December 2021, now is the time to make concrete commitments and plans towards eliminating all forms of malnutrition over the second half of the UN Decade of Action on Nutrition until 2025[53,54] and towards the 2030 SDGs. ■

2.3 ENDING HUNGER AND ALL FORMS OF MALNUTRITION BY 2030

KEY MESSAGES

➔ New projections confirm that hunger will not be eradicated by 2030 unless bold actions are taken to accelerate progress, especially actions to address inequality in access to food. The COVID-19 pandemic has worsened the discouraging trends that already existed prior to the crisis.

➔ Projections that consider the potential impact of the COVID-19 pandemic suggest that, following a peak of more than 760 million people in 2020, global hunger will decline slowly to fewer than 660 million in 2030. Nevertheless, this represents 30 million more people than projected for 2030 had the pandemic not occurred, revealing lasting effects of the pandemic on global food security.

➔ While a substantial reduction in hunger is projected for Asia by 2030 (from 418 million in 2020 to 300 million people), a significant increase is forecasted for Africa (from more than 280 to 300 million people), placing it by 2030 on par with Asia as the region with the highest number of undernourished people.

➔ Globally, progress is being made for some forms of malnutrition, but the world is not on track to achieve targets for any of the nutrition indicators by 2030. The current rate of progress on child stunting, exclusive breastfeeding and low birthweight is insufficient, and progress on child overweight, child wasting, anaemia in women of reproductive age and adult obesity is stalled or the situation is worsening.

➔ Despite poor progress at the global level, notable improvements are occurring in some areas, with about one-quarter of countries confirmed to be on track to reach the 2030 SDG targets for childhood stunting and wasting and about one in six countries on track to achieve the target on child overweight.

➔ The COVID-19 pandemic has likely impacted the prevalence of multiple forms of malnutrition, and could have lasting effects beyond 2020, as we are already seeing in 2021. These will be compounded through the intergenerational effects of malnutrition and the resulting impacts on productivity. Exceptional efforts are required to address and overcome the effects of the pandemic as part of accelerating progress towards achieving SDG Target 2.2.

With ten years left to reach the end of the time horizon set for achieving the SDGs, last year's edition of this report presented a first assessment of the likelihood that Targets 2.1 and 2.2 would be achieved.[7] The forecast depicted a world that was not on track to achieve Zero Hunger by 2030. Projections also highlighted the tremendous challenges, despite some progress on child stunting and low birthweight, to achieving all global nutrition targets by 2030. This year, with nine years remaining to achieve the targets, renewed efforts were made to look ahead to 2030 in a scenario further complicated by the COVID-19 pandemic.

Towards ending hunger: projections to 2030

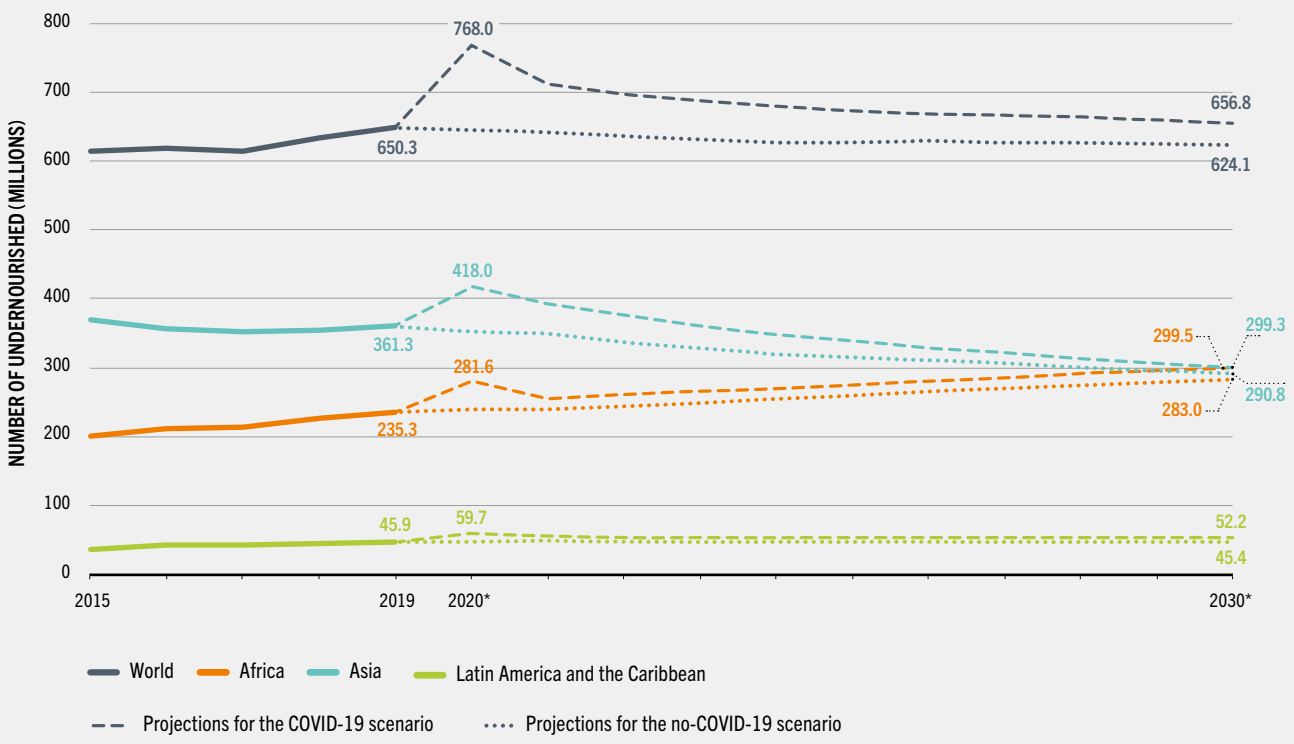
With respect to SDG Target 2.1, the conclusion presented in last year's report that the target of eradicating hunger would be out of reach was based on extrapolation of recent trends in the three fundamental variables used to compute the prevalence of undernourishment for each country: the total supply of food, the population size and composition (which determine the total dietary energy requirements) and the degree of inequality in food access within the population. The simple time-series forecasting methods applied depicted a scenario in which food supplies would not keep pace with population growth, hence reducing the availability of food in per capita terms, while inequality in food access continued to increase.

Clearly, a method that projects the future by extrapolating past trends cannot properly account for the consequences that an unprecedented shock like the COVID-19 pandemic has had – and may continue to have – on the drivers of food insecurity. Therefore, for this edition of the report, a different approach was used.

This year's projections of the elements that determine the PoU values up to 2030 were estimated using a structural approach based on MIRAGRODEP,[55] a dynamic general equilibrium model that reproduces the functioning of world agricultural and non-agricultural markets, considers developments in agricultural markets and applies them to the economy as a whole to generate new equilibrium values of a set of macroeconomic parameters. The MIRAGRODEP model was calibrated to the pre-COVID-19 situation of the world economy in 2018 and used to generate projections of macroeconomic fundamentals into 2019–2030 under two scenarios: a reference scenario, aimed at capturing the macroeconomic impact of the COVID-19 pandemic as reflected in the latest available update of the IMF's *World Economic Outlook* (WEO), published in April 2021, hereby referred to as the COVID-19 scenario; and a no-COVID-19 scenario based on economic growth projections presented in the October 2019 edition of the WEO, the last one before the pandemic.

Specifically, trajectories of food supply, economic growth and real price of food were derived from the COVID-19 scenario for 171 countries, and of poverty rates for 85 countries. These were used, in turn, to predict the evolution of the DEC for all countries and of the CV for 85 countries. Together with projections of population size and growth rates as provided by the 2019 UN World Population Prospects, these were then used to project the future trajectories of the three fundamental variables that inform the PoU (see above). These trajectories were then linked to the 2020 nowcasts of the same variables to generate the projected PoU series from 2021 to 2030. In the case of the no-COVID-19 scenario, the trajectories of the fundamental variables beginning from 2019 were linked to the pre-COVID-19 situation in 2018 (for details, see **Annex 2**). Both scenarios assume the trajectories are not disrupted by new conflicts, climate variability and extreme weather events, and economic downturns, the main drivers of recent increases in food insecurity (see Chapter 3). They also assume that momentous actions needed to transform food systems for food security and decrease inequalities in access to food (Chapter 4) are not implemented.

FIGURE 10 THE COVID-19 SCENARIO PROJECTS A SMALL DECREASE IN GLOBAL HUNGER BETWEEN 2021 AND 2030, WITH WIDE VARIATION IN EVOLUTION ACROSS REGIONS



NOTES: * Projected values. The 2020 projected values are based on the middle of the projected range. The full ranges can be found in **Annex 2**.
SOURCE: FAO.

Figure 10 shows the projected series of the number of undernourished globally and at regional level. Under the COVID-19 scenario, following a projected peak of around 768 million (9.9 percent of the population) in 2020, global hunger would decrease to around 710 million in 2021 (9.0 percent), and then continue to decrease marginally to less than 660 million (7.7 percent) in 2030. However, the evolution from 2020 to 2030 is quite different across regions. While a substantial reduction is projected for Asia (from 418 to 300 million people), a significant increase is forecast for Africa (from more than 280 to 300 million people), placing it on par with Asia by 2030 as the region with the highest number of undernourished people. Numbers remain stable in Latin America and the Caribbean, and marginal in other regions.

Comparing the COVID-19 scenario to the hypothetical no-COVID-19 scenario, we see that global hunger in 2030 is projected to be above the level it would have been had the pandemic not occurred. About 30 million more people may face hunger in 2030 compared with the no-COVID-19 scenario, revealing possible persistent effects of the pandemic on global food security.

A closer look at the underlying parameters that inform the estimates of the number of undernourished (see Box 2 and **Annex 2**) sheds

light on what is driving this higher projected number due to the COVID-19 pandemic in 2030. We observe that while the COVID-19 scenario indicates that food supplies will return to levels that would have prevailed under the no-COVID-19 scenario, it also predicts the pandemic will have a lasting impact on GDP growth rates, income inequality and poverty rates that will not be fully absorbed by 2030, thus inducing higher levels of inequality in food access in the COVID-19 scenario compared with the no-COVID-19 scenario. This greater inequality in access to food would therefore be mostly responsible for the observed difference.

The structural approach used to inform the new projections confirms the fundamental result anticipated last year: hunger will not be eradicated by 2030 unless exceptional efforts are deployed. The prospects were already discouraging before the COVID-19 pandemic, which has aggravated the situation. Bold actions are needed to accelerate progress – especially actions to address inequality in access to food (see Chapter 4).

Towards ending all forms of malnutrition: projections to 2030

With respect to SDG Target 2.2 and the WHA global nutrition targets, last year's report also pointed to insufficient progress towards ending malnutrition in all its forms, even without taking the impact of the COVID-19 pandemic into account. Like the projections for hunger, estimates regarding levels of malnutrition in 2030 are characterized by a high level of uncertainty. Household survey data on child height and weight were, in most cases, not collected in 2020 due to physical distancing measures; moreover, the future of the COVID-19 pandemic, and its impacts over the next decade, are unknown. For this reason, the same approach applied in the last edition of this report to project the nutritional indicators was used, which is based on the rate of observed trends before the pandemic. This rate was then compared with the rate of progress required to achieve the 2030 targets to provide an assessment of progress towards the global nutrition targets (see Box 5 and **Annex 2**). The limitations of this approach, however, are that it does not include the effect of the COVID-19 pandemic, does not give weight to the more recent trends and does not factor in future potential change in trends.

Globally, progress has been made for some forms of malnutrition, but the world is not on track to achieve targets for any of the nutrition indicators by 2030. The current rate of progress on child stunting, exclusive breastfeeding and low birthweight is insufficient, and progress on child overweight, child wasting, anaemia in women of reproductive age and adult obesity is stalled (no progress) or the situation is worsening (Table 7).

Progress has been uneven across regions (Table 7 and Figure 11). While almost all subregions are either on track or making some strides towards reducing child stunting, too many are still off track to reach the other global nutrition targets, pointing to the need for accelerated actions to change course between now and 2030. The current level of wasting remains well above the 5 percent global target for 2025 and the 3 percent global target for 2030. While Latin America and the Caribbean is on track for wasting, other regions remain off track, with many children suffering from this life-threatening condition. Most regions are showing no progress or are worsening with respect to the prevalence of children under 5 who are overweight. Particularly concerning are the worsening trends seen in Eastern Asia and South-eastern Asia, and Australia and New Zealand. The prevalence of overweight is greater among older age groups, and preventive interventions in early childhood are critical to reduce the risk of overweight and obesity across the life course.[5] Meaningful progress in this area is needed to reduce child overweight to less than 3 percent; such efforts would also likely contribute to stem the alarming rise in adult obesity, which is worsening in all subregions. No subregion is on track to achieve either the 2025 or 2030 targets on reducing anaemia in women of reproductive age, with trends stagnating or worsening in all regions except Latin America and the Caribbean. Likewise, based on the latest estimates, no subregion is on track to reach the 2025 or 2030 global targets for low birthweight.

If current trends continue, the world is expected to reach the 2025 target for exclusive »

TABLE 7 MOST REGIONS HAVE MADE SOME PROGRESS, BUT NOT ENOUGH TO ACHIEVE GLOBAL TARGETS IF TRENDS (BEFORE COVID-19) CONTINUE; NO SUBREGION IS ON TRACK FOR THE LOW BIRTHWEIGHT TARGET, AND ADULT OBESITY HAS BEEN WORSENING IN ALL SUBREGIONS

	Child stunting (percent)			Child overweight (percent)			Child wasting[a] (percent)		Low birthweight[a] (percent)			Exclusive breastfeeding[b] (percent)			Anaemia in women of reproductive age (percent)			Adult obesity[c] (percent)		
	2012	2020	2030	2012	2020	2030	2020	2030	2012	2015	2030	2012	2019	2030	2012	2019	2030	2012	2016	2025
World	**26.2**	**22.0**		**5.6**	**5.7**		**6.7**		**15.0**	**14.6**		**37.0**	**44.0**		**28.5**	**29.9**		**11.7**	**13.2**	
Africa	**34.5**	**30.7**		**5.0**	**5.3**		**6.0**		**14.1**	**13.7**		**35.5**	**43.6**		**39.2**	**38.9**		**10.4**	**11.8**	
Northern Africa	22.7	21.4		12.0	13.0		6.6		12.4	12.2		40.7	42.1		31.9	31.1		22.5	25.4	
Sub-Saharan Africa	36.6	32.3		3.8	4.0		5.9		14.4	14.0		34.5	44.0		41.2	40.7		6.9	8.0	
Eastern Africa	38.9	32.6		4.0	4.0		5.2		13.8	13.4		48.6	60.7		31.4	31.9		4.3	5.2	
Middle Africa	38.0	36.8		4.4	4.8		6.2		12.8	12.5		28.5	n.a.		46.1	43.2		5.5	6.6	
Southern Africa	24.3	23.3		12.1	12.1		3.2		14.3	14.2		n.a.	33.5		28.5	30.3		23.2	25.6	
Western Africa	34.9	30.9		2.3	2.7		6.9		15.6	15.2		22.1	32.3		52.9	51.8		6.4	7.7	
Asia	**28.1**	**21.8**		**4.9**	**5.2**		**8.9**		**17.8**	**17.3**		**39.0**	**45.3**		**31.1**	**32.7**		**6.0**	**7.3**	
Central Asia and Southern Asia	39.2	29.8		3.1	2.7		13.6		26.4	25.5		46.6	56.6		47.5	47.5		4.6	5.7	
Central Asia	15.4	10.0		8.5	5.6		2.3		5.6	5.4		29.2	44.8		28.8	28.1		14.4	16.8	
Southern Asia	40.2	30.7		2.9	2.5		14.1		27.2	26.4		47.4	57.2		48.3	48.2		4.2	5.2	
Eastern Asia and South-eastern Asia	16.0	13.4		6.5	7.7		4.1		8.0	8.0		30.4	29.8		18.2	19.5		5.1	6.5	
Eastern Asia	7.5	4.9		6.8	7.9		1.7		5.1	5.1		28.5	22.0		15.5	16.1		5.0	6.4	
South-eastern Asia	30.5	27.4		5.8	7.5		8.2		12.4	12.3		33.5	47.9		25.0	27.2		5.3	6.7	
Western Asia	17.8	13.9		9.0	8.3		3.5		10.0	9.9		32.3	33.1		31.7	32.5		25.7	28.6	
Western Asia and Northern Africa	*20.3*	*17.8*		*10.5*	*10.8*		*5.1*		*11.2*	*11.1*		*37.4*	*38.7*		*31.8*	*31.8*		*24.2*	*27.2*	
Latin America and the Caribbean	**12.8**	**11.3**		**7.3**	**7.5**		**1.3**		**8.7**	**8.7**		**33.4**	**n.a.**		**18.2**	**17.2**		**21.7**	**24.1**	
Caribbean	13.2	11.8		6.4	6.6		2.8		10.1	9.9		29.7	25.9		28.7	29.2		21.9	24.8	
Central America	17.9	16.6		6.6	6.3		0.9		8.8	8.7		21.6	33.2		15.2	14.6		24.2	26.6	
South America	10.2	8.6		7.7	8.2		1.4		8.6	8.6		41.9	n.a.		18.4	17.3		20.8	23.0	
Oceania excluding Australia and New Zealand	**40.3**	**41.4**		**7.3**	**8.0**		**9.0**		**10.0**	**9.9**		**56.9**	**61.3**		**32.9**	**33.9**		**20.1**	**22.4**	
Australia and New Zealand	2.4	2.3		12.9	16.9		n.a.		6.2	6.4		n.a.	n.a.		7.6	8.8		28.2	30.7	
Northern America and Europe	**4.4**	**4.0**		**9.3**	**8.6**		**n.a.**		**7.0**	**7.0**		**n.a.**	**n.a.**		**13.1**	**14.6**		**26.7**	**29.0**	
Europe	5.3	4.5		9.6	8.3		n.a.		6.6	6.5		n.a.	n.a.		14.5	16.0		23.4	25.4	
Northern America	2.8	3.2		8.8	9.1		0.2		7.9	7.9		25.5	34.7		9.9	11.7		34.1	36.7	

TABLE 7 (CONTINUED)

Child stunting, child overweight, child wasting and anaemia
On track
Off track – some progress
Off track – no progress
Off track – worsening
Assessment not possible

Low birthweight and exclusive breastfeeding
On track
Off track – some progress
Off track – no progress or worsening
Assessment not possible

Adult obesity
On track
Off track – worsening
Assessment not possible

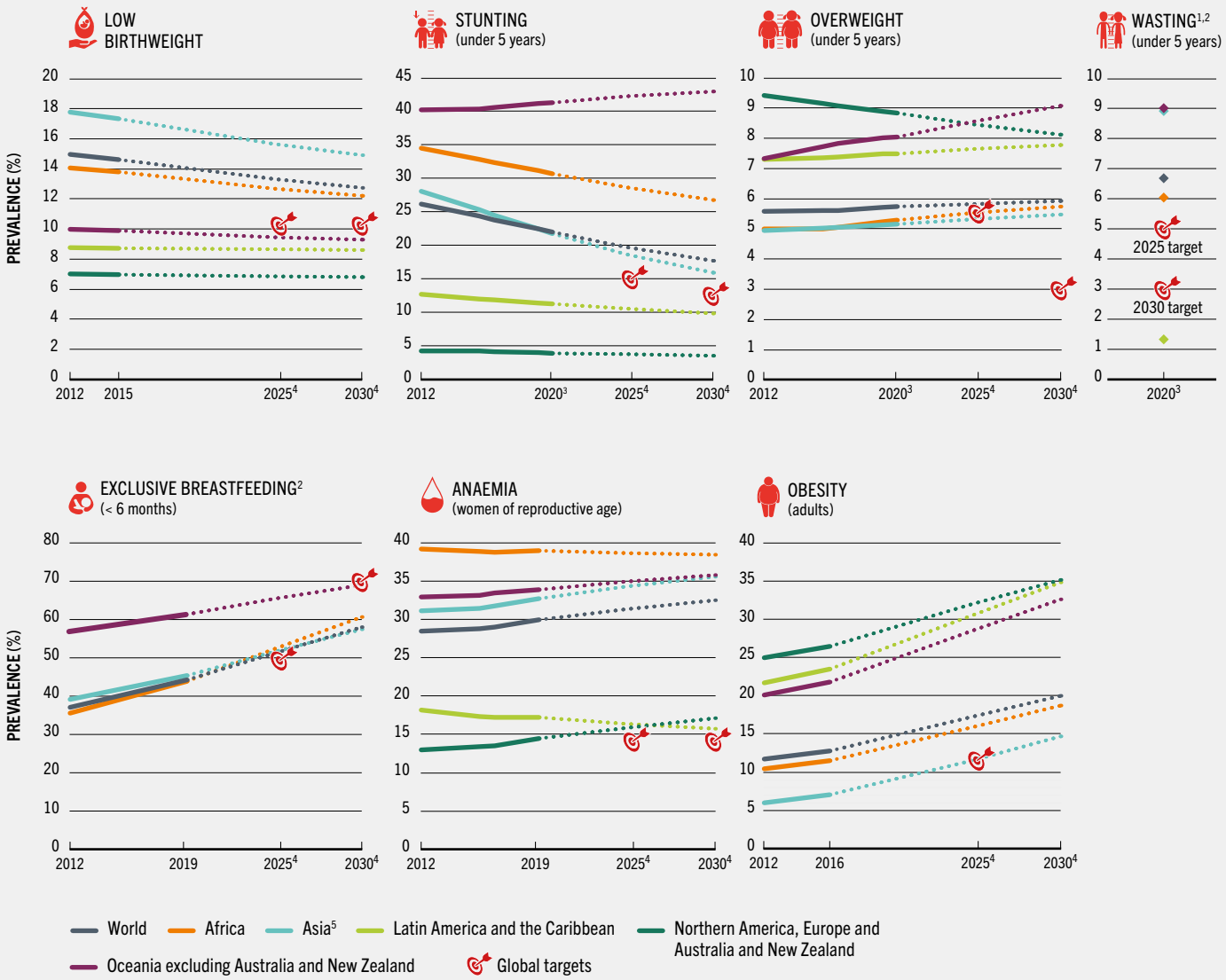
NOTES: Details on the methodology to assess progress can be found in **Annex 2**; n.a. shown where population coverage is under 50 percent. [a] Wasting and low birthweight regional aggregates exclude Japan. [b] Exclusive breastfeeding: Regional averages are population weighted using the most recent estimate for each country between 2005 and 2012 (2012 column) and 2014 to 2019 (2019 column), except for China where a 2013 estimate is used for 2019 aggregates; estimates in the 2012 and 2019 columns do not have the same subset of countries. [c] Adult obesity: There is no official target for adult obesity for 2030.
SOURCES: UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition; NCD Risk Factor Collaboration (NCD-RisC). 2017. Worldwide trends in body-mass index, underweight, overweight and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents and adults. *The Lancet*, 390(10113): 2627–2642; UNICEF & WHO. 2019. UNICEF-WHO Joint Low Birthweight Estimates [online]. [Cited 28 April 2020]. www.unicef.org/reports/UNICEF-WHO-low-birthweight-estimates-2019; www.who.int/nutrition/publications/UNICEF-WHO-lowbirthweight-estimates-2019; UNICEF. 2020. UNICEF Global Database on Infant and Young Child Feeding. In: *UNICEF* [online]. New York, USA. [Cited 19 April 2021]. data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for anaemia are based on WHO. 2021. Global Health Observatory (GHO). In: *WHO* [online]. Geneva, Switzerland. [Cited 26 April 2021] www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for adult obesity are based on WHO. 2017. Global Health Observatory (GHO). In: *WHO* [online]. Geneva, Switzerland. [Cited 2 May 2019]. www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-)

BOX 5 ASSESSMENT OF PROGRESS TOWARDS 2030 TARGETS FOR NUTRITION INDICATORS

To determine which progress assessment category to use for each indicator and for each region, two distinct average annual rates of reduction (AARR)* are calculated: (i) the AARR required for the region to reach the 2030 target and (ii) the actual AARR that the region has experienced to date. The required AARR is calculated using the baseline prevalence for the region in 2012 and the target prevalence as noted in the 2030 Maternal Infant and Young Child Nutrition targets.** For example, for child overweight, the required AARR at the global level is the annual rate of change needed to go from a prevalence of 5.6 percent in 2012 to the targeted 3.0 percent in 2030. The actual AARR experienced to date is calculated using a trendline comprising all*** estimates available between 2012 (baseline) and the latest available estimate for that indicator. For example, for child overweight, the trendline to assess the actual AARR uses the nine annual point estimates from 2012 (baseline) to 2020 (the latest available estimate). For a region to be considered "on track" towards a specific target, the actual AARR must be higher than the required AARR for that target.**** For the "off track" categories, the AARR ranges associated with each category (some progress, no progress, worsening) vary by indicator. See **Annex 2** for further details.

* See technical note on how to calculate AARR (available at: https://data.unicef.org/resources/technical-note-calculate-average-annual-rate-reduction-aarr-underweight-prevalence). Note that for wasting, AARR based on trend estimates from the UNICEF-WHO-World Bank Joint Malnutrition Estimates are used even if trends are unpublished.
** The 2030 targets for six of the seven indicators are available from *The extension of the 2025 Maternal, Infant and Young Child nutrition targets to 2030.*[26] Please note that only a 2025 target is available for adult obesity.
*** Multiple years of data are used to calculate the actual AARRs experienced to date for all indicators except exclusive breastfeeding, for which modelled estimates are not available and which is calculated using only two estimates: the baseline (2012) and the latest year available (2019).
**** A static threshold for the latest prevalence is also used for some indicators; for example, any country for which the most recent stunting prevalence is below 3 percent is considered "on track", even if the AARR is less than the required AARR (see **Annex 2**).

FIGURE 11 SOME PROGRESS HAS BEEN MADE ON MALNUTRITION, BUT THE PACE MUST BE ACCELERATED, AND TRENDS IN SOME FORMS OF MALNUTRITION MUST BE REVERSED TO ACHIEVE THE 2025 AND 2030 GLOBAL NUTRITION TARGETS



NOTES: [1] Wasting is an acute condition that can change frequently and rapidly over the course of a calendar year. This makes it difficult to generate reliable trends over time with the input data available and, as such, this report provides only the most recent global and regional estimates. [2] For wasting and exclusive breastfeeding, estimates are not shown for regions/years where population coverage was below 50 percent. [3] The collection of household survey data on child height and weight were limited in 2020 due to the physical distancing measures required to prevent the spread of COVID-19. Only four national surveys included in the database were carried out (at least partially) in 2020. The estimates on child stunting, wasting and overweight are therefore based almost entirely on data collected before 2020 and do not take into account the impact of the COVID-19 pandemic. [4] For methods on projections to 2025 and 2030, see **Annex 2**. [5] For wasting and low birthweight, the Asia estimate excludes Japan.

SOURCES: Data for low birthweight are based on UNICEF & WHO. 2019. UNICEF-WHO Low Birthweight Estimates: levels and trends 2000–2015, May 2019. In: *UNICEF* [online]. New York, USA, UNICEF [Cited 19 April 2021]. https://data.unicef.org/resources/unicef-who-low-birthweight-estimates-levels-and-trends-2000-2015; data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2020. UNICEF Global Database on Infant and Young Child Feeding. In: *UNICEF* [online]. New York, USA. [Cited 19 April 2021]. data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for anaemia are based on WHO. 2021. Global Health Observatory (GHO). In: *WHO* [online]. Geneva, Switzerland. [Cited 26 April 2021] www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for adult obesity are based on WHO. 2017. Global Health Observatory (GHO). In: *WHO* [online]. Geneva, Switzerland. [Cited 2 May 2019]. www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-)

» breastfeeding, but not the 2030 target. Most subregions are making at least some progress towards the 2030 target, except Eastern Asia and the Caribbean – the only subregions experiencing a decline in prevalence. Central America is nearly on track to reach the 2030 target for exclusive breastfeeding, missing the target by only one year if current trends continue. If current rates of progress for exclusive breastfeeding are maintained in Central Asia and Southern Asia, these subregions will reach the 2030 target.

Most regions are making some progress, but not enough to achieve the global nutrition targets. Where progress is being made at the regional level, it can often mask the lack of country-level progress. Figure 12 shows the percentage of countries in each region that are on track and off track, with off track countries differentiated by whether they are making some progress, no progress or worsening. For the target to reduce the number of children affected by stunting by 50 percent, only 25 percent of countries are confirmed to be on track, and within the Africa region, only 9 percent of countries are on track (five countries). For the target to reduce wasting levels to less than 3 percent, only 28 percent of countries seem to be on track based on available data (57 countries). Particularly concerning are the trends in Africa and Asia, where more than half of the countries with data are off track or worsening. Globally, a mere 17 percent of countries are confirmed to be on track to achieve the target of reducing child overweight prevalence to less than 3 percent; no countries are on track in Latin America and the Caribbean and only 2 percent of countries are on track in Northern America and Europe, and Australia and New Zealand. In 2020, about half of the world's children under five lived in countries that were not on track to achieve any of the three 2030 SDG targets for stunting, wasting or overweight. This analysis provides clear evidence of the need to step up efforts to eliminate child malnutrition if the targets are to be met by 2030.

Potential additional cases of stunting and wasting due to the COVID-19 pandemic

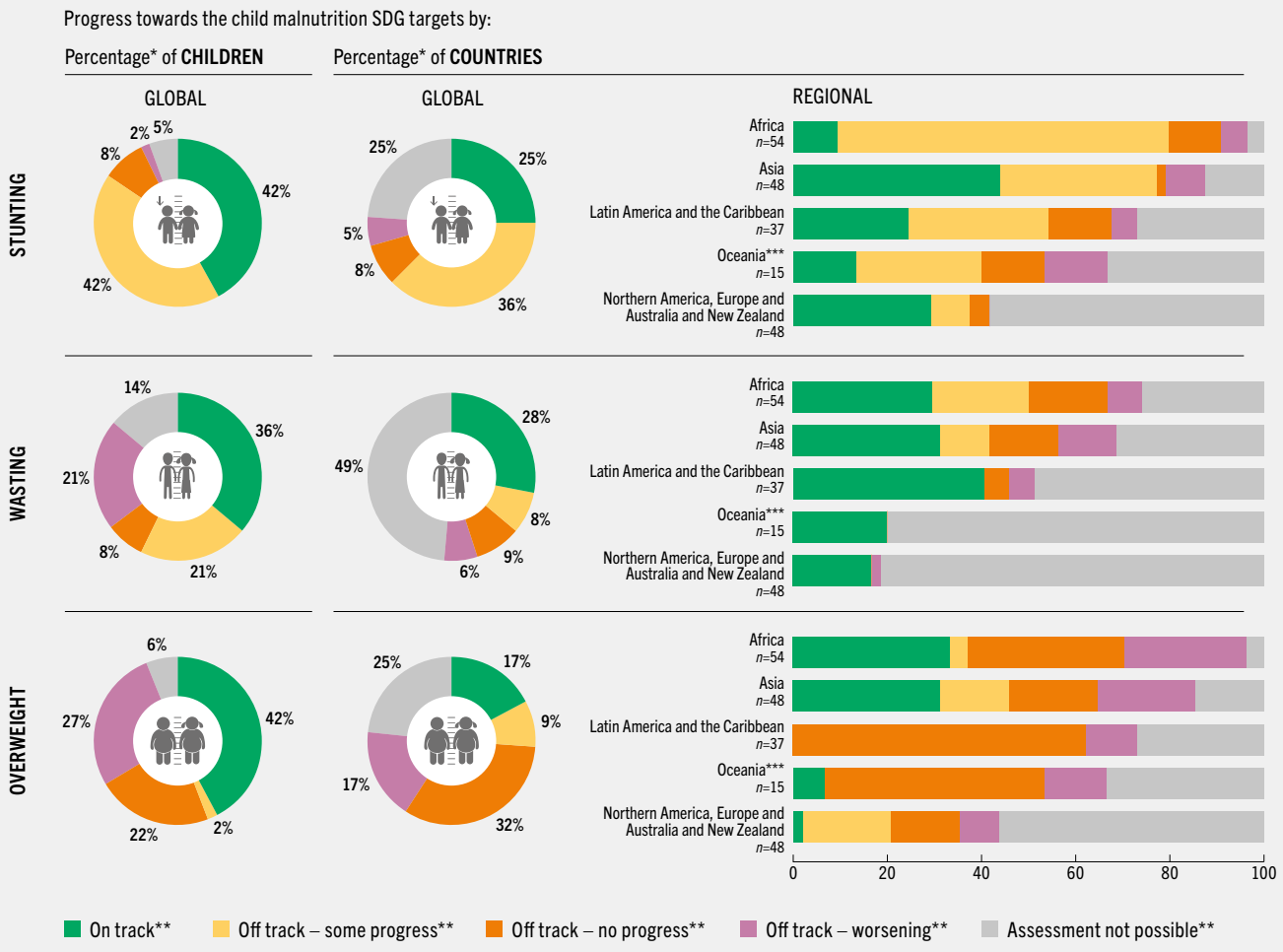
The projections presented above do not account for the effect of the COVID-19 pandemic on malnutrition. They describe the projected progress towards the global nutrition targets if the trends prior to the pandemic were to continue to 2030. This section presents a scenario (see Box 6) of how the COVID-19 pandemic could potentially affect the prevalence of child stunting and wasting by 2030. While any such projections are highly speculative, they nevertheless illustrate one important point: in a context in which additional effort, attention and action were already called for prior to the pandemic, even more will be needed now – in a situation worsened by the COVID-19 pandemic – to get on track to reach the 2030 targets.

Under a no-COVID-19 scenario, if the AARR of child stunting before the COVID-19 pandemic were to continue, 23.2 percent of children under five years would be expected to be stunted in 2022. In comparison, projections from our COVID-19 scenario indicate that 23.9 percent of children under five years would be stunted in the year 2022 under the pessimistic scenario (Figure 13A), and 23.7 percent under the moderate scenario. While this represents only a small increase in prevalence, even this marginal increase would result in 4.5 and 3.4 million additional stunted children in the year 2022 alone under the pessimistic and moderate scenarios, respectively.

When making projections to 2030, it is important to consider the cumulative and chronic nature of childhood stunting, as once a child is stunted, he or she will most likely remain stunted in subsequent years. This will result in double-counting if the number of additional stunted children is aggregated every year. To avoid this, we assume that 35 percent of the total number of stunted children each year contributes to the additional stunted population in subsequent years. Furthermore, if we assume that from 2022 to 2030, trends in stunting follow the pre-COVID-19 trajectory, an additional 16 to 22 million children in low- and middle-income countries will be stunted between the years 2020 and 2030 under the moderate and pessimistic scenarios, respectively, compared with the scenario without the COVID-19 pandemic.

The projected additional numbers of stunted children almost certainly underestimate the full impact of the COVID-19 pandemic on stunting

FIGURE 12 AROUND HALF OF CHILDREN LIVE IN COUNTRIES THAT ARE NOT ON TRACK TO REACH ONE OF THE 2030 SDG TARGETS FOR CHILD STUNTING, WASTING AND OVERWEIGHT



NOTES: * Percentages may not add up to 100 percent due to rounding. ** See notes on progress assessment categories in **Annex 2**. *** Oceania excluding Australia and New Zealand.
SOURCE: UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition

for several reasons. The effects of stunting will last beyond age 5 throughout the life course and can have intergenerational effects, as stunted adults are more likely to earn less income and stunted mothers are more likely to give birth to children who will be stunted, leading to intergenerational effects of poverty and stunting. Also, if there are persistent effects of the COVID-19 pandemic and no improvement in the conditions that contribute to increased stunting, such as poor nutrition and disruptions in access to health and nutrition services, it is possible that the additional number of children who are stunted will increase over time (scenario not shown). Furthermore, there will also be an intergenerational effect from deteriorating maternal nutrition during the COVID-19 pandemic (not shown), leading to more mothers

BOX 6 METHODOLOGY: ESTIMATES OF POTENTIAL ADDITIONAL CASES OF STUNTING AND WASTING DUE TO THE COVID-19 PANDEMIC BASED ON A SCENARIO

Given the interest in understanding how the COVID-19 pandemic may shape progress towards 2030 global nutrition targets, and the lack of global data directly measuring malnutrition status during the pandemic in 2020, a crude scenario was developed to consider potential implications.

As described in Section 2.2, results of one published modelling exercise covering 118 low- and middle-income countries estimated how the prevalence of childhood stunting and wasting may increase between 2020 and 2022 under moderate and pessimistic assumptions.[47] These estimates of increased wasting and stunting in 118 countries were extrapolated to all 135 low- and middle-income countries for 2020–2022. For the projection of additional cases between 2020 and 2030 due to the COVID-19 pandemic in this section, a scenario where low- and middle-income countries no longer experience an increase in stunting and wasting after 2022, but rather return to the pre-COVID annual average rate of reduction (AARR), was applied to hypothesize a potential scenario.

For the three-year period of 2020–2022, the increase in prevalence of wasting (and stunting) due to the COVID-19 pandemic was calculated for the moderate and pessimistic scenarios of a modelling exercise of 118 countries.[47] First, the additional prevalence was estimated by dividing the predicted additional cases from the modelling exercise by the projected populations of the UN World Population Prospects. Then the increased prevalence in wasting (or stunting) was derived by calculating the ratio of the additional prevalence compared with the wasting (or stunting) prevalence estimates for low- and middle-income countries from the UNICEF/WHO/World Bank Joint Malnutrition Estimates (JME) Working Group. This increase in prevalence due to the COVID-19 pandemic under the moderate and pessimistic scenarios was extrapolated to all 135 low- and middle-income countries for each of the three years to calculate the projected relative increase in prevalence and number of children stunted and wasted for 2020, 2021 and 2022.

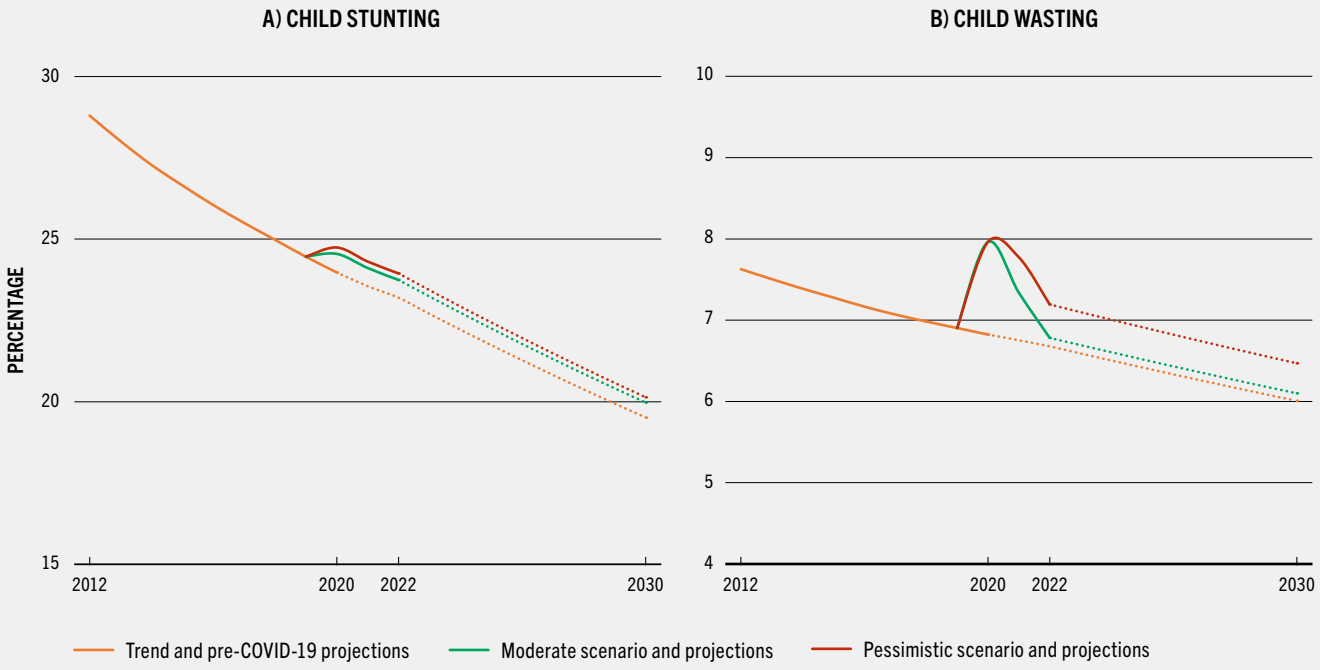
To generate projections for the prevalence of stunting and wasting from 2022 to 2030, the trajectory (AARR) for the pre-COVID-19 scenario was applied to the 2022 prevalence under each scenario. The pre-COVID-19 AARR was calculated from all data points available from 2012 to 2020 of the JME estimates.

This COVID-19 scenario was created for illustrative purposes to discuss the potential impact of the COVID-19 pandemic on wasting and stunting. The real impact of the pandemic on child stunting and wasting, as well as other forms of malnutrition, by 2030 is difficult to predict and is influenced by multiple pathways. There are many unknown factors, such as the extent and scope of virus mutations; potential resurgence of the epidemic and associated mitigation practices in various settings; the trajectory of economic recovery; the speed at which any disruptions of essential nutrition services and food access will subside; and whether there may be other shocks and what the lasting effects of those shocks might be. This section presents merely a scenario to illustrate potential repercussions.

with inadequate nutrition giving birth to a cohort of children who are more likely to be stunted (and to experience wasting), which would increase the number of stunted children above our current scenario.[56]

Of the seven global nutrition targets, the most progress in the past two decades has been achieved on child stunting. Still, even before the pandemic, it was projected that 119 million children under 5 would be stunted in 2030 in the 135 low- and middle-income countries, which is well above 85 million, the 2030 SDG target of a 50 percent reduction in the number of children under five who are stunted. Our COVID-19 scenario projects 125 to 127 million stunted children in the year 2030 (20.4 to 20.7 percent), which is 5 to 7 million more children than if pre-COVID trends continued without the effect of COVID-19, and 42 million above the

FIGURE 13 CONSERVATIVE ESTIMATES OF THE POTENTIAL IMPACTS OF THE COVID-19 PANDEMIC INDICATE THAT AN ADDITIONAL 5 TO 7 MILLION CHILDREN MAY BE STUNTED, AND 570 THOUSAND TO 2.8 MILLION MORE WASTED, IN LOW- AND MIDDLE-INCOME COUNTRIES IN THE YEAR 2030. HOWEVER, THE ESTIMATE OF ACCUMULATED ADDITIONAL CASES OF WASTING FROM 2020 TO 2030 IS 16 TO 40 MILLION



NOTES: Wasting is an acute condition that can change frequently and rapidly over the course of a calendar year. This makes it difficult to generate reliable trends over time with the input data available; this trend is not an official estimate but is shown as a scenario for this exercise.
SOURCES: UNICEF and WHO analysis of potential impact of the COVID-19 pandemic on stunting and wasting, based on extrapolation of increase in wasting and stunting from a modelling exercise[47] and joint malnutrition estimates of trends and average annual rate of reduction before the COVID-19 pandemic.[32] See Box 6 for more details.

SDG target (Figure 13A). Comprehensive efforts to address the detrimental impacts of the COVID-19 pandemic on maternal and child nutrition are crucial to return to the pre-COVID-19 level of progress, and achieve the 2030 global target for childhood stunting.

With respect to child wasting, under a no-COVID-19 scenario, it is estimated that 6.8 percent of children under 5 years in low- and middle-income countries were affected by this acute form of undernutrition in 2020.[32] If the effect of the COVID-19 pandemic is considered, under the pessimistic scenario, the wasting prevalence in low- and middle-income countries is projected to increase to 8.0 percent in 2020, 7.8 percent in 2021 and 7.2 percent in 2022 (Figure 13B), resulting in an additional 16 million children affected by wasting between 2020 and 2022. Under the moderate scenario, 11 million additional children in low- and middle-income countries will suffer from wasting in the three-year period. If we assume that after 2022, trends in wasting follow a similar pattern to the trend before the COVID-19 pandemic, an additional 16 to 40 million children will be affected by wasting between 2020 and 2030, under the moderate and pessimistic modelled scenarios, respectively.

This does not take into account any large future shocks or emergencies that could cause a spike in the number of children affected by wasting. The application of the pre-COVID-19 AARR from 2022–2030 also may not take into account relevant seasonalities associated with wasting. This is because the AARR used represents trends in survey time points that capture a specific cross-section of fluctuating wasting caseload and may not be representative of overall trends. Nevertheless, the immediate effects of the COVID-19 pandemic are manifested first in the acute condition of child wasting and, if economic conditions, food access and dietary patterns do not recover fully, levels of child wasting globally will be elevated. Moreover, the management of moderate and severe undernutrition was one of the most frequently disrupted services.

Based on the scenarios accounting for COVID-19, it is projected that 6.1 to 6.5 percent of children under five (37.3 to 39.6 million children) will be wasted in 2030 under the moderate and pessimistic scenarios, respectively, in low- and middle-income countries (Figure 13B). This represents 570 thousand to 2.8 million more children compared with the no-COVID-19 scenario, and implies a level of wasting which is twice as high as the global target of 3 percent in 2030. Thus, if the rise in child wasting is not prevented, and there are disruptions in caring for these children, child mortality will increase as well. Clearly, the prevention, care, management and treatment of child wasting requires urgent attention.

As the pandemic continues with no clear end in sight, and the economic and other impacts continue to unfold, the trajectory over the next years is difficult to foresee. Evidence is still scarce on the actual effects of the COVID-19 pandemic on various forms of malnutrition, including on the prevalence of child stunting, wasting, overweight, adult obesity, anaemia in women of reproductive age, low birthweight and exclusive breastfeeding. These effects will be compounded through the intergenerational effects of malnutrition and the resulting impact on productivity and, hence, economic recovery. However, it is clear that the COVID-19 pandemic has likely impacted the prevalence of multiple forms of malnutrition, and could have lasting effects beyond 2020, as we are already seeing in 2021. Therefore, exceptional efforts are required to address and overcome the effects of the pandemic as part of accelerating progress towards achieving SDG Target 2.2.

While the simple projected scenarios showing a reversal in progress are discouraging, if the right policies and actions are put in place now, it is possible to get the world on track towards zero hunger and malnutrition. In the context of declining Overseas Development Assistance projections, this would require sufficient and innovative financing, strong commitment and efficient delivery to ensure essential nutrition services are provided to the population in need. Just as the vulnerabilities of food systems have been laid bare by the pandemic, so have many of the actions needed to strengthen their resilience to the various drivers that have been undermining progress. Chapter 3 provides an integrated analysis of these drivers and Chapter 4 lays out pathways for transforming food systems that can help get the world back on track towards zero hunger and malnutrition. ■

UGANDA
Agro-pastoralist women collect harvest greens next to their crops near the Kenyan border.
©FAO/Luis Tato

CHAPTER 3
MAJOR DRIVERS OF RECENT FOOD SECURITY AND NUTRITION TRENDS

KEY MESSAGES

➔ In the last ten years, the frequency and intensity of conflict, climate variability and extremes, and economic slowdowns and downturns have increased significantly. The increased occurrence of these major drivers, now exacerbated by the COVID-19 pandemic, has led to a rise in hunger and has undermined progress in reducing all forms of malnutrition, particularly in low- and middle-income countries.

➔ Economic downturns in 2020, including those resulting from COVID-19 containment measures, contributed to one of the largest increases in world hunger in decades, affecting almost all low- and middle-income countries. When economic downturns occurred along with other drivers, particularly climate-related disasters, conflict, or a combination of both, the largest increases in the PoU occurred in Africa, followed by Asia.

➔ Each of these major drivers is unique and, while they are external to food systems, they interact to create multiple, compounding impacts at many different points within food systems, to the detriment of food security and nutrition.

➔ Seventy percent of low- and middle-income countries are affected by at least one of the drivers and 41 percent also have high income inequality (38 of 93 countries), which worsens their impact.

➔ The majority of undernourished people and stunted children live in countries affected by multiple drivers. Between 2017 and 2019, in all regions, countries affected by multiple drivers exhibit the highest increases in the PoU – 12 times larger than those in countries affected by only a single driver.

➔ High income inequality magnifies the negative impact of these drivers on food insecurity for middle-income countries. While middle-income countries affected by these drivers show a 2 percent increase in the PoU between 2017 and 2019, for those countries with high income inequality, the increase is double – 4 percent.

➔ Low-income countries affected by these drivers show the largest increase in the PoU from 2017 to 2019; the increases in their PoU are 2.5 times greater than increases in middle-income countries affected by these drivers during the same period.

➔ Countries affected by economic downturns in Africa, Asia, and Latin America and the Caribbean show the highest increase in the PoU compared with countries affected by climate extremes and conflict from 2017 to 2019. Africa is the only region where such a surge is associated with all three major drivers.

➔ New evidence suggests that recent increases in the unaffordability of healthy diets are associated with increases in both severe and moderate forms of food insecurity, especially in lower-middle-income countries.

➔ Drivers that are external (e.g. conflict and climate shocks) and internal (e.g. low productivity and inefficient food supply chains) to food systems are pushing up the cost of nutritious foods which, combined with low incomes, is increasing the unaffordability of healthy diets.

➔ Countries affected by multiple drivers exhibited in 2019 the highest percentage of the population who cannot afford a healthy diet (68 percent), which is, on average, 39 and 66 percent higher than that of countries affected by a single driver or not affected by any driver, respectively. The unaffordability of healthy diets tends to be higher where there is conflict.

3.1 A FOOD SYSTEMS LENS IS CRITICAL TO ADDRESS THE MAJOR DRIVERS OF RECENT FOOD SECURITY AND NUTRITION TRENDS

As highlighted in the last four editions of this report, as well as Chapter 1 (see Box 1), conflict, climate variability and extremes, and economic slowdowns and downturns are challenging efforts to end hunger and all forms of malnutrition. Their adverse influence is made all the more difficult by high and persistent levels of inequality. In addition, millions of people around the world suffer from food insecurity and different forms of malnutrition because they cannot afford the cost of healthy diets.[7] This is because other drivers are pushing up the cost of nutritious foods throughout the food system, including low productivity, inefficient food supply chains and trade policies, among others,[t] while the income of millions of people cannot keep up. Put simply, unaffordable healthy diets can be seen as a driver that is the result of other drivers and low incomes. They are associated with increasing food insecurity and all forms of malnutrition, including stunting, wasting, micronutrient deficiencies, overweight and obesity, and NCDs.

Food systems are extensive networks made up of everything – and everybody – involved in producing, storing, packing, processing, distributing, marketing, consuming and disposing of food, including the social, political, economic, legal and environmental systems.[57,58,59,60,61,62,63,23,64,65] Agri-food systems, a term increasingly used in the context of transforming food systems for sustainability and inclusivity, are broader as they encompass both agricultural and food systems and focus on both food and non-food agricultural products, with clear overlaps (see Chapter 4, Figure 29). While broader agri-food systems transformation is of utmost importance, it is beyond the scope of this report.

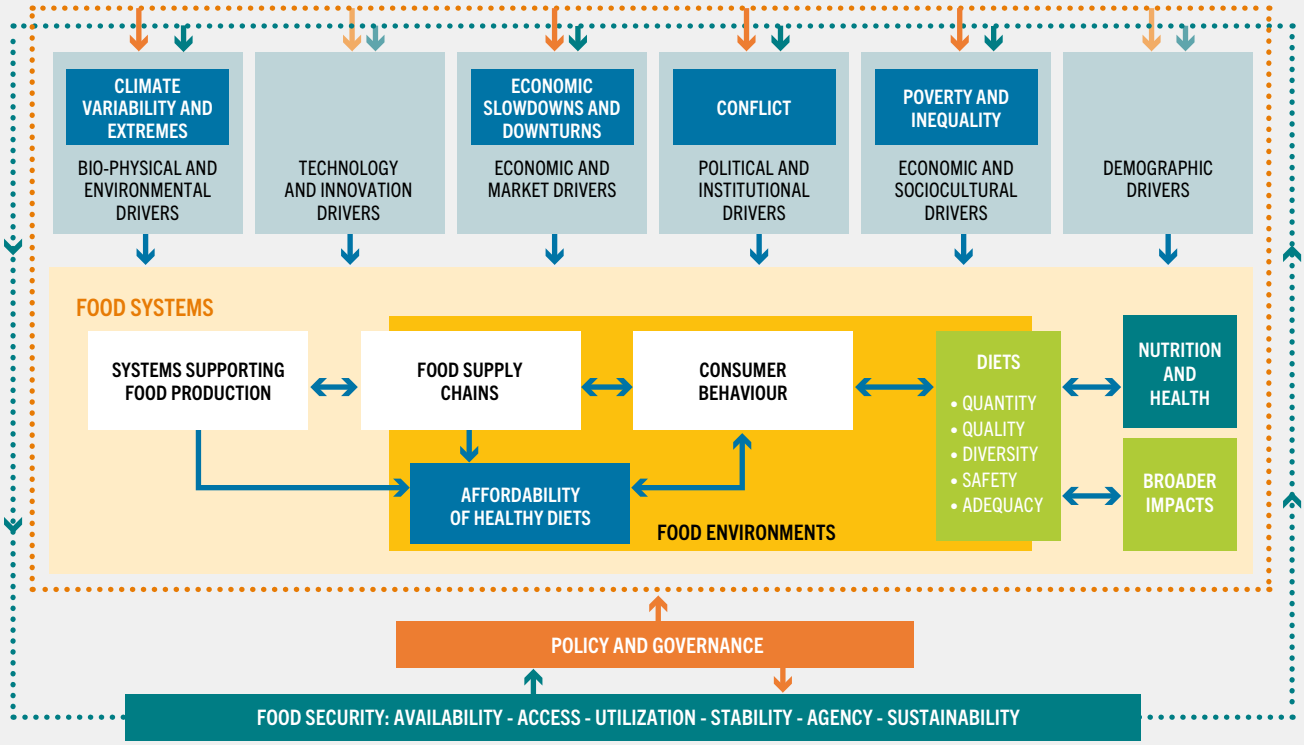
Importantly, food systems perform a central role not only in determining the quantity, quality, diversity and nutritional content of the foods available for consumption, but also in sustaining the livelihoods of millions of people around the world. In addition, food systems have a major impact on human health (both positive and negative) through a variety of different channels,[66] and on the environmental and ecosystem health of our planet. As such, how food systems function, the cost and quality of the food they deliver, and the impact they have on the health of people and our planet, directly and indirectly impacts outcomes of food security and nutrition. Therefore, any analysis of the after-mentioned drivers and their impacts must be viewed through a food systems lens, which involves considering trade-offs and synergies between these different outcomes.

The previous editions of this report, which analysed in depth each driver separately, taught us that these drivers are not mutually exclusive, as they interact to the detriment of food security and nutrition by creating multiple, compounding impacts at many different points within our food systems. We also learned that drivers do not necessarily move in the same direction, and that there are trade-offs and synergies associated with the policies enacted in response to these drivers. A food systems lens, therefore, becomes essential to better understand how the negative impacts of these drivers interact, and to facilitate the identification of targeted entry points for interventions to address the significant challenges presented by the drivers.

This perspective also allows for an examination of the synergies and trade-offs between policy interventions and how addressing one driver can have positive and negative impacts on different outcomes. For example, an effective response to recover from an economic downturn can improve both food access and utilization, with either

t Factors driving up the cost of nutritious foods are found in the realms of food production, food supply chains, food environments, as well as consumer demand and the political economy of food. *The State of Food Security and Nutrition in the World 2020* provides an in-depth examination of each of these.

FIGURE 14 IMPACTS OF VARIOUS DRIVERS ARE TRANSMITTED THROUGHOUT FOOD SYSTEMS, UNDERMINING FOOD SECURITY AND NUTRITION



SOURCE: Adapted from HLPE. 2020. *Food security and nutrition: building a global narrative towards 2030.* A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome.

negative or positive effects on the environment. A disconnected approach is unable to address the interconnected nature of the challenges, both within food systems and also in the intersection of food systems and other systems, including environmental, health and social protection systems.

Figure 14 presents a food systems diagram to illustrate how the drivers behind recent food security and nutrition trends specifically create multiple impacts throughout food systems (food systems, including food environments), leading to impacts on the four dimensions of food security (availability, access, utilization and stability), as well as the two additional dimensions of agency and sustainability.[u] These drivers have impacts on attributes of diets (quantity, quality, diversity, safety and adequacy) and nutrition and health outcomes (nutrition and health). While Figure 14 includes other drivers in addition to those identified in

u While these two new dimensions are proposed by the High Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS), they are not formally agreed upon by FAO or other bodies, nor is there an agreed language on the definition. However, due to their relevance in the context of this report, they are included here. For definitions, see **Annex 6** Glossary in this report.

this report, such as demographic drivers[v] and technology and innovation drivers,[w] these are not elaborated upon as these tend to be long-term drivers in their effects on food security and nutrition, whereas in this report we focus more on the short term. The report specifically focuses on the major drivers (dark blue boxes in Figure 14) that are behind the recent rise in hunger and slowdown in progress in reducing all forms of malnutrition. The orange text in parenthesis throughout this section refers to specific element names in Figure 14 for emphasis and to ease cross-referencing with the figure.

The diagram also accounts for circular feedback loops that can create compounding impacts that occur over time. For example, economic downturns that reduce the affordability of nutritious foods and increase the consumption of unhealthy diets not only negatively affect people's nutrition and health, but can also (as shown in the 2020 edition of this report) contribute to broader effects on the environment and climate change, through increased greenhouse gas (GHG) emissions.

Rather than one single impact, drivers tend to create multiple, compounding impacts on food systems

In Figure 14, conflict (political and institutional drivers), climate variability and extremes (bio-physical and environmental drivers), economic slowdowns and downturns (economic and market drivers), and poverty and inequality (economic and sociocultural drivers) are **external drivers** that act upon food systems (yellow box). Rather than one single impact, these drivers tend to create multiple, compounding impacts on food systems that negatively affect food security and nutrition. Because the drivers coexist and interact, this complexity must be fully understood and addressed when designing programme and policy responses.

For example, as shown in the 2017 edition of this report, **conflict** negatively affects almost every aspect of food systems,[1] from production, harvesting, processing and transport to input supply, financing, marketing and consumption. Direct impacts can be significant, particularly in regard to the destruction of agricultural and livelihood assets (such as land, livestock, crops, seed stocks or irrigation infrastructure), the forced or corrupt seizure of natural resources, and displacement from land, livestock grazing areas and fishing grounds. When conflict and civil insecurity severely disrupt and restrict trade and movements of goods and services, there can also be a negative effect on the availability of food, including nutritious foods that constitute a heathy diet, and upward pressure on prices of traded goods, which negatively affects food access and food utilization at the household level. Conflict disrupts the flow of food, funds, labour and other essential items through markets; creates shortages; and contributes to price hikes, thereby damaging market functionality. Conflicts can also erode finances for social protection and healthcare and so damage health and nutrition.[1]

Similarly, the 2018 edition of this report analysed how **climate variability and extremes**[x] create multiple and compounding impacts on food systems.[3] They negatively affect agricultural productivity (crop yields and cropping intensity), and also affect food imports as countries try to compensate for domestic production losses. Medium- and large-scale climate-related disasters can lead to significant impacts across the food value chain, with negative consequences on sector growth and on food and non-food agro-industries. Food price spikes and volatility tend to follow climate extremes (often in combination with losses in agricultural income),

v Population dynamics and urbanization are expected to result in growing populations and increasing food demand. These changes are most evident in sub-Saharan Africa and South Asia. In addition to population growth, other factors relative to the different locations – for example, ageing in rural areas and changes in high-income countries – are also important. Other social aspects, such as spatial location or gender, are also subject to change as a result of internal and international migration.[321]

w For example, currently, several technologies in agri-food systems contribute to degradation of natural resources. This is due to intensive production systems focusing on profitability over environmental aspects. Technical progress, including the emergence of more "systemic" technologies, digitalization, biotechnologies and other innovative approaches, implies opportunities to achieve the dual aim of producing sufficient food and safeguarding the environment. Research is ongoing to ensure safety and acceptability, gender-balanced access and inclusion of low-income countries to avoid technological divides.[321]

x While increasing climate variability and extremes can be attributed to climate change, in this chapter we do not focus on the cause of the increase, but analyse the occurrence of climate variability and extremes and their association with food insecurity and malnutrition. See the 2018 edition of this report for further details.

reducing access to food and negatively affecting the quantity, quality and dietary diversity of food consumed. In addition, more erratic rainfall and higher temperatures jeopardize the quality and safety of food and increase instances of crop contamination and outbreaks of pests and diseases.[y] Nutrition is highly susceptible to changes in climate and bears a heavy burden as a result, as seen in the impaired nutrient quality and dietary diversity of foods produced and consumed, the impacts on water and sanitation, and the effects on patterns of health risks and disease, as well as changes in maternal care, child care and breastfeeding.[3]

Economic slowdowns and downturns, in turn, primarily impact food systems through their negative effects on people's access to food, including the affordability of healthy diets, as they lead to rises in unemployment and declines in wages and incomes.[5] This is the case irrespective of whether they are driven by market swings, trade wars, political unrest, or a global pandemic such as COVID-19 (Box 7). As shown in the 2019 edition of this report, for countries dependent on primary commodity trade, food security and nutrition is especially vulnerable when economic slowdowns and downturns are linked to international trade shocks.[5] In all countries, the poor who spend a large share of their income on food and depend on markets for a significant portion of their diets, are especially vulnerable to economic slowdowns and downturns.[z] With reduced incomes, healthy diets become even more unaffordable, due to the higher relative cost compared with a basic diet.

The impacts of economic slowdowns and downturns can also be felt particularly hard in the food and agriculture sectors, both because of what happens within the sector (e.g. reduced ability to invest in the next planning cycle) and because of urban–rural linkages. These impacts can be especially harmful to countries lagging behind in terms of economic development, as the food and agriculture sectors account for substantial shares of employment and output in these countries. The need to change consumption patterns can lead vulnerable households to shift away from nutritious foods towards more energy-dense foods with minimal nutritional value, or to cut spending on a range of basic services for health and disease prevention. Economic slowdowns and downturns also reduce the fiscal space for government to provide support to the poor.

The **unaffordability of healthy diets**[aa] is regarded here as an **internal driver** resulting from the effect of other drivers or factors that directly affect the cost of nutritious foods throughout the food system. Affordability of a diet is determined by the cost of food relative to people's income. As such, this internal driver acts within food systems, and more specifically within food environments (food environment, affordability of healthy diets) to negatively affect food security and nutrition (Figure 14). Food environment refers to the physical, economic, sociocultural and policy conditions that shape access, affordability, safety and food preferences.[58,67,68,69] Clearly, the unaffordability of healthy diets can be driven by income changes (which can in turn be driven by conflict, climate variability and extremes, and economic slowdowns or downturns, among others), as well as determined by supply and demand factors within the food system that affect food prices.[7]

As shown in the 2020 edition of this report, the factors that drive the cost of nutritious foods are found throughout the food system. On the food production or supply side, low levels of productivity,[70,71] high production risks and insufficient diversification towards the production of more nutritious foods are key drivers of the cost of healthy diets, especially in low-income countries. In food supply chains, inadequate food handling and storage,[72] poor road infrastructure[7] »

y For example, higher intensity rainfall can create conditions that lead to mould growth and the subsequent contamination of crops in the field with mycotoxin contamination, while higher temperatures can lead to pest and fungi development during storage. Climate extremes such as temperature and humidity alter survival and transmission patterns and can lead to increased bacterial, viral and pathogenic contamination in water (for both consumption and for irrigation of crops) and food. See FAO (2018),[3] p. 74.

z In a review of studies of dietary diversity that included a measure of market access and production diversity, five of six studies showed a statistically significant positive relationship between market access and dietary diversity in at least some models.[322]

aa For the definition of a healthy diet, see Chapter 1, Section 2.1 Affordability of healthy diets: a link between food security and nutritional outcomes.

BOX 7 IMPACT CHANNELS OF THE COVID-19 PANDEMIC ON FOOD SECURITY AND NUTRITION

©FAO/Ismail Taxta

The COVID-19 pandemic and the measures put in place to counter it have delivered one of the most devastating blows to global food security and nutrition in recent times, with multiple impacts on food systems (Figure 14) and the channels through which food systems affect diets, including the affordability of healthy diets (systems supporting food production, food supply chains, food environments, consumer behaviour).[74] The number of people suffering from chronic hunger in the world, as measured by the prevalence of undernourishment (PoU), increased by up to 161 million more people in 2020 – the largest single-year increase in decades (Figure A).

Additionally, by the end of 2020, at least 155 million people suffered from acute food insecurity* requiring urgent humanitarian assistance in 55 countries/territories (Integrate Food Security Phase Classification/ *Cadre Harmonisé* [IPC/CH] Phase 3 or above).[75] Of these, economic shocks were a primary driver of acute food insecurity in 17 food crisis countries affecting 40 million people in Crisis or worse (IPC/CH Phase 3 or above). By comparison, in 2019, economic shocks constituted the primary driver in just eight countries with around 24 million people in Crisis or worse (IPC/CH Phase 3 or above), or equivalent.

The most destructive effects of the COVID-19 pandemic on food security and nutrition emanate from the unprecedented reach and scale of the economic downturns caused by the pandemic containment measures (economic and market drivers). These plunged the world and most countries into economic recession in 2020, with per capita incomes contracting in more countries than at any time in the recent past. People employed in the informal sector in many countries around the world saw their incomes significantly reduced or disappear. In high-income countries, governments provided support to employers to retain employees, albeit at reduced salaries.

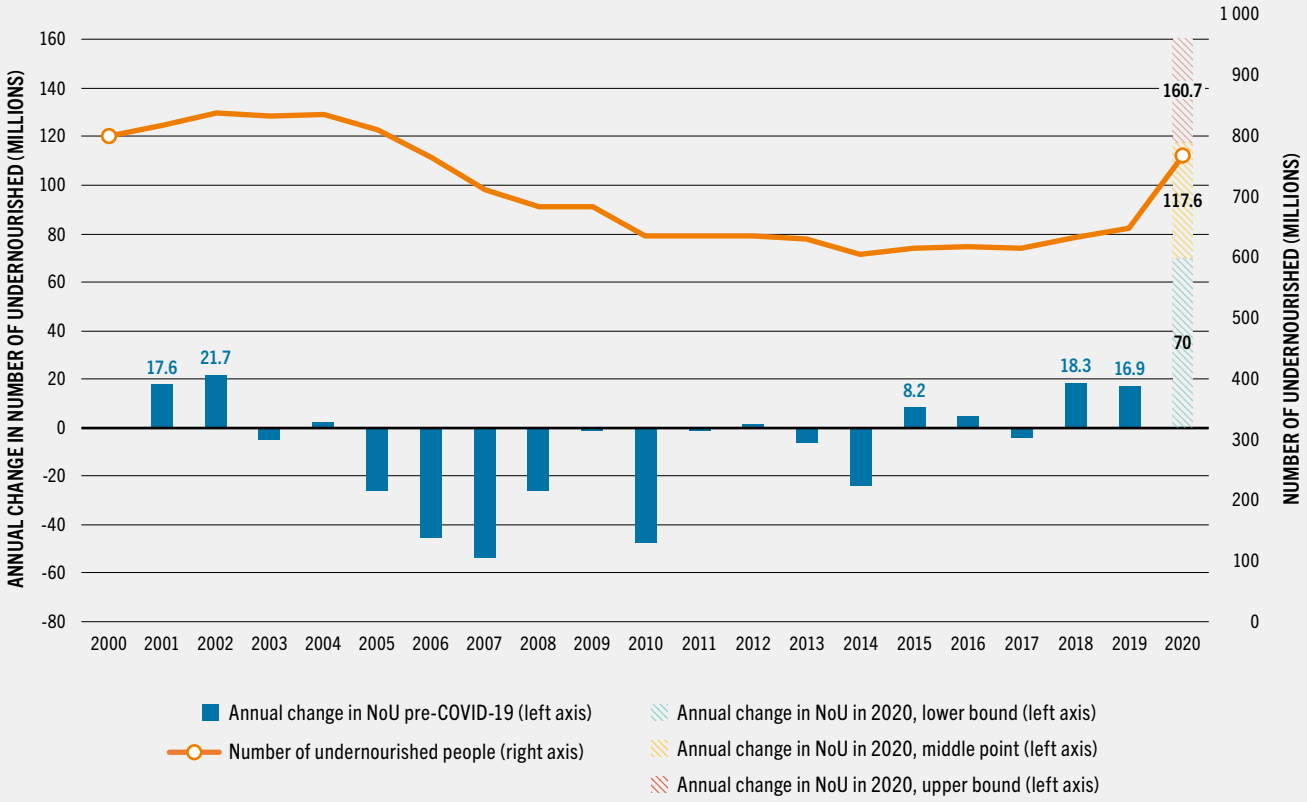
While food supply chains have proven to be more robust than originally predicted, the pandemic is eroding people's ability to purchase food as they lose their incomes and livelihoods. As a result, not only are more people unable to afford healthy diets, increasing their risk of any form of malnutrition, but more people are going hungry because they lack sufficient quantities of food. In addition, school closures have led to the suspension of critically important school food and nutrition programmes. Food assistance programmes such as food banks and various other initiatives have experienced a significant and continuous increase in demand for their services throughout 2020, in both developing and developed countries. This rise in demand stems from income loss and subsequent increased unaffordability of foods resulting in many more people depending on food assistance to maintain a healthy diet and avoid food insecurity.

This economic downturn translates directly into increased unaffordability of food and greater food insecurity and malnutrition – as people have less income to buy food, let alone more expensive nutritious foods required for healthy diets. Migrant workers have been affected by lockdowns, trade disruptions, layoffs and illness,[76] although remittances sent to their home countries show a smaller decline than previously predicted.[77] Women have been particularly hard hit by the economic and social fallout of the COVID-19 pandemic. The pandemic has pushed more women into extreme poverty than men, with women also facing higher job losses, shrinking work hours and greater care burdens.[74] As highlighted in Chapter 2, the gender gap has grown even larger in the year of the pandemic – with the prevalence of moderate or severe food insecurity being 10 percent higher among women than men in 2020, compared with 6 percent in 2019. (see Chapter 2, Figure 6).

But the COVID-19 pandemic is not only having multiple demand-side effects on access to food; there are also supply-side effects that are negatively affecting people's capacity to access food and healthy diets. These include border closures, travel restrictions, quarantines, and market, supply chain and trade disruptions. These negative effects restrict people's physical access to sufficient, diverse and nutritious

* Acute food insecurity is a severe form of food insecurity that threatens lives and/or livelihoods, requiring urgent humanitarian assistance. Generally, it reflects short-term fluctuations, typical of acute crises, which are the main focus of the indicators. On the other hand, chronic food insecurity is food insecurity that persists over time mainly due to structural causes. This measure has relevance in providing strategic guidance to actions that focus on the medium- and long-term improvement of the quality and quantity of food consumption for an active and healthy life. See Box 5 in FAO, IFAD, UNICEF, WFP and WHO (2019)[5] for a discussion of the comparison of different objectives and assessments of acute and chronic food insecurity indicator measures.

FIGURE A THE COVID-19 PANDEMIC CONTRIBUTED TO THE LARGEST SINGLE-YEAR INCREASE IN GLOBAL HUNGER IN DECADES



NOTES: The blue bars show the annual change in the number of undernourished people (NoU) between 2000 and 2019 (left y-axis). Selected numbers in correspondence of the blue bars denote the highest annual changes in the NoU. The orange line shows the total number of undernourished people in 2000–2019 (right y-axis). The stacked bar for year 2020 shows the additional number of undernourished people in 2020, which ranges from 70 million people (lower bound) to 160.7 million people (upper bound).
SOURCE: FAO for NoU and PoU.

sources of food, especially in countries hit hard by the pandemic or already affected by high levels of food insecurity and malnutrition. High-value perishable commodities are going to waste along the chains, as essential workers in food and agriculture are barred from crossing borders and food supply chains are being disrupted. Closure of markets, including informal markets, also exacerbates the unaffordability of healthy diets.

The adverse effects of the pandemic physical distancing measures have tended to be more immediate and pronounced for highly perishable fruits and vegetables, for which production and trade are more labour-intensive as compared with other food commodities such as staple foods.[78,79,80] While impacts may be less than expected and more evidence is needed, there are some reports of food losses and waste, especially of fruits and vegetables, fish, meat and dairy products.[80] Furthermore, travel restrictions are causing severe labour shortages in food and agriculture production and processing industries, leading to production and supply disruptions. Moreover, school closures have led to missed meals normally provided through school food and nutrition programmes. As a response, some countries have started door-to-door meal delivery service to children.**

The COVID-19 pandemic and related containment measures have exacerbated other drivers, widened inequalities, and exposed structural vulnerabilities of local and global food systems. While the COVID-19

** There are a number of other impacts not highlighted, including observed changes in purchasing patterns in favour of products with longer shelf lives and often poorer nutrition profiles, which could lead to higher levels of undernutrition, as well as overweight and obesity. Although many negative consequences have been noted, positive consequences have also been observed such as increased opportunities for online food purchases, home delivery of meals to the elderly, or setup of community kitchens to serve free meals to vulnerable populations.

BOX 7 (CONTINUED)

pandemic is itself driving a global economic downturn, it has negatively affected several regions of the world while interacting with conflict or climate variability and extremes, or a combination of both (see analysis below and Figures 19 and 24) as well as more localized drivers, such as the locust outbreaks in East Africa (Kenya and Somalia) and South Asia (India and Pakistan). It has also combined to worsen food crises in emergency contexts.[75] For example, acute food insecurity requiring emergency response has increased in El Salvador, Honduras and Nicaragua due to the double impact of hurricanes Eta and Iota and the economic effects of the COVID-19 pandemic. In the Democratic Republic of the Congo and South Sudan, the combined effects of conflict and climate variability and extremes, including droughts, cyclones or seasonal flooding, have been aggravated by the economic effects of the pandemic.[75,81]

The global economic recession that started in 2020 is extending into 2021 for many countries, with regional and international trade impacts, record levels of unemployment, lost livelihoods and rising poverty levels in many countries around the world.[82,25,10] The uneven pace of recovery from the effects of the COVID-19 pandemic and containment measures will mean that some countries will continue to face significant food security and nutrition challenges related to these in 2021, and possibly beyond, especially in contexts where this is combined with conflict and climate-related disasters. As shown in Figure 24, in 2020, in countries affected by economic downturns combined with climate-related disasters and conflict, increases in undernourishment were more than five times greater than in countries only affected by economic downturns.

» and limited food preservation capacity lead to food losses (especially for highly perishable foods)[73] and inefficiencies along the food supply chain that drive up the cost of nutritious foods.[7] On the demand side, food environments influence consumer behaviour; moreover, the preferences of consumers also represent an important factor driving the cost and affordability – and the availability – of healthy diets.[7] Rapid rates of urbanization have resulted in more work-away and eat-away-from-home habits, with a direct impact on the demand for easy-to-prepare, highly processed foods or convenience foods that are often energy dense and high in fat, sugar and/or salt. Such foods have also become more widely available and affordable, but do not necessarily contribute to healthy diets. However, consumer demand can also be a positive force: for example, increased demand can also encourage production of nutritious foods, making it more available at a lower cost.

Inequality and sociocultural stratification magnify the negative effects of other drivers

Poverty and **inequality** (economic and market drivers) and sociocultural stratification and empowerment, including gender and power dynamics (sociocultural drivers), are important external factors (Figure 14) that tend to magnify the negative effects of other drivers. Importantly, inequality is related to economic and market drivers in a broader sense (i.e. multidimensional), including inequality in access to resources (land, water) and basic services (health, education, etc.). Their impacts are felt throughout food systems and food environments, ultimately affecting the affordability of healthy diets and food security and nutrition outcomes. The 2019 edition of this report analysed the nexus between economic growth, poverty, and food security and nutrition, factoring in inequality. Analysis reconfirmed that economic slowdowns and downturns are associated with increases in food insecurity, but also showed that not only does income inequality increase the likelihood of food insecurity, but high income inequality amplifies the negative effect of economic slowdowns or downturns on individual food security.[5,6]

There are circular interconnected impacts of drivers on other systems, including environmental and health systems

Beyond their direct impacts on food systems, these major global drivers weaken food security and nutrition through interconnected and circular impacts on other systems, including environmental and health systems. For example, as explored in depth in the 2020 edition of this report, diets of poor quality and insufficient quantity have broader impacts on human health and the environment, including increased morbidity, mortality and the social costs associated with multiple forms of malnutrition,

including stunting, wasting, micronutrient deficiencies, overweight and obesity, as well as costs associated with environmental degradation and GHG emissions (broader impacts: economic, socio-economic, environmental) (Figure 14).

Current food consumption patterns are a leading cause of morbidity and disability – with poor diets accounting for 8 million premature deaths globally every year[83] – which require higher spending on healthcare, placing significant burdens on national healthcare systems and economies.[59] The 2020 edition of this report estimated that if current food consumption patterns continue, diet-related health costs linked to NCDs and their mortality are projected to exceed USD 1.3 trillion per year by 2030.[7] At the same time, current food consumption patterns are leading to significant environmental impacts and associated costs. The diet-related social costs (i.e. economic costs) of GHG emissions associated with current dietary patterns is projected to exceed USD 1.7 trillion per year by 2030.[7]

These broader impacts – and their repercussions on other systems – are important as they fuel a circular feedback loop impacting drivers that affect the food system, for example in the way diets affect GHG emissions, which are a driver of climate change that then affects the food systems (bio-physical and environmental drivers) (Figure 14).

Governance and policy shape how food systems function and the outcomes they produce, including both positive and negative food security and nutrition outcomes

Other factors that need to be taken into consideration are the **policies and governance** – including legislation and finance – that shape food systems, and hence food security and nutrition outcomes (policy and governance) (Figure 14). They can be a positive force, but also a negative one.

For example, **food and agricultural policies** have the power, either directly or indirectly, to positively affect the availability, access to and cost of nutritious foods. Policy measures, including food standards, fiscal, labelling, reformulation, public procurement and marketing policies, can also shape healthier food environments.

On the other hand, some economic policies may result in an economic slowdown, or governance may trigger conflict. For example, protectionary trade measures and input subsidy programmes tend to protect and incentivize the domestic production of staple foods, such as rice and maize, often to the detriment of more nutritious foods, such as fruits and vegetables.[7,84,85] These measures and programmes can also keep the cost of fruits and vegetables above the world market rate or restrict farmers to just producing the staple crops – both of which also reduce consumer access to a diverse diet. Similarly, liberalization of trade and investment rules can also reshape food systems and thus influence food security and nutrition in both positive and negative ways – whether by improving access to diverse, nutritious foods or by increasing the availability and affordability of foods that are high in fat, sugar or salt. Finally, non-tariff trade measures can help improve food safety, quality standards and the nutritional value of food, and minimize any unintended consequences, but they can also drive up the costs of trade and hence food prices, negatively affecting the affordability of healthy diets.[7]

It is, however, not only about having the right policies; governance, legislation and institutions are key to the implementation of policies and to ensuring they consider the impacts on all dimensions of food security and nutrition (policy coherence) and on all stakeholders, especially the most vulnerable. For policies to be enforceable, they need to be grounded in legislation. This highlights the importance of an enabling legislative environment for food security and nutrition. Such a legal framework is composed of complex networks of interlinked legal areas and is best construed through a food systems lens to ensure consistency and coherence.

In particular, it is also very important to consider institutional deficits and power imbalances. For example, poorer households, even net-food sellers, are exposed to volatility in food prices, owing to their weak bargaining position in food chains that keeps them from capturing

the benefits from higher prices.[86] The agency dimension of food security is also key to addressing power asymmetries and reducing inequality, for example, by enhancing the participation of the rural poor in food systems transformation and its benefits. Agency goes beyond access to material resources in that it includes empowerment – the ability of people to take actions that help improve their own well-being, including food security and nutrition, as well as their ability to engage in society in ways that wield influence.[58]

These drivers differ from country to country and even within countries, and in the way they interact. They also increase and decrease in intensity, and may disappear altogether for a time. However, what is common across countries is the lack of resilience of food systems to the negative effects of these drivers and their lack of capacity to deliver food security and good nutrition under these circumstances.

Analysis shows that this food systems vulnerability is further compromised and made worse by high and persistent levels of inequality – in terms of income, productive assets and basic services (e.g. health, education). Income and wealth inequalities are closely associated with access to food and, as a consequence, to hunger. If we are to end hunger, food insecurity and malnutrition in all its forms, food systems need to be transformed and inequality reduced in order to strengthen resilience to the negative effects of these drivers. A food systems approach is necessary to overcome the complexity of this challenge, by gaining an understanding of the interrelationships among key drivers and their negative impacts to help formulate appropriate solutions. Only then will a global transformation be possible to achieve well-functioning, resilient food systems that deliver affordable healthy diets. ■

3.2 IMPACT OF MAJOR DRIVERS ON FOOD SECURITY AND NUTRITION

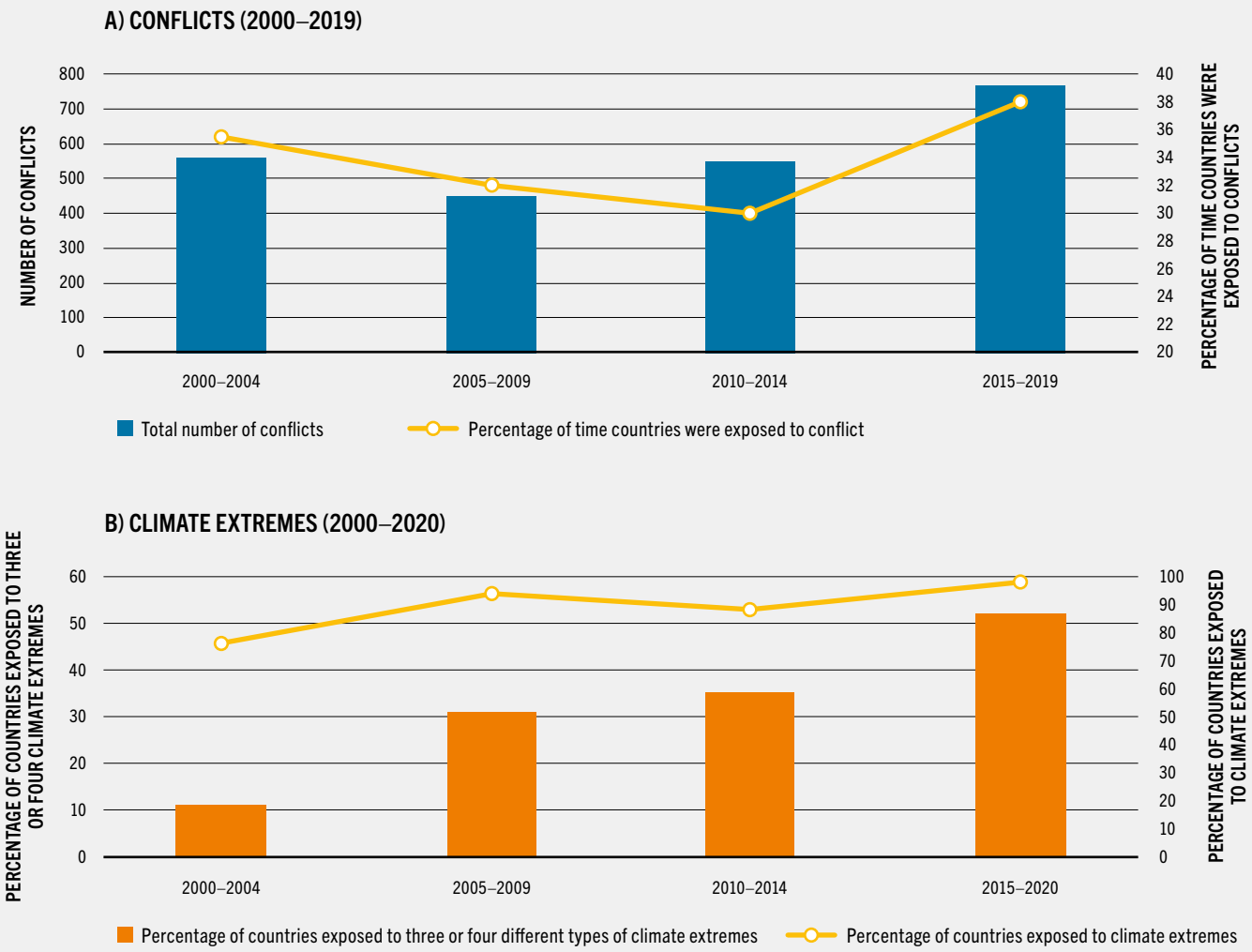
As highlighted above, conflict, climate variability and extremes, and economic slowdowns and downturns can negatively affect food security and nutrition through their impacts on our food systems. As a result, all dimensions of food security and nutrition are likely to be affected, including food availability, access, utilization and stability. This is corroborated by the association found between the occurrence of these drivers and the food security and nutrition indicators, as we detail in this section.

Drivers are increasing in frequency and intensity, undermining food security and nutrition

In the last ten years, the frequency and intensity of conflict, climate variability and extremes, and economic slowdowns and downturns have increased and are undermining food security and nutrition around the world. Of particular concern are low- and middle-income countries because the negative impacts on food security and nutrition are greatest in these countries: they carry the biggest burden of the world's population who are undernourished (13 percent) and children who are stunted (24 percent). Further, these countries experience multiple forms of malnutrition, including child overweight (6 percent) and adult obesity (18 percent).

High-income countries also face the increased occurrence of some of these major drivers, notably climate variability and extremes, and economic slowdowns and downturns. In the context of these countries, some people will become food insecure and malnourished as a result of the drivers, particularly during the COVID-19 pandemic. However, the analysis here focuses on low- and middle-income countries,

FIGURE 15 LOW- AND MIDDLE-INCOME COUNTRIES FACE INCREASING FREQUENCY AND INTENSITY OF DRIVERS



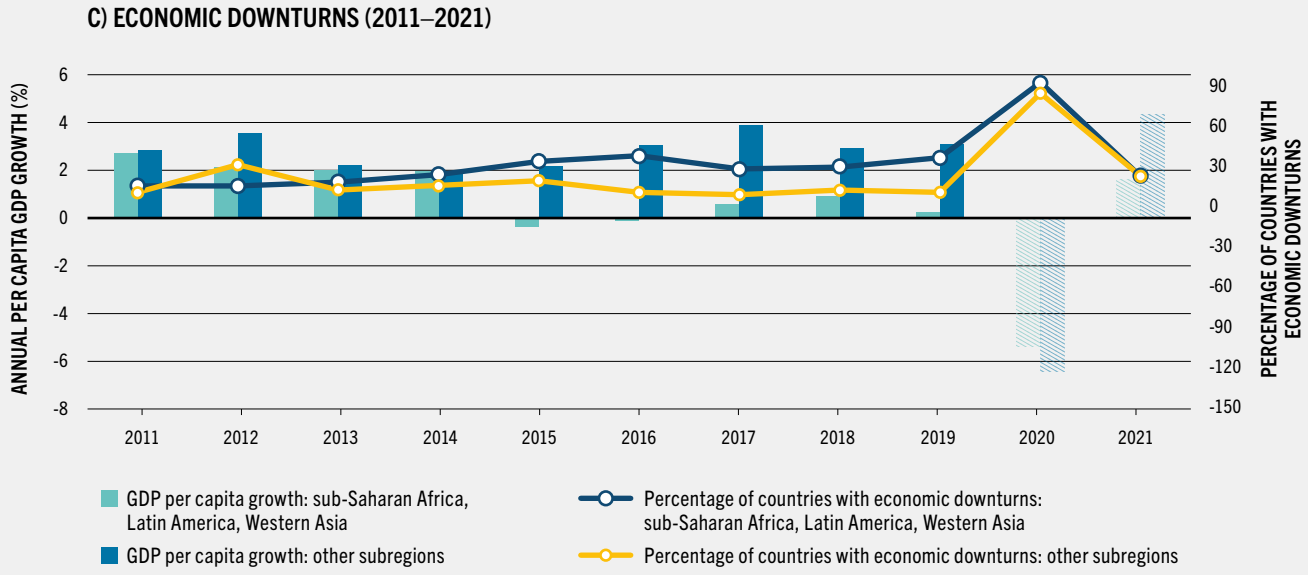
where the major drivers exhibit the most significant impacts on hunger and malnutrition.

There has been a notable and significant increase in the frequency and intensity of conflict, climate variability and extremes, and economic slowdowns and downturns in the last ten years among low- and middle-income countries (Figure 15). For our analysis of the latter two drivers, we focus specifically on climate extremes and economic downturns.

Conflict

The number of countries, as well as the specific countries, experiencing violent conflicts has remained fairly stable over the last ten years. However, there is a marked increase in the number of conflicts per year and the percentage of time countries experienced conflict (Figure 15A). There has also been a resurgence in the number of violent conflicts, with conflict-related deaths increasing from an all-time low in 2005. The number of conflicts that include

FIGURE 15 (CONTINUED)



NOTES: Figure 15A shows the total number of violent conflicts in the five-year subperiods that were caused by internal or intrastate conflict (blue bars), and the percentage of time countries were exposed to conflict (yellow line). Globally, 98 countries were affected by conflict during 2000–2019. Figure 15B shows the percentage of countries where at least one climate extreme (yellow line) occurred, and the percentage of countries exposed to three or four climate extremes (orange bars). There are 127 low- and middle-income countries with information available on climate extremes. Figure 15C refers to the occurrence of economic downturns, for years 2011–2019 and 2020–2021, respectively. There are 129 low- and middle-income countries with information available on GDP per capita growth: 71 countries in sub-Saharan Africa, Latin America and Western Asia, and 58 countries in the other regions. See **Annex 3** for methodology.
SOURCES: Violent conflict data based on the Uppsala University. 2021. Uppsala Conflict Data Program (UCDP). In: *UCDP* [online]. Uppsala, Sweden. [Cited 10 June 2021]. ucdp.uu.se; for years 2000–2005 updated drought provided by UCT using data from the European Centre for Medium-Range Weather Forecasts (ECMWF). 2021. Datasets. In: *ECMWF* [online]. Reading, United Kingdom. [Cited 10 June 2021].www.ecmwf.int/en/forecasts/datasets and for years 2006–2020 provided by EU-JRC using data from the European Commission. 2021. Anomaly Hotspots of Agricultural Production (ASAP). In: *ASAP* [online]. Brussels. [Cited 10 June 2021]. mars.jrc.ec.europa.eu/asap; updated flood data provided by UCT using Climate Hazards Center of the University of California - Santa Barbara. 2021. CHIRPS: Rainfall estimates from rain gauge and satellite observations. In: *CHIRPS* [online]. Santa Barbara, USA. [Cited 10 June 2021]. www.chc.ucsb.edu/data/chirps; updated heat spell data provided by UCT using data from the European Centre for Medium-Range Weather Forecasts (ECMWF). 2021. Datasets. In: *ECMWF* [online]. Reading, United Kingdom. [Cited 10 June 2021]. www.ecmwf.int/en/forecasts/datasets; updated storm data based on Centre for Research on the Epidemiology of Disasters (CRED). 2021. EM-DAT: the international disasters database. In: *EM-DAT* [online]. Brussels. [Cited 10 June 2021]. public.emdat.be; annual per capita GDP based on IMF. 2021. World Economic Outlook Database - April 2021. In: *IMF* [online]. Washington, DC. [Cited 10 June 2021]. www.imf.org/en/Publications/WEO/weo-database/2021/April

one-sided, state- and non-state violence have increased dramatically (by 86 percent since 2010, and at 145 conflicts as of 2019)[ab] and now are at an all-time high.[1] These increases have been accompanied by increasing numbers of displaced people. The number of refugees and internally displaced persons (IDPs) has increased significantly with the increase in conflicts, nearly doubling from 40 million in 2010 to more than 70 million in 2019; this number reached more than 80 million in 2020.[87,88]

ab Data are not updated to 2020 because at the time of writing, the Uppsala Conflict Data Program (UCDP) dataset was only updated to 2019.

The nature of conflict is also changing – conflicts are becoming more complex, protracted and intractable. Internal conflicts have surpassed the number of interstate conflicts and there is a significant rise in internationalized internal conflicts (internal conflicts that have spread to involve other nations).[87,88] Coupled with large outflows of displaced people and the entanglement of external international actors, conflicts are also increasingly a regional problem, with cross-border armed networks that are all too ready to share resources to further their

common goals.[ac] Conflicts also tend to have multiple layers in many countries, making concepts like onset and cessation analytically difficult to disentangle in practice. Even in post-conflict contexts, violence can simply change its form as settings, actors and drivers change.[89] Sometimes the factors that lead to a conflict may not disappear when the conflict is seemingly over; what is more, conflicts can take on a cyclical nature if underlying causes are not addressed.[ad]

Climate extremes

Countries face increasing climate variability and more frequent climate extremes, linked in part to climate change.[4] The number of low- and middle-income countries exposed to climate extremes has steadily been on the rise over the past twenty years, from 76 percent of countries in 2000–2004 to 98 percent in 2015–2020. More strikingly, countries' exposure to climate extremes has significantly magnified in terms of intensity (three or four types of climate extremes in a five-year period) (Figure 15B). The frequency, or number of years a country is exposed in each subperiod, increased by 42 percentage points, from 30 percent in 2000–2004 to 72 percent in 2015–2019 (not shown in figure). In terms of increasing intensity, 52 percent of countries were exposed to three or four types of climate extremes (heat spell, drought, flood, or storm) in 2015–2020, compared with 11 percent in 2000–2004. In other words, the number has almost quintupled in the last 20 years (see **Annex 3** for definitions, methodology and data sources).

The analysis at the regional level confirms the intensity of climate extremes found at the global level. For instance, the occurrence of three or more types of climate extremes has increased by 39 percentage points for countries in Africa, from 10 percent in 2000–2004 to 49 percent in 2015–2020. Similarly, the percentage of Asian countries experiencing multiple types of climate extremes increased to 57 percent in 2015–2020, up from 11 percent in 2000–2004. The intensity of climate extremes in Latin America and the Caribbean also moved from 9 percent in 2000–2004 to 57 percent in 2015–2020.

Economic downturns

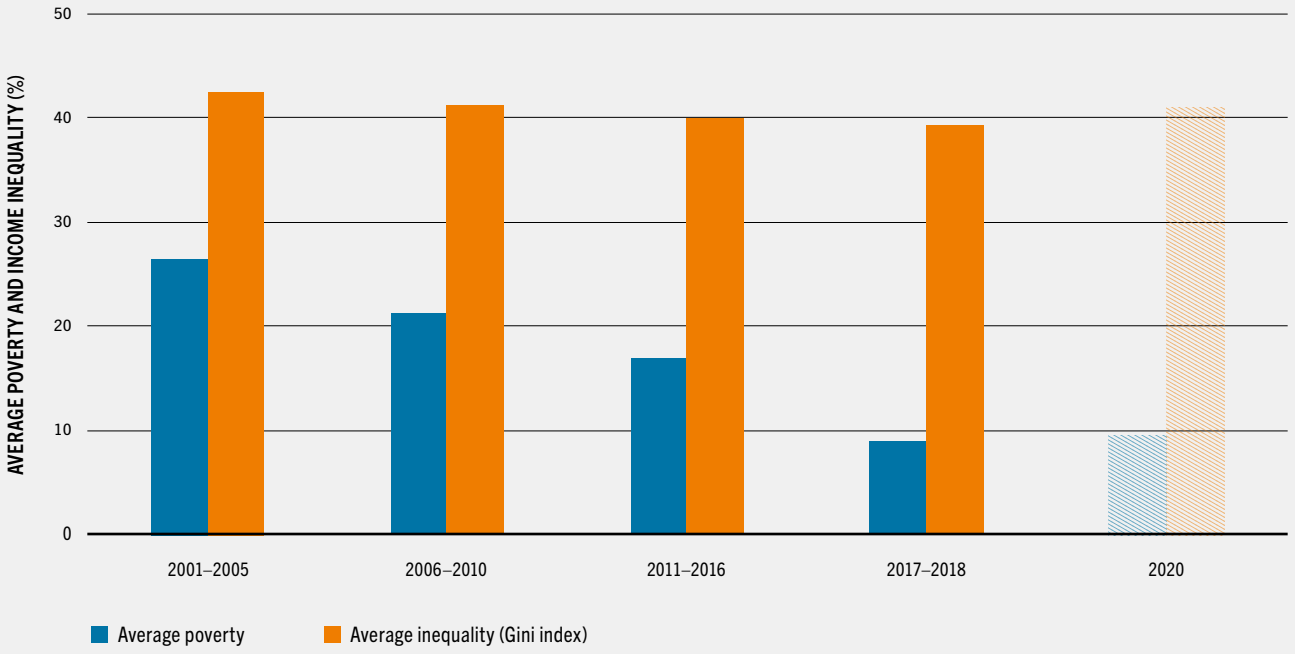
Even before the COVID-19 pandemic, global economic reports had highlighted that economic slowdowns, stagnation and outright recessions were evident in several economies and already leading to increased unemployment and declines in income.[5,90,91] The economic growth rate, as measured by the percent variation of real GDP per capita growth from one period to another, is typically used to gauge whether an economy is slowing down or contracting. In most regions, this rate rebounded after the sharp 2008–2009 global economic downturn. But the recovery was uneven and short lived, as many countries experienced generally declining trends in growth since 2011. Since 2014, poor and uneven growth has been especially pronounced in sub-Saharan Africa, Latin America and Western Asia. The percentage of countries experiencing economic downturns within these regions increased from 25 percent in 2014 to 38 percent in 2019. As a result, these regions experienced a severe reduction in their GDP per capita growth compared with other regions from 2014 to 2019 (Figure 15C).

The measures put in place to contain the COVID-19 pandemic delivered a significant economic hit, sending most countries into recession during 2020. For low- and middle-income countries, per capita income contracted in 117 of 129 countries with information available on GDP per capita growth. Specifically, 94 percent of the countries in sub-Saharan Africa, Latin America and Western Asia experienced an economic downturn in 2020, and 86 percent in other regions (Figure 15C). The 2020 global recession proved to be the deepest in decades, despite the extraordinary efforts of governments to counter the downturn with fiscal and monetary

ac The mapping of conflict events in Africa, across time and by magnitude, draws a startling picture of their cross-border and regional nature. These include some of the most protracted conflicts, including those in the Horn of Africa, the Great Lakes region and in northern Cameroon, Chad and northern Nigeria across the Sahel. But there are also examples in other regions, such as in Afghanistan, India and Pakistan in Asia.[2]

ad For example, in Africa and Asia, actors of violence during conflict and war often reconstitute themselves in post-conflict periods to take economic and political advantage of fragile and vulnerable environments.[1,2]

FIGURE 16 WHILE POVERTY DECLINES AROUND THE WORLD, INCOME INEQUALITY REMAINS HIGH, WITH AN INCREASE IN 2020 IN LOW- AND MIDDLE-INCOME COUNTRIES



NOTES: The figure shows the average poverty and income inequality by five-year subperiods in low- and middle-income countries. Shaded columns for year 2020 report IMF projections of the Gini index and poverty, as expressed by the percentage of the population living below USD 1.90 (PPP 2011). Poverty projections for 2020 are based on the October World Economic Outlook database. Income inequality in 2020 is expressed as a median. Poverty and inequality are shown for the sample of 133 low- and middle-income countries. See **Annex 3** for definitions.
SOURCES: World Bank. 2021. World Development Indicators. In: *World Bank* [online]. Washington, DC. [Cited 24 April 2020]. datatopics.worldbank.org/world-development-indicators for poverty and Gini index data between 2001–2018; and IMF. 2020. *Fiscal Monitor: policies for the recovery*. Washington, DC. (also available at www.imf.org/en/Publications/FM/Issues/2020/09/30/october-2020-fiscal-monitor) for poverty and the Gini index data in 2020.

policy support. While some countries have seen their economies begin to recover in 2021, it is forecasted that many will not. One of the factors that will make recovery in 2021 less likely in some countries is the growing external debt burden, which could crowd out investments in economic recovery and social protection, as a result of which food security and nutrition could worsen. The global economic recession that started in 2020 has extended into 2021, with record levels of unemployment, lost livelihoods and rising poverty levels in many countries around the world.

Poverty and inequality

Poverty and inequality are critical underlying structural factors that amplify the negative impact of conflict, climate variability and extremes, and economic slowdowns and downturns. While poverty has declined, income inequality – as measured by the Gini index – has remained high and persistent over the last 20 years at the global level (Figure 16). As shown in the 2019 edition of this report, a closer look at country level data shows that income inequality is rising in nearly half the countries in the world, including many low-

and middle-income countries.[5] As a region, Latin America and the Caribbean shows the most progress in reducing income inequality, but still exhibits the highest levels of inequality globally.[ae] For the first time in more than 20 years, poverty and income inequality at the global level increased in 2020 as a result of the COVID-19 pandemic and the measures put in place to contain it (Figure 16). The number of "new poor" (i.e. in addition to the number of people who were already poor), resulting from the pandemic was estimated to be between 119 and 124 million in 2020. In 2021, this number is set to rise to between 143 and 163 million.[10] Income inequality increased from 38 to 41 percent in 2020.

Nexus between drivers and underlying causes and interconnected circular associations

Although the trends in the occurrence of conflict, climate variability and extremes, economic slowdowns and downturns, and underlying causes of poverty and inequality are presented separately, in fact, they often interact, and tend to create interconnected circular associations. For example, as highlighted in the 2017 edition of this report, conflict can wreak havoc on economic production and growth, causing deep economic recessions. In turn, economic recessions that drive up inflation and lead to sharp increases in food prices tend to exacerbate the risk of political unrest, as witnessed in 2007–2008 when food riots broke out in more than 50 countries.[1] Similarly, increasing climate variability and extremes, especially severe droughts, tend to jeopardize food security in terms of food availability and access, which is found to increase the risk of conflict.[1]

There are also interconnected circular associations between conflict, climate variability and extremes, and economic slowdowns and downturns – especially if these are severe, prolonged or recurrent – and poverty and inequality. For example, as shown in the 2018 edition of this report, climate variability and extremes contribute to greater risk of food insecurity and malnutrition, but if prolonged or recurrent they lead to diminished coping capacity, loss of livelihoods, distress migration and destitution. In other words, they not only contribute to increased food insecurity and malnutrition, but can create and sustain poverty, as well as contribute to increased inequality.[3af] This creates further circular associations, contributing to increased food insecurity and malnutrition, as well as current and future vulnerability to climate extremes.

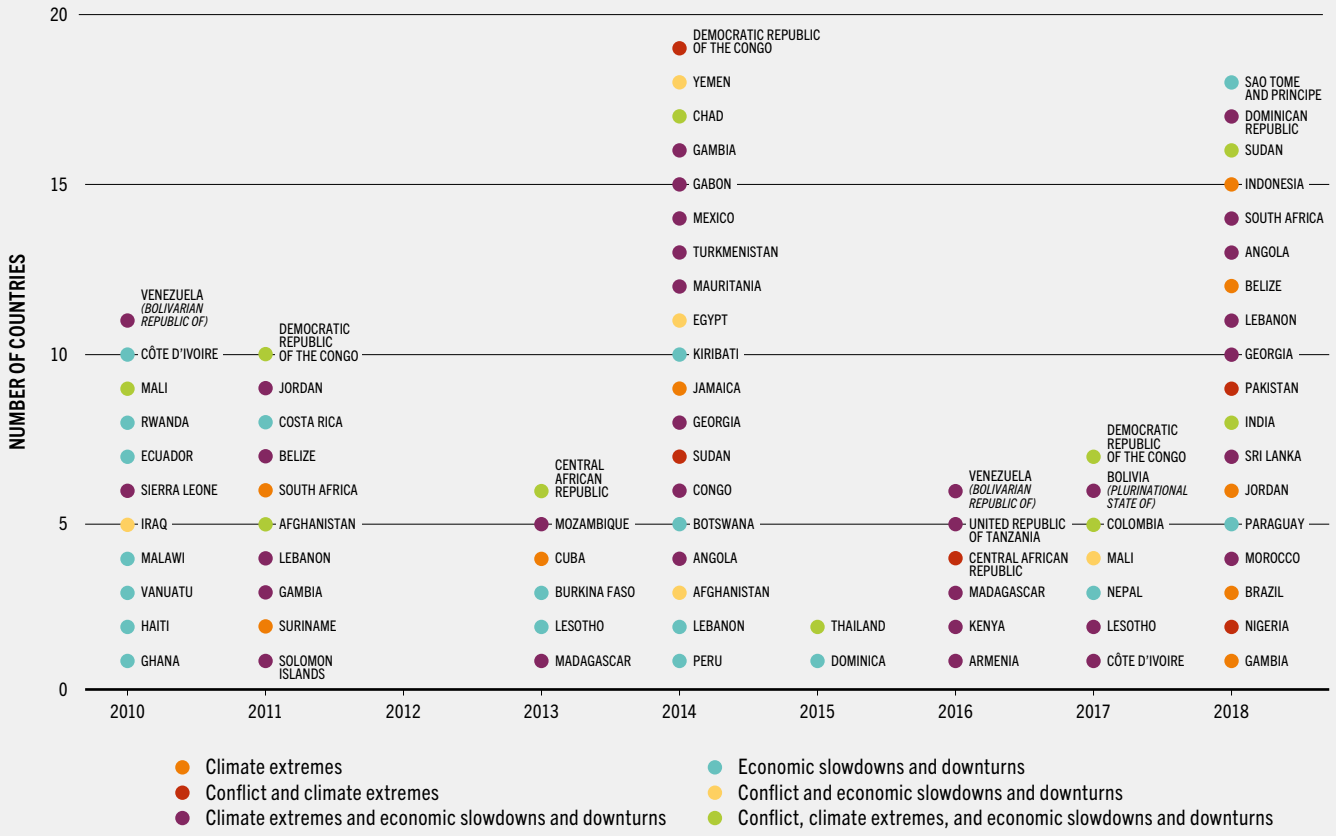
The Dry Corridor in Central America – in particular in El Salvador, Guatemala and Honduras – is highly vulnerable to climate-related disaster risks due to its geographical location, high occurrence of climate extremes, including recurrent droughts, excessive rains and severe flooding, and institutional and socio-economic weaknesses.[3,4] People's livelihoods are very climate-sensitive, with more than 1 million families relying on subsistence farming. Moreover, levels of poverty, inequality, food insecurity and malnutrition are alarming, particularly among rural populations and Indigenous Peoples. The reoccurring and increasing cycles of climate variability and extremes are not only a threat to food security and nutrition, but often trigger large-scale human displacement and migration – with those left behind being mostly the elderly, women and children. This exodus creates a breeding ground for conflict, and feeds a circular association of increased poverty, inequality and greater vulnerability to climate extremes.

Disentangling the nexus, and the causal factors between the drivers and underlying factors of poverty and inequality, is often so complex and challenging that it is not always clear which comes first and what follows. However, it is possible to observe the occurrence of the drivers simultaneously or over time, and their associated links with changes in food security and nutrition. »

ae Nonetheless, this progress in reducing income disparity in Latin America and the Caribbean does not seem to be reflected in the distribution of workers' wages. See Figure 34 in FAO, IFAD, UNICEF, WFP and WHO (2019)[5] and associated analysis.

af Also see Charles, Kalikoski and Macnaughton (2019).[113]

FIGURE 17 MORE THAN HALF OF LOW- AND MIDDLE-INCOME COUNTRIES EXPERIENCED INCREASING PoU CHANGE POINTS IN CORRESPONDENCE WITH ONE OR MORE DRIVERS (CONFLICT, CLIMATE EXTREMES, AND ECONOMIC SLOWDOWNS AND DOWNTURNS) BETWEEN 2010 AND 2018



NOTES: The figure shows the number of low- and middle-income countries with an increasing change point in the prevalence of undernourishment (PoU) occurring in any year between 2010 and 2018, and in correspondence with any one of the three drivers (conflict, climate extremes, or economic slowdowns and downturns). Of the 110 low- and middle-income countries with available information on the PoU, this analysis excludes one country for which the PoU was imputed. The figure shows 60 countries (of 109) with 79 increasing PoU change points in correspondence of one or more drivers. See **Annex 3** for methodology.

SOURCES: PoU based on FAO; conflict data based on Uppsala University. 2021. Uppsala Conflict Data Program (UCDP). In: *UCDP* [online]. Uppsala, Sweden. [Cited 10 June 2021]. ucdp.uu.se; updated drougth provided by EU-JRC using data from the European Commission. 2021. Anomaly Hotspots of Agricultural Production (ASAP). In: *ASAP* [online]. Brussels. [Cited 10 June 2021]. mars.jrc.ec.europa.eu/asap; updated flood provided by UCT using data from Climate Hazards Center of the University of California - Santa Barbara. 2021. CHIRPS: Rainfall estimates from rain gauge and satellite observations. In: *CHIRPS* [online]. Santa Barbara, USA. [Cited 10 June 2021]. www.chc.ucsb.edu/data/chirps; updated heat spells provided by UCT using data from the European Centre for Medium-Range Weather Forecasts (ECMWF). 2021. Datasets. In: *ECMWF* [online]. Reading, United Kingdom. [Cited 10 June 2021]. www.ecmwf.int/en/forecasts/datasets; updated storm data based on Centre for Research on the Epidemiology of Disasters (CRED). 2021. EM-DAT: the international disasters database. In: *EM-DAT* [online]. Brussels. [Cited 10 June 2021]. public.emdat.be; annual per capita GDP based on IMF. 2021. World Economic Outlook Database - April 2021. In: *IMF* [online]. Washington, DC. [Cited 10 June 2021]. www.imf.org/en/Publications/WEO/weo-database/2021/April

» Increases in undernourishment occur in correspondence with conflict, climate extremes and economic downturns

Conflict, climate extremes and economic downturns critically challenge food systems – either through effects on systems supporting food production, food supply changes, food environments or consumer behaviour, or any combination of these – with impacts on food security and nutrition. This is particularly the case where a country's food system is highly vulnerable to the impacts of the drivers and the country has high levels of poverty and inequality but does not have sufficient support in place to counter the fallout.

Although it is difficult to establish a direct causal relationship considering there is limited year-on-year variation in estimated PoU values,[ag] it is possible to examine whether increasing change points in the PoU time series correspond to the occurrence of the drivers. The identification of an increasing change point refers to the statistically significant increase in the PoU for two consecutive years before and after the year of the change point (see **Annex 3** for the methodology). A change point analysis was presented in the 2018 edition of this report for severe drought and in 2019 for economic slowdowns and downturns. Here we update the analysis for the first time to consider conflict, climate extremes, and economic downturns and slowdowns together, which provides further insights on the possible influences of multiple driver events in countries that concurrently experience PoU increases. Because the methodology requires two years before and two years after the year of the point of change, the latest change point that can be estimated is 2018.

The change point analysis of PoU time series presented here covers changes between 2010 and 2018, and within this period identifies the years characterized by increasing undernourishment after years of reduction or stabilization for 109 low- and middle-income countries with available information.[ah] It indicates that among the 109 countries combined, there were 87 increasing PoU change points during this period in 65 low- and middle-income countries. Of these, 79 increasing PoU change points in 60 countries were in correspondence with one or more drivers (conflict, climate extremes, and economic slowdowns and downturns) (Figure 17). This means that more than half of the countries (55 percent) experienced increasing PoU in correspondence with at least one of these drivers during 2010–2018.

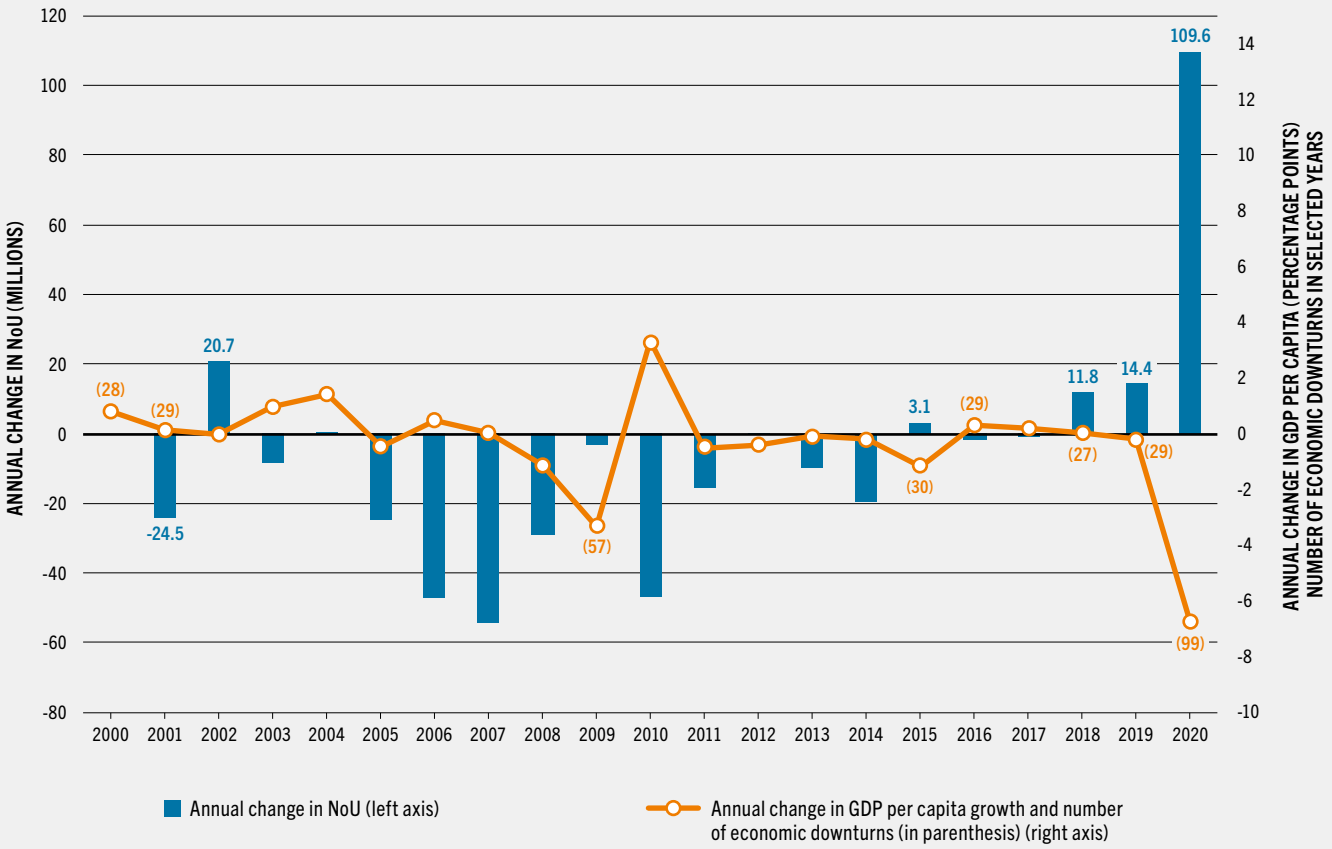
Around 45 percent, or 27 of the 60 countries, experienced an increase in the PoU in correspondence with one driver. Of these countries, most were in correspondence with economic slowdowns or downturns (18 countries), followed by climate extremes (9 countries), while, interestingly, conflict always occurs in combination with other drivers. However, seven of these countries not only experienced an increase in PoU in correspondence with one driver in a given year, but also experienced increases in other years in correspondence with a combination of drivers. As a result, 52 of the 79 PoU increases occurred in correspondence with a combination of drivers (in 40 of the 60 countries): 32 change points in 26 countries with climate extremes and economic slowdowns and downturns, 10 change points in nine countries with all three drivers combined, 5 change points in five countries with conflict and climate extremes, and the remaining 5 change points in five countries with conflict and economic slowdowns and downturns.

As seen from this analysis, there are more PoU increases (79) than there are countries (60), which also means that several countries experienced more than one increase in the PoU during the period 2010–2018. In other words, several countries faced recurring PoU increases during this period. Although most countries (44 of 60) experienced PoU increases while at

ag The PoU is used to monitor progress towards the achievement of SDG Target 2.1. As this indicator changes slowly over time, direct regression with other indicators is inappropriate. However, the PoU change point analysis allows the identification of increasing change points in the prevalence of undernourishment in the years when a subsequent increasing tendency in the PoU time series occurs. Therefore, it is possible to examine when major drivers, such as conflict, climate extremes and/or economic downturns, occur in correspondence with increasing change points in the PoU.

ah Of the 133 low- and middle-income countries analysed in the chapter, information on PoU is available for 110 countries. Furthermore, the PoU change point analysis excludes one country for which the prevalence of undernourishment was imputed. Therefore, the analysis includes 109 countries.

FIGURE 18 THE 2020 INCREASE IN THE NUMBER OF UNDERNOURISHED WAS MORE THAN FIVE TIMES GREATER THAN THE HIGHEST INCREASE IN UNDERNOURISHMENT IN THE LAST TWO DECADES, AND THE ECONOMIC DOWNTURN WAS TWICE AS SEVERE THAN PREVIOUSLY RECORDED IN LOW- AND MIDDLE-INCOME COUNTRIES

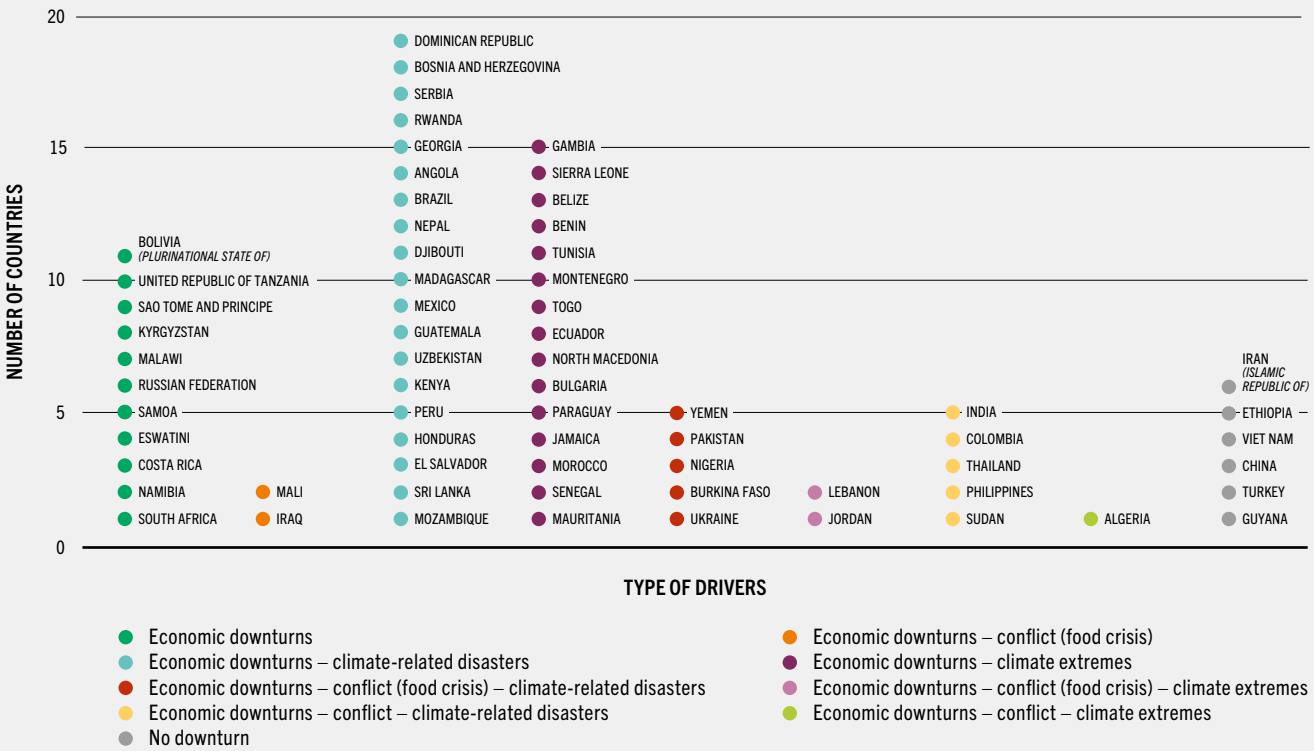


NOTES: The blue bars show the annual change in the number of undernourished people (NoU) between 2000 and 2020 (left axis) in low- and middle-income countries. Selected numbers in correspondence of the blue bars denote the highest annual changes in the NoU. The orange line shows the annual change in GDP per capita growth in the same period (right axis); the number in parenthesis refers to the total number of countries that experienced an economic downturn in selected years. The figure analyses the sample of 107 low- and middle-income countries with information available on NoU and GDP per capita. This sample includes only countries for which official Food Balance Sheets exist. See **Annex 4** for definitions.
SOURCES: FAO for PoU data and annual per capita GDP based on IMF. 2021. World Economic Outlook Database - April 2021. In: *IMF* [online]. Washington, DC. [Cited 10 June 2021]. www.imf.org/en/Publications/WEO/weo-database/2021/April

the same time being affected by one driver or a combination of drivers in a single year, several countries (16) experienced an increase in the PoU in correspondence with any of the drivers for two or three years. In particular, for 13 of the countries, this simultaneous occurrence is recorded for two years; three countries (Democratic Republic of the Congo, Gambia and Lebanon) witnessed it for three years.

Importantly, reoccurring PoU change points are seen where different drivers prevail. Only in 4 of the 16 countries with reoccurring increases in the PoU did these changes coincide with

FIGURE 19 IN 2020, MOST LOW- AND MIDDLE-INCOME COUNTRIES HIT BY ECONOMIC DOWNTURNS EXHIBIT AN INCREASE IN THE PoU, BUT OFTENTIMES ECONOMIC DOWNTURNS OCCUR SIMULTANEOUSLY WITH CLIMATE-RELATED DISASTERS AND CLIMATE EXTREMES



NOTES: Of the 107 low- and middle-income countries with available information on the prevalence of undernourishment (PoU) and GDP per capita, the figure shows 66 countries with an increase in the PoU from 2019 to 2020 that is higher than the increase from 2017 to 2019. Of the 66 countries, 60 have an increase in the PoU along with an economic downturn in 2020. For these countries, the PoU increase in 2020 may occur in correspondence with an economic downturn as well as other drivers: conflict, climate extremes or climate-related disasters. See **Annex 5** for definitions and methodology.
SOURCES: PoU based on FAO; see sources of Figure 17 for data on drivers (conflict, climate extremes and economic downturns); data on climate-related disasters (extreme temperatures, floods, storms) based on Centre for Research on the Epidemiology of Disasters (CRED). 2021. EM-DAT: the international disasters database. In: *EM-DAT* [online]. Brussels. [Cited 10 June 2021]. public.emdat.be; conflict as a primary driver of acute food insecurity in countries in a food crisis situation based on FSIN & Global Network Against Food Crisis. 2021. *Global Report on Food Crises 2021*. Rome. (also available at www.fsinplatform.org/sites/default/files/resources/files/GRFC 2021 050521 med.pdf).

the occurrence of the same driver(s), while the remaining 12 countries experienced different drivers or combinations of drivers. For instance, Côte d'Ivoire, Lebanon and Lesotho first experienced increasing PoU change points in correspondence with economic slowdowns and downturns (in 2010, 2014 and 2013, respectively) and then in combination with climate extremes (Lebanon in 2018, and the other two in 2017).

Similarly, the Democratic Republic of the Congo reported increasing change points in correspondence with all three drivers in two years (2011 and 2017) and with conflict and climate extremes in 2014. Afghanistan also experienced increasing PoU change points in correspondence with all three drivers in 2011, and with conflict and economic slowdowns and downturns in 2014.

While a PoU change point analysis is usually needed to detect statistically significant inflection points and increases in the PoU from year to year, the sharp and unprecedented rise in the PoU from 2019 to 2020 allows for a more direct approach. In this case, it is possible to detect an increase in 2020 by comparing the 2019 to 2020 PoU increase with the increase from 2017 to 2019 (see **Annex 5** for methodology). This approach is applied to examine the 2020 increase in the PoU and whether one or more of the drivers exerted influence at the same time.

The annual change in the number of undernourished people living in low- and middle-income countries was 110 million from 2019 to 2020, far exceeding any single year increase in decades (Figure 18). This unprecedented increase in undernourishment was primarily driven by the equally exceptional economic downturns that hit most countries around the world as a result of the COVID-19 pandemic containment measures (see Box 7). Among low- and middle-income countries, GDP per capita growth declined, on average, by 6.7 percentage points in 2020, which is more than double the severity of the 2009 global financial crisis and economic downturn (Figure 18).[ai] Economic downturns in 2020 also occurred in almost twice as many countries compared with 2009 (99 countries affected by economic downturns in 2020, compared with 57 in 2009).

Most low- and middle-income countries for which there are PoU and GDP per capita data for 2020 (81 of 107) registered an increase in the PoU from 2019 to 2020. The magnitude of this single-year increase in the PoU is higher than the increase from the previous two years in most countries (66 of 81) (Figure 19). Only 15 countries with a PoU increase from 2019 to 2020 did not have an increase higher than the one from 2017 to 2019.

Almost all the low- and middle-income countries with an increase in PoU in 2020 higher than the increase during the previous two years (60 of 66) show this increase amid an economic downturn (Figure 19). Of these, 11 countries show an increase in the PoU occurring with economic downturns only, while for the rest of the countries, the increases occurred under the influence of economic downturns and a combination of other drivers.

The most frequently occurring combination of drivers in 2020 was economic downturns with climate extremes or climate-related disasters (34 of 60) (Figure 19). Most striking is that in most (19) of these 34 countries, the climate impacts were severe, qualifying as medium- and/or large-scale climate-related disasters.[aj] Climate-related disasters have come to dominate the risk landscape to the point where they now account for more than 80 percent of all major internationally reported disasters.[92,93] There were two countries (Iraq and Mali) that had an increase in the PoU and were simultaneously affected by both economic downturns and conflict; both are food crisis countries with high levels of acute food insecurity requiring emergency humanitarian assistance. Thirteen of the 60 countries experienced an economic downturn along with conflict and climate extremes or climate-related disasters; seven of these are food crisis countries with high levels of acute food insecurity that also experienced climate-related disasters (Burkina Faso, Jordan, Lebanon, Nigeria, Pakistan, Ukraine and Yemen). As will be seen in the analysis below, some of the largest increases in the PoU from 2019 and 2020 were seen in countries where economic downturns combined with climate-related disasters, or with food crisis countries with conflict as a primary driver.

Highest levels of food insecurity and malnutrition seen in countries affected by multiple drivers

The extent to which a driver or factor negatively affects people's food security and nutrition depends on their degree of exposure and their vulnerability to its impact. In the analysis that follows, countries are categorized based on whether they are "affected" by a driver or factor, i.e. countries affected by conflict, countries affected by climate extremes, countries affected

ai See trend analysis of economic downturns.

aj Climate-related disasters are based on the Centre for Research on the Epidemiology of Disasters (EM-DAT)[326] datasets of medium- and large-scale disasters and include disasters caused by droughts, floods, extreme temperatures and storms. See EM-DAT for definitions and sources.

BOX 8 DEFINITION OF COUNTRIES AFFECTED BY CONFLICT, CLIMATE EXTREMES, ECONOMIC DOWNTURNS AND WITH HIGH INCOME INEQUALITY

The following definitions are applied to categorize countries affected by a driver (conflict, climate extremes and economic downturns) and with high inequality across 133 low- and middle-income countries. Countries can be categorized as affected by more than one driver (or factor) if they meet the criteria.

Countries affected by conflict are those experiencing conflict that resulted in a significant loss of human life, i.e. that suffered 500 or more battle deaths for at least one of the four subperiods considered in the analysis (2000–2004; 2005–2009; 2010–2014; 2015–2019). This definition includes both aspects of occurrence of conflict, as well as vulnerability in terms of a significant loss of life. As highlighted above, a longer time period is necessary to define countries affected by conflict; because of the changing nature of conflict where even in post-conflict contexts, violence can simply change its form as settings, actors and drivers change, may not disappear when the conflict is seemingly over and conflicts structural impacts can be seen in other locations and years.

Countries affected by climate extremes are those experiencing a combination of high exposure to climate extremes (i.e. drought, flood, heat spell, storm) and vulnerability to climate factors. High exposure is defined as when a country experiences three or four different typologies of climate extremes during 2010–2014 or 2015–2019 (among drought, flood, heat spell, storm), or when any of these extremes occur for at least seven years in the 2010–2019 period. Climate-related vulnerability is identified when at least one of the following conditions occur: i) a country shows a high and statistically significant association between cereal production or imports and at least one climate factor (temperature, precipitation and vegetation growth) during the years 2001–2020; ii) a country is highly dependent on agriculture, measured by 60 percent or more people employed in the agriculture sector in 2019; iii) a country shows an increasing PoU change point in correspondence with a severe drought warning.

Countries affected by economic downturns are those experiencing an economic downturn, coinciding with an increasing PoU change point during any year between 2010 and 2018. This definition captures both the occurrence of an economic downturn, as well as vulnerability in terms of a corresponding increase in undernourishment. Specifically, a PoU change point characterized by an increasing tendency between t-2 and t+2 is identified at time t, and it should occur in correspondence with an economic downturn reported at time t, or at time t-1.

Countries with high income inequality are those countries with a Gini index during 2010–2018 that is higher than the median value of the income inequality distribution.

A further breakdown of this analysis considers all possible combinations of multiple drivers that can affect low- and middle-income countries. Eight mutually exclusive categories of countries are identified.

See **Annex 4** for the methodology and the list of countries affected by different combinations of drivers.

by economic downturns and countries with high inequality. The variables used to define the different categories are provided in Box 8.

In summary, two criteria are used for a country to be categorized as being affected by a driver: (i) evidence of the occurrence of an event related to the driver in a country, for example, the occurrence of a conflict, a climate extreme, or an economic downturn; and (ii) evidence of a vulnerability to the impacts of such an event, which refers to conditions that increase the probability that the occurrence of the driver event will negatively affect the country's food security and nutrition situation.

For example, a country affected by climate extremes is a country where there is evidence of the occurrence of climate extremes over agricultural areas (exposure) and where there is an increased probability that these climate extremes will result in negative outcomes of food insecurity and malnutrition (vulnerability). If both conditions are met, then a country is categorized as a "country affected by climate extremes". A country can be affected by more than one type of driver if it meets the criteria, e.g. a country can be affected by both climate extremes and conflict.

Although there are many vulnerability factors related to each driver, many are problematic to define consistently across countries for a global analysis due to the lack of data and comparability. In this analysis, a small subset of indicators are selected for the analyses that serve as a proxy for best measure of, vulnerability related to the drivers and their relative importance to food security and nutrition, and measurability across the 133 low- and middle-income countries (LMICs).

As seen above, 2020 represents a unique year in that most low- and middle-income countries experienced steep economic downturns. As a result, for that year there is an unusually high number of countries affected by multiple drivers, with economic downturns combed with climate extremes and conflict. For this reason, it is important to separate this analysis and first examine the pre-COVID-19 period.

In the pre-COVID-19 period, most or 70 percent of low- and middle-income countries were affected by at least one of the drivers (93 of 133). Of the 133 low- and middle-income countries, only 40 countries are not affected by any of the three drivers, while most countries are affected by either one driver (52 countries) or a combination of drivers (41 countries). For countries affected by one driver, most are affected by climate extremes (38 countries), followed by conflict (8 countries) and economic downturns (6 countries). Climate extremes are the most common driver affecting countries, either as a single driver or in combination with other drivers (75 countries). Conflict is the second most common driver affecting countries, either as a single driver or in combination with other drivers (40 countries), followed by economic downturns (24 countries). For countries affected by one or more drivers 41 percent also have high income inequality (38 of 93 countries).

For countries affected by multiple drivers, more countries are affected by conflict and climate extremes (23 countries), followed by climate extremes and economic downturns (9 countries). Five countries are affected by all three drivers. See **Annex 4** for a list of countries affected by drivers.

The majority of chronically undernourished people and stunted children live in countries affected by multiple drivers (Figure 20). Moreover, countries affected by multiple drivers also have a significantly higher prevalence of undernourishment and of stunted children. In 2019, the unweighted average of the PoU in countries affected by multiple drivers (17 percent) was 6 percentage points higher than in countries affected by one driver or countries not affected by any driver (Figure 20A).

A salient finding is that most of the hungry people live in countries affected by multiple drivers: 381.4 million of the 650.3 million chronically undernourished globally in 2019 (Figure 20A).

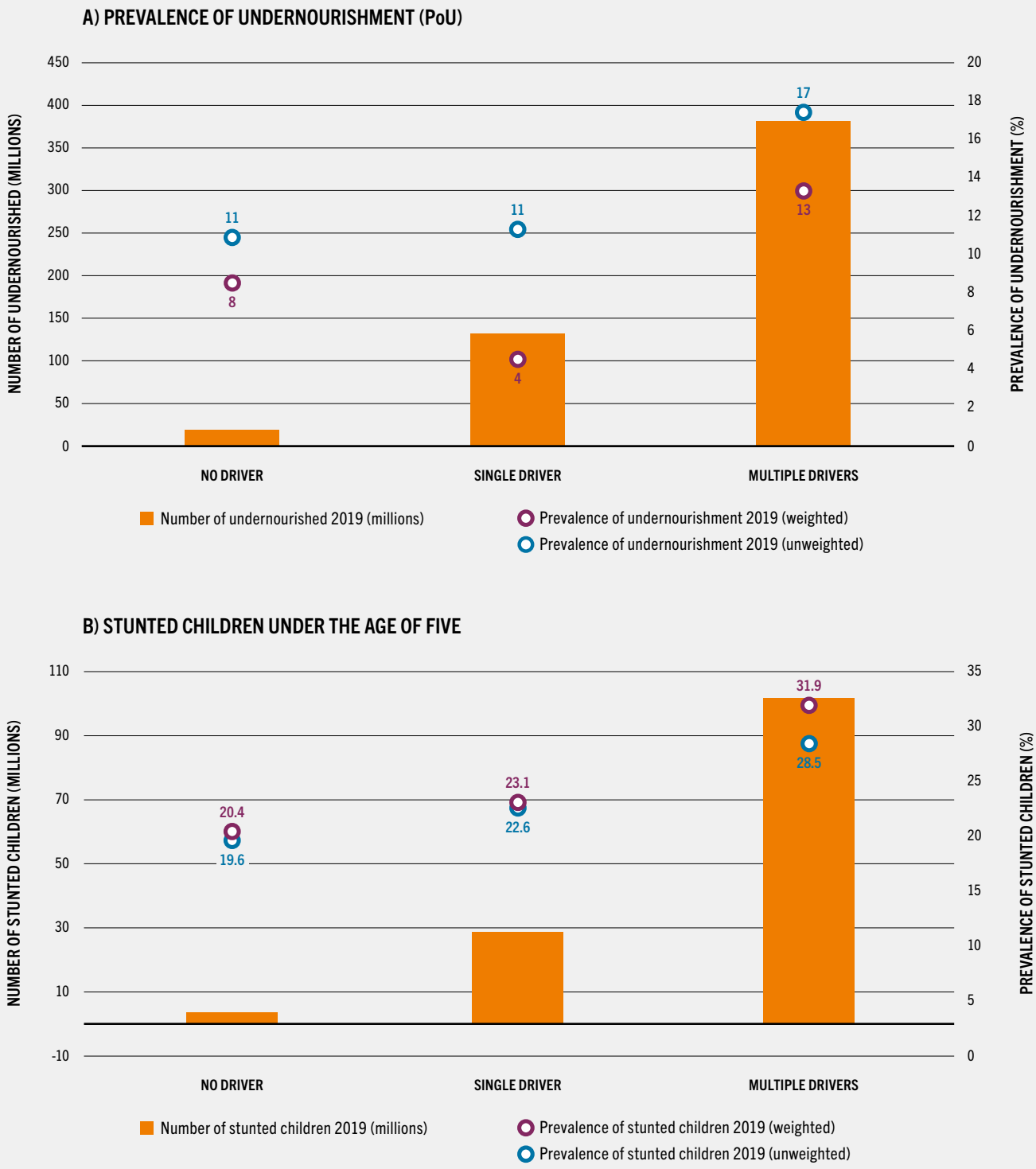
Child stunting shows a similar pattern. In 2019, for countries with available information, the unweighted average prevalence of stunted children in countries affected by a combination of drivers was 6 percentage points higher than in countries affected by one driver only, and 9 percentage points higher than in countries not affected by any driver (28.5, 22.6 and 19.6 percent, respectively) (Figure 20B). Around 130 million, or 90 percent, of the total number of stunted children under the age of five lived in countries affected by one or more drivers (Figure 20B). However, the drivers are not the only influencing factors determining food security and nutrition outcomes in these countries, and a deeper analysis is therefore called for.

If we update the analysis to identify countries affected by the different drivers including year 2020, of 133 low- and middle-income countries, the number of countries not affected by any of the drivers decreases from 40 to only 14 (compared with 2010–2019), while most of the countries (80 countries) are affected by a combination of drivers, and only a few are affected by one driver (39 countries). Climate extremes continue to be the most common driver affecting countries, either as a single driver or in combination with other drivers (104 countries). Economic downturns, however, either as a single or in combination, are the second most common driver affecting countries (72 countries), followed by conflict (40).

Consequently, in 2020, the number of undernourished people who live in low- and middle-income countries affected by multiple drivers increases significantly to more than 585 million people (no figure shown). Countries affected by multiple drivers also have a much higher prevalence of undernourishment in 2020 (16 percent) compared with countries affected by one driver or not affected by any driver (10 and 8 percent, respectively).

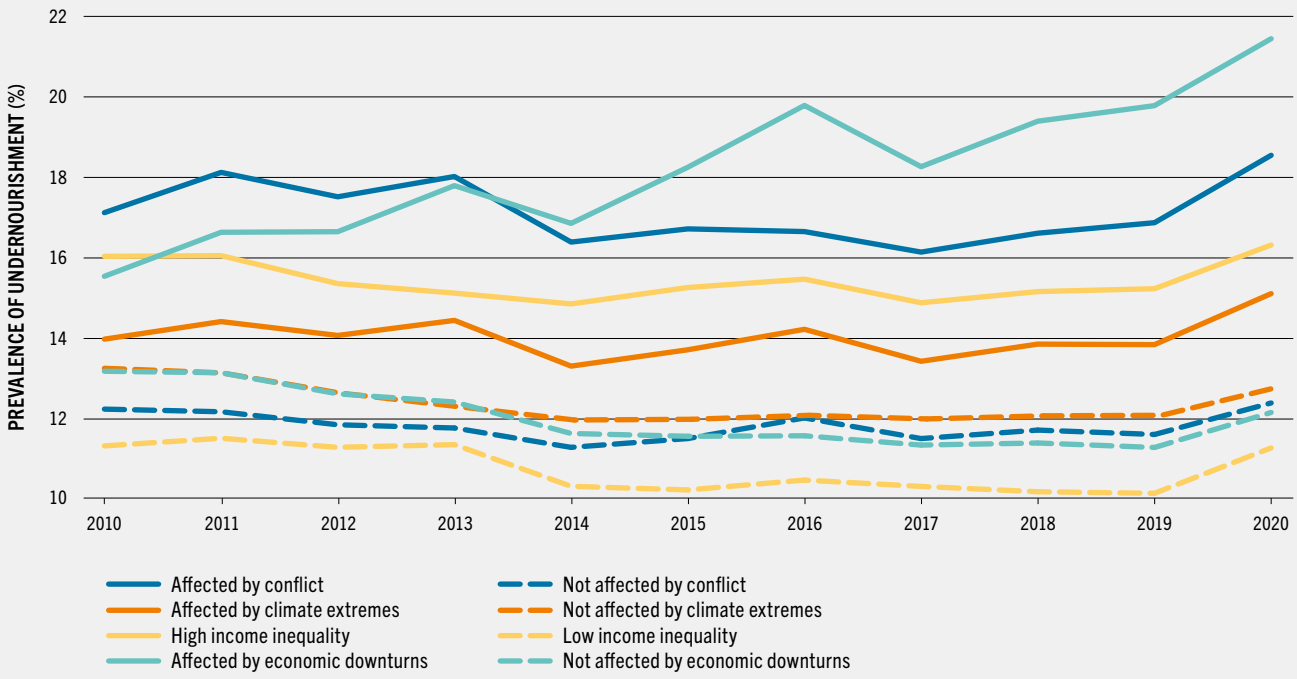
»

FIGURE 20 THE MAJORITY OF UNDERNOURISHED PEOPLE AND STUNTED CHILDREN LIVE IN COUNTRIES AFFECTED BY MULTIPLE DRIVERS (2019)



NOTES: Figure 20A shows the total number (bars) and prevalence of undernourishment (circles), and Figure 20B shows the total number (bars) and prevalence of stunted children (circles) in 2019, for low- and middle-income countries exposed to no driver, a single driver or multiple drivers. The analysis in Figure 20A (PoU) is shown for 110 low- and middle-income countries with available information in 2019, with 29 countries affected by no driver, 45 countries by one driver, and 36 countries by multiple drivers. The analysis in Figure 20B (stunting) is shown for 84 low- and middle-income countries with available information (17 countries affected by no driver, 37 countries by a single driver, and 30 countries by multiple drivers). See **Annex 4** for definitions and methodology of countries affected by multiple drivers.
SOURCES: PoU based on FAO; child stunting data based on UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition; see sources of Figure 17 for data on drivers (conflict, climate extremes and economic downturns).

FIGURE 21 **HUNGER IS HIGHER AND HAS INCREASED MORE IN COUNTRIES AFFECTED BY CONFLICT, CLIMATE EXTREMES OR ECONOMIC DOWNTURNS, OR WITH HIGH INEQUALITY**



NOTES: The figure shows the prevalence of undernourishment between the years 2010 and 2020 for low- and middle-income countries affected by any of the three drivers (conflict, climate extremes or economic downturns), and for countries with high income inequality. PoU estimates are unweighted. The analysis is shown for 110 low- and middle-income countries with available PoU information. See **Annex 4** for definitions and methodology of countries affected by the different drivers.
SOURCES: PoU based on FAO; Gini index of income inequality data based on World Bank. 2021. World Development Indicators. In: *World Bank* [online]. Washington, DC. [Cited 24 April 2020]. datatopics.worldbank.org/world-development-indicators; see sources of Figure 17 for data on drivers (conflict, climate extremes and economic downturns).

» Similarly, in 2020 the highest prevalence of stunting occurred in countries affected by multiple drivers (23 percent), compared with countries affected by one driver or not affected by any driver (18 and 14 percent, respectively). However, child stunting decreased from 24 percent in 2019 to 21 percent in 2020 for low- and middle-income countries.

Hunger increases the most where there is conflict, climate extremes, economic downturns and high income inequality

As shown in the previous chapter, world hunger, as measured by the PoU, reversed course after a long period of decline and began to slowly increase in 2014. Given the reversal in the downward trend and the recent increases in undernourishment, even before the COVID-19 pandemic, it is important to examine trends more closely in low- and middle-income countries affected by conflict, climate extremes and

economic downturns, as well as differences for countries with high income inequality.

This analysis shows that the reversal in the PoU trends in 2014 and the continuous increase (especially pronounced from 2017) is largely attributed to low- and middle-income countries affected by conflict, climate extremes and economic downturns, and to countries with high income inequality (Figure 21). The PoU is higher and has increased more in countries affected by these drivers.

Of the 110 low- and middle-income countries with available information, the largest increase in the PoU is observed in countries affected by economic downturns. The group of countries affected by economic downturns have had increases in the PoU that started as early as 2010, surpassing countries affected by other drivers to have the highest PoU (Figure 21).

Countries affected by conflict exhibit a small but increasing trend in their PoU from 16 to 16.9 percent between 2017 and 2019. Though not shown in Figure 21, the PoU is even higher and with greater increases in countries where conflict is compounded by protracted crisis. During the years 2010–2019, countries in protracted crises reported the highest PoU at an average level of 30 percent, with an increase of 1.5 percentage points between 2017 and 2019 (from 28.7 to 30.2 percent).

It is strikingly clear from Figure 21 that 2020 represents a clear departure from previous years, as surges in the PoU are seen across all low- and middle-income countries. As seen earlier, the economic downturns resulting from the COVID-19 pandemic and its containment measures delivered the hardest blow in decades to world hunger, contributing to a sharp and significant increase in undernourishment in a single year.

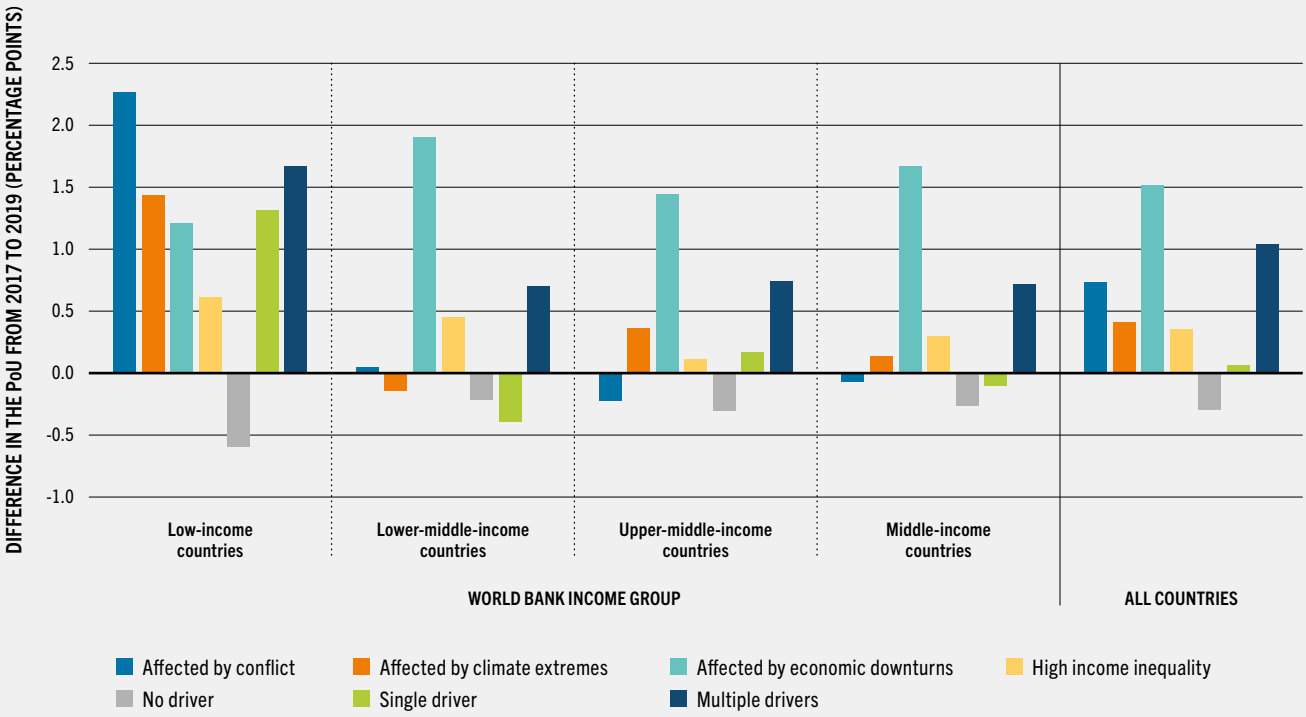
There are also important differences in trends depending on whether a country is affected by more than one driver (multiple drivers) and depending on the country income group (Figure 22). Focusing on the most recent period of increase before the COVID-19 pandemic, between 2017 and 2019, low- and middle-income countries affected by one or more of the drivers show an increase in the PoU of 4 percent, while countries not affected by any driver show a decreaseof 3 percent. Overall, between 2017 and 2019, countries affected by multiple drivers exhibit the highest increases in the PoU (6 percent), which is 12 times larger than those in countries affected by only a single driver (0.5 percent).

Considering all low- and middle-income countries, 24 of the countries affected by economic downturns show the largest increase in PoU (1.5 percentage points), while 36 countries affected by multiple drivers show the second largest increase (1.0 percentage point) (Figure 22). This compares with a 0.1 percentage point increase for the 45 countries affected by a single driver, and a 0.3 percentage point reduction for the 29 countries not affected by any driver.

A further breakdown of this analysis considers all possible combinations of multiple drivers that can affect low- and middle-income countries. Given 110 countries with available information on undernourishment, eight mutually exclusive groups are created. Figure A4.1 shows countries grouped by the eight categories denoting different combinations of drivers and Table A4.1 provides the country list. The largest increases in the PoU (not shown in figure) are seen by the nine countries affected by both climate extremes and economic downturns, with a 2.1 percentage point increase during 2017–2019, followed by the five countries affected by all three drivers, which feature an increase of 2 percentage points (Afghanistan, Central African Republic, Democratic Republic of the Congo, Nigeria and Yemen). Countries experiencing the combination of conflict and climate extremes (18 countries) or conflict and economic downturns (4 countries), feature a 0.4 and a 0.5 percentage point increase in the PoU, respectively.

Between 2017 and 2019, low-income countries affected by the drivers show the largest increase in the PoU (from 30.8 to 32.4 percent), which is 2.5 times higher than to the increase reported by middle-income countries affected by the drivers over the same period (from 8.9 to 9.1 percent) (Figure 22). Specifically, there is a 1.6 percentage point PoU increase in low-income countries, which is higher than the 0.2 percentage point PoU increase for middle-income-countries (no

FIGURE 22 LOW-INCOME COUNTRIES AFFECTED BY CONFLICT AND CLIMATE EXTREMES SHOW THE LARGEST INCREASE IN THE PoU, WHILE FOR MIDDLE-INCOME COUNTRIES, THE LARGEST INCREASE OCCURS DURING ECONOMIC DOWNTURNS



NOTES: The figure shows the difference in the PoU, measured in percentage points, from 2017 to 2019 for low- and middle-income countries affected by conflict, climate extremes and economic downturns, and for countries with high income inequality. The figure also shows the difference in the PoU by different combinations of drivers (no driver, single, multiple drivers). The analysis is shown by country income group for a sample of 110 low- and middle-income countries with available PoU information. See **Annex 4** for definitions and methodology.
SOURCES: PoU based on FAO; Gini index of income inequality data based on World Bank. 2021. World Development Indicators. In: *World Bank* [online]. Washington, DC. [Cited 24 April 2020]. datatopics.worldbank.org/world-development-indicators; see sources of Figure 17 for data on drivers (conflict, climate extremes and economic downturns).

increase for lower-middle-income countries and 0.4 for upper-middle-income countries). Low-income countries also feature high increases across all three drivers, as well as when affected by a single driver or multiple drivers. Low-income countries affected by conflict (11 countries) and climate extremes (14 countries) feature increases that are, respectively, 2.3 and 1.4 percentage points, which are higher compared with middle-income countries affected by these drivers (Figure 22). Furthermore, the 2.3 percentage point increase in low-income countries affected by conflict is higher also compared with low-income countries not affected by conflict (no increase in the PoU).

In contrast with low-income countries, increases in the PoU among middle-income countries during this period are primarily seen for countries affected by economic downturns and multiple drivers (Figure 22). Middle-income countries affected by economic downturns (16 countries) feature a 1.7 percentage point increase in the PoU, compared with middle-income

countries not affected by economic downturns (74), which show a 0.3 percentage point reduction. Of these, 8 lower-middle-income countries had a 1.9 percentage point increase, and 8 upper-middle-income countries had a 1.4 percentage point increase.

High income inequality is also a factor in the PoU increases during this period, especially in middle-income countries. Middle-income countries with high income inequality (39 countries) have a higher increase in the PoU than middle-income-countries without high income inequality. Specifically, the former had a 0.3 percentage point increase, and the latter a 0.3 percentage point reduction. Furthermore, considering middle-income countries affected by one or more drivers, they show a 2 percent increase in the PoU between 2017 and 2019, while those with the additional burden of high income inequality had a double increase in the PoU (4 percent).

In contrast to recent trends in the prevalence of undernourishment, the prevalence of child stunting shows a continuing declining trend from 2017 to 2019. However, an analysis of child stunting for countries affected by conflict, climate extremes and economic downturns, as well as differences for countries with high income inequality, did not reveal any notable patterns, indicating the presence of other stronger drivers behind these trends. Similarly, while there is an increase in adult obesity from 2012 to 2016 that is observed across low- and middle-income countries, the analysis indicates that this increasing trend is driven by structural factors related to the economic development of a country and associated changes in food environments, rather than by contingencies related to the drivers. In fact, the increase in adult obesity is correlated with country income level and with the nutrition transition that often accompanies economic development. Indeed, middle-income countries feature a statistically significant higher increase than low-income countries (1.9 compared with 1.4 percentage points), with the highest increase reported by upper-middle-income countries (2.1 percentage points).

Regional differences in drivers and impacts on food security and nutrition

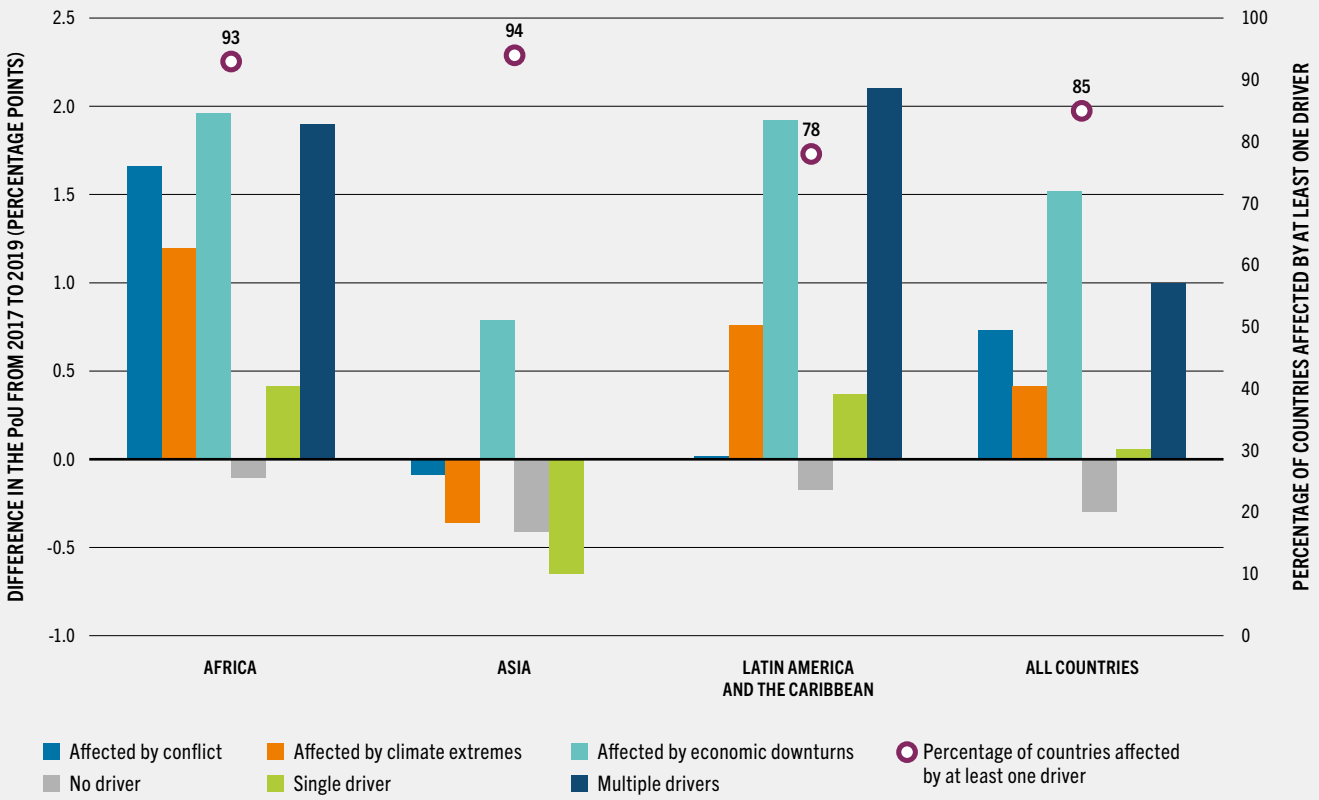
A regional analysis shows differences in trends related to the different drivers. The analysis in this section focuses on low- and middle-income countries in Africa, Asia, and Latin America and the Caribbean. These are the three regions of the world where most of the undernourished people and stunted children are located and where there are sufficient data for analysis. We first analyse the period 2017–2019, followed by a focused look at 2020.

In the period 2017–2019, for all three regions analysed, around 78 percent of low- and middle-income countries are affected by at least one of the three drivers (conflict, climate extremes and economic downturns) (Figure 23). Of these countries, 45 percent (33 of 74 countries) also have high income inequality, which worsens the impact of these drivers. There is a 0.6 percentage point increase in the PoU between 2017 and 2019 for countries affected by drivers with high income inequality (not shown in the figure), compared with a slight decrease in the PoU for countries affected by drivers but with low income inequality. Of the 44 countries from these regions that have high income inequality, 26 are located in Africa, 5 in Asia, and 13 in Latin America and the Caribbean.[ak]

Countries affected by economic downturns in Africa, Asia, and Latin America and the Caribbean show the highest PoU increase from 2017 to 2019, compared with countries affected by climate extremes or conflict (Figure 23). The largest increase is seen in Africa and Latin America and the Caribbean (2 percentage points). Africa is the only region where a surge in PoU is associated with all three major drivers. Of the 24 countries affected by economic downturns, 11 are in Africa (27 percent of countries), 6 in Asia (19 percent of countries) and 5 in Latin America and the Caribbean (22 percent of countries). There are also countries outside these regions affected by economic downturns but not shown in the figure: two in Oceania.

ak There are also low- and middle-income countries in two other regions, but these are not included in the analysis due to limited number of countries and data on drivers for these countries. There are three countries outside the three regions analysed with high income inequality, of which two are in North America and Europe, and one in Oceania.

FIGURE 23 LATIN AMERICA AND THE CARIBBEAN FEATURE THE HIGHEST INCREASE IN THE PoU FROM MULTIPLE DRIVERS, WHILE AFRICA IS THE ONLY REGION WHERE THE PoU INCREASED UNDER THE INFLUENCE OF ALL THREE DRIVERS FROM 2017 TO 2019



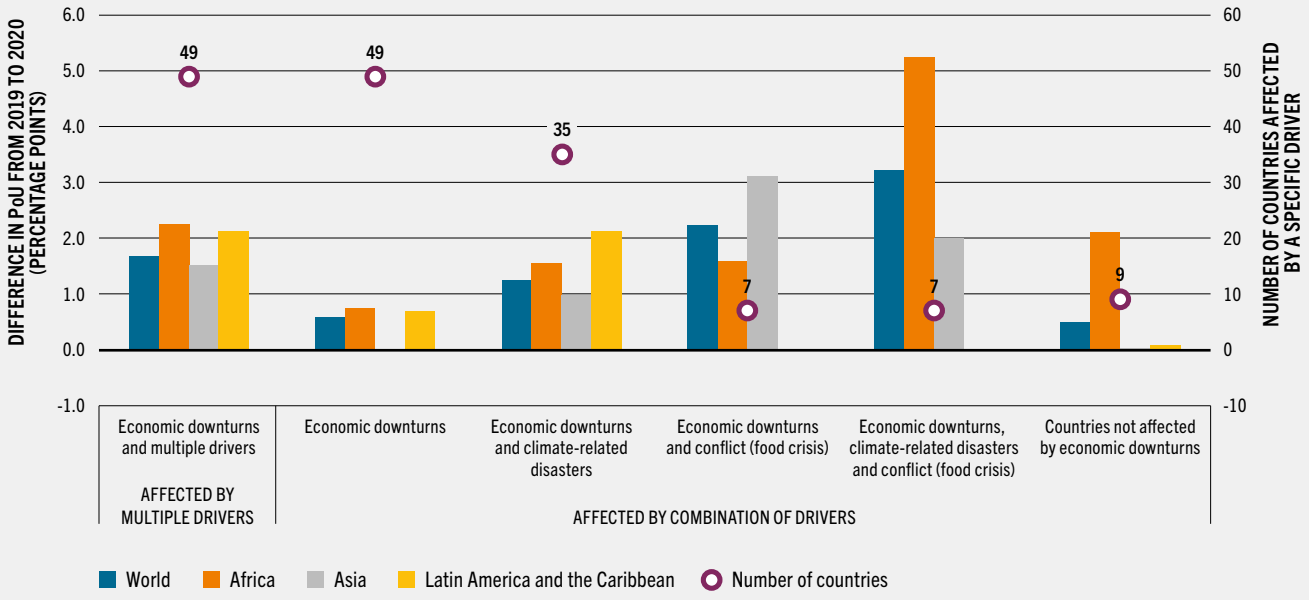
NOTES: In the figure, the left axis shows the difference in the PoU, measured in percentage points, from 2017 to 2019 for all low- and middle-income countries affected by conflict, climate extremes and economic downturns, and for each selected region (bars). The right axis shows the percentage of countries that were exposed to at least one driver in each region compared with all countries in the region (circles). The analysis is shown for a sample of 110 low- and middle-income countries with available PoU information. See **Annexes 3** and **4** for definitions and methodology.
SOURCES: PoU based on FAO; see sources of Figure 17 for data on drivers (conflict, climate extremes and economic downturns).

Climate extremes are an important driver in Africa, with countries affected by climate extremes in this region showing a 1.2 percentage point PoU increase from 2017 to 2019, whereas Asia reports a 0.4 percentage point reduction (Figure 23). There are 21 countries in Africa affected by climate extremes (51 percent of countries) and 24 countries in Asia (77 percent of countries).

Countries affected by conflict in Africa show a 1.7 percentage point increase in the PoU during 2017–2019 (Figure 23). In contrast, the one country affected by conflict in Latin America and the Caribbean (Colombia) shows no increase in the PoU.

Africa is the only region with PoU increases from 2017 to 2019 associated with all three drivers (conflict, climate extremes and economic downturns) (Figure 23). Moreover, countries affected by conflict and climate extremes in Africa show a higher increase in the PoU

FIGURE 24 IN 2020, AFRICA, ASIA, AND LATIN AMERICA AND THE CARIBBEAN WITNESSED SIGNIFICANT INCREASES IN THE PoU WHILE BEING HIT BY ECONOMIC DOWNTURNS COMBINED WITH CLIMATE-RELATED DISASTERS, CONFLICT, OR A COMBINATION OF BOTH



NOTES: In the figure, the left axis shows the difference in the PoU, measured in percentage points, from 2019 to 2020 in each selected region, and for all low- and middle-income countries affected by economic downturns, and by specific combinations of economic downturns with other drivers (bars). The right axis shows the number of low- and middle-income countries that were exposed to each combination of drivers (circles). The analysis is shown for a sample of 107 low- and middle-income countries with available information on PoU and GDP per capita growth in 2020. See **Annex 5** for definitions and methodology.
SOURCES: PoU based on FAO; conflict data based on Uppsala University. 2021. Uppsala Conflict Data Program (UCDP). In: *UCDP* [online]. Uppsala, Sweden. [Cited 10 June 2021]. ucdp.uu.se; climate-related disasters (extreme temperatures, flooding, storms) data based on Centre for Research on the Epidemiology of Disasters (CRED). 2021. EM-DAT: the international disasters database. In: *EM-DAT* [online]. Brussels. [Cited 10 June 2021]. public.emdat.be; annual per capita GDP based on IMF. 2021. World Economic Outlook Database - April 2021. In: *IMF* [online]. Washington, DC. [Cited 10 June 2021]. www.imf.org/en/Publications/WEO/weo-database/2021/April; conflict as a primary driver of acute food insecurity in countries in a food crisis situation based on FSIN & Global Network Against Food Crisis. 2021. *Global Report on Food Crises 2021*. Rome. (also available at www.fsinplatform.org/sites/default/files/resources/files/GRFC 2021 050521 med.pdf).

compared with countries affected by the same drivers in Asia and Latin America and the Caribbean. Interesting differences in the change in the PoU from 2017 to 2019 are found within the regions. African countries affected by conflict and economic downturns show higher increases in the PoU than African countries not affected by the same drivers (the latter show a small increase around 0.3–0.4 percentage point). Similarly, countries affected by economic downturns in Asia and Latin America and the Caribbean have higher PoU increases than countries not affected by this driver, which show a 0.6 percentage point reduction in Asia, and a 0.2 percentage point increase in Latin America and the Caribbean.

The highest increase in the PoU, a 2.1 percentage point increase, is observed in countries affected by multiple drivers in Latin America and the Caribbean (Figure 23). Africa also registered very high increases in the PoU for countries affected by multiple drivers (1.9 percentage point increase). The most frequent combination of drivers in Africa is conflict and climate extremes (five countries). In Latin America and the

Caribbean, four countries are affected by multiple drivers: three by climate extremes and economic downturns, and one by conflict and climate extremes (Colombia).

Countries affected by multiple drivers (one or more of the drivers) consistently show among the highest PoU increases during 2017–2019. In this period, for all three regions analysed (Africa, Asia, and Latin America and the Caribbean), around 36 percent of low- and middle-income countries were affected by multiple drivers, of which 15 are in Africa, 15 in Asia and 4 in Latin America and the Caribbean. Countries affected by multiple drivers show a 1.9 percentage point increase in Africa and a 2.1 percentage point increase in Latin America and the Caribbean, and no increase in Asia (Figure 23). On the other hand, while almost half the countries affected by drivers experience multiple drivers in Asia, during this period, it is only countries affected by economic downturns that show an increase in the PoU.

In 2020, all low- and middle-income countries with available information were affected by economic downturns, with the exception of nine countries (Bangladesh, China, Egypt, Ethiopia, Guyana, Iran, Myanmar, Turkey and Viet Nam). Guyana, for instance, grew at a rate of 43.5 percent in 2020, having completed an extraordinary year of oil production. Similarly, Iran's GDP grew by 8 percentage points in 2020, due to favourable oil revenues in the second half of the year.

Figure 24 shows PoU increases for economic downturns and various combinations with other drivers in 2020. When economic downturns occur along with other drivers (either climate-related disasters, conflict, or a combination of both), the largest PoU increase is seen in Africa (5.2 percentage points), followed by Asia (3.1 percentage points). Of the 49 countries affected by multiple drivers, 16 are in Africa (16 of 41 African countries), 18 are in Asia (18 of 30 Asian countries), 8 are in Latin America and the Caribbean (8 of 21 countries in Latin America and the Caribbean), and the remaining 7 countries in North America and Europe and Oceania. Of the 7, 3 countries are in North America and Europe (3 of 9) and 4 countries in Oceania (4 of 6).

There are many countries (49 of the 107 countries) with an increase in the PoU in 2020 that were affected only by the single driver of economic downturns, but the PoU increase on average, was much smaller than the increase in countries affected by economic downturns combined with other drivers (Figure 24). On average at the world level, the increase was 1.1 percentage point lower, and 1.5 percentage points lower for both Africa and Asia.

Economic downturns combined with climate-related disasters affected 35 countries and led to significant increases in the PoU in all three regions (Figure 24). The largest increase is seen in Latin America and the Caribbean (2.1 percentage points), followed by Africa (1.6 percentage points) and Asia (1 percentage point). Of the 35 countries, 9 are in Africa (9 of 41 African countries), 12 are in Asia (12 of 30 Asian countries) and 8 are in Latin America and the Caribbean (8 of 21 countries in that region).

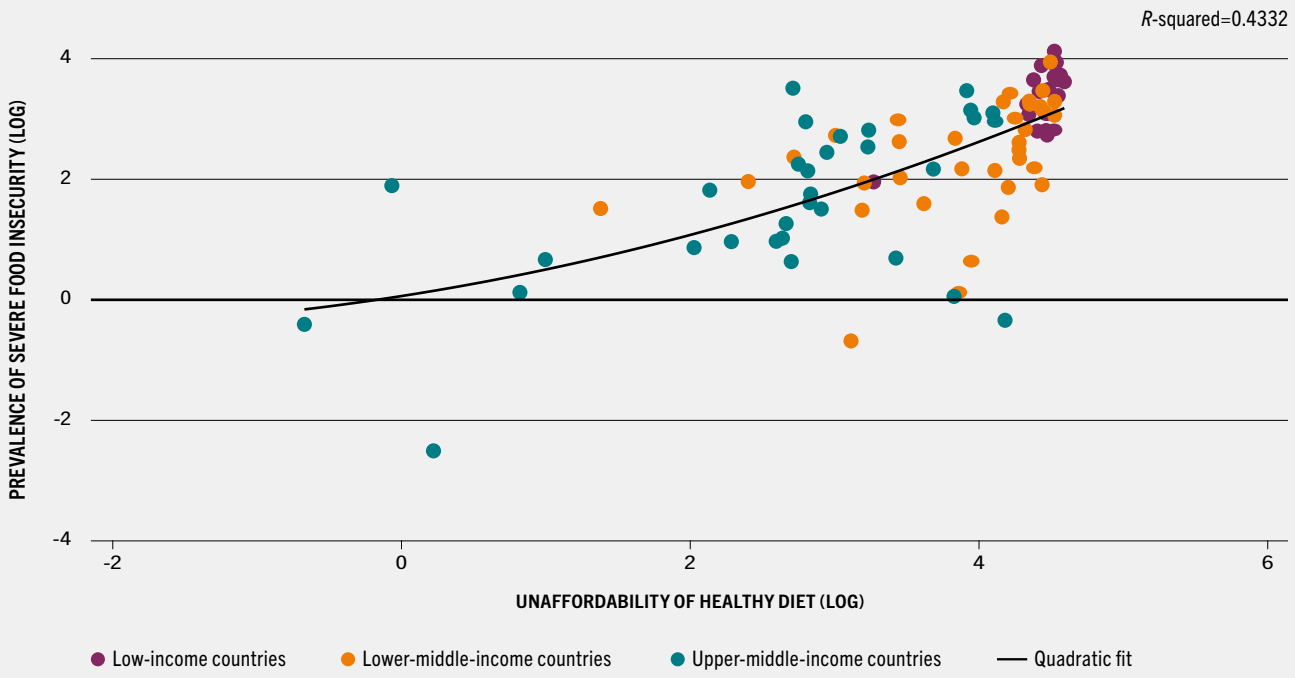
In 2020, countries affected by conflict combined with other drivers had a high PoU increase. Countries in Africa affected by all three drivers of economic downturns, climate-related disasters and conflict show the highest increase in the PoU (5.2 percentage points), while countries in Asia affected by economic downturns and conflict show the second highest increase (3.1 percentage points).

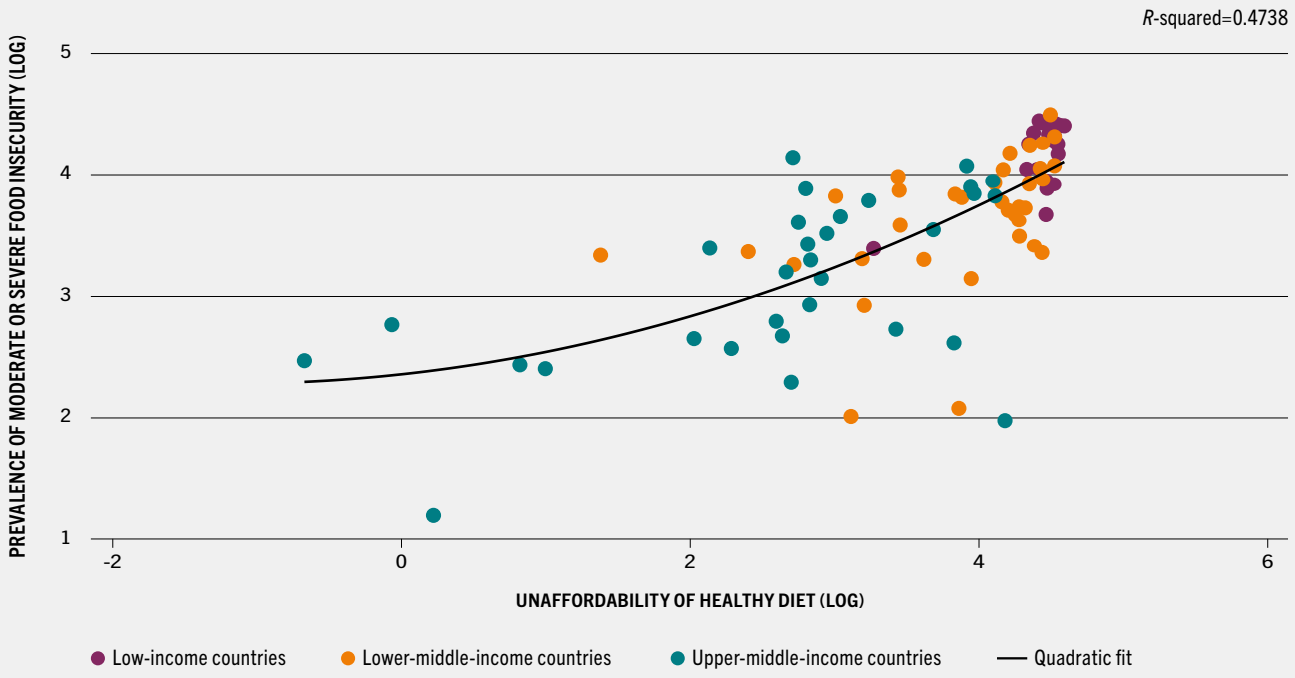
Increasing unaffordability of healthy diets is strongly associated with severe and moderate forms of food insecurity

FAO has begun to systematically monitor the cost and affordability of healthy diets around the world in this report. The new 2019 estimates presented in Chapter 2 provide an important opportunity to better understand how these are related to food insecurity, and how changes over time affect food insecurity and the different forms of malnutrition.

In last year's edition of this report, it was shown that the unaffordability of healthy diets in 2017 was strongly associated with undernourishment and different forms of malnutrition, including child stunting and adult obesity. These results are reconfirmed »

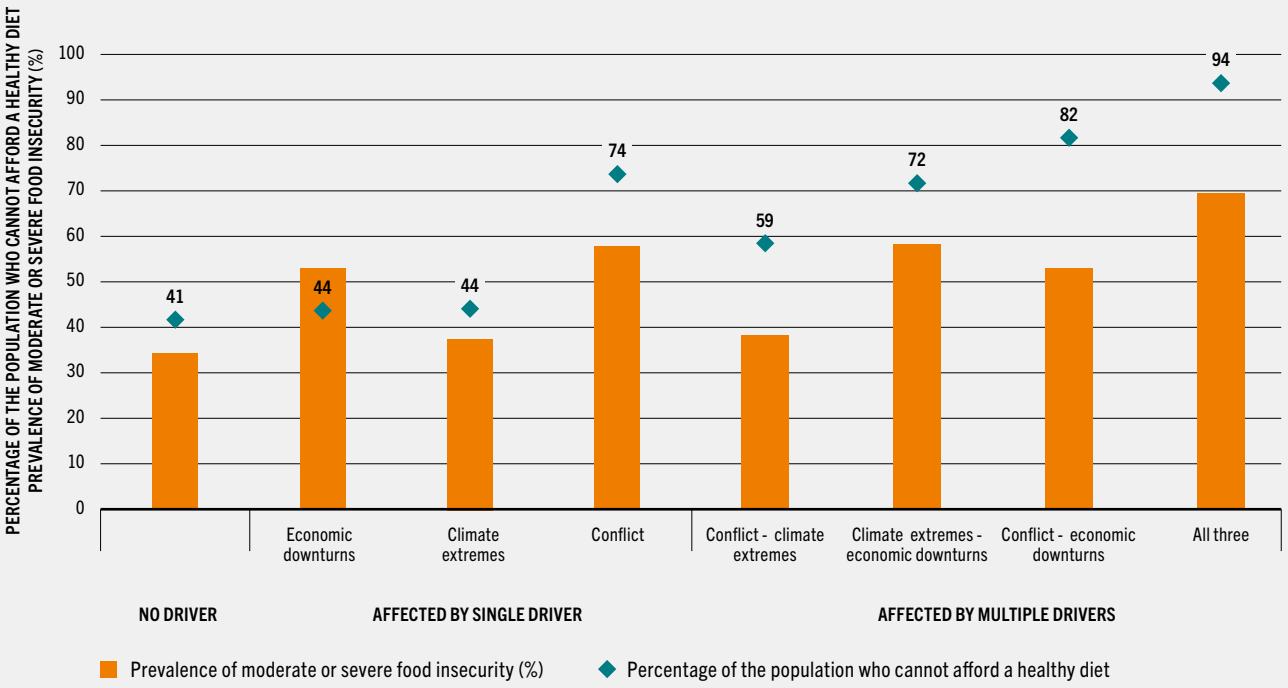
FIGURE 25 THE UNAFFORDABILITY OF HEALTHY DIETS IN 2019 IS STRONGLY ASSOCIATED WITH HIGHER LEVELS OF BOTH SEVERE AND MODERATE OR SEVERE FOOD INSECURITY





NOTES: The figure shows simple regression analyses by country income group between the prevalence of severe food insecurity and the unaffordability of a healthy diet (top), and between the prevalence of moderate or severe food insecurity and the unaffordability of a healthy diet (bottom). The unaffordability of a healthy diet (horizontal axis) identifies the percentage of the population in a country that cannot afford a healthy diet in 2019. Higher values on the horizontal axis reflect higher levels of food insecurity on the vertical axes. All variables are expressed in logarithms. The *R*-squared denotes the percent of the variance in the variable on the vertical axes explained by unaffordability of the healthy diet. The analysis is shown for 86 low- and middle-income countries with available information on both unaffordability and food insecurity. See **Annex 2** for definitions and methodology.
SOURCES: FAO for severe food insecurity and moderate or severe food insecurity indicators based on the FIES, and for unaffordability of healthy diets.

FIGURE 26 IN 2019, COUNTRIES AFFECTED BY MULTIPLE DRIVERS AND COUNTRIES AFFECTED BY CONFLICT (ALONE OR COMBINED WITH OTHER DRIVERS) EXHIBITED AMONG THE HIGHEST PERCENTAGE OF THE POPULATION WHO CANNOT AFFORD A HEALTHY DIET AND ARE MODERATELY OR SEVERELY FOOD INSECURE



NOTES: The figure shows the percentage of the population who cannot afford a healthy diet (blue diamonds) and the percentage of the population with moderate or severe food insecurity (orange bars). Both indicators are shown for the year 2019 and for all possible combinations of drivers. The analysis is shown for 100 low- and middle-income countries with available information on unaffordability of a healthy diet, and for 88 countries with available information on moderate or severe food insecurity. See **Annexes 2** and **4** for definitions and methodology.
SOURCES: FAO for moderate or severe food insecurity indicator based on the FIES, and for unaffordability of healthy diets. See sources of Figure 17 for data on drivers (conflict, climate extremes and economic downturns).

» this year by an analysis of estimates for 2019, which shows that high levels of unaffordability of healthy diets are strongly correlated with high levels of both severe and moderate or severe food insecurity, as measured by the FIES (Figure 25). As expected, the lower the income of the country, the higher the levels of both unaffordability of healthy diets and severe and moderate or severe forms of food insecurity.

Looking at the intersection between the percentage of the population that cannot afford a healthy diet, the percentage of the population who are moderately or severely food insecure, and whether or not these populations live in countries affected by drivers reveals interesting patterns (Figure 26). In countries affected by one or more drivers, on average, the percentage of the population who are moderately or severely food insecure is almost 10 percentage points higher (44 percent) than that of countries not affected by any driver (34 percent). Moreover, a larger percentage of the population cannot afford a healthy diet (57 percent) compared with the percentage in countries not affected by any driver (41 percent). Countries affected

by multiple drivers exhibit the highest levels of unaffordability (68 percent), which is, on average, 39 percent higher than countries affected by a single driver and 66 percent higher than countries not affected by any driver. Those countries also show higher levels of moderate or severe food insecurity (47 percent), 12 percent higher than countries affected by a single driver (42 percent) and 38 percent more than countries not affected by any driver (34 percent).

Countries affected by conflict have among the highest levels of moderate or severe food insecurity and unaffordability of healthy diets in 2019, irrespective of whether they are affected by conflict alone, or by conflict in combination with other drivers. The only exception is countries affected by conflict in combination with climate extremes, which have a lower level of moderate or severe food insecurity than countries affected by climate extremes combined with economic downturns (Figure 26). The few countries that were affected by all three drivers of conflict, climate extremes and economic downturns show the highest levels of unaffordability (94 percent of their population) and moderate or severe food insecurity (69 percent of their population).

Importantly, we now have the first opportunity to extend the analysis and look at the relationship between the change in the unaffordability of healthy diets, comparing 2017 and 2019 data, and the levels of food insecurity as measured by the two FIES-based indicators. Even though, at the global level, the total number of people who cannot afford a healthy diet in 2019 is slightly lower than the 2017 estimate published in last year's report, in several regions, the number actually increased (see Chapter 2, Table 5). Latin America and the Caribbean registered the largest increase (8.4 percent), with even higher subregional increases for Latin America (9.7 percent) and South America (14.3 percent). High increases were also registered in Africa (5.4 percent), notably in Middle Africa (6.8 percent) and Western Africa (5.9 percent). There is sufficient variability with both increases and decreases across countries with respect to the total number of people who cannot afford a healthy diet between 2017 and 2019. However, severe food insecurity and moderate or severe food insecurity, as measured using the FIES, do not show such variability in such a short period of time, so this analysis uses their levels for 2019, rather than their 2017–2019 change.[al]

The analysis shows (not presented graphically here) that there is a positive correlation between the 2017–2019 change in the number of people who cannot afford a healthy diet, for both moderate or severe food insecurity, and severe food insecurity in 2019. While the former variable may not explain much of the variability in the FIES-based indicators given a low coefficient of determination (*R*-squared of around 0.06), the correlation is statistically significant.

Thus, countries where the unaffordability of a healthy diet increased between 2017 and 2019 also show higher levels of food insecurity (both severe and moderate or severe). Further descriptive statistics and tests of significance suggest that this positive association is attributable mainly to lower-middle-income countries.

FAO has only begun to systematically monitor the cost and affordability of healthy diets. Therefore, it is expected that, as more data points over time become available, the capacity to analyse and better understand how changes in the cost and affordability of healthy diets affect food insecurity and the different forms of malnutrition will significantly improve. Furthermore, a systematic price collection of the key food items that form healthy diets will allow to build a healthy food basket populated with country-relevant food items that can be compared across countries while capturing local realities at the same time. ■

al An analysis was attempted to correlate the variation in the unaffordability of healthy diets from 2017 to 2019, and the variation in the levels of food insecurity as measured by the FIES-based indicators in the same period. However, due to the lack of variation in the data of the latter, the results did not turn out to be statistically significant. Although variation may be higher for specific subregions or countries, at the global level, both FIES-based indicators changed on average only by around 1 percentage point from 2017 to 2019, compared with a 3.6 percentage point change in the unaffordability variable.

AFGHANISTAN
Vendors carry onions to sell at a market in Herat.
©FAO/Farshad Usyan

CHAPTER 4
WHAT NEEDS TO BE DONE TO TRANSFORM FOOD SYSTEMS FOR FOOD SECURITY, IMPROVED NUTRITION AND AFFORDABLE HEALTHY DIETS?

KEY MESSAGES

➔ When transformed with greater resilience to major drivers, food systems can provide affordable healthy diets that are sustainable and inclusive, and become a powerful driving force towards ending hunger, food insecurity and malnutrition in all its forms.

➔ In conflict-affected areas, maintaining conflict-sensitive food systems functions to the extent possible, while aligning actions for immediate humanitarian assistance to protect lives and livelihoods, long-term development and sustaining peace, is key to building resilience of the most vulnerable in these areas.

➔ Innovative mechanisms to reduce climate-related risks, widespread adoption of climate-smart and environmentally sound production techniques, and the conservation and rehabilitation of natural environments will strengthen the resilience of food systems against increased climate variability and extremes.

➔ The economic fallout from the COVID-19 pandemic has demonstrated that during economic slowdowns and downturns, it is critical to keep food supply chains operational, while providing adequate support to the livelihoods of the most vulnerable, ensuring continued production and access to nutritious foods, including through enhanced social protection programmes.

➔ The persistence of socio-economic inequalities amplifies the need for systemic changes in food systems to provide vulnerable and historically marginalized populations with greater access to productive resources, technology, data and innovation to empower them to become agents of change towards more sustainable food systems.

➔ Comprehensive policies aimed at both the food and natural environments, reinforced by regulations and legislation, can result in behavioural changes along the food supply chain and among consumers, thus shifting dietary patterns to the benefit of human health and the environment.

➔ Coherence in the formulation and implementation of policies and investments among agri-food, health, social protection and environmental systems is essential to build on synergies towards more efficient and effective food systems solutions to deliver affordable healthy diets for all.

➔ Effective and inclusive governance mechanisms and institutions, in addition to access to technology, data and innovation, should serve as important accelerators in the comprehensive portfolios of policies, investments and legislation aimed at transforming food systems to increase the affordability of healthy diets.

➔ Given that food systems are affected by more than one driver, and also impact on food security and nutrition outcomes in multiple ways, comprehensive portfolios of context-specific policies, investments and legislation should be formulated to maximize their combined effects on food systems transformation, while recognizing that financial resources are limited.

➔ Systems approaches that contribute to win-win solutions and help manage trade-offs are needed to build coherent portfolios of policies, investments and legislation; these include territorial approaches, ecosystems approaches, Indigenous Peoples' food systems approaches and coordinated policy actions under protracted crisis conditions, complementing peacebuilding efforts.

Global calls for action towards food systems transformation

Over the past several decades, food systems have delivered a wide variety of foods needed to feed a fast-growing and more urbanized world population. But many of these food systems have not succeeded in providing safe and nutritious foods to nourish the entire world's population adequately, as nearly three billion people could not even afford a healthy diet before the onset of the COVID-19 pandemic. Moreover, a growing proportion of the world's population now consumes diets containing highly processed energy-dense foods and beverages high in fats, sugars and/or salt.[94]

The inability of food systems to provide households with adequate access to nutritious foods that contribute to healthy diets – especially in the aftermath of containment measures aimed at stemming the still ongoing COVID-19 pandemic – has amplified the call for a transformation of food systems[7] to make healthy diets available and affordable to all. The urgent need for this transformation has become central to a global debate aimed at addressing some of the greatest challenges to sustainable development, specifically the challenge of ending hunger, food insecurity and malnutrition in all its forms by 2030. Three global summits to be held during the course of 2021 will address issues central to this debate, including the UN Food Systems Summit in New York (and the Pre-Summit held in Rome), the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow, and the Tokyo Nutrition for Growth Summit.

As already shown in Chapter 3, a number of major drivers, through their impact on food systems, have had increasingly negative effects on food security and nutrition outcomes worldwide. Major drivers include conflict, climate variability and extremes, and economic slowdowns and downturns, whose impacts are intensified by poverty and inequality. In spite of these challenges, if food systems are transformed[am] with greater resilience to the identified drivers, and incentives are put in place for food systems to provide affordable healthy diets sustainably and inclusively, they can become a powerful driving force towards ending hunger, food insecurity and malnutrition in all its forms – and put us on track towards achieving SDG 2, while also triggering important synergies for other SDGs.

This transformation of food systems demands innovative systemic changes supported by an enabling environment of institutions, policies, laws, regulations and investments with coherent and complementary objectives, across sectors.[86,95] In addition, incremental transitions at small scale and structural changes to institutions, legislation and standards at larger scale are needed – in coordinated and integrated ways – to achieve the desired transformation.[96] Importantly, coordinated action by all key players in public and private sectors, academia, civil society and international institutions is essential, as is recognized by the aforementioned global events. The challenges associated with achieving such changes are immense, and require significant mobilization of financial resources, while ensuring the identification of win-win solutions and managing trade-offs.

Best practices help illustrate transformative changes needed

Drawing upon best practices[an] and lessons learned from a series of case studies worldwide,[97] this chapter provides policy guidance for actors at the local, country, regional and global levels to transform food systems to be more resilient to the major drivers behind recent increases in food insecurity and malnutrition, while improving access to affordable healthy diets for all through environmentally sustainable approaches. It highlights the importance of understanding specific contexts in addition to the needs of vulnerable population groups, including women, children and youth, Indigenous Peoples, and people living in conflict-affected countries and in remote areas.

am In the context of this report, *food systems transformation* happens when profound and purposeful departures from business as usual are introduced into any of the food system components,[3] resulting in greater resilience to drivers of food insecurity and malnutrition, and in greater affordability of healthy diets.

an A "best practice" can be defined as a practice that has proven to work well, has produced good results through a sound evaluation, and is therefore recommended as a model to be scaled up. It is a successful experience, which has been tested, validated and repeated, and thus deserves to be shared so that a greater number of people can adopt it.

As there are no one-size-fits-all solutions, country-level experiences provide illustrative examples of what it takes – in very practical and innovative ways – to transform food systems. In particular, coherence of policy measures and investments between food systems and closely related systems, such as agri-food, health, environmental and social protection systems, are considered. The examples demonstrate how transformative measures, especially inclusive governance mechanisms, technology, data and innovation (in addition to legislation, standards and other measures), can lead to successful transformation of food systems.

Well over 100 contributions were received in response to a global *"call for best practices in transforming food systems for affordable healthy diets and addressing major drivers of food insecurity and malnutrition"*[98] issued for this report, supplemented by a questionnaire circulated among partner agencies. Examples of best practices and the lessons drawn from them are detailed in the sections below. The contributions demonstrate how major drivers of food insecurity and malnutrition can be addressed and which key policy actions are needed along one or more of six identified pathways. In all cases, the importance of ensuring better integration of various policy platforms, and of measures and actions across and within sectors is highlighted, with emphasis on sectors covering natural resources, food, agriculture, health, social welfare, education, marketing, trade and investment. ■

4.1 SIX PATHWAYS TO ADDRESS MAJOR DRIVERS BEHIND RECENT FOOD SECURITY AND NUTRITION TRENDS

A key challenge that restricts successful transformation of food systems is that existing national, regional and global policies, strategies, investments and legislation are compartmentalized into distinct dialogues: for example, separate discussions on priorities for political stability or economic recovery, disaster risk reduction and climate resilience, trade and development in food and agriculture sectors, or restoring health systems and ensuring adequate social protection.[1,3,5,7] Too often, there is insufficient recognition – or lack of action, where there has been recognition – of important relationships and complementarities among these dialogues and their relevance to key functions of the food systems, such as ensuring the sufficient production and supply of nutritious foods and the affordability of healthy diets.

Even though it is easier said than done, these challenges can only be overcome through the formulation and implementation of cross-sectoral portfolios of policies and investments that comprehensively address the major drivers whose widespread effects on food systems are resulting in negative food security and nutrition outcomes (as presented and analysed in Chapter 3). These portfolios need to be well targeted and provide incentives for all actors to change behaviour and to engage constructively in innovative and systemic changes that will lead to transformed food systems.

The sections below discuss six possible pathways (Figure 27) along which food systems can be transformed to address the major drivers of

FIGURE 27 POSSIBLE PATHWAYS TOWARDS FOOD SYSTEMS TRANSFORMATION TO ADDRESS MAJOR DRIVERS OF FOOD INSECURITY, MALNUTRITION AND UNAFFORDABILITY OF HEALTHY DIETS

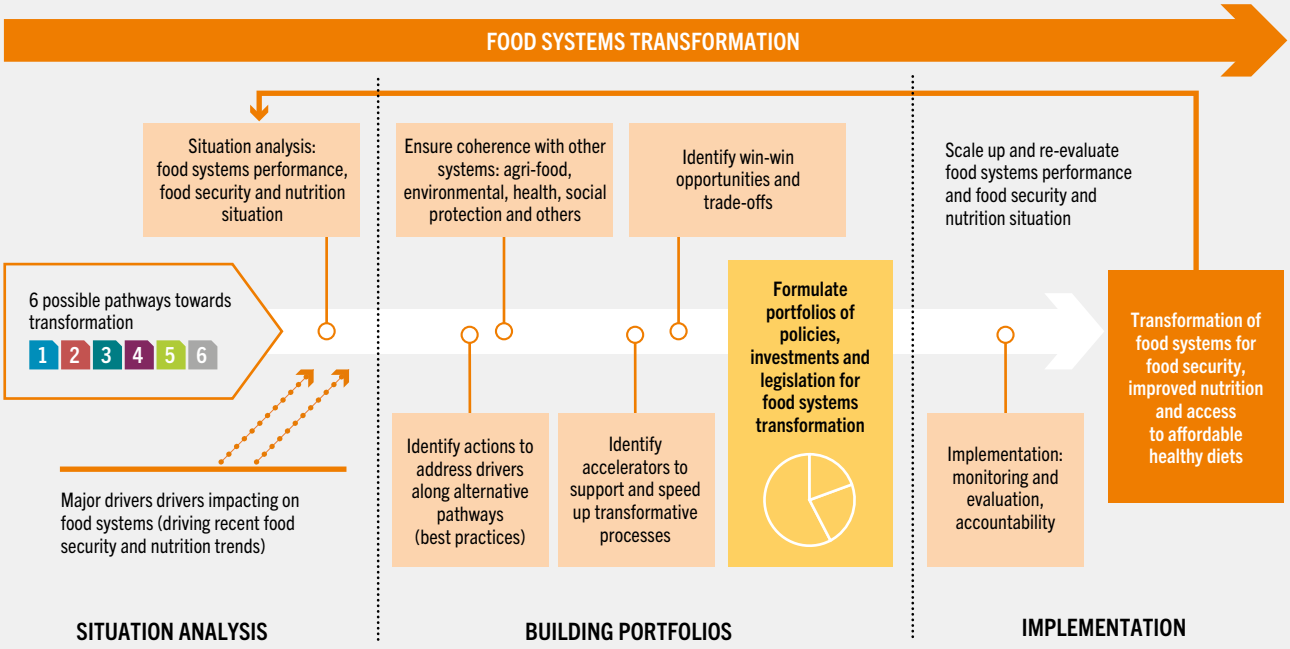
SOURCES: FAO, IFAD, UNICEF, WFP & WHO. 2017. *The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security*. Rome, FAO; FAO, IFAD, UNICEF, WFP & WHO. 2018. *The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition*. Rome, FAO; FAO, IFAD, UNICEF, WFP & WHO. 2019. *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Rome, FAO; FAO, IFAD, UNICEF, WFP & WHO. 2020. *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO.

food insecurity and malnutrition identified and reviewed in previous chapters – and as summarized in Box 1. Every one of the pathways builds on key recommendations from the previous four editions of this report (2017–2020) and corresponds to one or more of the major drivers discussed and analysed in Chapter 3.

These transformation pathways form a basis for formulating a coherent set of policy and investment portfolios to enable the transformation of food systems (see also Figures 28 and 29). The relevant set of pathways is derived from a context-specific situation analysis (see below) that determines which driver or combination of drivers impacts most on the identified food system and on related food security and nutrition outcomes. The pathways may also complement and reinforce each other.

Drawing upon illustrative examples from country case studies, in addition to policy recommendations from the scientific community and previous editions of this report, the remainder of this chapter reviews practical steps for building the recommended portfolios of policies and investments along the six transformation pathways. Figure 28 illustrates the recommended steps in the entire process towards food systems transformations that address the major drivers of

FIGURE 28 STEPS TOWARDS FOOD SYSTEMS TRANSFORMATION FOR MORE AFFORDABLE HEALTHY DIETS



SOURCE: FAO.

food insecurity, malnutrition and unaffordability of healthy diets for all. Broadly speaking, the process requires (i) an in-depth context-specific situation analysis; (ii) the formulation of coherent cross-sectoral portfolios of policies, investments and legislation, and including accelerators that spur the transformative processes; and (iii) the implementation of these portfolios with adequate monitoring and evaluation, as well as accountability mechanisms in place.

The **situation analysis** covers a context-specific and comprehensive assessment of which major drivers impact negatively on food systems and result in poor food security and nutrition outcomes, based on available data and information as provided annually in this report (and in other key references at global, national and local levels).[99,100,101,102,103,104] Depending on which drivers of food insecurity and malnutrition are present, stakeholders decide where in the food system systemic changes are needed to achieve desired outcomes. Furthermore, through a multi-stakeholder consultation, the relevant policy, investment and governance environments in the country are identified, taking into account the most relevant institutions and any political economy issues.[7] All of the above will help identify which pathways towards food systems transformation are most appropriate within a given context.

For each applicable pathway, recommended policy options and best practices are then reviewed to illustrate the type of actions that could be taken and to inform the formulation of policy and investment portfolios – and associated accelerators – for food systems transformation. This part of the process is illustrated in the section below. The disastrous impact of the ongoing COVID-19 pandemic on

human health and economies worldwide, and the importance of social protection systems to help ensure adequate access to nutritious foods for the most vulnerable, demonstrate the interconnectedness of, especially, the agri-food, health, environmental and social protection systems. Ensuring coherence among these and other relevant systems is a *sine qua non* condition to facilitate the transformative processes. This and other key building blocks of policy and investment portfolios (Figure 29) are discussed in more detail in Section 4.2.

Examples of best practices along six pathways towards food systems transformation

Upon completion of an in-depth context-specific situation analysis of major drivers and their impact on food systems and on food insecurity and malnutrition in all its forms, the chosen pathways indicate which transformative measures to consider. Illustrative examples of best practices and important policy measures in each of these transformation pathways are provided below.[ao]

As many countries are affected by the major drivers, which also interact (elaborated in Chapter 3), several pathways will apply simultaneously, calling for coherence among them to ensure efficiency in implementation. Similarly, many of the best practices and policy measures discussed in this section are supportive of more than one pathway. For example, best practices in building resilience to climate variability and extremes (pathway 2) may also provide increased levels of resilience in countries affected by economic slowdowns and downturns (pathway 3) or conflict (pathway 1). Furthermore, given persistent and high levels of income inequality in most LMICs, in particular, best practices and policy measures elaborated under pathway 5 apply to many countries. Similarly, the best practices and policy measures discussed under pathway 6, which focuses on the food environment and consumer behaviour, generally apply to challenges faced by most food systems.[7]

1. Integrating humanitarian, development and peacebuilding policies in conflict-affected areas

It is important to recall that the majority of the chronically food insecure and many of the malnourished live in countries affected by insecurity and conflict. Therefore, it is imperative that conflict-sensitive policies, investments and actions to reduce immediate food insecurity and malnutrition be implemented simultaneously with those aimed at a reduction in the levels of conflict, and aligned with long-term socio-economic development and peacebuilding efforts.[1] Under conditions of violent conflict, entire food systems are often severely disrupted, challenging people's access to nutritious foods. Emergency food assistance programmes, emergency support to ensure clean water, quality health services and sanitation, and interventions to maintain livelihoods are among the typical crisis response and social protection mechanisms implemented to ensure minimum levels of food security and nutrition.

In **Yemen**, conflict is the main driver of severe food insecurity and malnutrition, requiring a large-scale humanitarian response. Acute malnutrition has reached record levels, affecting half the children under five years of age.[105] Among the major causes are a high prevalence of communicable diseases due to poor water quality. Near the capital Sana'a, a breakdown of a major wastewater treatment plant in 2017 resulted in contaminated water being used for vegetable production, causing cholera outbreaks and a scarcity of fresh vegetables in peri-urban areas. Through an emergency intervention in 2018–2019, cost-effective small-scale water treatment plants were built and water-efficient drip irrigation systems installed covering 60 ha of irrigated land for vegetable production. The intervention produced multiple benefits, including clean water provision, availability of uncontaminated vegetables, and restored livelihoods.[97,106] This example highlights the importance of ensuring local food systems provide minimum levels of access to safe and nutritious foods, also in conflict-affected areas.

ao For each pathway, key policy areas and associated goals are summarized (**Tables 8–13**). Importantly, key policy recommendations provided are not exhaustive. Rather, for a more in-depth discussion of recommended policies and actions needed to comprehensively address the major drivers behind recent food security and nutrition trends, the four most recent editions of this report (2017–2020) should be consulted.

In conflict-affected areas, peacebuilding efforts are of paramount importance in achieving long-term food security and improved nutrition. Furthermore, resilience-building programmes, as well as social protection mechanisms, should be put in place without delay; otherwise, individuals and households may engage in increasingly destructive and irreversible coping strategies (such as selling productive assets) that threaten future livelihoods as well as their food security and nutrition.[1] Conflict-affected countries have been particularly hard hit during the COVID-19 pandemic. For example, due to movement restrictions, it has often been difficult to reach refugees and internally displaced persons (IDPs) with humanitarian assistance and other forms of support needed to ensure sufficient access to nutritious foods.

Deep economic crises can unfold where the structural causes of conflict situations are linked to competition over natural resources, including productive land, forest, fisheries and water resources. Policies supported by institutional and legal reforms, where needed, should address these causes and aim to mitigate – and if possible, prevent – their impact on food systems, food security and nutrition, and the economy at large. Especially in the context of protracted crisis situations, with possible periods of low (but persistent) levels of conflict and prolonged periods of displacement, it is critical to maintain food and agricultural production, sustain food supply chains and ensure people's access to nutritious foods and healthy diets.[5]

The above scenario applies in **Somalia**, where people have experienced a three-decade-long protracted crisis with periods of severe food insecurity and malnutrition (and including famine in 2011), in addition to frequent extreme climate events (mainly droughts and floods). In recent years, appropriate action has been taken as, for example, in response to drought-induced large-scale food insecurity and malnutrition that affected up to 6 million people during 2017–2019, including acute malnutrition among 900 000 children.[107] A nutrition-sensitive "Cash+" programme was implemented in 2018 that combined unconditional long-term cash transfers with livelihood support to build resilience to future shocks, while maintaining productive capacity and food supply chains.[108] Agricultural households were provided with seeds and tools for home gardening, and pastoralists were given support for livestock, which improved animal health and milk production. The programme has increased access to food by households under emergency conditions, improved the quality and diversity of their diets, and enhanced the nutrition knowledge of the programme's participants through nutrition and food safety education.

In a context of escalating conflict, displacement, climate shocks and commodity price fluctuations in the **Central Sahel** (**Burkina Faso, Mali and Niger**), a multi-pronged food systems approach has been implemented, where food production, transformation, logistics, retail and consumption are aligned with the objectives of responding to the food security and nutrition crises, while also strengthening systems to better respond to, manage and prevent future crises. At the food production level, farmers are supported with productive assets, training in climate-smart agriculture practices and improved market access. At the food processing level, the capacities of women's groups and local agribusinesses are strengthened to produce fortified blended foods and fortified staples to improve the nutritional quality of food available on the market. And at the food environment level, to prevent malnutrition, access to nutritious foods and protection against price fluctuations is provided through a food voucher system for locally available nutritious foods that are otherwise not affordable. In addition, nutritionally vulnerable women and children are supported with programmes to prevent acute malnutrition. Hence, multiple entry points are used to ensure linkages among food, health and social protection systems, and to develop the capacity of governments to improve food quality and safety, and to systematically analyse food price data for decision-making. In this way, short-term emergency needs are met, and the resilience of individuals, households and communities strengthened.[109]

Prior to the recent violent and deadly conflict with Israel, **Palestine** had already endured a fragile security situation for decades, affecting food security and nutrition. Restrictions on the movement of people and goods, as well as limited access to natural resources and international

TABLE 8 KEY POLICY AREAS AND GOALS FOR INTEGRATING HUMANITARIAN, DEVELOPMENT AND PEACEBUILDING EFFORTS IN CONFLICT-AFFECTED AREAS

Policy area	Goals
Peacebuilding efforts linked to livelihood support	▸ Ensure that conflict-sensitive policies and actions at a minimum do no harm. ▸ Reduce/avoid conflict over access to and use of natural resources, while maintaining productive capacity. ▸ Prevent destructive coping mechanisms (sale of assets). ▸ Meet immediate food security and nutrition needs.
Nutrition-sensitive social protection and food production and supply programmes	▸ Livelihood support and social protection measures to ensure food security and nutrition and a robust recovery.
Maintaining key functions of food supply chains	▸ Re-engage smallholders, both during and in the aftermath of conflicts, to ensure a rapid stabilization of food supply for own consumption and commercialization.
Community-based approaches in post-conflict policies	▸ Foster trust and social cohesion for reduced uncertainties, reinforced positive aspirations and improved well-being.

SOURCE: FAO, IFAD, UNICEF, WFP & WHO. 2017. *The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security*. Rome, FAO.

markets, had placed a heavy burden on local food systems and people's livelihoods. In spite of the difficult circumstances, there have been efforts to strengthen the resilience of food systems within the context of periodic conflict, as well as social, environmental and economic shocks. Some food systems have been transformed into more resource-efficient and diversified market-led systems through improved agricultural knowledge, strengthened post-production and market capacities, increased value chain services and empowered producer cooperatives. Results (prior to the recent conflict) show a 12 percent improvement in land productivity, 10 percent improvement in marketing values, 15 percent reduction in production costs and an overall 10 percent increase in profitability among the agribusinesses run by small- and medium-scale farmers supported by the project.[97] Production of high-value crops, compliant with international quality and safety standards, and strengthened linkages between small-scale producers (and their cooperatives) and other value chain actors, including distributors and marketers, have raised export revenues, in addition to nutritious and safe foods being made available on local markets.

Drawing upon key policy recommendations from the 2017 edition of this report, complemented by more recent evidence, Table 8 provides a short list of the most important policy measures to be considered for integrating humanitarian, development and peacebuilding efforts in conflict-affected areas.

2. Scaling up climate resilience across food systems

The ways we produce food and use our natural resources can help deliver a climate-positive future in which people and nature can coexist and thrive.[110] This is important, not only because food systems are affected by environmental degradation and climate events, but also because food systems themselves impact on the state of the environment and are a major driver of climate change. Central to this effort are priorities to protect nature, to sustainably manage existing food production and supply systems, and to restore and rehabilitate natural environments.[111,112]

Solutions require increased partnerships and multi-year, large-scale funding in support of (among others): integrated disaster risk reduction and management programmes; climate change adaptation policies; and practices that are short-, medium- and long-term in scope[3] to mitigate the impact of climate variability and extremes, including on persistent poverty and inequality.[113] Adopting climate-sensitive approaches in food and agricultural investments can reduce food security risks associated with climate extremes, build long-term resilience and strengthen coping mechanisms along food supply chains.[114]

The implementation of climate resilience policies and programmes requires adapting and refitting tools and interventions such as risk monitoring and early warning systems,

emergency preparedness and response, vulnerability reduction and resilience-building measures, shock-responsive social protection mechanisms, risk transfers (including climate risk insurance) and forecast-based financing, in addition to strong risk governance structures in the environment–food–health system nexus.[3] To ensure their enforceability, such tools may need to be grounded in legislation. Climate risk and food insecurity are deeply intertwined in rural areas of the developing world, which has led to the development of various asset insurance schemes targeted specifically at poor and vulnerable households. The challenges of making micro-insurance markets work are multiple; nevertheless, available analysis suggests the potential gains to solving these challenges are substantial.[115]

In **Zambia**, new initiatives aimed at raising climate resilience include the introduction of agricultural insurance for vulnerable households. Households that adopt conservation agriculture techniques are provided with access to agricultural insurance, which in turn allows for investment in riskier projects with potentially higher revenues. Under this approach, agricultural insurance is not only important for building climate resilience but could also lead to poverty reduction and increased food security and improved nutrition. Elsewhere, different types of agricultural insurance schemes aimed specifically at poor and vulnerable smallholder households have been developed.

Implementing insurance schemes against disaster risk in agriculture is a costly endeavour that faces several challenges and constraints (e.g. infrastructural, regulatory and socio-economic). Nevertheless, integrating agricultural insurance schemes as a component of broader social protection programmes can lead to increased smallholder resilience and reduced rural poverty, while also reducing the cost of existing social protection mechanisms and strengthening the planning capacities of public agencies, when it comes to mitigating and transferring the risk of natural disasters. This has been demonstrated by a number of successful agricultural insurance schemes implemented in recent years, such as the Index-based Livestock Insurance (IBLI) programme in **Ethiopia** and **Kenya.**[115] Likewise, in **Mexico**, the CADENA Programme has scaled up smallholder access to agricultural insurance through a subsidized public–private insurance scheme, which promotes the engagement of the private insurance sector in small-scale agriculture in providing insurance coverage related to a wide variety of climate-related risks.[116]

A proven approach to building climate resilience is climate-smart agriculture (CSA), which builds resilience in multiple ways through climate-sensitive and socio-economically beneficial approaches that have demonstrated triple wins in food systems transformation: CSA approaches sustainably increase agricultural productivity and improve incomes, build resilience to the impacts of climate change and reduce GHG emissions.[117]

In **Lao People's Democratic Republic**, diversified and climate-resilient agricultural practices introduced in 2016 through farmer field schools and farmer nutrition schools resulted in positive impacts on soil conservation, biodiversity, and income and nutritional outcomes. In particular, community-based approaches with a strong focus on women's empowerment resulted in increased purchasing power and higher dietary diversity among women and children, in addition to positive impacts on children's health.[97]

In **Ethiopia**, during 2015–2020, a CSA project focused on supporting women resulted in increased crop revenue while reducing the risk of food deficits that many participants had experienced before the implementation of the project. Other examples worldwide have demonstrated that the adoption of sustainable agricultural practices raises productivity and enhances food systems resilience, while helping to reduce poverty, food insecurity and malnutrition.[3]

Access to water is essential for smallholders to build climate resilience while also working towards more equitable and sustainable livelihoods. It is estimated that 77 percent of small-scale farms across LMICs are located in water-scarce regions, while only 37 percent have access to irrigation.[118] In arid areas of the **Sahel** region, climate change has exacerbated irregular rainfall and other climate extremes,

such as repeated droughts and floods. The consequences have been devastating for the poorest rural households, who have seen their vulnerability worsen as they struggle to cope with these shocks. Efficient, sustainable and fair management of water resources is more than ever a priority to improve the resilience of vulnerable communities and raise their levels of food security and nutrition.[119] Many studies have documented how investments in water-harvesting techniques and irrigation infrastructure result in win-win solutions as the increased water-use efficiency also rises crop yields.[118]

In **Kiribati**, the combination of climate change, limited access to clean water, and unreliable imported food supplies have contributed to growing malnutrition and unhealthy diets. A community development project began in 2014 to provide rainwater-harvesting infrastructures and training related to household food production (home gardening and poultry). As a result, households reported an 80 percent reduction of cases of diarrhoea and dysentery and a 90 percent improvement in terms of access to clean water.[120]

Land is another crucial natural resource to build resilience to climate extremes. Many vulnerable producers face degradation in the quality of their land, which is increasingly linked to poverty and food insecurity, and higher levels of vulnerability to climate change. A vast majority of people living on degraded agricultural land live in LMICs.[121] In **Ethiopia**, a 2015–2020 landscape restoration project not only helped raise farm productivity through soil and water conservation, but also successfully linked farmers to markets, thereby raising their income-generating potential. Households reported improvements in food security, average household income grew significantly and minimum dietary diversity scores increased.[98] In **India**, a 2012–2016 land restoration and crop intensification project used traditional water storage systems (*haveli*) in combination with infrastructure investment and technology transfers, with positive effects on degraded and rainfed lands: crop yields increased by 10 to 70 percent, and average household incomes grew by 170 percent.[97,122] This approach also enabled groundwater recharges, resulting in improvements in water-use sustainability.

The territorial management and knowledge systems of Indigenous Peoples are useful for improving climate resilience, as these systems have enabled them to generate food in some of the most hostile environments and fragile ecosystems in the world.[112,123,124] In **Guatemala**, the Maya Ch'orti' Indigenous Peoples living in the Dry Corridor (*Corredor Seco*) have subsisted on farming in a dry environment for years, but increasing drought fuelled by climate change has led to increasing rates of food insecurity and malnutrition. A reforestation and water management project is now bringing renewed impetus to the use and conservation of endemic vegetal and animal species that are well adapted to the dry environment. The Maya Ch'orti' have benefited from this support, which has led to a reduction of stunting by 51 percent following improved food consumption and diet quality.[98]

In **Colombia**, the Tikuna, Cocama and Yagua Indigenous Peoples living in the Tarapoto Lakes complex maintained sophisticated food systems for hundreds of years that were adapted to a unique forest and aquatic flooding-ecosystem, which later became a Ramsar Convention[ap] Amazon protected area.[112] But with the rapid growth of food markets in urban areas, increased demand for fish and wild animals provoked new extractive fishing and hunting methods. These unsustainable fishing practices, such as the replacement of traditional traps with metal and nylon wires, led to the depletion of fish and game stocks. Calling upon traditional indigenous knowledge and governance systems, a community-based fishing agreement was drawn up and complemented by an educational programme for indigenous youth to re-establish sustainable fishing practices. The agreement, based on collective rights, regulates the use of fishing tools, includes temporary bans on certain species and establishes fishing standards.[112,125] Today, healthy fish populations provide essential protein within a thriving indigenous food system counting over 153 different foods – largely wild and semi-wild foods.[126,127,128]

The utilization of traditional varieties and wild edible species from local food systems to increase

ap The Ramsar Convention refers to The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat.

TABLE 9 KEY POLICY AREAS AND GOALS FOR SCALING UP CLIMATE RESILIENCE ACROSS FOOD SYSTEMS

Policy area	Goals
Reducing climate-related risk and adapting to climate change	▸ Increase resilience to climate events along the entire food supply chain to fewer disruptions in food production and supply. ▸ Protect smallholders against climate events that could affect their livelihoods, including through climate risk insurance. ▸ Create an enabling environment for promoting sustainable investments in agriculture.
Establishing climate risk monitoring and early warning systems	▸ Reduce impact of different hazards, including climate extremes, in both food systems and livelihoods.
Improving access to, and management of, natural productive resources	▸ Sustainable increase in agricultural productivity (with positive effects on natural resources and the environment), including through climate-smart agricultural practices.

SOURCE: FAO, IFAD, UNICEF, WFP & WHO. 2018. *The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition*. Rome, FAO.

climate resilience has also been applied in **Brazil, Kenya, Sri Lanka** and **Turkey**.[97] The approach seeks out potential improvements along food value chains, building farmers' capacity to produce traditional crops and species in adequate quantity and quality, while raising consumer awareness and demand for these products. This initiative also builds on linkages with other programmes: in **Brazil**, local products have been included in the public procurement system, and in the meals that are part of the school feeding programmes. In **Kenya**, traditional products have been included in farm-to-school networks that provide school meals, while in **Sri Lanka,** 32 market outlets are now selling products made from traditional food crops.[129]

Country examples of best practices presented above illustrate some of the innovative measures towards building climate resilience that have evolved in recent years. Key policy areas and goals for scaling up climate resilience across food systems are presented in Table 9. The 2018 edition of this report contains an in-depth discussion of policy areas and measures aimed at strengthened resilience to climate variability and extremes.

3. Strengthening resilience of the most vulnerable to economic adversity

In 2020, as world GDP contracted by an estimated 3.3 percent during the COVID-19 pandemic,[130] counteractive measures, including stepped-up social assistance, employment and social insurance programmes, and large-scale emergency measures to protect economies worldwide, demonstrated the importance of building resilience in the face of economic adversity.[13] Critically, the need for economic and social policies, institutions, legislation and other measures to be in place well *in advance* of economic slowdowns and downturns became evident, as these measures are designed to counteract the effects of adverse economic cycles when they do arrive, especially for the most vulnerable population groups, and to maintain access to nutritious foods and healthy diets. In the immediate term, such policies, laws and investments must include social protection mechanisms and primary healthcare services, while supporting household income and livelihoods through social assistance or active labour market policies.

Social protection programmes have been central to government policy responses to the consequences of the COVID-19 pandemic on people's incomes and livelihoods. By May 2021, more than 200 countries and territories in the world had implemented at least one social protection initiative, comprised mostly of cash and in-kind transfers, waived or postponed financial obligations and labour regulations. Together, these measures have benefited just over 1.5 billion people worldwide.[13] Importantly, largely due to financial constraints, many COVID-19-related social protection responses had low coverage, provided small transfers and could be maintained only for a limited period of time. Cash transfer programmes, for example, were implemented on average for only four months. In **Timor-Leste**, one of the

poorest countries in the world, a universal cash transfer was established in June 2020, followed by a subsidy for three months directed at self-employed and informal workers,[13] which helped buffer the income shock of measures taken during the pandemic on the population.[131]

In **Panama**, an inter-ministerial programme aimed at providing support to families affected by the COVID-19 pandemic has delivered in-kind food transfers to some of the most vulnerable populations. Procured directly from food producers nationwide, the programme provides diverse and nutritious foods including animal source foods, fruits, vegetables, legumes, roots and tubers. In **Jamaica**, rural livelihoods were supported by reinforcing the Government's public procurement mechanism during 2020, with a focus on female-headed farming households. In addition, in-kind transfers consisting of locally grown fresh foods were delivered to the programme's beneficiaries, supporting both household incomes and food intake.

Elsewhere, in **Brazil**, the mandatory closure of schools due to the pandemic put the continued implementation of a nationwide school feeding programme targeting millions of beneficiaries at risk. The programme was rapidly modified to enable in-kind food transfers to be delivered directly to children's homes instead. Even under much more difficult circumstances, food kits include at least 30 percent locally procured fresh foods, as established by Brazil's school feeding law.[97]

Before the COVID-19 pandemic, school feeding programmes reached 388 million children worldwide, representing one of the largest social protection mechanisms. Between 2013 and 2020, the number of children receiving meals through school feeding grew by 9 percent globally and by 36 percent in low-income countries. This growth reflects a widespread institutionalization of these programmes, as 80 percent of countries have integrated school feeding into their policies (up from 42 percent in 2013) with 90 percent of their funding coming from national budgets.[132] The importance of school food and nutrition programmes has been underscored during 2020–2021, as millions of children globally have missed out on their meals as schools closed to stem the spread of the COVID-19 disease. To date, 27 countries have not re-opened schools, seven of which have important school food and nutrition programmes.

In several countries, in an effort to further institutionalize school feeding programmes, innovative approaches include home-grown school feeding (HGSF) and school gardens that improve the nutritional status of school children while also promoting access to an increased supply of affordable nutritious foods. Other benefits of these initiatives include raising awareness of the importance of healthy diets and shifting households' food demand towards more nutritious foods. Arguments in favour of HGSF as a transformative measure to strengthen food systems are presented in Box 9.

In **Ethiopia**, a further innovative social protection scheme provides digital access to monthly food vouchers, tailored to household size for an amount based on the cost of a nutritious diet. In rural areas, mothers with children under two years of age are provided vouchers for the purchase of fresh fruits, vegetables and eggs. These are redeemed with local retailers, who themselves have received training to improve the quality and safety of their food supply. As a complementary action, changes in social behaviour are encouraged through community counselling and media campaigns to promote improved dietary diversity and care practices and to raise demand for fresh fruits and vegetables. An external evaluation revealed that the voucher programme has increased the profits of rural food retailers by as much as 40 percent and shortened food supply chains, while also having a positive impact on the dietary diversity of mothers and their children.[97]

In **Kyrgyzstan**, an ongoing "Cash Plus" approach aims to strengthen the impact of the national cash transfer programme. Positive results at household level include increased and more diversified food production for own consumption and stepped-up engagement in income-generating activities. Seventy-four percent of households increased agricultural productivity, and 90 percent of beneficiaries improved dietary diversity and nutritional outcomes, for both mothers and their children.[98]

»

BOX 9 HOME-GROWN SCHOOL FEEDING AS A LEVER FOR FOOD SYSTEMS TRANSFORMATION

School feeding programmes, coupled with nutrition education and other nutrition interventions, support access to school and learning opportunities, while also providing school children with food and other services that contribute to better health and nutrition. They also improve children's learning abilities for a better future.[133] The programmes are particularly beneficial in LMICs, where many children suffer from micronutrient deficiencies. The school meals are often the only nutritious meals the children eat;[134] moreover, they provide an incentive to attend school.

When linked to smallholder agriculture, school feeding programmes and other healthy public food procurement and service policies[135] can promote additional social, economic and environmental benefits. Moreover, they can become an entry point for food systems transformation, especially if they are scaled up. The home-grown school feeding (HGSF) model is designed to provide children in schools with safe, diverse and nutritious food, partially food sourced locally from smallholders.[136] In integrating education, agriculture, social protection and public procurement objectives, these programmes provide both educational and food security and nutrition gains for children, as well as livelihood gains for smallholders and their communities. In addition, by changing procurement practices and creating a demand for healthy diets through sustainable food systems, HGSF can incentivize those involved in the supply chain to support a transition towards more sustainable food production and consumption patterns. School feeding programmes can create 1 700 jobs for every 100 000 children fed.[132]

Kenya and **Ethiopia** have embraced HGSF approaches, illustrating the importance of a multisectoral approach for successful implementation. In **Kenya's** Busia County, challenges related to poverty, food insecurity and malnutrition, as well as biodiversity loss, were addressed through a HGSF approach conceptualized by a Biodiversity for Food and Nutrition (BFN) project. The combined goal was to improve student nutrition while promoting biodiversity conservation, the empowerment of local farmers and the development of inclusive value chains.[137] Implemented since 2012, the initiative has triggered local demand for traditional African leafy vegetables (ALVs), leading to improved nutritional practices and creating jobs through local public procurement, while enhancing territorial biodiversity. The numerous benefits include improved capacity of smallholders to access new and steady markets, and increased awareness and interest among youth in sustainable agriculture and environmental issues. Moreover, the resilience of local agricultural systems has been reinforced while crop diversification has been enhanced; thousands of students have received school meals enriched with ALVs that improve their nutrition and health.

In **Ethiopia**, the HGSF approach has served as a lever for food systems transformation, specifically in addressing existing bottlenecks in procurement and along supply chains.[138] The solutions to these bottlenecks include (i) conducive public procurement regulatory frameworks and (ii) improving the inclusivity and efficiency of local supply chains, using a multisector and multidimensional approach. Specifically, in reforming its HGSF programme, Ethiopia has been able to address challenges faced by smallholders in accessing schools and other formal markets. Smallholders now have greater access to new market opportunities and to increased and more stable sources of income. The programme has also directly impacted the lives of vulnerable children and their families, providing daily school meals and contributing to their nutrition, health and education.

The tremendous potential of HGSF programmes to enable food systems transformation has become more evident as a result of COVID-19-induced economic shocks and crises in the education sector, which has seen more than 199 countries closing schools and cutting off school feeding supply chains, affecting an estimated 370 million children.[132] Based on the Kenyan and Ethiopian experiences, which demonstrate the potential for positive change, there is an urgent need to review existing school food and nutrition practices to build more resilient rural livelihoods and ensure that vulnerable children, smallholder farmers and others dependent on well-functioning food systems are better protected.

TABLE 10 KEY POLICY AREAS AND GOALS FOR STRENGTHENING RESILIENCE OF THE MOST VULNERABLE TO ECONOMIC ADVERSITY

Policy area	Goals
Strengthening agri-food productivity and market linkages along the food supply chain	▸ Improve income opportunities for smallholders and other actors of the food supply chain.
Curbing rises in food prices and excessive price volatility and/or mitigating their effects	▸ Reduce the vulnerability of poor households and net food buyers in accessing food. ▸ Avoid undesirable coping strategies during periods of extreme food price fluctuations.
Boosting job creation and expanding social protection schemes	▸ Minimize short-term impacts of economic shocks among vulnerable households through nutrition-sensitive social protection programmes. ▸ Stabilize incomes and food consumption.

SOURCE: FAO, IFAD, UNICEF, WFP & WHO. 2019. *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Rome, FAO.

» As countries move beyond the COVID-19 pandemic, it is vital that adequate levels of public spending on health and social protection systems be maintained. Any cuts would likely increase hardship among already disadvantaged groups, weaken performance, increase the risk of negative health and nutrition outcomes, add to fiscal pressures and undermine development gains.[139,140] In the medium term, these policies should be institutionalized as part of national social protection systems, together with increasing access to social services.[5] In addition, other innovative measures towards building economic resilience should be implemented, such as stepping up access to agricultural insurance for food producers, many of whom are vulnerable to both climate-related and economic shocks.[141] Such insurance schemes (as discussed under pathway 2) can help reduce poverty, especially when combined with social protection schemes.[142]

Country examples under this third pathway have highlighted the importance of a number of innovative social protection mechanisms aimed in particular at strengthening resilience of the most vulnerable populations to economic slowdowns and downturns, as also experienced during the COVID-19 pandemic. There are many other longer-term policy measures that need to be considered to strengthen economic resilience as discussed in detail in the 2019 edition of this report. Several key policy areas and goals are presented in Table 10.[5]

4. Intervening along food supply chains to lower the cost of nutritious foods

Interventions along food supply chains are needed to increase the availability of safe and nutritious foods and lower their cost, primarily as a means to increase the affordability of healthy diets. This pathway calls for a coherent set of policies and investments from production to consumption aimed at realizing efficiency gains and cutting food losses and waste to help achieve these objectives.[7] Incentives should, among others, stimulate diversification of production in the food and agriculture sectors towards nutritious foods, including fruits, vegetables, legumes and seeds, as well as animal source foods and biofortified crops, in addition to investments in innovation, research and extension to raise productivity. Elsewhere in the supply chain, the nutritional quality of food products and beverages can be improved by post-harvest fortification of staple foods in line with international guidelines.[143,144,145,146] Food manufacturers and retailers can also reformulate their products to eliminate industrially produced trans-fatty acids and reduce levels of saturated fat, sugars and/or salt (see also pathway 6).

Fortification and biofortification have been used as a cost-effective measure to reduce micronutrient deficiencies while increasing the availability – and lowering the cost – of nutritious foods. The fortification of staple foods has been an effective strategy to supply micronutrients to entire populations (such as universal iodization of salt, and iron and folic acid fortification of

wheat or maize flour). In **Peru**, the fortification of rice with 9 vitamins and minerals has been scaled up, where it has been included in the school feeding programme and other social protection programmes. Considering that micronutrient deficiencies and anaemia are widespread in the population across socioeconomic groups, the country approved the national rice fortification law in 2021.

In **Zimbabwe,** in the context of a programme promoting conservation agriculture for increasing climate resilience and agricultural productivity, farmers participating in the programme adopted biofortified varieties of different crops. The increases in productivity after the adoption of climate resilient techniques also improved the availability of micronutrients among participating households. Finally, in **Rwanda**, iron-biofortified beans have been introduced and rapidly adopted by farmers. By the end of 2018, it was estimated that 20 percent of beans produced in the country were iron-biofortified, and 15 percent of the population was consuming these. Regular consumption of fortified beans can provide up to 80 percent of daily iron needs. Iron-biofortified varieties have also produced yields with iron levels that are 20 percent above those of other varieties, turning them into an attractive alternative for farmers.[97]

Small and medium-sized enterprises (SMEs) play a central role in maintaining local community-based food systems, and can help ensure an adequate supply of safe and nutritious foods. Their role in achieving food security and good nutrition has been increasingly recognized.[147] For example, SMEs engaged in food processing in Africa procure 95 percent of their food supplies from smallholders, demonstrating their importance in the development and transformation of the whole food system.[148] And while the economic impact of lockdowns during the COVID-19 pandemic has hit many SMEs particularly hard,[149] given the way SMEs are embedded in local communities, they also play a key role in building forward from crisis conditions and ensuring sufficient access to safe and nutritious foods.

In **Kenya**, SMEs involved in the fruit and vegetable supply chains have received government support[150] with the objective of enhancing their role in promoting healthy diets with sustainability considerations. Support components include building capacities to ensure food quality and safety, improving access to financial resources and strengthening market linkages. Similarly, in **Myanmar**, SMEs at the food production level have received support to diversify their products through direct transfers, increased access to new technologies and training in sustainable production techniques. More than half of the programme's participants have seen their incomes increase by 50 percent, and their expansion of production to include fresh vegetables has significantly increased the supply of nutritious foods in local markets.[151] In **Sao Tome and Principe**, a recent five-year development project facilitated the marketing of organic, high quality cacao, coffee and pepper by developing farmer cooperatives and family plantations to increase sales to domestic and export markets through public-private partnerships. Results from the impact assessment of these programmes demonstrated positive and significant impacts on agricultural incomes (by 46 percent) and on increased levels of dietary diversity (5 percent).[152]

Rapid rates of urbanization worldwide are placing tremendous pressure on ever longer food supply chains to deliver nutritious foods safely and sustainably to ever more congested metropolitan areas. In many urban and peri-urban areas, poverty and inequality prevent the most vulnerable from accessing sufficient nutritious foods, while changing food environments and consumption patterns have led to rising levels of overweight, obesity and diet-related NCDs. Various processes linked to urbanization pose challenges but also present opportunities to create food systems that are more inclusive in providing greater access to nutritious foods to all, while also being environmentally sustainable.[153] In this context, appropriate urban food policies and efficient rural–urban linkages are critical for the transformation of food systems for greater affordability of healthy diets in peri-urban and urban settings (Box 10).[154] Small- and medium-sized cities can play a key role in strengthening rural–urban linkages because of their proximity to surrounding rural areas

BOX 10 THE QUITO AGRI-FOOD PACT: FACILITATING THE TRANSFORMATION OF THE CITY'S FOOD SYSTEMS

Similar to many cities in the world, inequitable income distribution in Quito, Ecuador, is preventing the most vulnerable populations from accessing adequate nutritious foods. Households of the poorest income decile consume foods that contain 20 percent more carbohydrates and 50 percent less animal protein than the richest income bracket.[153] The challenges of Quito's food system include dependence on long food supply chains from production to consumption, as well as vulnerability because of natural and man-made hazards, insufficient risk reduction measures and limited supply routes. Moreover, the availability and quality of food varies significantly across the city.[158]

In 2015, to address these challenges, the main stakeholders concerned with Quito's food system, including public institutions, the private sector, civil society organizations and development agencies, established the *Quito Agri-food Pact*. The pact provided a policy coordination space that, jointly with the municipality, then developed the *Quito Agri-food Strategy* to identify the main challenges facing the city.[159] A key challenge was the insufficient availability of fresh and nutritious foods in some of the most vulnerable neighbourhoods.

The promotion of urban agriculture represents an important part of the strategy. The project "AGRUPAR" has supported the creation of more than 4 400 urban gardens (84 percent of which are led by women) to increase the availability of nutritious foods not only for own consumption, but also to be sold in the city through significantly shorter food supply chains – thus lowering their cost. Forty-three percent of the produce from urban gardens is sold in local food markets, improving access to fresh and nutritious foods, particularly in the most vulnerable zones of the city. The network of urban gardens has played a significant role in improving the resilience of Quito's food system, as also demonstrated by the success of the gardens in continuing to supply nutritious foods even during the worst period of the COVID-19 pandemic.

Urban policies formulated and implemented through the engagement of all key stakeholders, as in the case of Quito, represent an excellent model of how to build coherent and integrated portfolios of policies to enable the transformation of urban food systems. The territorial approach and the development of appropriate governance mechanisms, among other important elements, can be replicated or adapted to similar contexts elsewhere to effectively provide healthy diets to all through sustainable food systems.

(referred to as a "functional territory") and in addressing key social, economic and environmental challenges.[155] Appropriate policy action can play a major role in supporting such functional territories to improve livelihoods and strengthen the resilience of people and of agri-food systems. Development of food systems in these functional territories furthermore holds potential for sustainably reducing poverty, food insecurity and malnutrition, as food systems respond to the growth of cities and the concurrent transformation of diets, which itself is dependent on rural-urban linkages.[156]

Urban agriculture is likely to deliver positive impacts on both dietary diversity and household incomes.[157] In **Brazil**, a longstanding project has been creating urban gardens in informal settlements and schools in Rio de Janeiro. The food produced has been for own consumption by the engaged households, with surpluses donated or sold to the neighbouring community, thus improving access to nutritious foods and generating income for urban dwellers. As in many other places, maintaining the supply of nutritious foods in urban areas has become a great challenge under the COVID-19 pandemic. In **Ecuador**, linkages between some areas of the city of Quito with a high prevalence of COVID-19 cases and farmers from the surrounding province have been strengthened through neighbourhood cultural societies that have established a marketing and distribution network, receiving food baskets from farmers and then distributing them to buyers

TABLE 11 KEY POLICY AREAS AND GOALS FOR INTERVENING ALONG FOOD SUPPLY CHAINS TO LOWER THE COST OF NUTRITIOUS FOODS

Policy area	Goals
Increasing investments for a more productive and diverse agriculture sector	▸ Increase the supply of safe and nutritious foods, lowering their cost.
Increasing the efficiency of food value chains	▸ Improve functioning of value chains to realize efficiency gains in storage, processing and marketing of food, thus lowering the cost of nutritious foods. ▸ Reduce food loss and waste through a coherent set of policies and investments in food production, harvesting, handling, packaging, storage, transportation, processing and marketing.
Creating an environment that promotes nutritious foods along the supply chain	▸ Adjust fiscal and other policies to influence relative prices of nutritious foods and of foods high in fats, sugars and/or salt.
Enacting mandatory food fortification in line with international guidelines	▸ Increase supply of fortified foods as part of a programme to address micronutrient deficiencies.
Promoting biofortification in line with international guidelines and regulations	▸ Increase production of foods with higher micronutrient content to address micronutrient deficiencies.

SOURCE: FAO, IFAD, UNICEF, WFP & WHO. 2020. *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO.

directly at their homes. These baskets include fresh fruits and vegetables produced organically, so urban dwellers have access to nutritious foods and farmers face a shorter marketing chain, which allows them to sell their products at a lower cost. These practices have continued following the pandemic lockdowns, creating new and innovative linkages between urban dwellers and rural food producers.[97]

The country cases under this fourth pathway highlight some of the key areas where there are opportunities for interventions along the food supply chain to lower the cost of nutritious foods, which are listed in Table 11. Additional policy recommendations aimed at lowering the cost of nutritious foods are discussed in more detail in the 2020 edition of this report.

5. Tackling poverty and structural inequalities, ensuring interventions are pro-poor and inclusive

Persistent and high levels of inequality seriously limit people's chances to overcome hunger, food insecurity and malnutrition in all its forms. Policies, investments and laws that address underlying structural inequalities faced by vulnerable population groups in both rural and urban areas are needed, while also increasing their access to productive resources and new technologies. About 80 percent of the extreme poor live in rural areas, where poverty rates are three times higher than in urban areas. The COVID-19 pandemic has aggravated this situation, exacerbating inequalities and negatively impacting on the lives and well-being of the rural poor, in particular.[160] If implemented successfully, this fifth pathway can reduce extreme poverty and structural inequalities through accelerated food systems transformation that is both pro-poor and inclusive.

In rural areas in particular, the transformation of agri-food systems presents an opportunity to some of the poorest smallholders who are not well integrated into food value chains. In South-eastern Asia, rural poverty among smallholders is exacerbated by the lack of access to productive resources and poor market integration, further compounded by climate-related and economic shocks, as well as periodic plant and animal disease outbreaks.[97] In this region, the integration of poor smallholders into food value chains has been facilitated through public-private-producer partnerships (PPPPs) that provide opportunities to overcome poverty and structural inequalities, especially where reinforced by improved governance mechanisms and multi-stakeholder platforms.[97]

In **Indonesia**, in 2017, the total production and value of cocoa had fallen by 70 percent from its peak in 2009, hitting smallholders' incomes and livelihoods particularly hard. Since 2014, in an effort to reduce the number of cocoa farmers

living below the poverty line and empower them to engage in a more efficient and resilient cocoa supply chain, a multi-stakeholder "whole of value chain" approach was introduced. The PPPP approach engaging 150 000 smallholders included, among others, increased access to financing and productivity-enhancing technologies, the introduction of traceability systems, product certification to capture premium prices, improved primary processing, nutrition education and the establishment of farmer organizations. Over a five-year period, cocoa yields increased by 73 percent, while empowered smallholders saw their incomes increase by more than 200 percent.[97]

In **Viet Nam**, about 500 000 mostly poor smallholder farmers earn their livelihoods from coffee production. In mid-2020, coffee prices had plummeted by 48 percent from a peak in late 2016, before recovering but remaining volatile. To help reduce smallholder vulnerability to both economic and climate-related shocks, provincial and district-level coffee boards were established to assist smallholders with improved technologies and good environmental practices in coffee production. The improved practices allowed the coffee to be certified for a premium on producer prices, while also strengthening the resilience of coffee growers not only to climate shocks, but also to likely future economic shocks.[97]

In **Morocco**, over the past decade, a cross-sectoral territorial approach has been implemented to address regional inequalities within the country.[161] A major investment programme has transformed a large geographic area of 5.2 million people, covering 16 provinces in the remote oases and argan tree zones. The programme focused on transforming the agri-food value chains of date palm and argan trees, two high-value crops. The population previously experienced relatively high levels of poverty, illiteracy and malnutrition, associated with harsh living conditions and vulnerability due to various natural and environmental threats (desertification, soil erosion, water scarcity, extreme weather conditions).[97] Over a ten-year period, the cross-sectoral territorial investment programme resulted in a 41 percent increase in regional per capita GDP, a 33 percent increase in farmer incomes and a 50 percent reduction in poverty rates, among many other positive development indicators.

Another initiative concerned with improving livelihoods of people living in remote areas is the Mountain Partnership Products (MPP) Initiative that aims at strengthening the resilience of mountain peoples, their economies and their ecosystems in eight countries.[97] In providing access to a certification and labelling scheme based on environmentally and ethically sound approaches, the MPP Initiative promotes short value chains, while ensuring transparency and trust between producers and consumers, fair compensation for the primary producers, conservation of agrobiodiversity and preservation of ancient techniques implemented in several countries. In **Bolivia**, for example, women producing certified honey from a local bee variety were able to strengthen their linkages with local markets, while preserving cultural traditions and local biodiversity.

In **Nepal**, during 2011–2018, an agriculture project covering some of the most remote hilly and mountainous areas of Karnali province adopted a whole value chain approach, to bridge information and access gaps between producers and markets. Targeted actions sought to make the new value chains more inclusive by breaking down the barriers that typically hold back participation of under-represented groups such as women and ethnic minorities. Results show that the project was successful in increasing annual income by 32 percent among its target groups, with crop and livestock income increasing by 47 percent and 44 percent, respectively.[162] Results show that project participants experienced lower levels of food insecurity (by 9 percent) and a higher food consumption score (by 4 percent).

The Nepal example alludes to a strong and common theme across many of the best practice case studies reviewed: the importance of empowerment, in one way or another, of poor and vulnerable population groups, often smallholders with limited access to resources or those living in remote locations, as a major lever in transformative change. Measures of empowerment vary widely, but include in particular the need for increased access to productive resources (access to natural resources, agricultural inputs and technology, financial resources, as well as knowledge and education). Other empowerment measures

relate to strengthened organizational skills (increased engagement in producer groups and cooperatives), certification programmes (e.g. for locally produced organic products), and importantly, access to digital technology and communication.

The effects of the COVID-19 pandemic have furthermore exposed structural inequalities, as women's productive and income-generating capacities have been impacted disproportionately, because of reduced economic opportunities and access to nutritious foods, while at the same time having to increase their workloads. Hence, policy responses should consider women's roles in agri-food systems and ensure that their multiple needs – as guardians of household food security, food producers, farm managers, processors, traders, wage workers and entrepreneurs – are adequately addressed.[163] Beyond merely "levelling the playing field", policies and interventions that help strengthen women's roles in food systems and their decision-making capacity can be a powerful source of food systems transformation.[164] The potential of addressing gender gaps to increase productivity has been well established,[165] while there is growing evidence that empowering women also results in improved nutritional outcomes for their children.[166] Innovations that support women's productive capacity either directly or indirectly by freeing up women's time are especially empowering, such as making drinking water more easily accessible, and enabling women to engage in productive activities, such as growing fruits and vegetables for household consumption.[119]

Youth represent a tremendous opportunity for transformative change in food systems, especially in less developed countries, where more than 80 percent of the youth live.[167] Youth (aged 15–24 years) make up about 16 percent (1.2 billion) of the world's population,[168] and as potential young entrepreneurs, they represent the future agents of change. Yet, the youth of today face greater constraints when compared with adults in accessing decent jobs,[169] productive resources, social capital and governance mechanisms that shape food systems.[170] Strengthening their skills and agency through training, positive role models and mentorship is central to untap their entrepreneurship and innovation potential.[171] Young entrepreneurs engaged in agri-food systems have been particularly hard hit by the COVID-19 pandemic, exacerbating existing challenges that young people face when engaging in agri-food systems, notably because of limited access to productive resources, finance and markets.[172] Generally, a lack of economic dynamism and employment opportunities in rural areas leads young people to migrate out of necessity.[173] Hence, within broader efforts to boost responsible investments, specific action is needed to increase youth access to productive resources, finance, markets and connectivity, as well as decision-making. Social norms that might prevent young rural people from taking advantage of new opportunities, especially vulnerable groups, such as young women and indigenous youth, also need to be addressed.[174]

Additional evidence of how the empowerment of both women and youth could accelerate food systems transformation for improved food security and nutrition is presented in Box 11.

Community-based approaches are key to building relationships and strengthening social cohesion, improving aspirations, confidence and trust, all of which are critical in tackling structural inequalities and in ensuring that policies, legislation and interventions are pro-poor and inclusive, and deliver equitable services. In **Burundi**, the *Caisse de Resilience* (CdR) is an integrated community-based and participatory approach that combines technical, financial and social dimensions in a mutually reinforcing way. Under this approach, small groups of rural households receive training in sustainable agricultural practices through farmer field schools, while a savings and loans fund managed by communities themselves enhances their financial capacities. This community-based participatory approach has resulted in increases in agricultural production of 30 to 60 percent, as well as increases in household income by some 40 to 52 percent.[97]

While recognizing the need to combat poverty in both rural and urban settings, illustrative country examples provided under this fifth pathway highlight the importance of tackling structural inequalities (as also illustrated in Chapter 3), while ensuring interventions »

BOX 11 ACCELERATING FOOD SYSTEMS TRANSFORMATION BY EMPOWERING WOMEN AND YOUTH

Women's empowerment often leads to improved nutrition because of positive effects on child and maternal health. In **Ghana,** women's empowerment is strongly associated with diet quality, and women's aggregate empowerment and participation in credit decisions is positively and significantly correlated with the indicator estimating Minimum Dietary Diversity for Women (MDD-W). A study in **Nepal** measuring outcomes against three of ten indicators of the Women's Empowerment in Agriculture Index (WEAI) found significant associations between women's empowerment and improved child nutrition.[175] Moreover, a study using the WEAI in six countries in Africa and Asia to help identify which dimensions of women's empowerment are related to household, women, and child-level dietary and nutrition outcomes has found that several indicators are positively associated with the Household Dietary Diversity Score (HDDS). The study also found that some trade-offs exist between increased participation of women in agriculture on the one hand, and women's workload and their own nutrition conditions on the other.[176]

In **Tajikistan**, a livestock and pasture development project addressed the effects of over-grazing and climate change on degraded pastoral land, with emphasis on supporting women-headed households. Among these households, livestock income increased by 47 percent and livestock ownership by 77 percent. In addition, women who benefited from the project realized significantly higher economic decision-making power. An unintended positive impact was on children's school attendance, which increased by 6 percent thanks to less time spent on water harvesting and livestock rearing, as well as increased household income.[177] In **Indonesia**, a coastal community development project promoted sustainable fishery and aquaculture production practices by providing production inputs and establishing processing facilities and market linkages. Women, who are primarily engaged in fish processing and marketing,[178] saw their empowerment increased by 27 percent, while fish productivity increased by 78 percent and post-harvest losses reduced by 5 percent. Diets of target groups became more diverse (by 6 percent) with higher consumption of seafood, dairy and fruits.[179]

Young people can similarly benefit from interventions that remove some of the age-specific constraints to their ability to productively engage in agriculture and food systems. Evidence from an empowerment and livelihoods for adolescents programme in **Uganda** showed how vocational and life-skills training could significantly increase the likelihood of adolescent girls of legal working age engaging in safe income-generating activities (by 48 percent), while reducing both teenage pregnancy (by 34 percent) and the likelihood of entering into early marriage or cohabitation (by 62 percent).[180] Especially for younger youth below 18, employment-focused interventions need to avoid drawing children into child labour situations, and thus need to target only youth of legal working age (14–15 years old in most countries) and engage them only in safe tasks. In **Senegal**, a comprehensive approach to diversified agricultural production improved market access of mostly vulnerable small-scale producers, women and underemployed youth by strengthening their access to markets and ensuring access to finance. Smallholders managed to diversify their production to include poultry rearing and vegetable production, in addition to groundnuts. Incomes from crop production increased by 48 percent, and total income increased by 11 percent among the project's target groups.[97] In **Zambia**, a market system approach was used to create opportunities for rural youth in agribusiness. During 2014–2019, more than 14 600 enterprises were supported, creating an additional 5 367 additional jobs of which more than 40 percent specifically for youth.[181] The approach aimed at inspiring companies working in agri-food value chains to coordinate more effectively, while developing and refining business models that are more youth-inclusive.

In **Guatemala**, rural youth were empowered through community-based social enterprises, promoting their role as agents of territorial and food system development. Following intensive training, young participants from migration-prone rural areas were able to assess local markets and community assets, mobilize both youth and adults in their rural areas and lead the design of community-based and environmentally friendly business plans. Over one-third of the young participants managed to gather small-scale local agribusiness into community clusters with at least 25 young and adult members. After one year, more than half of those clusters had been successfully registered as cooperatives or producer associations, with youth gaining credibility and self-confidence as changemakers, with several of them managing to sell directly to schools under the national school feeding programme.[182]

TABLE 12 KEY POLICY AREAS AND GOALS FOR TACKLING STRUCTURAL INEQUALITIES, ENSURING INTERVENTIONS ARE PRO-POOR AND INCLUSIVE

Policy area	Goals
Empowering vulnerable and historically marginalized populations	▸ Reduce inequality within households, with positive effects on food security and nutrition outcomes of women, children and youth.
Reducing gender inequalities in food security and nutrition and supporting women's economic activities in food value chains	▸ Increase productive capacity of men and women by ensuring equitable access to productive resources. ▸ Implement financial services support mechanisms targeting women's economic activities as producers, processors, traders and entrepreneurs.
Enacting reforms with a gender lens to enable more equal distribution of resources and access to social services	▸ Improve access to key agricultural productive assets. ▸ Increase access of vulnerable populations to essential services, primary healthcare and expanded social protection mechanisms. ▸ Improve income distribution within countries.

SOURCE: FAO, IFAD, UNICEF, WFP & WHO. 2019. *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Rome, FAO.

» are not only pro-poor and inclusive, but also empower women and youth as a means of accelerating transformative change in food systems. Key policy areas and goals in this regard are presented in Table 12. Additional policy recommendations supportive of this pathway can be found in the 2019 edition of this report.

6. Strengthening food environments and changing consumer behaviour to promote dietary patterns with positive impacts on human health and the environment

Access to nutritious foods and healthy diets is not only a matter of cost and affordability. Many elements of the food environment determine dietary patterns, while culture, language, culinary practices, knowledge and consumption patterns, food preferences, beliefs and values all relate to the way food is sourced, generated, produced and consumed. Dietary patterns have been changing and have had both positive and negative impacts on human health and the environment.[58] Hidden costs to human health and to the environment that characterize most food systems today are ignored. Given that they are mostly not measured either, they also go unaddressed and are unaccounted for in food prices, ultimately jeopardizing the sustainability of food systems. Therefore, based on the specific country context and prevailing consumption patterns, there is a need for policies, laws and investments to create healthier food environments and to empower consumers to pursue dietary patterns that are nutritious, healthy and safe and with a lower impact on the environment.[7]

The promotion and increased availability of highly processed foods has led to increased consumption of unhealthy diets affecting all ages. Promotion of breastmilk substitutes dissuades mothers from breastfeeding and weakens the ability of healthcare workers to fully support lactating mothers. Large food companies target much of their marketing to youth, and small-scale local production of foods of high energy density and minimal nutritional value is also expanding rapidly. As a result of these food environment changes, childhood overweight and obesity are rising as fast or faster than underweight is falling in every region of the developing world.[183]

Early adolescents are seeing the largest increases in the incidence of overweight, but it should be noted that it is an issue that has its roots in early childhood and even during the gestational period. The promotion and marketing of foods can influence food preferences and consumption, even in ways that consumers may not be aware of.[68] This has been recognized as one of the main drivers that explain today's dietary patterns, with children especially showing a susceptibility to this influence.[184,185] Restrictions on food marketing to children should be implemented as part of a comprehensive package of measures to create healthy food environments that enable dietary choices for optimal nutrition and good health. International guidelines can provide clear recommendations on the marketing of breastmilk substitutes, complementary foods, and foods and beverages for older children.[186,187,188] Highlights of best practices from several countries are presented in Box 12. »

BOX 12 PROTECTING CHILDREN FROM THE HARMFUL IMPACTS OF FOOD MARKETING

Protecting children of all ages from the harmful impacts of food marketing is an essential food system action, a moral imperative and a human rights obligation.[198,199,200] It can be done through a combination of legislation on marketing of breastmilk substitutes, foods for infants and young children, and marketing to which children are exposed in general. Notwithstanding the existence of global rules on food marketing,[186,201,202] no country has yet implemented comprehensive best practice legislation to protect children from birth to 18 years from the harmful impact of food marketing. Nevertheless, a number of countries have implemented elements of best practice, including India,[203] Brazil,[204,205] the Philippines,[206] Chile[207] and Turkey[208] as summarized below.

Because the determinants of malnutrition are so multi-factorial, it is very challenging to unpick the nutritional impact of any single policy measure, but data from **India** and **Chile** point to how well the laws are working. In India, sales of infant formula remained steady between 2002 and 2008, while sales in **China**, in comparison, more than tripled; the more robust Indian marketing legislation has been proposed as a factor.[209] Exclusive breastfeeding in India increased from 46 percent in 1992 to 55 percent in 2015.[210] Following implementation of **Chile's** law of food labelling and advertising, pre-school children's and adolescents' exposure to advertising for restricted foods dropped,[211] and sales of these foods in school food kiosks dramatically declined.[212] Purchases of foods and beverages high in salt, sugar, energy or saturated fat,[207] which are required to carry front-of-pack warning labels, fell by 24 percent following introduction of the regulation.[213]

The barriers that countries face in implementing food marketing laws include opposition from powerful vested interests, as well as difficulties in addressing cross-border marketing and monitoring digital marketing. International guidance is available to support countries in implementing comprehensive measures to protect children of all ages.[186,187,214] Marketing measures should be considered as part of a comprehensive portfolio of policies to reduce all forms of malnutrition and to support healthy diets.

ELEMENTS OF BEST PRACTICE TO PROTECT CHILDREN FROM THE HARMFUL IMPACT OF FOOD MARKETING

Element of best practice		Country examples
Legislation covering all relevant foods	Infants and young children: complementary foods covered.	**Brazil**: Legislation covers any complementary foods for young children up to 36 months.
	Marketing of foods to children: robust, transparent nutrition criteria used to define foods high in fats, sugars and/or salt (HFSS).	**Chile**: The law defines "high" levels for calories, saturated fat, total sugars and sodium in foods and beverages. **Turkey**: Nutrient criteria are closely aligned with WHO European regional nutrient profile model used to define HFSS foods.
Protection for all children from birth to 18 years	Infants and young children: covers children up to 36 months.	**Philippines**: The law extends to products marketed or labelled as being suitable for infants and children up to 36 months.
	Marketing of foods to children: covers children up to 18 years.	**Turkey**: Broadcast regulations are intended to protect all children up to 18 years.
All forms of marketing are regulated (media channels and promotional techniques)	Infants and young children: covers children up to 36 months.	**Philippines**: Prohibition of advertising, provision of samples or gifts, point-of-sale promotions, with robust provisions to keep industry at arm's length from health workers/facilities, and strict rules on product labelling, as well as the use of cartoons.
	Marketing of foods to children: covers children up to 18 years.	**Chile**: Wide scope covering: television advertising; use of cartoons and toys; sale and promotion of food in schools (including sponsorship or educational resources); product labelling.
Robust monitoring and enforcement, with meaningful sanctions	Infants and young children.	**India**: A monitoring mechanism, in place from the outset, authorizes consumer organizations to report violations, which the authorities are obliged to investigate.
	Marketing of foods to children.	**Turkey**: Baseline study conducted in 2017 (WHO and Ministry of Health) to monitor digital food marketing to children. **Chile**: Enforcement is well coordinated by the Ministry of Health, and implemented by regional health authorities.

SOURCE: UNICEF/WHO.

BOX 13 NUTRITION POLICY MEASURES TO ENHANCE BENEFITS AND MINIMIZE RISKS OF TRADE

Trade can improve the availability and diversity of nutritious foods, but it can also increase the availability, accessibility and affordability of highly processed foods that are high in fat, sugar and/or salt.[217,218] In response, national policymakers have implemented different measures to ensure coherence between trade and nutrition policies, utilizing available mechanisms under trade agreements to implement measures to protect public health, in line with the Framework for Action recommendation from the Second International Conference on Nutrition (ICN2).[219]

Minimizing trade-related risks: Ghana's use of food standards

Ghana experienced a dramatic increase in imports of meat products as a result of trade liberalization in the late 1980s and early 1990s. The Ghana Health Service raised particular concerns about rising consumption of one particular product – namely, imported turkey tails (known as *tsofi* locally), which have a very high fat content (up to 40 percent). In response to these concerns, the Ministries of Health, Trade and Agriculture collaborated to set standards for the maximum amount of fat in carcasses and cuts of meat, including an upper limit of 15 percent for poultry, which were applicable to meats regardless of origin (i.e. applied to both domestic and imported products).

The overall effect of these standards has been to reduce the availability of turkey tails in the Ghanaian food supply for over 20 years. Import data show that imports of unspecified turkey cuts, which includes tails, declined following introduction of the standards in the 1990s. At times, due to fluctuation in imports, the measure has been reinforced by enhanced publicity and high-profile enforcement action, bringing imports down again. Moreover, these standards have been adopted and implemented without allowing domestic production of fatty meats to increase to compensate for the drop in imports.[220,221]

Enhancing the benefits of increased trade: Fiscal policies in Fiji

Fiscal policies such as taxes, subsidies and changes in import tariffs (customs duties), can be used to minimize the risk and/or enhance the benefits of increased trade. One example of an approach to enhance the benefits of trade is the Fijian Government's removal of customs duties on imported vegetables in 2013.[222] As in other Pacific Island countries, globalization and increased international trade have influenced the nutrition transition in Fiji, which has contributed to elevated levels of overweight and obesity in the country (adult obesity was 30 percent in 2016)[210] and the high burden of NCDs.

Based on advocacy work by the Ministry of Health with support from the Consumer Council of Fiji and the academic sector, a new customs policy was introduced to improve access to vegetables in Fiji.[223] In 2012, customs duty was decreased from 32 percent to 5 percent on vegetables not grown or produced in Fiji; then in 2013 an excise tax of 10 percent on all imported vegetables was eliminated, while revenue losses were offset by increasing duty on less nutritious foods.[223]

The volume of imported vegetables, which are not grown in Fiji, including leeks, capsicums, cauliflowers and celery, increased substantially between 2010 and 2014. Imports of carrots – a vegetable, which is grown in Fiji – also increased, but not to the same extent.[222] Further research is needed to explore how this greater availability of vegetables translates to vegetable consumption in the diet of Fijians.[223]

TABLE 13 KEY POLICY AREAS AND GOALS FOR STRENGTHENING FOOD ENVIRONMENTS AND CHANGING CONSUMER BEHAVIOUR TO PROMOTE DIETARY PATTERNS WITH POSITIVE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT

Policy area	Goals
Implementing healthy public food procurement and service policies	▸ Ensure that food sold or served in schools, hospitals and other public institutions contributes to healthy diets.
Improving trade standards with a nutrition-oriented focus	▸ Enhance the role of trade for increasing the availability and affordability of healthy diets.
Taxation of energy-dense foods high in fats, sugars and/or salt and subsidizing nutritious foods	▸ Lower consumption of food with negative impact on human health. ▸ Ensure nutritious foods are more affordable than energy-dense foods.
Enacting legislation on food marketing	▸ Protect all people, and in particular children from birth to 18 years, from harmful impacts of food marketing.
Enacting labelling rules, including interpretive front-of-pack nutrition labelling	▸ Help consumers to shift their preference towards nutritious foods, in using interpretive nutrition labels on the front, as well as nutrition information panels on the back of food packaging.
Regulating industrially produced trans fats	▸ Eliminate industrially produced trans fats from the food supply chain.
Reformulating food products and beverages	▸ Reduce levels of salt/sodium, sugars, calories and/or saturated fat in highly processed food.

SOURCE: FAO, IFAD, UNICEF, WFP & WHO. 2020. *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO.

» Regulatory approaches can be used to improve the nutritional quality of widely available processed foods that enable dietary patterns with more positive impacts on health. Since 2004, **Argentina** has implemented successive policies to reduce industrial trans fats in the food supply, including voluntary reformulation in cooperation with the food industry, mandatory trans-fat labelling and, ultimately, mandatory limits for levels in foods.[189] By 2015, 93 percent of foods were reported to be compliant.[190] Multisectoral cooperation between relevant government ministries and research institutes, consumer groups, academia and the food industry provided technical support to the process.

In the **Republic of Korea**, "green food zones" were established in 2009–2010, prohibiting the sale of foods of high energy density and minimal nutritional value, including fast foods, within 200 metres of selected schools. By 2017, "green food zones" were established around more than 90 percent of all schools. This was part of a wider package of regulatory measures introduced to protect the nutrition of children and young people, including, among others: introduction of traffic-light nutrition labelling and menu labelling in chain restaurants; a ban on sales of sweetened beverages within all school premises; restrictions on marketing for high-calorie, low-nutrient foods and high-caffeine foods directed at children and food quality certification for children's foods.[191,192,193,194]

Efforts to encourage the consumption of nutritious foods and avoid negative impact on human health include the reformulation of foods,[195] which targets the main sources of food that are of concern to human health, such as saturated fat or trans fats, sugars and/or salt. In **Kuwait**, the Food and Nutrition Administration identified locally produced bread as a key source of salt in the population's diet and approached the government-owned flour mills and bakeries, which produce most of the country's bread, about progressively reducing the levels of salt.[196] Within two months, the salt content of flat white bread had been reduced by 10 percent, and within the year, a 20 percent reduction of salt content had been achieved.[197]

Many countries have seen their food systems transform rapidly as a result of globalization.[7] Over the past several decades, increasing levels of international trade in food and agricultural products have played a key role in ensuring

a sufficient supply of staple foods, while also maintaining dietary diversity in the provision of nutritious foods, in particular where the availability of fresh fruits and vegetables may drop significantly for part of the year. Yet, trade policies, including protectionary trade measures, may affect the availability and cost of nutritious foods on local markets, as well as the supply and price of energy-dense foods. Similarly, while non-tariff trade measures can help improve food safety, quality standards and the nutritional value of food, they can also drive up the costs of trade and hence food prices, negatively affecting affordability of healthy diets.

In **Peru**, for example, the US-Peru free trade agreement eliminated a 25 percent tariff on soft drinks from the United States of America, which resulted in increased investment flows, followed by an increase of 122 percent in soft drink production in the country (including juices, bottled water and energy drinks).[215] An initial rise in sugar consumption from sugar-sweetened beverages eventually stagnated at elevated levels. As part of a comprehensive approach to NCD prevention in Peru, especially given rising prevalence of overweight and obesity, the country has raised taxes on sugar-sweetened beverages.[216] Since 2019, a tiered system of taxation – with higher tax rates on drinks with higher levels of sugar – has been in place. As well as the expected impact on consumer purchases, especially when combined with the front-of-pack warning label required on beverages high in sugar, this type of tax can act as a powerful driver for industry to reformulate products to reduce the sugar content.

A number of nutrition policy measures can enhance benefits and minimize risks of increased trade and investment in global food systems (Box 13).

Table 13 summarizes the key policy areas, including related laws and regulations to strengthen food environments and changing consumer behaviour to promote dietary patterns with positive impacts on human health and the environment. Additional policy recommendations related to this pathway can be found in the 2020 edition of this report. ■

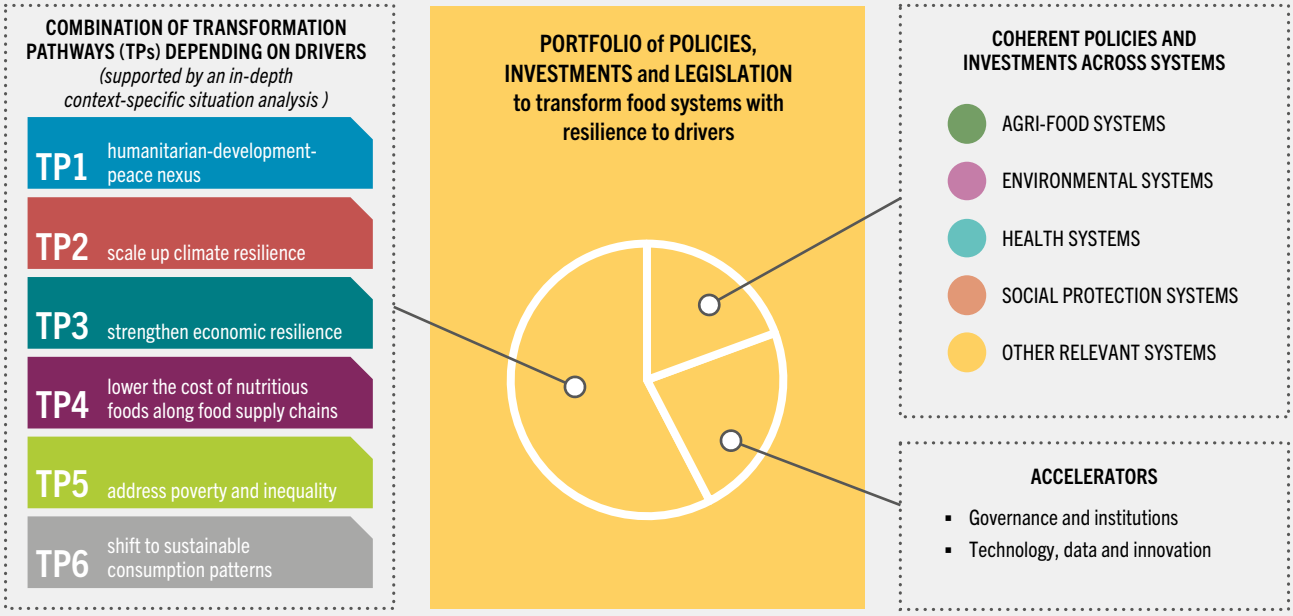
4.2 BUILDING COHERENT PORTFOLIOS OF POLICIES AND INVESTMENTS

Key elements of portfolios of policies and investments

As elaborated above and illustrated in Figure 28, the formulation of comprehensive portfolios of policies and investments starts with a context-specific situation analysis to obtain an in-depth understanding of the country context, including the nature and intensity of major drivers impacting upon food systems and the prevailing food security and nutrition situation, in addition to the identification of relevant actors, institutions and governance mechanisms. The situation analysis will enable countries to assess which combination of pathways towards the transformation of food systems is most relevant, given the way in which the major drivers of food insecurity and malnutrition have affected them, and which policy measures and investments are most appropriate to form part of the portfolio (Figure 29, left-hand side).

Given the cross-sectoral nature of interventions needed to transform food systems and achieve food security and improved nutrition (as illustrated in the examples presented in the previous section), coherence with policies and investments between agri-food, environmental, health, social protection and other systems such as education, energy, trade and finance is essential for effective transformative change (Figure 29, right-hand side). Coherence is needed not only for effective formulation, but also for the efficient and accelerated implementation of the portfolios, all of which call for multi-stakeholder governance mechanisms and supportive institutions. Importantly, apart from access to productive and financial resources, systemic transformative change requires development and generation of (and access to) appropriate technology, data and innovation, referred to as accelerators to spur the transformative processes (Figure 29, right-hand side).

FIGURE 29 KEY ELEMENTS OF A PORTFOLIO OF POLICIES AND INVESTMENTS



SOURCE: FAO.

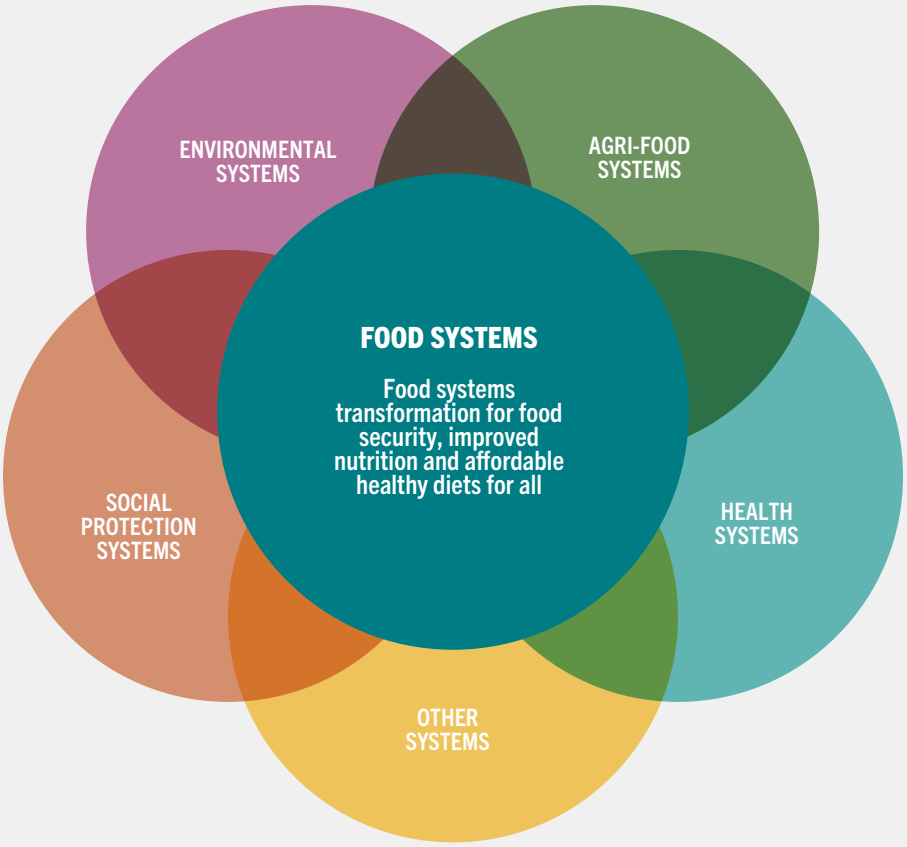
Following the in-depth discussion of best practices and policy measures along the six possible pathways towards the transformation of food systems in the previous section, the remainder of this chapter reviews the importance of coherence across relevant systems, as well as the role of accelerators. A number of existing systems approaches that represent useful frameworks for building coherent portfolios and facilitating multisectoral investments and action to achieve food security and improved levels of nutrition are also briefly discussed.

Coherence of food system policies and investments with other systems

The overall performance of food systems depends on their coherence and interaction with several other systems, including especially the wider agri-food systems, in addition to environmental, health and social protection systems.
Other systems play a critical role throughout the food system, from providing the necessary knowledge and skills in food production to nutrition education for school-aged children and raising consumer awareness for better informed choices towards minimizing the negative impacts of food consumption on human health and the environment. Energy systems are essential to the functioning of food systems, as they provide the energy for food production, transportation, food processing, storage and consumption. In the specific context of food systems transformation, energy systems are critical in ensuring increased productivity and in reducing food losses and waste. Increased energy efficiencies may help lower the cost of safe and nutritious foods.

Given the important interrelationships among systems, food systems emerge as a potential common space for advancing co-benefits for a range of policy goals efficiently and effectively.[57] Hence, apart from the identification of policy and investment portfolios to transform food systems

FIGURE 30 ENSURING COHERENCE AND COMPLEMENTARITY AMONG AGRI-FOOD*, ENVIRONMENTAL, HEALTH, SOCIAL PROTECTION AND OTHER SYSTEMS FOR FOOD SYSTEMS TRANSFORMATION FOR FOOD SECURITY, IMPROVED NUTRITION AND AFFORDABLE HEALTHY DIETS FOR ALL**



NOTES: * Agri-food systems include fisheries and forestry systems. ** Other systems include additional systems that are critical to food systems transformation, including among others: education, energy, legal, social, economic, finance, trade and marketing systems.
SOURCE: FAO.

themselves, policy coherence is needed, not only across the different transformation pathways described above, but also with other systems that underpin the long-term sustainability of these food systems, as shown graphically in Figure 30.

Agri-food systems comprise both agricultural and food systems and encompass the entire range of actors and their interlinked value-adding activities. This includes the primary production of food and non-food products in agriculture, fisheries and forestry, as well as food storage, aggregation, post-harvest handling, transportation, processing, distribution, marketing, disposal and consumption.[224] Agri-food systems interact with non-food supply chains through the purchase of agricultural inputs and by providing intermediate inputs to the production of non-food commodities, such as maize for biofuel production or cotton for textiles. As stated in Chapter 3, while broader agri-food systems transformation is of utmost

importance, it is covered extensively in the forthcoming publication on *The State of Food and Agriculture in the World 2021*,[224] and is beyond the scope of this report.

Nevertheless, in the context of building portfolios of policies and investments towards the transformation of food systems, ensuring coherence among those policies and investments specifically aimed at food systems on the one hand, and those in the broader agri-food systems domain on the other, is important for a number of reasons – not least given the importance of agri-food systems in providing income and employment for millions of households. Clearly, both agri-food systems as well as food systems (forming an integral part of agri-food systems) are affected by the same drivers outlined in Chapter 3, and influenced and shaped by the same social, economic and natural environments in which their production systems are embedded.

Environmental systems interact with food systems primarily at the production level in providing the necessary environmental conditions and nutrients in the agriculture, fisheries and forestry sectors for food to be produced. Food and agricultural production systems, on the other hand, impact on the environment in multiple ways, including through their impact on biodiversity, soil and water quality, animal and plant health, greenhouse gas emissions, toxicity, as well as food loss and waste. Hence, there is an increased recognition of the need for nature-positive production and supply models which "produce more with less" to ensure sufficient nutritious food supplies for a growing world population over the coming decades. Nature-positive production involves actions aimed at the three interrelated goals of protecting nature, sustainably managing existing food production and supply systems, and restoring and rehabilitating natural environments:[111]

- **Protecting nature:** Given how inefficient current systems are, it is possible to maintain production levels, while halting the encroachment on natural ecosystems and protecting marginal agricultural areas rich in biodiversity, such as peatlands and mangroves. A recent global estimate suggests that up to 40 percent of global agricultural land could be restored without reducing production, if inputs used and crop distribution were optimized while respecting biodiversity hotspots.[225]
- **Sustainably managing existing food production and supply systems** renews ecosystems' ability to provide healthy soil and clean water, and also supports biodiversity. This is accomplished by increasing efficiency while reducing external inputs, favouring the circular use of resources, and supporting multiple ecosystem services (e.g. through rotations that diminish the need for chemical fertilizers while promoting soil health and carbon absorption). A rich menu of options exist (ranging from regenerative practices based on intercropping and short rotations to precision agriculture and innovations for sustainable agriculture), to be adopted and tailored to the local context.
- **Restoring and rehabilitating natural environments**: Nature-positive production can contribute to restoring the one-third of global land considered degraded, by either rewilding it or by restoring its agricultural productivity (and therefore helping to avoid additional land conversion for agriculture), while also contributing to preserving the quality of all land resources.

Health systems and their services are vital in ensuring that people are able to consume foods and utilize the necessary nutrients for their health and well-being. Food systems may exert both positive and negative impacts on human health through multiple interrelated pathways, which are influenced by factors arising from within and outside food systems, including social, economic and environmental determinants of health. Closer examination of the food–health nexus indicates that unhealthy diets are among the key risk factors driving the global burden of disease; moreover, the negative health impacts associated with poor quality diets are significant. According to the Global Burden of Disease initiative, 20 percent of premature deaths worldwide are associated with a poor quality diet.[226] Poor quality diets include those diets with too high a content of foods high in fats, sugars and/or salt of minimal nutritional value and too low levels of protein quality. Adequate breastfeeding and child feeding for

infants and young children are important to ensure good quality diets. With current food consumption patterns, diet-related health costs linked to mortality and NCDs are projected to exceed USD 1.3 trillion per year by 2030.[7]

Food systems impact human health and well-being in several ways, including through: unhealthy diets and food insecurity; zoonotic pathogens (originating from both farmed and wild animals) and antimicrobial resistance (AMR); unsafe and adulterated foods; environmental contamination and degradation; and occupational hazards.[139] Illnesses may occur from the ingestion of foods containing various pathogens and toxicants; there are also risks with the consumption of altered and novel foods. Globally, an estimated 33 million healthy life years are lost due to the consumption of unsafe food.[227] Malnutrition in all its forms increases susceptibility to foodborne diseases, zoonosis, physical injuries and mental health issues and vice versa, while healthy diets and healthy food systems help protect against these susceptibilities. With specific reference to zoonotic diseases, the multisectoral and multidisciplinary One Health approach builds national mechanisms to address health threats at the human-animal-environment interface.[228,229]

Many of the public health policy goals rely on the effective functioning of food systems to deliver safe and nutritious foods in a sustainable way (as also reflected in the SDGs). For example, the nutritional quality of foods produced and supplied affects dietary goals and diet-related health goals. At the same time, the ways in which food is grown, distributed and consumed also affect environmental goals, while employment and income generation in agriculture affect economic goals for producers and farmers, including strategies aimed at the reduction of rural poverty and income inequality.

Poverty and inequality make these food system-related health impacts more likely and increase their severity. There can be serious health consequences from different forms of environmental contamination – including from heavy metal contamination, fertilizers, pesticides, air pollution and smog, GHG emissions and microplastic pollution. Similarly, there are many occupational hazards (e.g. the use of pesticides, drowning and physical injuries) that affect the health of, among others, farmers, agricultural workers, fisherfolk, those working within the food processing and retail sectors, and other food chain workers.[139]

Policies, laws, regulations and investments in health systems form part of the food–health nexus. Universal health coverage is essential to ensure healthy lives and to promote human well-being. Universal coverage implies that all people can use the health services they need and that these services are of sufficient quality and do not expose people to financial hardship. Inputs from health systems can support and reinforce food systems transformation, for example, through the provision of essential nutrition actions in universal health coverage,[230] including among others:

- Nutrition counselling during pregnancy and support to breastfeeding and complementary feeding, alongside food system measures to regulate the marketing and promotion of breastmilk substitutes and foods for infants and young children.
- Early detection and support for the management or treatment of different forms of malnutrition, which is critical in informing food systems transformation, as well as social protection needs in crisis situations.
- The use of micronutrient supplements for vulnerable groups can be an appropriate interim measure until food systems are transformed to provide greater dietary diversity and ensure everyone has access to affordable healthy diets at all times.

Additional health system actions can be reinforced through nutrition-responsive social protection systems, including social transfers, maternity leave protection and breastfeeding support policies. In the context of the COVID-19 pandemic, it has been particularly critical to strengthen the health system response for nutritional care, as already strained healthcare systems are being forced to divert resources from essential nutrition-related services.[37,46,66,231] The inextricable linkages between food systems and health systems highlighted above demonstrate the importance of coherence among food and health systems policies, laws, regulations and investments.

Food environment policies that foster food system changes towards healthy diets are also important. As illustrated in pathway 6 above, relevant policies are needed to create healthy food environments by using standards and legislation to improve the nutritional quality of food products and beverages; use fiscal policies to influence relative prices of nutritious foods and foods high in fats, sugars and/or salt; limit harmful food marketing; require packaged foods to carry nutrition labels that help people to choose healthier diets; and ensure that foods contributing to healthy diets are served in schools, hospitals, care homes and other public institutions, as well as food aid programmes. In addition, policies that encourage changes in consumer behaviour to encourage healthier and more sustainable food consumption and food waste reduction are needed.[7]

Social protection systems represent a set of policies and programmes, often grounded in enforceable legislation, that address economic, environmental and social vulnerabilities to poverty, food insecurity and malnutrition by protecting and promoting livelihoods, in particular through the reduction of financial and social barriers to accessing food and other essential needs.[7,232] The impacts of a sudden loss of income and employment for hundreds of millions across continents has stretched the capacity of social welfare and social protection systems to the limit, resulting in deeper inequalities and increased poverty levels.[233] Millions of children have been out of school for more than a year, losing out not only on education, but also daily school meals that make up an important proportion of their daily nutrient requirements.[234]

Nutrition-sensitive social protection programmes are particularly effective in supporting poor people and those living under crisis conditions who do not have basic access to sufficient nutritious food to consume healthy diets nor to essential complementary nutrition, health and sanitation services. However, social protection policies and programmes do not always lead to greater affordability of healthy diets. Coherent investments in food, agriculture and social protection are crucial for eradicating hunger and poverty, but their effect on increasing the quality of diets and the affordability of nutritious foods depends on several factors, including effective targeting, adequate transfer amounts and modalities, and effectively integrating nutrition-specific components.[235,236,237]

Social protection programmes can be effective in overcoming drivers of food insecurity and malnutrition in all its forms and in improving the affordability of healthy diets in two principal ways:

- **Supporting household incomes and livelihoods** for the poorest and most vulnerable groups. Measures include boosting job creation and implementing labour market policies, such as public works programmes that can be used as short-term measures to support purchasing power in times of crisis and for developing assets that bring future returns to livelihoods; social assistance initiatives, such as cash transfer programmes that provide support to meet the most immediate needs and that enable households to invest in their productive activities;[235] and increasing universal access to healthcare, education and social services that could safeguard against setbacks to families, nations and regions.[5]
- **Improving access and affordability of healthy diets** through school food and nutrition programmes (among others) especially designed to improve dietary diversity, while also encouraging the purchase of fresh food from local producers. In-kind transfers, especially in places where food markets are not functioning well, could increase access to nutritious foods, in addition to food subsidies, especially those focused on nutritious foods and targeted at the most vulnerable.[7]

Large-scale investments in social protection systems have served as powerful instruments for strengthening people's access to nutritious food, particularly for vulnerable groups in both urban and rural settings. And while it is recognized that the capacity of LMICs to finance such investments has been limited, with the right investments, laws, regulations and policies in place, social protection, health systems and food systems can work together to improve coverage of a population's health and nutritional needs.[37]

Importantly, given the impact of measures to stem the COVID-19 pandemic, such complementary policies and investments should ensure that public funds are used to keep local and national food markets functioning, strengthen health responses for nutritional care, and empower women and caretakers who make household decisions, especially about food choices. Actions to protect food workers and close gaps in food distribution are critical to reach the most vulnerable.[37] Importantly, social protection is more than a short-term response to acute situations of food insecurity and malnutrition. It is when reliable and well targeted, social protection can support households to engage in new economic activities, and to capitalize on opportunities created by the continued economic dynamism of food systems, thereby bringing about longer-term improvements in access to healthy diets, in addition to stimulating the development of local economies.[238,239,240]

The role of accelerators in food systems transformation

The effective and efficient implementation of portfolios of policies and investments requires an enabling environment of governance mechanisms and institutions that facilitate consultation across sectors and key stakeholders.[241] At the same time, scaling up the availability of technologies, data and innovative solutions is key to accelerating the transformative processes.[242] Food systems transformations are often attributed mainly to technological innovations, overlooking the importance of social and political conditions in enabling its implementation.[243] Importantly, a wide range of institutional, policy and socio-cultural innovations are needed to enable the deployment and adoption of new technologies and innovations for systemic transformation of food systems.[244]

Lessons drawn from country-level best practices towards food systems transformation confirm the relevance of accelerators linked to institutional, policy and socio-cultural factors with high transformative potential, combined with the implementation of new technologies, the extended use of data and the promotion of innovative solutions to build resilience to food insecurity and malnutrition drivers. These two broad categories of accelerators of food systems transformation – effective governance and institutions, and access to technology, data and innovations – are discussed below.

Governance and institutions

The importance of effective governance and institutions to the implementation of coherent and complementary food systems policies has been increasingly recognized, especially after the food price crisis of 2007–2008.[245] There are many existing mechanisms at global, regional, national and local levels, all of which aim to ensure adequate consultation and collaboration across sectors and among key actors.[aq] International coordination mechanisms facilitate, among others, the setting of standards (such as harmonized sanitary and phytosanitary regulations) and other trade-related measures to enhance regional and international trade. At national levels, the most effective governance mechanisms for the coordination of multisectoral actions across systems are best located at a super-ministerial level in close consultation with sector-specific ministries and institutions. Importantly, these governance mechanisms should facilitate engagement of key actors from public and private sectors and from civil society.

In 2016, more than three-quarters of countries reported having multisectoral mechanisms to coordinate nutrition work – most commonly involving health, agriculture and education.[246] Such coordination mechanisms may need to be further expanded to ensure a whole-of-government approach and for increased policy coherence. Case studies have identified strengths and weaknesses in current governance mechanisms: a 2017 diagnostic study on food systems governance in **South Africa** reviewed what forms of institutional arrangements are most appropriate. It found that the

aq At global level, relevant mechanisms for advancing food security, improved nutrition and healthy diets include the follow-up to the Second International Conference on Nutrition (ICN2), held in 2014; the UN Decade of Action on Nutrition (2016–2025); and the UN Food Systems Summit and the Tokyo Nutrition for Growth Summit (N4G), both to be held in 2021. Furthermore, the multi-partner global Committee on World Food Security (CFS) develops and endorses policy recommendations and guidance on a wide range of food security and nutrition topics.

existence of three governance mechanisms created various challenges as the dominance of single government bodies in programme implementation limited flexibility in policy responses and lacked stakeholder participation.[247]

In **Mexico**, an inter-sectoral governance mechanism was established in 2020 with multiple objectives to address poverty, inequality, environmental challenges, food insecurity and malnutrition through the sustainable transformation of food systems. The mechanism involving 18 thematic working groups covering a wide range of public sector institutions, civil society and UN agencies concerning health, food and the environment. Over a short period of time, the body has successfully promoted the introduction of the front-of-package nutritional labelling, as well as an agreement to phase out glyphosate and genetically modified corn for human consumption. The still pending formal recognition of this inter-sectoral approach towards the transformation of food systems in Mexico remains a constraint, as it prevents the institutions engaged from raising the necessary investment and undermines further progress towards food security and improved nutrition.[97]

Political dialogue and advocacy are essential to generate political commitment and broad support for food systems transformation. While policymaking remains the role of government, a key condition for transformative change is to create an enabling environment that allows different actors in public and private sectors and within civil society to interact, while setting up transparent rules of engagement, including identifying and managing conflicts of interest. Within food systems, interaction is needed among smallholders and agribusinesses; among food suppliers, marketing agencies and consumers; and among regulators and those who must comply with the regulations. Multi-stakeholder mechanisms that engage in the formulation and implementation of policies and investments, and that provide robust safeguards against possible abuse and conflicts of interest, have proven to be effective consultative platforms. Effective governance should also include built-in accountability mechanisms and strengthened oversight, monitoring and evaluation, including multisectoral information systems for reliable and timely data to inform policy development.

The **Association of Southeast Asian Nations** (ASEAN) has made wide use of multi-stakeholder platforms (MSPs) in seeking transformative change, including to strengthen food value chains at country and subnational levels, as well as addressing issues of regional concern (such as implications of the COVID-19 pandemic), in addition to exploring opportunities to strengthen smallholder engagement in food value chains through digitization. In six of the ASEAN member nations, public-private-producer partnerships (PPPPs) are being supported by country networks and a regional network, composed of more than 520 organizations across the region, representing the public sector, multinational corporations, local agribusinesses, civil society, farmer associations, and academic and research institutions.[248]

Technology, data and innovation

Technology, data and innovation – at food production levels, throughout the food value chain, and in the consumer environment – represent an essential set of accelerators to speed up transformative change in food systems. Technological innovations over the past century have been responsible for fundamental improvements in food production, processing and distribution, leading to important improvements in human well-being. The challenges currently faced by all actors in introducing systemic changes towards healthier, more equitable, resilient and sustainable food systems call for urgent technological and innovative changes.[249] The list of available technologies at all stages of the value chain that can increase the availability of nutritious foods is immense, and ranges from improved vegetable seed varieties to hydroponics to vertical farming in urban areas. Meanwhile, there are numerous new technologies across the food system with transformational potential that are ready to be adopted.[244]

Beyond the data and analytical capacity needed for an in-depth situation analysis to inform priority actions in the transformation of food systems referred to above, there is also a need for improved data, analysis and decision-making tools in the implementation of policy and

investment portfolios for the accelerated transformation of food systems. New means are being explored to fully exploit the ongoing data revolution to help transform food and agricultural systems worldwide through evidence-based, country-led and country-owned initiatives. Sophisticated tools are available, including advanced geo-spatial modelling and analytics to identify opportunities to raise incomes and reduce vulnerabilities of rural populations, who constitute the vast majority of the world's poor.[250]

Innovations along the food value chain. Measures taken to contain the COVID-19 pandemic have had an unprecedented impact on food value chains. Both the food supply and demand side have faced important challenges: linkages between farmers, intermediaries, wholesalers, processors and retailers have been more difficult, due to lockdown measures, while consumers have had to endure not only physical challenges in accessing food (with the closure of retail stores and mandatory stay-at-home orders), but also drastic reductions in their economic access to food. Economic recessions have triggered record losses in income, employment and livelihoods worldwide, hitting in particular the most vulnerable populations the hardest.[251]

Nevertheless, and contrary to some initial assumptions, most food supply chains have shown to be resilient and have continued functioning, as innovations were introduced and speedy decisions were taken to protect food supply chains as an "essential service" during the pandemic.[252] And, while these measures have been applied more widely to modern and vertically integrated supply chains rather than to traditional (i.e. much shorter) food supply chains, measures taken during the COVID-19 pandemic have accelerated changes in food supply chains worldwide. Many innovations and new technologies have spread rapidly, including an unprecedented expansion of digitization, to maintain food supply chains during the periods of lockdown and constrained transportation and distribution systems.[251]

In **Bangladesh**, COVID-19 lockdowns put tremendous pressure on farmers, as the flow of agricultural products and inputs was heavily disrupted. Farmers faced challenges in procuring inputs such as fertilizers and feed, and in selling their harvested products. There were significant drops in prices of all perishable products such as milk, vegetables and fish. With breaks in the supply chains and increasing concerns over health risks faced by their members and farm workers, farmer organizations facilitated the setting up of virtual call centres (VCCs). VCCs facilitate local coordination and communication to support farmers in continuing to sell their commodities, buying essential inputs and services, and sharing best practices during the pandemic. The VCC innovation has improved efficiency and productivity through cooperation and technology, and also increased smallholder incomes. This has strengthened direct linkages between food producers and traders, while benefitting local communities through increased economic activity.[97]

New and promising technologies can effectively reinforce food systems' resilience to the drivers of food insecurity and malnutrition, at the same time that these are transformed to provide healthy diets with sustainability considerations. For example, solar powered irrigation systems are climate-friendly, reliable and affordable if adequately managed. In the **Near East and North Africa**, a regional initiative has given special focus to the use of solar energy for agricultural irrigation and sustainable development. The system has reduced the negative environmental impacts of agriculture, decreasing soil pollution from diesel spillovers and greenhouse gas emissions.[253]

In **Benin**, the use of biofertilizer and isotopic techniques has led to a four-fold increase in soybean production between 2009 and 2019, raising smallholder incomes and the availability of healthy soya-based foods, while leading to significant increases in soil fertility as well as export earnings. In **Argentina**, Mediterranean fruit flies had repeatedly damaged valuable cash crops (cherries, pears and apples) for large-, medium- and small-scale producers of the Patagonia and Mendoza regions, leading to substantial production losses and reduced revenues. Furthermore, frequent use of pesticides had caused health concerns for both producers and consumers. The introduction of the Sterile Insect Technique (SIT) to control the fruit flies

led to the suppression and eradication of the fruit fly, which subsequently led to substantial increases in production and international trade in the fruit sector – i.e. greater economic resilience and increased revenues for Argentinian farmers and traders.[97]

The field of innovation is not only related to scientific or engineering advances. For example, the high amount of investment required for food systems transformation will require new and innovative financing mechanisms, in addition to enabling legal and regulatory frameworks, while innovative components in social protection programmes can increase their effectiveness and improve their sustainability and positive effects in facilitating the access to healthy diets for the most vulnerable.[249] The COVID-19 pandemic has put a tremendous pressure on these areas, which have called for innovative solutions: in some sub-Saharan countries, including **Malawi**, **Nigeria** and **Togo**, satellite images have been used, combined with other methods, in the selection of new beneficiaries entitled to stepped-up cash transfer programmes following increased support needed as a consequence of the COVID-19 pandemic.[13]

Capitalizing on win-win solutions and managing trade-offs

The successful transformation of food systems towards greater affordability of healthy diets for all, sustainably produced and with improved resilience to identified drivers, calls for win-win solutions to be fully exploited, and for trade-offs to be carefully managed. As with all systemic changes, there will be winners and losers, while the introduction of new technologies and innovations, and the subsequent changes in food systems performance, will produce both positive and negative spillover effects.[249] The above-mentioned coherence among systems, as well as the cross-cutting accelerators, play a key role in maximizing the benefits and minimizing negative consequences of transformation for food security, improved nutrition and affordable healthy diets: that is why policy coherence, understood as a situation where the implementation of policies in one area do not undermine others (and even reinforce each other where feasible),[254] is needed in building transformative multisectoral portfolios. Below, examples of systems approaches demonstrate how win-win solutions can help speed up the type of transformative processes with greater efficiency that this report is calling for, while at the same time managing necessary trade-offs towards more sustainable and inclusive food systems transformation.

Examples of systems approaches for building coherent portfolios

Territorial approaches

As highlighted under several of the pathways reviewed in this report, territorial approaches can facilitate comprehensive and systemic approaches towards the transformation of food systems. In policy development and the implementation of transformative action, territorial approaches advocate for cross-sectoral and multi-level governance mechanisms, as well as coherence across different spatial levels, while focusing on linkages and opportunities between systems in a given territory.[255] As such, territorial approaches lend themselves to realizing efficiency gains, while managing trade-offs in policy implementation. Hence, with the benefit of involving all relevant actors in a given space, territorial approaches represent ideal frameworks for responding to the particular context, as well as the dynamic and evolving nature of drivers impacting on food systems and allow policymakers to design coherent and more effective multisectoral policy portfolios.

This approach has been implemented in **Colombia,** where a 50-year conflict had left rural areas and populations in poverty and with limited institutional capacity. Since the 2016 Peace Agreement, territorial development plans have been implemented in 16 territories. These consist of investment plans grouped into eight pillars, including land tenure, infrastructure, health and education services, housing, water and sanitation, among others.[256] The Great Green Wall project in the **Sahel** represents another territorial approach: an ambitious 11-country project that seeks to transform the lives of 100 million people by focusing on the agro-ecological potential of landscape restoration, while also producing

food, increasing food security, creating jobs and promoting peace in a politically fragile region.[257] In a context of climate change and desertification, the project creates opportunities for increasing biodiversity and reversing land degradation in ways that create "green jobs". Focusing on enhancing the ability of small-scale producers to cope with climate change, the project also invests in improved access to markets and strengthened value chains, expanding the use of solar energy, and capitalizing on agroforestry and community-led efforts to achieve food security and improved nutrition.[258]

As introduced under pathway 4 above, territorial approaches to food systems transformation also apply to urban and peri-urban settings. With over half of the world's population now living in urban settings,[259] municipal authorities responsible for cities and urban places can play an important role in transforming food systems to improve food security and nutrition and to help raise the affordability of healthy diets. City authorities can, for example, use their regulatory and planning powers to shape the food environment (e.g. zoning of fast food outlets, calorie labelling, advertising restrictions, or taxation of beverages with a high sugar content).[194] One example is the Milan Urban Food Policy Pact, an international agreement among cities to "develop sustainable food systems that are inclusive, resilient, safe and diverse, that provide healthy and affordable food to all people in a human-rights based framework, that minimize waste and conserve biodiversity while adapting to and mitigating impacts of climate change." The pact has been signed by 211 cities worldwide with the aim of fostering city-to-city cooperation and exchange of best practices.[260]

Coherent policy portfolios also have to address increased exposure and vulnerability of livelihoods, particularly of disadvantaged population groups. Without proper planning, climate variability and extremes will affect vulnerability to future extreme events.[3] Any rise in climate extremes can exacerbate the vulnerability of disadvantaged population groups, with adverse long-term developmental effects if no action is taken to increase resilience at all levels (productive, social, climatic and environmental). To be successful across livelihoods and food systems and to address food insecurity and all forms of malnutrition, climate resilience policies and programmes should be built around climate risk assessments, science and interdisciplinary cross-sectoral knowledge, in addition to "blended" humanitarian, development and peace approaches that are participatory and inclusive as well as driven by the needs of climate-vulnerable groups.[3]

Ecosystem approaches

In regard to coherence among food and environmental systems, the transformation and "greening" of food systems can be a powerful tool to build resilience to climate and economic shocks simultaneously. The IMF has estimated that green multipliers are several orders of magnitude larger than non-green ones.[261] When portfolios of policies and investments for the greening of food systems are designed and implemented in such a way as to be an engine of economic recovery, they can create viable jobs and sustainable livelihoods, address inequality, and promote food security and nutrition. Hence, strengthening climate resilience of food systems is not only good for sustainability and reducing the carbon footprint – it is also good for ending hunger and malnutrition in all its forms. Similarly, developing or updating national food-based dietary guidelines (FBDGs) through the full integration of environmental sustainability elements in each of the guideline's recommendations, according to national contexts and using these FBDGs to guide agriculture and food policies, is one way help to drive the greening of food systems.[23]

The potential for boosting the provision of ecosystem services, while increasing productivity, food security and resilience, has been illustrated by a number of integrated watershed management interventions. In **Kenya**, an innovative Water Fund supports farmers in the Upper Tana River Basin in adopting sustainable land and water management practices. In addition to strengthening smallholder resilience to the impacts of climate variability and extremes, the Water Fund has helped raise productivity and profitability of

coffee and other value chains. The integrated approach of the Water Fund has furthermore improved the quality of drinking water for the capital Nairobi, while raising the country's hydropower output. Hence, this investment has contributed to water and energy systems directly and to food, health and social protection systems indirectly.[262]

In **Mexico**, a community-based forest management project has been designed to address and overcome problems linked to deforestation and forest degradation in rural communities of marginalized forest areas in Campeche, Chiapas and Oaxaca. The project shows successful results in regard to environmental benefits. Project beneficiaries report being more resilient to shocks (8 percent higher than comparison group), particularly to climatic shocks, and also less affected by drought (16 percent lower). Moreover, incomes from off-farm activities have increased significantly (by 22 percent). On a more general level, total assets have also increased (15 percent), particularly productive assets (41 percent), reflecting investments in business enterprises and improvements in the domain of economic mobility.[263]

Coordinated policy action under protracted crisis conditions

As highlighted under the first pathway, in conflict-affected countries, it is imperative that policies, investments and actions to reduce immediate food insecurity and malnutrition are implemented simultaneously with those aimed at a reduction in the levels of conflict, and are aligned with long-term socio-economic development and peacebuilding efforts. In **Iraq**, a three decade-old protracted crisis has had devastating effects on agri-food systems, causing large population displacements, destruction of agricultural infrastructure, loss of livelihood assets and the severe disruption of food value chains. Low productivity compounded by the impact of climate change has raised challenges in the food and agriculture sectors, which are major sources of employment in both rural and urban areas.[97] During 2020, largely due to repercussions of the COVID-19 pandemic, poverty levels rose from 20 percent (2017–2018) to as much as 35 percent in central governorates.[264]

Urgent policy recommendation to support Iraq on a sustainable path to recovery include: the scaling up of social protection mechanisms; ensuring basic services for the poor; protecting jobs, SMEs, and vulnerable workers in the informal economy,[265] as well as cross-cutting reforms for private sector-led diversification and growth by creating sustainable job opportunities.[266] Along these lines, a multisectoral and multi-partner food systems and value chain programme involving the Ministries of Planning, Agriculture, Water Resources, Trade, Education and Migration, aims to support the return of millions of formerly internally displaced people (IDP) and host communities by providing employment to help them rebuild their livelihoods. The cross-sectoral programme (2020–2024) is a component of a UN-led humanitarian-development-peace (HDP) nexus programme and supports: (i) an enabling environment through policy engagement and legislation changes, facilitating trade and improving working conditions; (ii) building capacity of public and private service providers; (iii) supporting smallholders to adopt sustainable practices; (iv) strengthening agri-food SMEs by providing technical and financial support; and (v) promoting agribusiness development and network linkages. The comprehensive portfolio of policies and investments will strengthen the management of Iraq's natural resources, support fair and sustainable employment opportunities, build human capital and strengthen private sector growth towards long-term recovery and development in Iraq.

In **Palestine**, more than 1.7 million people were food insecure in 2018 – about one-third of the population.[267] This estimate rose to more than 2 million following the outbreak of the COVID-19 pandemic in 2020,[268] and before the recent outbreak of violent conflict with Israel. Apart from causing a health crisis, the pandemic aggravated the humanitarian situation, while lockdowns impacted negatively on socio-economic development in Palestine. In response to the crisis, emergency policy measures were put in place to maintain agri-food systems, with additional measures to mitigate the effect of the crisis on vulnerable groups while protecting and promoting their livelihoods.[269]

After decades of humanitarian response, the above measures reflect stepped-up efforts over the past five years to strengthen a HDP nexus approach.[270] In this context, in late 2020, the Palestinian cabinet endorsed its first National Food and Nutrition Security Policy (NFNSP, 2019–2030),[271] complemented by a National Investment Plan for Food and Nutrition Security and Sustainable Agriculture (NIP, 2020–2022).[268,272] In spite of the protracted crisis, the NFNSP and NIP – formulated by the Ministry of Agriculture, in cooperation with, among others, the Ministries of Health, Social Development, Education and Higher Education, the Palestinian Water and Environmental Authorities, and the Central Bureau of Statistics – jointly aim at consolidating policy frameworks and coordinating and prioritizing interventions by different actors. The renewed policy approach rests on strengthening the link between agricultural development, social protection and economic empowerment to simultaneously address the most urgent as well as structural development needs of the Palestinian people. Regrettably, given the most recent outbreak of violent conflict between Israel and Palestine, current efforts are inevitably focused on peacebuilding, which remains the most important priority in the near future.

Indigenous Peoples' food systems

A good example of holistic and interconnected systems, providing nutritious and varied foods within healthy environments while preserving biodiversity, are the food systems of Indigenous Peoples.[273,274] In recent decades, these sustainable and resilient food systems – which have managed to generate food and medicines for hundreds of years – have been negatively affected by climate change, extractive industries, expansion of commercial agriculture and persistent marginalization, resulting in displacement, violence, structural poverty and inequality.[112,275,276,277] The ongoing COVID-19 pandemic has exacerbated their food insecurity, particularly in urban and peri-urban areas and in communities that rely more on market access to food.

In spite of these challenges, Indigenous Peoples have demonstrated that integrated approaches that go beyond food are fundamental to improving food environments and social protection systems.[273,278] Their food systems are founded on a holistic and systemic view that encompasses spirituality, life and culture, with biotic and abiotic components in the ecosystem, as well as the interconnections between them. These food systems involve the totality of human capacity for the sustainable production, generation, utilization, access, availability, stability and management of foods that are nutritious and fulfilling.[279]

Indigenous Peoples' food systems provide best practices on sustainability, incorporating seasonality, a broad food base, resilience, food generation, self-governance, management of collective rights and ecosystems management. These practices could be applied elsewhere to create healthier, more sustainable food systems. In the **United States of America**, where Indigenous Peoples are twice as likely to be food insecure than non-indigenous,[280] the Oneida Nation in Wisconsin is confronting food insecurity and malnutrition among its people, including high levels of diabetes and obesity resulting from excessive consumption of processed foods. An integrated community food systems approach has been set up to revitalize their beliefs, cosmogony and governance, and a local food systems' governance coalition has been established to restore their lands and waters to sustainably produce nutritious foods for their people. Their farm-to-school programme has been nationally recognized as a successful way of including nutritious foods in children's school menus that are both local and culturally appropriate. Furthermore, their intercultural and integrated approach to food within governance, policy, investment and community leadership has strengthened the food environment for the Oneida Nation, improved public health and reinforced intergenerational commitment to sustain their food systems.[97]

Living in more than 90 countries across seven socio-cultural regions, Indigenous Peoples represent 6.2 percent of the world population (476 million). While one in five of the world's extreme poor belong to Indigenous Peoples, their economic poverty is in sharp contrast with the cultural and ecological richness of their societies: they speak 4 000 out of the 6 700 languages remaining worldwide, and while their land and »

BOX 14 INDIGENOUS PEOPLES' SYSTEMIC APPROACHES PROVIDE EXTENSIVE KNOWLEDGE FOR THE SUSTAINABLE AND INCLUSIVE TRANSFORMATION OF FOOD SYSTEMS

Indigenous Peoples´ systemic approach to food, nutrition, health, environment and biodiversity, demonstrates how environmental, agri-food, health and social protection systems can build cross-sectoral, coherent and sustainable approaches to food systems. Their experiences can inform policies to transform other food systems towards sustainability. Key messages include:

- **Systemic, inclusive approaches to food systems** strengthen the links between the environment, health and food production. This includes a biocentric approach that uses new metrics to measure system performance to complement current indicators. Internationally, the One Health approach recognizes the interdependence between food, health and the environment, including biodiversity.[228]
- **Diversification of the food base**. Indigenous Peoples' food systems can serve as an example of how to expand current food bases in acknowledging biodiversity, enabling diverse agri-food systems, building resilience and ensuring positive human health benefits from diversified diets.[283] The Tikuna, Cocama and Yagua Peoples in **Colombia** as well as Khasi, Botia and Anwal Peoples in **India** sustain food systems counting well beyond 100 edibles consisting of wild, semi-domesticated and domesticated species.[112] And the Tzeltal women in **Mexico** conserve the biological richness of maize, validating sustainable practices and doubling the productivity of their seeds.
- **Blending technology and innovation with Indigenous Peoples' traditional knowledge systems for new adapted solutions.** In **Panama**, Indigenous communities help to monitor illegal logging using drone, cell phone and computer technologies, supported by Indigenous elders, who are able to share their knowledge, such as mental mappings of their territory to decide about the most appropriate actions to take.[284] In **India**, an agro-ecological programme based on the traditional knowledge of Indigenous Peoples has promoted the use of finger millet to address the impact of climate change on food production. Through this programme, millet yields almost tripled in comparison to other forms of millet cultivation.[285,286,287]
- **Interculturality in policy discussions, decision-making and implementation**. Examples here include **Canada**´s new Food Policy, which was formulated through extensive consultation with First Nations, Métis Nations and Inuit.[288] In **Bolivia**, intercultural health assistance programmes have been developed, combining traditional Indigenous medicine with western medicine at the community level.
- **Intercultural institutions for inclusive governance can support access to safe and nutritious foods for all** by combining Indigenous Peoples' institutions, customary self-regulation and governance systems with formal institutions. In **New Zealand**, the Government has started a programme to incorporate indigenous customary law, mediation, and conflict resolution to reduce the imprisonment of Maori People. In **India**, the rights of Adivasi or Indigenous Peoples to forest, land and territorial management are enshrined within the 2006 Forest Rights Act. In **Indonesia**, the Constitutional Ruling recognizes the rights of Hutan Adat or Indigenous Peoples over forest lands.[289]
- **Developing co-responsible, circular food systems through reciprocity, solidarity and safety nets** that influence corporate responsibility beyond the life of a given product. Circularity and co-responsibility within food systems can ensure that externalities are absorbed in the prices and ensure that the current waste generated by the food systems is moved away from inorganic waste residues towards organic ones and thus reincorporated into the system as an input. In **New Zealand**, the Government's Waste Minimisation Fund supports food rescue initiatives, such as Para Kore and Kai Ika to repurpose and redirect food waste to families and community groups in the local region, promoting food security and diverting organic waste from landfills.
- **Highlighting the importance of dedicated policies to address collective rights and mobile livelihoods for food security.** Indigenous Peoples´ food systems combine individual and collective rights to lands and resources. Similarly, mobile, semi-mobile and nomadic livelihoods are essential for maintaining both food generation and food production activities within these food systems. In **Mali**, the importance of nomadism and mobile livelihoods is recognized in national legislation. Moreover, scientists and policy practitioners are starting to realize the relevance of mobile livelihoods in biodiversity conservation and territorial management.[112]

» territories encompass around 25 percent of the Earth's surface, these contain 80 percent of the remaining terrestrial biodiversity and see lower rates of deforestation.

Given their global presence and their wealth of knowledge, Indigenous Peoples are key partners to contribute to global debates around sustainable and resilient food systems. Their food systems are diverse and nutritious, help to preserve biodiversity and have demonstrated to be resilient and adaptive to shocks. Despite the growing contributions on sustainability that Indigenous Peoples can make towards the transformation of food systems, their voices are still marginalized in policy discussions and decision-making processes.[281] To help rectify this, the Global-Hub on Indigenous Peoples' Food Systems brings together Indigenous and non-Indigenous experts, scientists and researchers to co-create knowledge and evidence that can influence policy.[282] Drawing upon experiences of Indigenous Peoples worldwide, Box 14 provides guidance on best practices towards systemic approaches for the sustainable and inclusive transformation of food systems. ■

GUATEMALA
A woman applying good practices of handling healthy food preparation.
©FAO/Luis Gustavo Sánchez Días

CHAPTER 5
CONCLUSION

Having monitored for five years the progress made towards ending hunger and all forms of malnutrition in the framework of SDG 2, and examined the major drivers behind that progress, this year, *The State of Food Security and Nutrition in the World* completes a pentalogy of editions that closes on both a negative and positive note.

The negative note is obvious. Chapter 2 of this report makes it clear that, with less than a decade to 2030, we are not on track to ending world hunger and malnutrition – in fact, we are moving in the wrong direction. The picture is bleak. After remaining virtually unchanged for five years, the prevalence of undernourishment increased from 8.4 percent in 2019 to around 9.9 percent in 2020, meaning that between 720 and 811 million people in the world faced hunger in 2020 – as many as 161 million more people than in 2019. Beyond hunger, the outlook is also discouraging. For the global prevalence of moderate or severe food insecurity, the estimated increase in 2020 was equal to that of the previous five years combined. Thus, nearly one in three people in the world (2.37 billion) did not have access to adequate food in 2020 – an increase of almost 320 million people in just one year. Related to this, the high cost of healthy diets coupled with persistent high levels of income inequality put healthy diets out of reach for around 3 billion people in 2019 across all regions. This number will likely increase in 2020, affecting most regions, due to the COVID-19 pandemic.

Moreover, the goal of ending all forms of malnutrition remains a challenge. Although data limitations have prevented this report from fully accounting for the impact of the pandemic, it is estimated that 22.0 percent of children in 2020 were affected by stunting, 6.7 percent were suffering from wasting and 5.7 percent were overweight. An estimated 29.9 percent of women aged 15 to 49 years in 2019 around the world were affected by anaemia, and adult obesity is increasing sharply in all regions. The current rate of global progress towards targets for these nutrition indicators is insufficient or is even stalled or worsening.

As indicated in Chapter 3, driving these unwelcome trends are the increasing frequency and intensity of conflict, climate variability

and extremes, economic slowdowns and downturns, and high levels of inequality. Economic downturns in 2020, which were mainly a consequence of COVID-19 containment measures all over the world, have contributed to one of the largest increases in world hunger in decades, which has affected almost all low- and middle-income countries, and can reverse gains made in nutrition. But the downturns resulting from the COVID-19 pandemic were just a small part of a much bigger problem: more alarmingly, the pandemic has exposed the vulnerabilities forming in our food systems over recent years as a result of major drivers such as conflict, climate variability and extremes, and economic slowdowns and downturns. These major drivers are increasingly occurring simultaneously in countries, with interactions that seriously undermine food security and nutrition. It has been shown that the majority of children who are hungry and stunted live in countries affected by a combination of these drivers. Moreover, increases in hunger in 2020 were even larger in countries where economic downturns were combined with climate-related disasters or conflict, or both.

It is also important to consider that millions of people are food insecure and malnourished in all its forms because they cannot afford a healthy diet. The aforementioned drivers and high levels of inequality, as well as other factors driving up the cost of nutritious foods – in the realms of food production, food supply chains and food environments, as well as consumer demand and the political economy of food – are behind this significant deficiency in our food systems. Evidence already suggests that countries where the unaffordability of a healthy diet increased between 2017 and 2019 also show higher levels of severe as well as moderate or severe food insecurity, especially lower-middle-income countries.

While the COVID-19 pandemic and its impacts have been an immense challenge for the world, they may also be a warning call of unwelcome events to come if we do not commit to more resolute actions to change course. As the report has shown, the major drivers threatening food security and nutrition are also interconnected with, and have circular impacts on, other systems, including environmental and health systems. This creates interconnected circular associations, contributing to increased food insecurity and malnutrition and leading to current and future vulnerability. These major drivers each have their own trajectory or cyclicality that ensures they will continue to occur and could even worsen in the coming years; therefore, bolder and scaled-up actions are needed to build resilience to their negative effects on food security and nutrition.

On a more positive note, there is a solution going forward, and Chapter 4 of this report has pointed us to it. Given that the major drivers negatively affect food security and nutrition through their impacts on food systems, the solution lies in the transformation of these systems, and in fact there is already momentum to do so. The world has noted that food systems are central to the goal of eradicating hunger and malnutrition in all its forms and ensuring that everyone can afford a healthy diet. The UN Food Systems Summit 2021 will bring forward a series of concrete actions that people from all over the world can take to support a transformation of the world's food systems. To that end, this report has identified six pathways that, alone or frequently in combination, specifically address the negative impacts of the major drivers behind the recent rise in hunger and slowing progress to reduce malnutrition in all its forms. These include: (i) integrating humanitarian, development and peacebuilding policies in conflict-affected areas; (ii) scaling up climate resilience across food systems; (iii) strengthening resilience of the most vulnerable to economic adversity; (iv) intervening along the food supply chains to lower the cost of nutritious foods; (v) tackling poverty and structural inequalities, ensuring interventions are pro-poor and inclusive; and (vi) strengthening food environments and changing consumer behaviour to promote dietary patterns with positive impacts on human health and the environment.

The complex challenges to food security and nutrition call for greater synergy and coherence in policy formulation and implementation across sectors, supported by more strategic investments from both the public and private sectors, which is key to avoid undesirable trade-offs. This also means that silo solutions are no longer an option.

What are required are integrated portfolios of policies, investments and legislation, built along the particular transformation pathways needed in each context, that can specifically address food security and nutrition challenges head on.

The persistence of socio-economic inequalities and poverty is a major issue – one that any process of food systems transformation cannot afford to ignore. This amplifies the need to provide vulnerable and historically marginalized populations with greater access to productive resources, technology and innovation to empower them to become agents of change towards more equitable and sustainable food systems. The successful transformation of food systems towards greater affordability of healthy diets for all, sustainably produced and with improved resilience to the major drivers identified, calls for win-win solutions to be fully exploited, and for trade-offs to be carefully managed. Hence, it is not enough to address the factors driving up the cost of nutritious foods; the inequalities and low incomes faced by many vulnerable people also need to become a thing of the past.

As with all systemic changes, the actions taken along the six transformation pathways proposed in this report will result in winners and losers. The introduction of new technologies and innovations will serve as important accelerators in the comprehensive portfolios of policies, investments and legislation aimed at transforming food systems to increase the affordability of healthy diets. However, adequate governance will need to be in place to ensure no one is left behind in the access to these accelerations and potential inequalities and divides are prevented. Timely availability of data and information at both national and subnational levels will also be critical to monitor progress towards targets and to target interventions where they are needed most. As presented in this report (Chapter 2), having food security estimates based on the Food Experience Scale at disaggregated geographical level has allowed policymakers and programme planners to visualize which provinces or regions are most in need of interventions to guarantee the right to adequate food. Moreover, more and better data allow for carrying out situation analyses covering context-specific and comprehensive assessments of which key drivers are impacting negatively on food systems and resulting in poor food security and nutrition outcomes (as noted in Chapter 4).

Policy coherence – understood as a situation where the implementation of policies in one area do not undermine others and even reinforce each other where feasible – across systems, as well as cross-cutting accelerators, play a key role in maximizing the benefits and minimizing the negative consequences of transformation. These conditions will be critical to building transformative multisectoral portfolios of policies, investments and legislation that become win-win solutions and help manage trade-offs. Systems approaches are also needed, such as territorial approaches, ecosystems approaches, Indigenous Peoples' food systems and interventions that systemically address protracted crisis conditions.

This report recognizes the urgency for the broader food systems transformation that is needed and is currently at the centre of global attention. At the same time, it makes the case that, for getting back on track towards meeting SDG Target 2.1, ensuring access to safe, nutritious and sufficient food for all people all year round, and SDG Target 2.2, eradicating all forms of malnutrition, we must focus on the transformation pathways and policy coherence that help most in addressing the major drivers behind the recent rise in hunger and slowing progress towards reducing all forms of malnutrition. ■

KYRGYZSTAN
A scene of cooking chak-chak – a dessert.
©FAO/Mirbek Kadraliev

ANNEXES

ANNEX 1A
Statistical tables to Chapter 2 130

ANNEX 1B
Methodological notes for the food security and nutrition indicators 156

ANNEX 2
Methodologies Chapter 2 170

ANNEX 3
Country exposure to the drivers and PoU change point analysis in Chapter 3 179

ANNEX 4
Country group definitions and lists of countries affected by drivers in Chapter 3 181

ANNEX 5
Country group definitions for the analysis of food insecurity and drivers in 2020 186

ANNEX 6
Glossary 188

ANNEX 1A
STATISTICAL TABLES TO CHAPTER 2

TABLE A1.1 PROGRESS TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS (SDGs) AND GLOBAL NUTRITION TARGETS: PREVALENCE OF UNDERNOURISHMENT, MODERATE OR SEVERE FOOD INSECURITY, SELECTED FORMS OF MALNUTRITION, EXCLUSIVE BREASTFEEDING AND LOW BIRTHWEIGHT

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
WORLD	12.3	8.9	8.2	10.5	23.0	27.6	6.7	26.2	22.0	5.6	5.7	11.8	13.1	28.5	29.9	37.0	44.0	15.0	14.6
Least developed countries	28.5	22.0	20.5	22.3	49.9	53.8	7.3	38.9	33.7	3.2	3.4	4.9	6.0	39.1	39.4	45.7	55.2	16.2	15.6
Landlocked developing countries	26.8	17.5	16.4	19.7	44.5	51.3	5.6	36.2	30.2	4.3	3.9	8.3	9.4	32.0	32.9	45.4	54.5	14.3	13.9
Small island developing states	18.2	15.2	n.a.	n.a.	n.a.	n.a.	5.6	21.1	20.6	6.3	6.6	18.8	20.9	28.2	29.2	36.8	38.6	11.2	11.1
Low-income economies	32.5	28.9	23.3	26.2	54.6	59.6	6.9	39.6	34.6	3.9	3.7	6.3	7.3	38.5	38.8	42.5	54.4	14.5	14.1
Lower-middle-income economies	18.5	13.0	12.7	16.5	31.5	39.0	9.9	36.3	29.1	4.0	4.0	6.5	7.6	43.8	43.7	39.8	50.1	21.3	20.5
Upper-middle-income economies	8.0	3.4	3.4	4.7	14.1	17.3	2.1	12.8	10.8	8.1	8.8	11.5	13.1	18.6	19.6	31.1	29.6	7.8	7.7
High-income economies	<2.5	<2.5	1.7	1.6	8.6	7.6	0.4[a]	3.7[a]	3.4[a]	7.3[a]	7.8[a]	22.3	24.3	13.2	14.4	n.a.	n.a.	7.6	7.6
Low-income food-deficit countries	23.3	18.0	16.8	20.4	35.8	43.8	10.6	38.6	30.7	3.2	3.1	4.3	5.2	n.a.	n.a.	43.7	55.7	20.9	20.1

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
AFRICA	**21.6**	**19.0**	**18.6**	**22.8**	**48.8**	**55.5**	**6.0**	**34.5**	**30.7**	**5.0**	**5.3**	**11.5**	**12.8**	**39.2**	**38.9**	**35.5**	**43.6**	**14.1**	**13.7**
Northern Africa	**8.3**	**6.6**	**9.9**	**9.2**	**28.7**	**30.0**	**6.6**	**22.7**	**21.4**	**12.0**	**13.0**	**23.0**	**25.2**	**31.9**	**31.1**	**40.7**	**42.1**	**12.4**	**12.2**
Algeria	6.7	<2.5	13.0	6.9	22.9	17.6	2.7	12.6	9.3	13.5	12.9	24.7	27.4	32.9	33.3	25.4	n.a.	7.3	7.3
Egypt	6.4	5.4	8.4[b]	6.7	27.8[b]	27.8	9.5	22.5	22.3	15.8	17.8	29.3	32.0	31.0	28.3	52.8	39.5	n.a.	n.a.
Libya	n.a.	n.a.	11.2	18.6	29.1	37.4	10.2	29.3	43.5	25.6	25.4	30.0	32.5	28.6	29.9	n.a.	n.a.	n.a.	n.a.
Morocco	5.5	4.2				28.0[c,d]	2.6	16.4	12.9	11.8	11.3	23.4	26.1	29.8	29.9	27.8	35.0	17.5	17.3
Sudan	18.9	12.3	13.4[c,d]	16.8[c,d]	41.4[c,d]	49.4[c,d]	16.3	36.0	33.7	2.5	2.7	<0.1	<0.1	36.8	36.5	41.0	54.6	n.a.	n.a.
Tunisia	4.3	3.0	9.1	10.7	18.2	25.1	2.1	9.1	8.6	10.9	16.5	24.6	26.9	30.4	32.1	8.5	13.5	7.5	7.5
Northern Africa (excluding Sudan)	**6.1**	**5.4**	**9.1**	**7.5**	**26.0**	**25.9**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**26.8**	**29.5**	**n.a.**	**n.a.**	**40.6**	**37.1**	**11.5**	**11.4**
Sub-Saharan Africa	**25.0**	**21.8**	**20.6**	**25.9**	**53.4**	**61.3**	**5.9**	**36.6**	**32.3**	**3.8**	**4.0**	**8.0**	**9.2**	**41.2**	**40.7**	**34.5**	**44.0**	**14.4**	**14.0**
Eastern Africa	**34.2**	**26.6**	**24.6**	**26.6**	**59.3**	**63.5**	**5.2**	**38.9**	**32.6**	**4.0**	**4.0**	**5.3**	**6.4**	**31.4**	**31.9**	**48.6**	**60.7**	**13.8**	**13.4**
Burundi	n.a.	n.a.					4.8	56.8	57.6	2.3	3.1	4.4	5.4	31.1	38.5	69.3	71.9	15.5	15.1
Comoros	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	32.3	22.6	10.9	9.6	6.7	7.8	32.8	33.8	11.4	n.a.	24.2	23.7
Djibouti	31.3	16.2	n.a.	n.a.	n.a.	n.a.	n.a.	31.7	34.0	7.2	7.2	12.3	13.5	31.0	32.3	12.4	n.a.	n.a.	n.a.
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	50.1	49.1	1.7	2.1	4.1	5.0	36.2	37.0	68.7	n.a.	n.a.	n.a.
Ethiopia	37.1	16.2	14.5	16.4	56.2	56.3	7.2	42.8	35.3	2.5	2.6	3.6	4.5	22.4	23.9	52.0	58.8	n.a.	n.a.
Kenya	28.5	24.8	17.3[c,d]	25.7[c,d]	53.0[c,d]	68.5[c,d]	4.2	27.8	19.4	4.6	4.5	5.9	7.1	28.4	28.7	31.9	61.4	11.7	11.5
Madagascar	33.4	43.2	n.a.	n.a.	n.a.	n.a.	6.4	47.9	40.2	1.8	1.5	4.3	5.3	37.5	37.8	41.9	50.6	17.5	17.1
Malawi	22.5	17.3	51.8[c,d]	51.4[c,d]	81.9[c,d]	81.8[c,d]	0.6	43.8	37.0	5.7	4.7	4.8	5.8	30.6	31.4	70.8	59.4	14.9	14.5
Mauritius	5.1	6.2	5.2	8.3	13.0	24.2	n.a.	9.0[f]	8.7[f]	7.4[f]	7.6[f]	9.6	10.8	19.2	23.5	n.a.	n.a.	17.0	17.1
Mozambique	33.3	31.2	40.7	40.5	68.4	71.1	4.4	42.9	37.8	5.7	6.0	6.1	7.2	48.8	47.9	40.0	n.a.	14.1	13.8
Rwanda	35.3	35.2					1.1	40.5	32.6	5.7	5.2	4.7	5.8	18.3	17.2	83.8	86.9	8.2	7.9
Seychelles	n.a.	n.a.	3.2[c]	3.3[c]	14.3[c]	14.7[c]	n.a.	8.0	7.4	9.6	9.8	12.4	14.0	23.5	25.1	n.a.	n.a.	11.0	11.7

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Somalia	58.2	59.5	n.a.	43.0[h]	n.a.	79.1[h]	n.a.	31.1	27.4	3.1	2.9	7.0	8.3	44.0	43.1	5.3	n.a.	n.a.	n.a.
South Sudan	–	n.a.	65.4[c]	62.0[c]	85.1[c]	84.8[c]	n.a.	32.1	30.6	6.4	5.7	<0.1	<0.1	34.7	35.6	44.5	n.a.	n.a.	n.a.
Uganda	n.a.	n.a.	17.5[c,d]	21.7[c,d]	58.0[c,d]	69.2[c,d]	3.5	34.1	27.9	3.9	4.0	4.3	5.3	31.3	32.8	62.3	65.5	n.a.	n.a.
United Republic of Tanzania	31.6	25.1	23.8[c,d]	24.7[c,d]	55.0[c,d]	56.4[c,d]	3.5	38.3	32.0	4.7	5.5	6.9	8.4	40.3	38.9	48.7	57.8	10.7	10.5
Zambia	n.a.	n.a.	21.8[c,d]	23.2[c,d]	48.8[c,d]	51.4[c,d]	4.2	41.3	32.3	6.2	5.7	6.8	8.1	30.5	31.5	59.9	69.9	11.9	11.6
Zimbabwe	n.a.	n.a.	35.5	32.1	64.7	69.8	2.9	31.4	23.0	4.7	3.6	14.3	15.5	30.0	28.9	31.3	41.9	12.8	12.6
Middle Africa	**36.7**	**30.5**	**n.a.**	**35.6**	**n.a.**	**69.5**	**6.2**	**38.0**	**36.8**	**4.4**	**4.8**	**6.7**	**7.9**	**46.1**	**43.2**	**28.5**	**n.a.**	**12.8**	**12.5**
Angola	52.2	17.3	21.0	26.9[c]	66.5	73.5[c]	4.9	32.4	37.7	2.9	3.5	6.8	8.2	45.9	44.5	n.a.	37.4	12.0	15.3
Cameroon	15.9	5.3	n.a.	26.7	n.a.	55.8	4.3	32.5	27.2	6.9	9.6	9.8	11.4	41.2	40.6	19.9	39.4	9.6	12.0
Central African Republic	39.6	48.2	n.a.	61.8	n.a.	81.3	5.2	41.4	40.1	3.5	2.6	6.4	7.5	47.9	46.8	33.0	28.8	11.5	14.5
Chad	37.8	31.7					13.9	38.7	35.0	2.4	3.4	5.1	6.1	49.2	45.4	3.2	0.1	n.a.	n.a.
Congo	34.0	37.7	42.6	51.7	82.0	88.3	8.2	23.4	18.9	5.1	5.1	8.3	9.6	53.1	48.8	20.2	32.9	9.4	11.6
Democratic Republic of the Congo	38.4	41.7	n.a.	38.5	n.a.	69.2	6.4	42.8	40.8	4.6	4.2	5.6	6.7	46.4	42.4	36.4	n.a.	8.7	10.8
Equatorial Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	25.5	19.7	8.8	9.3	6.8	8.0	47.4	44.5	7.4	n.a.	n.a.	n.a.
Gabon	14.3	15.7	n.a.	n.a.	n.a.	n.a.	n.a.	17.2	14.4	6.5	7.4	13.5	15.0	55.3	52.4	5.1	n.a.	11.4	14.2
Sao Tome and Principe	9.0	11.9	n.a.	n.a.	n.a.	n.a.	4.1	18.3	11.8	2.7	4.0	10.7	12.4	45.7	44.2	50.3	71.7	5.1	6.6
Southern Africa	**5.1**	**8.4**	**18.9**	**20.3**	**43.9**	**46.1**	**3.2**	**24.3**	**23.3**	**12.1**	**12.1**	**25.0**	**27.1**	**28.5**	**30.3**	**n.a.**	**33.5**	**14.3**	**14.2**
Botswana	25.2	29.3	19.6[c,d]	22.2[c,d]	45.9[c,d]	50.8[c,d]	n.a.	24.4	22.8	10.6	11.0	17.5	18.9	31.3	32.5	20.3	30.0	15.9	15.6
Eswatini	9.2	11.6	29.4	30.8	62.6	64.1	2.0	29.2	22.6	10.6	9.7	14.9	16.5	30.0	30.7	43.8	63.8	10.5	10.3
Lesotho	13.7	23.5	n.a.	27.0[c]	n.a.	49.7[c]	2.1	37.7	32.1	7.0	7.2	14.9	16.6	28.3	27.9	52.9	59.0	14.8	14.6
Namibia	18.2	19.8	28.9[c,d]	32.1[c,d]	53.2[c,d]	57.6[c,d]	n.a.	24.1	18.4	4.3	5.0	15.1	17.2	24.7	25.2	22.1	n.a.	15.7	15.5

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
South Africa	3.4	6.5	18.0	19.3	42.9	44.9	3.4	23.6	23.2	12.8	12.9	26.1	28.3	28.6	30.5	n.a.	31.6	14.3	14.2
Western Africa	**14.1**	**14.8**	**10.8**	**21.8**	**42.5**	**57.8**	**6.9**	**34.9**	**30.9**	**2.3**	**2.7**	**7.4**	**8.9**	**52.9**	**51.8**	**22.1**	**32.3**	**15.6**	**15.2**
Benin	12.0	7.6	n.a.	n.a.	n.a.	n.a.	5.0	33.8	31.3	1.6	2.2	8.2	9.6	55.5	55.2	32.5	41.4	17.2	16.9
Burkina Faso	17.5	14.4	10.0[c,d]	15.4[c,d]	41.8[c,d]	47.9[c,d]	8.1	33.9	25.5	1.7	2.6	4.5	5.6	53.3	52.5	38.2	55.8	13.5	13.1
Cabo Verde	11.0	15.4	n.a.	7.6[c]	n.a.	35.1[c]	n.a.	12.2[f]	9.7[f]	n.a.	n.a.	10.3	11.8	26.9	24.3	59.6	n.a.	n.a.	n.a.
Côte d'Ivoire	20.2	14.9					6.1	29.3	17.8	2.5	2.8	8.7	10.3	52.2	50.9	11.8	23.1	15.8	15.5
Gambia	21.7	13.6	23.6	25.7	52.7	56.0	5.1	22.4	16.1	1.9	2.3	8.7	10.3	56.4	49.5	33.1	53.3	17.2	16.8
Ghana	11.2	6.1	7.6[c,d]	8.6[c,d]	49.3[c,d]	50.2[c,d]	6.8	22.2	14.2	2.2	2.9	9.4	10.9	44.2	35.4	45.7	42.9	14.5	14.2
Guinea	n.a.	n.a.	44.3	49.7	72.5	74.1	9.2	33.8	29.4	4.1	5.7	6.4	7.7	50.9	48.0	20.4	33.4	n.a.	n.a.
Guinea-Bissau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	7.8	29.7	28.0	2.7	3.4	7.9	9.5	49.9	48.1	38.3	52.5	21.8	21.1
Liberia	35.8	38.9	n.a.	37.3	n.a.	80.6	3.4	35.6	28.0	3.2	4.7	8.6	9.9	43.6	42.6	27.8	n.a.	n.a.	n.a.
Mali	13.3	10.4					9.3	30.9	25.7	1.6	2.1	7.2	8.6	58.2	59.0	20.2	40.2	n.a.	n.a.
Mauritania	9.4	9.1	4.6[c,d]	6.5[c,d]	26.3[c,d]	39.8[c,d]	11.5	27.0	24.2	1.9	2.7	11.0	12.7	45.1	43.3	26.7	40.3	n.a.	n.a.
Niger	n.a.	n.a.					9.8	48.3	46.7	0.9	1.9	4.5	5.5	49.1	49.5	23.3	n.a.	n.a.	n.a.
Nigeria	7.1	14.6	6.6[c,d]	21.4[c,d]	36.5[c,d]	57.7[c,d]	6.5	38.0	35.3	2.5	2.7	7.4	8.9	54.9	55.1	14.7	25.2	n.a.	n.a.
Senegal	17.2	7.5	14.5	13.6[c]	39.3	40.9[c]	8.1	19.8	17.2	1.5	2.1	7.6	8.8	55.9	52.7	37.5	42.1	18.9	18.5
Sierra Leone	46.7	26.2	30.4[c,d]	31.8[c,d]	78.4[c,d]	83.9[c,d]	5.4	35.4	26.8	3.4	4.7	7.4	8.7	47.9	48.4	31.2	54.1	14.9	14.4
Togo	27.7	20.4					5.7	27.4	23.8	1.7	2.4	7.1	8.4	47.4	45.7	62.1	64.3	16.3	16.1
Sub-Saharan Africa (including Sudan)	**24.8**	**21.4**	**20.3**	**25.6**	**53.0**	**60.8**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**7.7**	**8.9**	**n.a.**	**n.a.**	**34.8**	**44.3**	**14.4**	**14.0**
ASIA*	**13.7**	**8.2**	**7.3**	**9.3**	**19.0**	**23.6**	**8.9**	**28.1**	**21.8**	**4.9**	**5.2**	**6.1**	**7.3**	**31.1**	**32.7**	**39.0**	**45.3**	**17.8**	**17.3**
Central Asia	**10.8**	**3.2**	**1.7**	**3.1**	**9.2**	**15.0**	**2.3**	**15.4**	**10.0**	**8.5**	**5.6**	**15.6**	**17.7**	**28.8**	**28.1**	**29.2**	**44.8**	**5.6**	**5.4**
Kazakhstan	7.3	<2.5	n.a.	<0.5[c,d]	n.a.	2.3[c,d]	3.1	11.1	6.7	11.5	8.8	19.0	21.0	27.3	28.7	31.8	37.8	6.1	5.4
Kyrgyzstan	9.0	7.2	n.a.	1.1[c,d]	n.a.	7.0[c,d]	2.0	16.0	11.4	7.6	5.8	14.4	16.6	34.1	35.8	56.0	45.6	5.6	5.5

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Tajikistan	n.a.	n.a.					5.6	26.5	15.3	5.6	3.5	12.2	14.2	31.0	35.2	32.6	35.8	5.7	5.6
Turkmenistan	4.2	4.1	n.a.	n.a.	n.a.	n.a.	4.1	13.0	7.6	5.0	3.8	16.3	18.6	25.3	26.6	10.9	58.3	5.0	4.9
Uzbekistan	14.7	<2.5	1.9	4.0	11.2	19.7	1.8	14.2	9.9	8.6	5.0	14.4	16.6	28.7	24.8	23.8	49.5	5.3	5.3
Eastern Asia*	**6.9**	**<2.5**	**1.0**	**1.7**	**6.1**	**8.3**	**1.7**	**7.5**	**4.9**	**6.8**	**7.9**	**4.9**	**6.0**	**15.5**	**16.1**	**28.5**	**22.0**	**5.1**	**5.1**
China	7.0	<2.5					1.9	7.4	4.7	7.2	8.3	5.0	6.2	14.8	15.5	27.6	20.8	5.0	5.0
China, mainland	7.1	<2.5					n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Taiwan Province of China	4.3	3.3					n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	27.0	28.4	n.a.	n.a.	n.a.	n.a.
China, Hong Kong SAR	<2.5	<2.5					n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Macao SAR	16.0	4.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	33.8	42.4	n.a.	n.a.	n.a.	n.a.	2.5	26.1	18.2	1.3	1.9	5.9	6.8	31.7	33.9	68.9	71.4	n.a.	n.a.
Japan	<2.5	<2.5	<0.5	0.7	2.6	3.4	n.a.	6.6	5.5	2.0	2.4	3.6	4.3	19.7	19.0	n.a.	n.a.	9.6	9.5
Mongolia	29.6	4.3	3.4	4.9	21.0	26.2	0.9	12.6	7.1	10.2	10.1	17.9	20.6	14.3	14.5	65.7	50.2	5.5	5.4
Republic of Korea	<2.5	<2.5	<0.5[c]	0.6	4.8[c]	5.1	n.a.	2.2	2.2	7.7	8.8	4.1	4.7	13.7	13.5	n.a.	n.a.	5.4	5.8
Eastern Asia (excluding China, mainland)	**5.6**	**6.2**	**0.5**	**0.8**	**3.9**	**4.6**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**8.5**	**8.4**
South-eastern Asia	**17.1**	**7.1**	**2.4**	**2.8**	**15.9**	**17.6**	**8.2**	**30.5**	**27.4**	**5.8**	**7.5**	**5.4**	**6.7**	**25.0**	**27.2**	**33.5**	**47.9**	**12.4**	**12.3**
Brunei Darussalam	<2.5	<2.5	n.a.	n.a.	n.a.	n.a.	n.a.	17.5	12.7	8.4	9.3	12.1	14.1	14.8	16.7	n.a.	n.a.	12.1	10.8
Cambodia	17.0	6.2	16.9	13.4	48.9	44.8	9.7	34.4	29.9	2.1	2.1	3.1	3.9	46.1	47.1	72.8	65.2	12.6	12.1
Indonesia	19.2	6.5	0.7[c,d]	0.7[c,d]	6.0[c,d]	6.2[c,d]	10.2	34.5	31.8	8.2	11.1	5.5	6.9	27.0	31.2	40.9	50.7	10.2	10.0
Lao People's Democratic Republic	22.4	5.3	n.a.	8.9	n.a.	29.4	9.0	40.7	30.2	2.3	3.0	4.1	5.3	36.3	39.5	39.7	44.4	17.7	17.3
Malaysia	3.2	3.2	7.8	7.5	17.4	18.7	9.7	18.3	20.9	6.0	6.1	13.1	15.6	30.1	32.0	n.a.	40.3	11.3	11.3

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Myanmar	27.8	7.6	n.a.	1.9	n.a.	22.2	6.7	31.9	25.2	2.2	1.5	4.6	5.8	39.4	42.1	23.6	51.2	12.5	12.3
Philippines	14.9	9.4	3.2[c,d]	4[c,d]	41.2[c,d]	42.7[c,d]	5.6	32.2	28.7	3.4	4.2	5.4	6.4	16.9	12.3	33.0	n.a.	20.4	20.1
Singapore	n.a.	n.a.	1.0	0.9	2.8	4.5	n.a.	3.2	2.8	4.0	4.8	5.6	6.1	11.5	13.0	n.a.	n.a.	9.7	9.6
Thailand	11.9	8.2	4.2	8.5	15.1	29.8	7.7	13.9	12.3	8.7	9.2	7.9	10.0	22.1	24.0	12.3	23.0	10.8	10.5
Timor-Leste	32.2	22.6	n.a.	n.a.	n.a.	n.a.	n.a.	52.8	48.8	3.0	2.6	2.9	3.8	26.8	29.9	50.8	50.2	n.a.	n.a.
Viet Nam	15.5	6.7	<0.5	0.5[c,d]	6.3	6.5[c,d]	5.8	25.9	22.3	4.2	6.0	1.6	2.1	17.0	20.6	17.0	n.a.	8.4	8.2
Southern Asia	**19.9**	**14.1**	**14.6**	**18.4**	**30.9**	**38.7**	**14.1**	**40.2**	**30.7**	**2.9**	**2.5**	**4.5**	**5.4**	**48.3**	**48.2**	**47.4**	**57.2**	**27.2**	**26.4**
Afghanistan	36.1	25.6	14.8	19.8[c,d]	45.1	63.1[c,d]	5.1	44.7	35.1	5.3	3.9	4.4	5.5	37.5	42.6	n.a.	57.5	n.a.	n.a.
Bangladesh	14.2	9.7	13.3	10.5	32.2	31.9	9.8	38.1	30.2	1.7	2.1	2.8	3.6	35.7	36.7	64.1	65.0	29.0	27.8
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	30.2	22.4	6.1	5.2	5.2	6.4	39.8	38.6	48.7	53.2	11.9	11.7
India	21.6	15.3					17.3	41.7	30.9	2.4	1.9	3.1	3.9	53.2	53.0	46.4	58.0	n.a.	n.a.
Iran (Islamic Republic of)	5.2	5.5	9.5	8.7	48.0	42.5	n.a.	6.1	6.3	8.4[f]	9.4[f]	23.3	25.8	22.8	24.1	53.1	n.a.	n.a.	n.a.
Maldives	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	9.1	17.2	14.2	5.8	4.6	6.7	8.6	45.6	52.2	45.3	63.0	12.0	11.7
Nepal	16.8	4.8	10.4	12.0	29.5	36.4	12.0	40.3	30.4	1.4	1.8	3.3	4.1	35.9	35.7	69.6	65.2	22.6	21.8
Pakistan	17.6	12.9					7.1	43.4	36.7	4.6	3.4	7.1	8.6	42.7	41.3	37.0	47.5	n.a.	n.a.
Sri Lanka	14.7	6.8					15.1	16.8	16.0	1.2	1.3	4.1	5.2	33.5	34.6	75.8	82.0	16.6	15.9
Southern Asia (excluding India)	**15.4**	**11.0**	**12.4**	**13.4**	**38.6**	**39.8**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**8.2**	**9.5**	**n.a.**	**n.a.**	**49.9**	**55.3**	**n.a.**	**n.a.**
Western Asia	**8.9**	**14.6**	**8.5**	**9.0**	**27.1**	**27.9**	**3.5**	**17.8**	**13.9**	**9.0**	**8.3**	**27.2**	**29.8**	**31.7**	**32.5**	**32.3**	**33.1**	**10.0**	**9.9**
Armenia	12.3	3.4	1.2	1.1[c,d]	17.1	12.7[c,d]	4.4	14.0	9.1	14.8	10.8	18.3	20.2	17.6	17.3	34.1	44.5	8.0	9.0
Azerbaijan	4.8	<2.5	<0.5	<0.5	5.9	8.9	n.a.	17.2	16.3	11.1	9.4	17.7	19.9	34.7	35.1	10.8	n.a.	7.0	7.3
Bahrain	n.a.	n.a.					n.a.	6.3[f]	5.1[f]	5.6[f]	6.4[f]	27.6	29.8	36.3	35.4	n.a.	n.a.	10.2	11.9
Cyprus	7.6	<2.5					n.a.	n.a.	n.a.	n.a.	n.a.	20.4	21.8	12.0	13.6	n.a.	n.a.	n.a.	n.a.

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Georgia	4.1	8.7	7.0	9.5	31.8	39.7	0.6	9.2	5.7	13.7	7.6	19.3	21.7	26.9	27.5	54.8	20.4	4.8	6.1
Iraq	23.8	37.5					3.0	19.2	11.6	9.2	9.0	28.0	30.4	29.8	28.6	19.4	25.8	n.a.	n.a.
Israel	<2.5	<2.5	1.3[c,d]	1.9[c,d]	11.0[c,d]	13.7[c,d]	n.a.	n.a.	n.a.	n.a.	n.a.	24.8	26.1	11.5	12.9	n.a.	n.a.	8.0	7.8
Jordan	5.5	9.5					n.a.	7.9	7.3	5.7	7.1	33.1	35.5	30.5	37.7	22.7	25.4	13.9	13.8
Kuwait	<2.5	<2.5	4.9	4.9	12.6	12.2	2.5	4.8	6.0	7.9	7.1	35.6	37.9	21.1	23.7	n.a.	n.a.	9.9	9.9
Lebanon	10.9	9.3					n.a.	12.9	10.4	19.8	19.7	29.7	32.0	25.4	28.3	n.a.	n.a.	9.3	9.2
Oman	9.6	8.2	n.a.	n.a.	n.a.	n.a.	9.3	11.3	12.2	3.0	4.8	24.3	27.0	29.0	29.1	n.a.	23.2	10.6	10.5
Palestine	n.a.	n.a.	n.a.	4.4[c]	n.a.	26.3[c]	1.3	10.3	7.8	8.1	8.5	n.a.	n.a.	30.5	31.0	28.7	38.1	8.5	n.a.
Qatar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.0[f]	4.6[f]	13.1[f]	13.9[f]	32.4	35.1	27.1	28.1	29.3	n.a.	7.5	7.3
Saudi Arabia	4.8	3.9					n.a.	5.5	3.9	6.2	7.6	32.8	35.4	25.8	27.5	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	27.6	29.6	19.2	18.2	25.1	27.8	31.7	32.8	42.6	n.a.	n.a.	n.a.
Turkey	<2.5	<2.5					1.7	n.a.[g]	n.a.[g]	n.a.[g]	n.a.[g]	29.5	32.1	n.a.	n.a.	41.6	40.7	11.6	11.4
United Arab Emirates	8.8	3.7					n.a.	n.a.	n.a.	n.a.	n.a.	29.0	31.7	24.0	24.3	n.a.	n.a.	12.7	12.7
Yemen	27.8	45.4	n.a.	n.a.	n.a.	n.a.	n.a.	47.4	37.2	2.9	2.7	14.6	17.1	61.5	61.5	n.a.	n.a.	n.a.	n.a.
Central Asia and Southern Asia	**19.6**	**13.7**	**14.1**	**17.8**	**30.1**	**37.8**	**13.6**	**39.2**	**29.8**	**3.1**	**2.7**	**4.9**	**5.9**	**47.5**	**47.5**	**46.6**	**56.6**	**26.4**	**25.5**
Eastern Asia and South-eastern Asia*	**9.6**	**2.8**	**1.4**	**2.0**	**8.8**	**10.9**	**4.1**	**16.0**	**13.4**	**6.5**	**7.7**	**5.0**	**6.2**	**18.2**	**19.5**	**30.4**	**29.8**	**8.1**	**8.0**
Western Asia and Northern Africa	**8.6**	**10.9**	**9.1**	**9.1**	**27.8**	**28.9**	**5.1**	**20.3**	**17.8**	**10.5**	**10.8**	**25.3**	**27.7**	**31.8**	**31.8**	**37.4**	**38.7**	**11.2**	**11.1**
LATIN AMERICA AND THE CARIBBEAN	**9.3**	**7.7**	**8.1**	**11.3**	**27.9**	**34.8**	**1.3**	**12.8**	**11.3**	**7.3**	**7.5**	**22.2**	**24.2**	**18.2**	**17.2**	**33.4**	**n.a.**	**8.7**	**8.7**
Caribbean	**19.2**	**16.0**	**n.a.**	**37.6**	**n.a.**	**67.5**	**2.8**	**13.2**	**11.8**	**6.4**	**6.6**	**22.0**	**24.7**	**28.7**	**29.2**	**29.7**	**25.9**	**10.1**	**9.9**

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Antigua and Barbuda	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	17.1	18.9	16.7	17.2	n.a.	n.a.	9.1	9.1
Bahamas	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	29.5	31.6	13.3	14.5	n.a.	n.a.	13.2	13.1
Barbados	6.1	4.1	n.a.	n.a.	n.a.	n.a.	n.a.	7.6	6.6	10.8	11.4	20.9	23.1	16.9	17.0	19.7	n.a.	n.a.	n.a.
Cuba	<2.5	<2.5	n.a.	n.a.	n.a.	n.a.	2.0	7.1	7.0	9.2	10.0	22.6	24.6	20.2	19.3	48.6	32.8	5.2	5.3
Dominica	5.4	5.6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	25.6	27.9	20.1	20.8	n.a.	n.a.	n.a.	n.a.
Dominican Republic	19.2	8.3					n.a.	8.0	5.9	7.8	7.6	24.5	27.6	28.0	26.4	8.0	4.6	11.4	11.3
Grenada	n.a.	n.a.					n.a.	n.a.	n.a.	n.a.	n.a.	19.1	21.3	18.9	19.2	n.a.	n.a.	n.a.	n.a.
Haiti	55.0	46.8					3.7	23.9	20.4	3.6	3.7	19.4	22.7	47.6	47.7	39.3	39.9	n.a.	n.a.
Jamaica	7.4	7.7					3.3	6.8	8.5	7.2	6.8	22.3	24.7	19.5	19.9	23.8	n.a.	14.7	14.6
Puerto Rico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	18.4	18.8	n.a.	n.a.	n.a.	n.a.
Saint Kitts and Nevis	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	20.4	22.9	16.0	15.4	n.a.	n.a.	n.a.	n.a.
Saint Lucia	n.a.	n.a.	4.5[c]	n.a.	22.2[c]	n.a.	n.a.	2.7	2.8	6.5	6.9	17.4	19.7	14.1	14.3	3.5	n.a.	n.a.	n.a.
Saint Vincent and the Grenadines	7.9	5.6					n.a.	n.a.	n.a.	n.a.	n.a.	21.2	23.7	17.3	17.0	n.a.	n.a.	n.a.	n.a.
Trinidad and Tobago	11.1	6.7	n.a.	n.a.	n.a.	n.a.	n.a.	8.5	8.7	9.5	11.0	16.3	18.6	17.8	17.7	21.5	n.a.	12.5	12.4
Central America	**7.9**	**8.9**	**6.4**	**8.5**	**29.3**	**31.0**	**0.9**	**17.9**	**16.6**	**6.6**	**6.3**	**25.1**	**27.3**	**15.2**	**14.6**	**21.6**	**33.2**	**8.8**	**8.7**
Belize	5.7	5.9	n.a.	n.a.	n.a.	n.a.	1.8	17.5	13.3	9.0	8.0	22.0	24.1	21.2	20.5	14.7	33.2	8.7	8.6
Costa Rica	4.4	3.1	1.8[c,d]	2.6[c,d]	12.2[c,d]	15.3[c,d]	1.8	7.0	8.6	8.3	8.1	22.9	25.7	12.3	13.7	32.5	n.a.	7.3	7.5
El Salvador	9.1	8.5	13.8	13.8	42.2	47.1	2.1	16.0	11.2	6.0	6.6	22.2	24.6	9.9	10.6	31.4	46.7	10.4	10.3
Guatemala	18.9	16.8	16.1	19.2	42.7	49.7	0.8	47.5	42.8	5.4	5.1	18.9	21.2	11.0	7.4	49.6	53.2	11.2	11.0
Honduras	22.3	13.5	14.2[c,d]	14.6[c,d]	41.6[c,d]	45.6[c,d]	n.a.	22.7	19.9	5.0	5.7	19.0	21.4	16.6	18.0	30.7	n.a.	11.0	10.9
Mexico	4.4	7.2	3.6[c]	5.8[c,d]	25.6[c]	26.1[c,d]	1.4	12.7	12.1	6.7	6.3	26.8	28.9	15.9	15.3	14.4	28.6	8.0	7.9
Nicaragua	23.3	19.3					n.a.	17.4	14.1	7.2	7.5	21.5	23.7	13.3	15.7	31.7	n.a.	10.8	10.7

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Panama	21.6	7.5					n.a.	20.0	14.7	10.1	10.8	20.6	22.7	22.1	21.2	n.a.	n.a.	10.2	10.1
South America	**8.8**	**6.3**	**6.0**	**9.8**	**23.6**	**33.1**	**1.4[a]**	**10.2**	**8.6[a]**	**7.7**	**8.2[a]**	**21.1**	**23.0**	**18.4**	**17.3**	**41.9**	**n.a.**	**8.6**	**8.6**
Argentina	3.7	3.9	5.8	12.6	19.2	35.8	1.6	7.8	7.8	12.4	12.9	26.3	28.3	12.7	11.9	32.0	n.a.	7.1	7.3
Bolivia (Plurinational State of)	26.8	12.6					2.0	20.3	12.7	9.0	8.8	18.3	20.2	28.6	24.4	64.3	55.7	7.3	7.2
Brazil	6.5	<2.5	1.9	3.5	18.3	23.5	n.a.	6.3	6.1	6.9	7.3	20.1	22.1	18.3	16.1	38.6	n.a.	8.4	8.4
Chile	3.1	3.4	2.9[c,d]	4.3[c,d]	10.8[c,d]	17.9[c,d]	0.3	1.9	1.6	10.4	9.8	26.1	28.0	7.9	8.7	n.a.	n.a.	6.0	6.2
Colombia	11.2	8.8					1.6	12.9	11.5	5.2	5.8	20.4	22.3	22.1	21.2	n.a.	36.7	10.0	10.0
Ecuador	22.4	12.4	6.0[c,d]	11.6[c,d]	20.7[c,d]	32.7[c,d]	3.7	24.1	23.1	7.3	9.8	18.1	19.9	17.3	17.2	n.a.	n.a.	11.3	11.2
Guyana	7.1	5.2	n.a.	n.a.	n.a.	n.a.	6.4	14.4	9.0	5.9	6.6	17.9	20.2	34.4	31.7	31.3	21.1	15.8	15.6
Paraguay	9.5	9.2					1.0	9.6	4.6	10.1	12.0	18.2	20.3	22.2	23.0	24.4	29.6	8.2	8.1
Peru	18.8	8.7	13.5	19.2	37.2	47.8	0.4	18.8	10.8	8.7	8.0	18.1	19.7	20.6	20.6	67.4	66.4	9.5	9.4
Suriname	9.7	8.7	n.a.	n.a.	n.a.	n.a.	5.5	8.7	8.0	3.8	4.0	24.4	26.4	20.3	21.0	2.8	n.a.	14.9	14.7
Uruguay	3.9	<2.5	6.8	6.7	21.6	23.5	1.4	8.9	6.5	9.8	10.3	26.0	27.9	13.2	15.0	n.a.	n.a.	7.9	7.6
Venezuela (Bolivarian Republic of)	8.4	27.4					n.a.	12.5	10.6	6.4	6.7	24.0	25.6	20.9	24.2	n.a.	n.a.	8.6	9.1
OCEANIA	**6.7**	**6.2**	**2.8**	**3.4**	**11.1**	**12.9**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**25.8**	**28.1**	**14.4**	**16.0**	**n.a.**	**n.a.**	**7.8**	**7.9**
Australia and New Zealand	**<2.5**	**<2.5**	**2.8**	**3.4**	**10.6**	**12.6**	**n.a.**	**2.4**	**2.3[a]**	**12.9**	**16.9**	**27.0**	**29.3**	**7.6**	**8.8**	**n.a.**	**n.a.**	**6.2**	**6.4**
Australia	<2.5	<2.5	2.8	3.3	10.8	12.3	n.a.	2.1	2.1	14.2	18.5	26.7	29.0	7.4	8.5	n.a.	n.a.	6.3	6.5
New Zealand	<2.5	<2.5	2.8	3.9	10.0	14.0	n.a.	n.a.	n.a.	n.a.	n.a.	28.4	30.8	8.8	10.4	n.a.	n.a.	5.9	5.7
Oceania excluding Australia and New Zealand	**20.9**	**20.0**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**9.0**	**40.3**	**41.4**	**7.3**	**8.0**	**21.3**	**23.6**	**32.9**	**33.9**	**56.9**	**61.3**	**10.0**	**9.9**
Melanesia	**23.2**	**21.7**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**42.7**	**43.6**	**7.4**	**8.2**	**20.1**	**22.3**	**33.3**	**34.2**	**56.9**	**61.1**	**10.1**	**9.9**

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Fiji	3.7	5.6	n.a.	2.0[c]	n.a.	14.3[c]	n.a.	8.5	7.5	4.8	5.2	27.7	30.2	31.5	32.0	n.a.	n.a.	n.a.	n.a.
New Caledonia	9.6	6.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	27.4	24.6	n.a.	n.a.	n.a.	n.a.	n.a.	47.2	48.4	8.1	8.9	19.0	21.3	33.4	34.4	56.1	59.7	n.a.	n.a.
Solomon Islands	12.5	16.5	n.a.	n.a.	n.a.	n.a.	8.5	31.9	29.3	3.5	4.0	19.9	22.5	38.4	37.7	73.7	76.2	n.a.	n.a.
Vanuatu	6.3	9.3	n.a.	2.4[c]	n.a.	23.3[c]	n.a.	27.3	28.7	4.8	4.9	22.6	25.2	24.1	28.5	39.5	n.a.	11.0	10.9
Micronesia	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**16.5**	**15.2**	**4.5**	**4.8**	**43.2**	**45.9**	**27.9**	**29.1**	**66.4**	**n.a.**	**9.4**	**9.3**
Kiribati	5.3	4.1	n.a.	7.9[c]	n.a.	40.9[c]	3.5	15.8	14.9	2.4	2.4	43.5	46.0	31.8	32.6	66.4	n.a.	n.a.	n.a.
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.5	36.2	32.2	4.1	4.2	50.7	52.9	29.7	30.6	27.3	43.1	n.a.	n.a.
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	42.9	45.8	22.7	25.0	n.a.	n.a.	n.a.	n.a.
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	20.3	15.0	3.1	3.7	59.6	61.0	29.5	29.6	67.2	n.a.	n.a.	n.a.
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	53.1	55.3	27.3	28.5	n.a.	n.a.	n.a.	n.a.
Polynesia	**3.6**	**4.1**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**7.5**	**6.7**	**8.3**	**8.4**	**44.9**	**47.6**	**25.6**	**27.4**	**51.6**	**70.3**	**8.1**	**8.1**
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	53.8	55.9	25.8	27.1	n.a.	n.a.	3.5	3.5
French Polynesia	3.8	3.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	46.8	50.0	25.9	27.3	n.a.	n.a.	n.a.	n.a.
Samoa	3.4	4.6	n.a.	3.4[c]	n.a.	23.6[c]	3.1	5.7	6.8	6.7	7.1	44.7	47.3	24.5	26.8	51.3	70.3	n.a.	n.a.
Tokelau (Associate Member)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	n.a.	n.a.	6.0[c]	n.a.	23.2[c]	1.1	6.7	2.6	13.2	12.6	45.4	48.2	27.2	28.5	52.2	n.a.	n.a.	n.a.
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10.0	9.7	6.2	6.4	48.6	51.6	26.0	27.5	34.7	n.a.	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**<2.5**	**<2.5**	**1.3**	**1.1**	**9.1**	**8.0**	**n.a.**	**4.4[a]**	**4.0[a]**	**9.3[a]**	**8.6[a]**	**25.0**	**26.9**	**13.1**	**14.6**	**n.a.**	**n.a.**	**7.0**	**7.0**
Northern America**	**<2.5**	**<2.5**	**1.0**	**0.8**	**9.9**	**7.8**	**0.2**	**2.8**	**3.2**	**8.8**	**9.1**	**32.9**	**35.5**	**9.9**	**11.7**	**25.5**	**34.7**	**7.9**	**7.9**

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Bermuda	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	<2.5	<2.5	0.6[c]	0.9[c]	5.0[c]	5.8[c]	n.a.	n.a.	n.a.	11.2	11.8	27.1	29.4	8.8	10.4	n.a.	n.a.	6.2	6.4
Greenland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States of America	<2.5	<2.5	1.1[c]	0.8[c]	10.5[c]	8.0[c]	0.1	2.7	3.2	8.6	8.8	33.6	36.2	10.0	11.8	25.5	34.7	8.1	8.0
Europe	**<2.5**	**<2.5**	**1.5**	**1.3**	**8.7**	**8.1**	**n.a.**	**5.3[a]**	**4.5[a]**	**9.6[a]**	**8.3[a]**	**21.4**	**22.9**	**14.5**	**16.0**	**n.a.**	**n.a.**	**6.6**	**6.5**
Eastern Europe	**<2.5**	**<2.5**	**1.5**	**1.5**	**11.2**	**11.4**	**n.a.**	**7.9[a]**	**6.6[a]**	**13.5[a]**	**9.9[a]**	**22.0**	**23.4**	**19.2**	**20.5**	**n.a.**	**n.a.**	**6.2**	**6.1**
Belarus	<2.5	<2.5					n.a.	4.0	3.9	9.2	6.8	23.0	24.5	19.1	20.6	19.0	n.a.	4.9	5.1
Bulgaria	4.9	3.0	1.9	2.4	14.9	13.2	6.3	7.5	6.4	8.2	5.7	23.2	25.0	22.5	23.6	n.a.	n.a.	9.4	9.6
Czechia	<2.5	<2.5	0.7	0.8	5.8	4.2	n.a.	2.4	2.5	5.9	6.6	24.5	26.0	20.0	21.1	n.a.	n.a.	7.9	7.8
Hungary	<2.5	<2.5	1.4	1.4	11.3	8.6	n.a.	n.a.	n.a.	n.a.	n.a.	24.5	26.4	19.6	19.7	n.a.	n.a.	8.6	8.8
Poland	<2.5	<2.5	1.8	<0.5	8.9	5.8	n.a.	2.3	2.3	5.9	6.7	21.5	23.1	n.a.	n.a.	n.a.	n.a.	5.7	5.9
Republic of Moldova	n.a.	n.a.	1.6	4.5	19.3	27.2	n.a.	7.1	4.9	6.2	4.3	17.5	18.9	26.0	26.1	36.4	n.a.	5.0	5.0
Romania	<2.5	<2.5	5.6	3.4	19.3	13.9	n.a.	10.6	9.7	9.5	6.7	20.7	22.5	22.1	22.7	n.a.	n.a.	8.3	8.2
Russian Federation	<2.5	<2.5	0.7	<0.5[c]	8.2	6.0[c]	n.a.	n.a.	n.a.	n.a.	n.a.	21.9	23.1	20.0	21.1	n.a.	n.a.	6.0	5.8
Slovakia	5.5	4.0	1.1	1.1	6.2	6.0	n.a.	n.a.	n.a.	n.a.	n.a.	19.1	20.5	22.3	23.5	n.a.	n.a.	8.0	7.6
Ukraine	<2.5	<2.5	2.0	2.5			n.a.	19.1	15.9	25.7	17.0	22.7	24.1	14.4	17.7	19.7	n.a.	5.4	5.6
Northern Europe	**<2.5**	**<2.5**	**1.8**	**1.1**	**6.7**	**4.9**	**n.a.**	**3.4[a]**	**2.9[a]**	**7.5[a]**	**8.3[a]**	**23.7**	**25.8**	**10.6**	**12.0**	**n.a.**	**n.a.**	**6.1**	**6.0**
Denmark	<2.5	<2.5	1.0	1.1	5.9	5.0	n.a.	n.a.	n.a.	n.a.	n.a.	18.1	19.7	11.5	12.2	n.a.	n.a.	5.3	5.3
Estonia	<2.5	<2.5	0.9	0.8	9.5	7.9	1.5	1.3	1.2	5.1	5.7	20.1	21.2	20.7	21.7	n.a.	n.a.	4.4	4.3
Finland	<2.5	<2.5	2.4	1.9	9.3	8.0	n.a.	n.a.	n.a.	n.a.	n.a.	20.7	22.2	9.7	10.9	n.a.	n.a.	4.2	4.1
Iceland	<2.5	<2.5	1.7	1.5	6.4	6.6	n.a.	n.a.	n.a.	n.a.	n.a.	20.3	21.9	9.4	10.3	n.a.	n.a.	3.9	4.2
Ireland	<2.5	<2.5	3.4	4.3	8.9	8.3	n.a.	n.a.	n.a.	n.a.	n.a.	22.8	25.3	10.9	12.1	n.a.	n.a.	5.3	5.9
Latvia	<2.5	<2.5	0.6	0.7	9.9	10.2	n.a.	n.a.	n.a.	n.a.	n.a.	22.4	23.6	20.9	21.6	n.a.	n.a.	4.5	4.5

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Lithuania	<2.5	<2.5	2.5	1.7	15.3	11.3	n.a.	n.a.	n.a.	n.a.	n.a.	25.0	26.3	18.8	19.9	n.a.	n.a.	4.5	4.5
Norway	<2.5	<2.5	1.1	1.0	4.8	4.1	n.a.	n.a.	n.a.	n.a.	n.a.	21.3	23.1	10.7	12.0	n.a.	n.a.	4.7	4.5
Sweden	<2.5	<2.5	0.8	1.2	4.5	5.3	n.a.	n.a.	n.a.	n.a.	n.a.	19.0	20.6	11.7	13.6	n.a.	n.a.	3.8	2.4
United Kingdom of Great Britain and Northern Ireland	<2.5	<2.5	1.9	0.7	6.3	3.9	n.a.	n.a.	n.a.	n.a.	n.a.	25.4	27.8	9.4	11.1	n.a.	n.a.	6.9	7.0
Southern Europe	**<2.5**	**<2.5**	**1.7**	**1.9**	**9.9**	**9.0**	**n.a.**	**4.5[a]**	**4.0[a]**	**8.1[a]**	**8.0[a]**	**20.4**	**21.8**	**13.5**	**15.1**	**n.a.**	**n.a.**	**7.2**	**7.3**
Albania	8.9	3.9	10.0	8.8	38.8	33.8	1.6	17.6	9.6	21.7	14.6	19.3	21.7	21.6	24.8	37.1	36.5	4.6	4.6
Andorra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	24.8	25.6	10.6	12.1	n.a.	n.a.	7.5	7.4
Bosnia and Herzegovina	<2.5	<2.5	1.5	2.0	9.6	10.0	n.a.	9.3	9.1	18.9	12.8	16.3	17.9	23.8	24.4	18.2	n.a.	3.4	3.4
Croatia	<2.5	<2.5	0.6	1.3	6.5	11.0	n.a.	n.a.	n.a.	n.a.	n.a.	22.5	24.4	20.4	21.0	n.a.	n.a.	4.8	5.1
Greece	<2.5	<2.5	2.6	1.7[c,e]	15.8	8.6[c,e]	n.a.	2.1	2.2	14.2	13.9	23.2	24.9	12.8	15.1	n.a.	n.a.	8.7	8.7
Italy	<2.5	<2.5	1.2	1.2	8.6	6.7	n.a.	n.a.	n.a.	n.a.	n.a.	18.7	19.9	11.8	13.6	n.a.	n.a.	7.0	7.0
Malta	<2.5	<2.5	1.5	0.9	5.9	4.3	n.a.	n.a.	n.a.	n.a.	n.a.	27.5	28.9	12.3	13.7	n.a.	n.a.	7.0	6.3
Montenegro	5.5	<2.5	2.1	2.8	12.6	13.5	2.2	8.2	8.1	15.3	10.2	21.6	23.3	16.1	17.2	19.3	n.a.	5.2	5.5
North Macedonia	5.0	2.7	3.6	5.0	15.1	17.7	3.4	5.8	4.1	13.4	10.0	20.8	22.4	17.2	19.3	23.0	n.a.	8.8	9.1
Portugal	<2.5	<2.5	4.1	3.2	14.7	11.5	0.6	3.8	3.3	7.6	8.5	19.0	20.8	12.0	13.2	n.a.	n.a.	8.5	8.9
Serbia	<2.5	3.9	1.7	2.6	11.4	12.0	2.6	6.2	5.3	15.5	10.8	20.0	21.5	21.8	22.8	13.4	12.8	4.6	4.5
Slovenia	<2.5	<2.5	0.9	<0.5	12.3	8.2	n.a.	n.a.	n.a.	n.a.	n.a.	18.8	20.2	20.2	21.8	n.a.	n.a.	6.2	6.1
Spain	<2.5	<2.5	1.1	1.8	7.1	8.8	n.a.	n.a.	n.a.	n.a.	n.a.	22.4	23.8	12.0	13.4	n.a.	n.a.	8.2	8.3
Western Europe	**<2.5**	**<2.5**	**1.3**	**0.8**	**5.2**	**4.2**	**n.a.**	**2.6[a]**	**2.3[a]**	**5.4[a]**	**6.0[a]**	**20.1**	**21.7**	**9.6**	**11.6**	**n.a.**	**n.a.**	**7.0**	**6.9**
Austria	<2.5	<2.5	1.1	0.9	5.5	3.0	n.a.	n.a.	n.a.	n.a.	n.a.	18.4	20.1	11.5	13.0	n.a.	n.a.	6.9	6.5
Belgium	<2.5	<2.5	n.a.	1.1	n.a.	3.7	0.4	2.7	2.3	4.5	5.1	20.7	22.1	11.3	13.6	n.a.	n.a.	6.9	7.3
France	<2.5	<2.5	1.6	0.7	6.8	5.8	n.a.	n.a.	n.a.	n.a.	n.a.	20.1	21.6	8.8	10.6	n.a.	n.a.	7.4	7.4

TABLE A1.1 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (UNDER 5 YEARS OF AGE)	PREVALENCE OF STUNTING IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OVERWEIGHT IN CHILDREN (UNDER 5 YEARS OF AGE)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (18 YEARS AND OLDER)		PREVALENCE OF ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE (15–49)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS 0–5 MONTHS OF AGE		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Germany	<2.5	<2.5	1.0	0.7	4.1	3.4	0.3	1.5	1.6	3.7	4.1	20.7	22.3	9.6	11.7	n.a.	n.a.	6.8	6.6
Luxembourg	<2.5	<2.5	1.8	0.8	4.7	3.1	n.a.	n.a.	n.a.	n.a.	n.a.	20.9	22.6	9.0	10.2	n.a.	n.a.	6.8	6.5
Netherlands	<2.5	<2.5	1.5	1.4	5.7	4.7	n.a.	1.5	1.6	4.1	5.0	18.6	20.4	10.9	12.8	n.a.	n.a.	6.2	6.2
Switzerland	<2.5	<2.5	1.5	<0.5	4.8	2.0	n.a.	n.a.	n.a.	n.a.	n.a.	18.0	19.5	9.6	11.3	n.a.	n.a.	6.5	6.5

NOTES:
[1] Regional estimates were included when more than 50 percent of population was covered. To reduce the margin of error, estimates are presented as three-year averages.
[2] FAO estimates of the percentage of people in the total population living in households where at least one adult has been found to be food insecure.
[3] Country-level results are presented only for those countries for which estimates are based on official national data (see note c) or as provisional estimates, based on FAO data collected through the Gallup© World Poll, for countries whose national relevant authorities expressed no objection to their publication. Note that consent to publication does not necessarily imply validation of the estimate by the national authorities involved and that the estimate is subject to revision as soon as suitable data from official national sources are available. Global, regional and subregional aggregates are based on data collected in approximately 150 countries.
[4] The estimates for the year 2020 are the middle of the projected range.
[5] For regional estimates, values correspond to the model predicted estimates for the year 2020. For countries, the latest data available from 2014 to 2020 are used.
[6] The collection of household survey data on child height and weight were limited in 2020 due to the physical distancing measures required to prevent the spread of COVID-19. Only four national surveys included in the database were carried out (at least partially) in 2020. The estimates on child stunting, wasting and overweight are therefore based almost entirely on data collected before 2020 and do not take into account the impact of the COVID-19 pandemic.
[7] Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2005 to 2012 are used.
[8] Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2014 to 2019 are used with the exception of China where the latest data are from the year 2013.
* Wasting under 5 years of age and low birthweight regional aggregates exclude Japan.
** The Northern America wasting estimates are derived applying mixed-effect models with subregions as fixed effects; data were available only for the United States of America, preventing the estimation of standard errors (and confidence intervals). Further details on the methodology are described in De Onis, M., Blössner, M., Borghi, E., Frongillo, E.A. & Morris, R. 2004. Estimates of global prevalence of childhood underweight in 1990 and 2015. *Journal of the American Medical Association*, 291(21): 2600–2606. Model selection is based on best fit.
[a] Consecutive low population coverage; interpret with caution.
[b] The Central Agency for Public Mobilization & Statistics (CAPMAS) reports an estimate of severe food insecurity of 1.3 percent for 2015, based on HIECS data, using the WFP consolidated approach for reporting indicators of food security. Note that the two estimates are not directly comparable due to different definitions of "severe food insecurity".
[c] Based on official national data.
[d] For years when official national data are not available, the estimates are projected using FAO data. See Annex 1B for further details.
[e] Based on official national data collected in 2019 and 2020 through EU-SILC.
[f] Most recent input data are from before 2000, interpret with caution.
[g] Pending review.
[h] 2020 estimate only.
<2.5 = prevalence of undernourishment less than 2.5 percent; <0.5 = prevalence of severe food insecurity less than 0.5 percent.
n.a. = data not available.

TABLE A1.2 PROGRESS TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS (SDGs) AND GLOBAL NUTRITION TARGETS: NUMBER OF PEOPLE WHO ARE AFFECTED BY UNDERNOURISHMENT, MODERATE OR SEVERE FOOD INSECURITY AND SELECTED FORMS OF MALNUTRITION; NUMBER OF INFANTS EXCLUSIVELY BREASTFED AND NUMBER OF BABIES BORN WITH LOW BIRTHWEIGHT

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
WORLD	**804.0**	**683.9**	**607.7**	**813.0**	**1 696.1**	**2 132.3**	**45.4**	**173.7**	**149.2**	**37.0**	**38.9**	**574.3**	**675.7**	**519.5**	**570.8**	**49.9**	**59.8**	**20.9**	**20.5**
Least developed countries	**212.1**	**227.0**	**192.7**	**230.2**	**469.5**	**556.2**	**10.9**	**51.8**	**50.2**	**4.2**	**5.0**	**22.5**	**30.8**	**83.6**	**101.4**	**12.7**	**16.9**	**4.9**	**4.9**
Landlocked developing countries	**100.3**	**91.4**	**77.5**	**102.7**	**210.9**	**267.2**	**4.2**	**24.4**	**22.7**	**2.9**	**2.9**	**19.3**	**24.5**	**34.3**	**42.4**	**6.4**	**8.3**	**2.2**	**2.2**
Small island developing states	**10.7**	**10.4**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**0.3**	**1.3**	**1.3**	**0.4**	**0.4**	**8.1**	**9.5**	**4.6**	**4.9**	**0.4**	**0.5**	**0.1**	**0.1**
Low-income economies	**150.6**	**193.6**	**151.9**	**188.1**	**354.0**	**427.0**	**7.3**	**36.7**	**36.5**	**3.6**	**3.9**	**17.6**	**22.9**	**50.3**	**6.2**	**8.3**	**11.8**	**2.8**	**3.3**
Lower-middle-income economies	**434.5**	**379.4**	**334.1**	**465.1**	**842.4**	**1 108.6**	**30.1**	**108.2**	**88.5**	**11.9**	**12.1**	**105.4**	**133.5**	**294.1**	**32.6**	**24.0**	**30.9**	**12.9**	**13.0**
Upper-middle-income economies	**206.5**	**99.8**	**101.6**	**140.3**	**398.7**	**504.7**	**4.3**	**25.7**	**21.6**	**16.3**	**17.5**	**232.4**	**277.2**	**138.8**	**14.4**	**12.9**	**11.8**	**3.2**	**3.2**
High-income economies	**n.r.**	**n.r.**	**19.8**	**19.0**	**99.9**	**90.7**	**0.2[a]**	**2.5[a]**	**2.2[a]**	**5.0[a]**	**5.1[a]**	**206.6**	**231.4**	**36.3**	**3.9**	**n.a.**	**n.a.**	**1.0**	**1.0**
Low-income food-deficit countries	**481.9**	**472.2**	**412.2**	**533.7**	**881.3**	**1 146.5**	**<0.1**	**108.8**	**89.0**	**8.9**	**8.9**	**59.9**	**79.6**	**n.a.**	**n.a.**	**24.8**	**33.0**	**14.9**	**14.5**
AFRICA	**198.4**	**248.0**	**219.8**	**298.7**	**576.7**	**726.4**	**12.1**	**60.2**	**61.4**	**8.7**	**10.6**	**65.5**	**81.5**	**103.1**	**122.7**	**13.1**	**17.7**	**5.6**	**5.7**
Northern Africa	**15.5**	**16.0**	**22.1**	**22.2**	**64.3**	**72.6**	**1.9**	**5.8**	**6.2**	**3.1**	**3.8**	**30.2**	**35.7**	**17.6**	**18.9**	**2.3**	**2.4**	**0.7**	**0.7**
Algeria	2.2	n.r.	5.2	3.0	9.1	7.6	0.1	0.5	0.5	0.6	0.6	6.2	7.4	3.4	3.6	0.2	n.a.	<0.1	<0.1
Egypt	4.9	5.4	7.8[b]	6.8	25.7[b]	27.9	1.1	2.4	2.8	1.7	2.3	15.6	18.4	6.9	7.0	1.3	1.0	n.a.	n.a.
Libya	n.a.	n.a.	0.7	1.3	1.9	2.5	0.1	0.2	0.3	0.2	0.2	1.2	1.4	0.5	0.6	n.a.	n.a.	n.a.	n.a.
Morocco	1.7	1.5				10.2[c,d]	0.1	0.5	0.4	0.4	0.4	5.2	6.2	2.7	2.9	0.2	0.2	0.1	0.1
Sudan	5.8	5.3	5.2[c,d]	7.2[c,d]	16.1[c,d]	21.2[c,d]	1.0	2.0	2.1	0.1	0.2	<0.1	<0.1	3.1	3.8	0.5	0.7	n.a.	n.a.
Tunisia	0.4	0.3	1.0	1.2	2.0	2.9	<0.1	0.1	0.1	0.1	0.2	1.9	2.2	0.9	1.0	<0.1	<0.1	<0.1	<0.1

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
Northern Africa (excluding Sudan)	**9.6**	**10.7**	**16.9**	**15.0**	**48.2**	**51.5**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**30.2**	**35.7**	**n.a.**	**n.a.**	**1.8**	**1.6**	**0.5**	**0.5**
Sub-Saharan Africa	**182.8**	**232.0**	**197.7**	**276.6**	**512.4**	**653.8**	**10.1**	**54.3**	**55.2**	**5.6**	**6.8**	**35.3**	**45.9**	**85.4**	**103.8**	**10.9**	**15.3**	**4.9**	**5.0**
Eastern Africa	**101.0**	**115.3**	**95.7**	**115.5**	**231.3**	**275.5**	**3.5**	**23.4**	**22.1**	**2.4**	**2.7**	**9.3**	**12.7**	**26.5**	**33.8**	**6.1**	**8.4**	**1.9**	**1.9**
Burundi	n.a.	n.a.					0.1	1.0	1.2	<0.1	0.1	0.2	0.3	0.7	1.0	0.3	0.3	<0.1	<0.1
Comoros	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Djibouti	0.2	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	n.a.	n.a.	n.a.
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.3	0.2	<0.1	<0.1	0.1	0.1	0.3	0.3	0.1	n.a.	n.a.	n.a.
Ethiopia	28.3	18.2	14.7	18.4	56.7	63.2	1.2	6.3	5.9	0.4	0.4	1.6	2.4	4.8	6.6	1.6	2.0	n.a.	n.a.
Kenya	10.4	13.0	8.3[c,d]	13.5[c,d]	25.4[c,d]	36.0[c,d]	0.3	2.0	1.4	0.3	0.3	1.3	1.8	3.1	3.9	0.5	0.9	0.2	0.2
Madagascar	6.1	11.7	n.a.	n.a.	n.a.	n.a.	0.3	1.7	1.7	0.1	0.1	0.5	0.7	2.0	2.5	0.3	0.4	0.1	0.1
Malawi	2.8	3.2	8.7[c,d]	9.6[c,d]	13.7[c,d]	15.2[c,d]	<0.1	1.2	1.1	0.2	0.1	0.3	0.5	1.1	1.4	0.4	0.4	<0.1	<0.1
Mauritius	<0.1	<0.1	<0.1	0.1	0.2	0.3	n.a.	<0.1[f]	<0.1[f]	<0.1[f]	<0.1[f]	0.1	0.1	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Mozambique	6.8	9.5	11.0	12.3	18.5	21.6	0.2	1.9	1.9	0.2	0.3	0.7	1.0	2.9	3.5	0.4	n.a.	0.1	0.2
Rwanda	3.1	4.4					<0.1	0.7	0.6	0.1	0.1	0.3	0.4	0.5	0.5	0.3	0.3	<0.1	<0.1
Seychelles	n.a.	n.a.	<0.1[c]	<0.1[c]	<0.1[c]	<0.1[c]	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Somalia	6.1	9.2	n.a.	6.8[h]	n.a.	12.6[h]	n.a.	0.7	0.8	0.1	0.1	0.4	0.5	1.2	1.5	<0.1	n.a.	n.a.	n.a.
South Sudan	--	n.a.	7.0[c]	6.9[c]	9.1[c]	9.4[c]	n.a.	0.5	0.5	0.1	0.1	<0.1	<0.1	0.8	0.9	0.2	n.a.	n.a.	n.a.
Uganda	n.a.	n.a.	6.7[c,d]	9.6[c,d]	22.2[c,d]	30.6[c,d]	0.2	2.2	2.2	0.3	0.3	0.7	1.0	2.5	3.4	0.9	1.0	n.a.	n.a.
United Republic of Tanzania	12.1	14.5	12.3[c,d]	14.3[c,d]	28.3[c,d]	32.7[c,d]	0.3	3.2	3.1	0.4	0.5	1.6	2.2	4.4	5.3	0.8	1.2	0.2	0.2
Zambia	n.a.	n.a.	3.5[c,d]	4.1[c,d]	7.7[c,d]	9.2[c,d]	0.1	1.1	1.0	0.2	0.2	0.5	0.6	1.0	1.4	0.3	0.4	<0.1	<0.1
Zimbabwe	n.a.	n.a.	4.9	4.7	8.9	10.2	0.1	0.7	0.5	0.1	0.1	1.0	1.1	1.0	1.1	0.1	0.2	<0.1	<0.1

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
Middle Africa	**41.2**	**53.2**	**n.a.**	**62.1**	**n.a.**	**121.2**	**1.9**	**9.8**	**11.3**	**1.1**	**1.5**	**4.5**	**6.0**	**14.6**	**17.2**	**1.6**	**n.a.**	**0.8**	**0.8**
Angola	10.1	5.5	5.9	8.6[c]	18.5	23.4[c]	0.3	1.6	2.2	0.1	0.2	0.8	1.1	2.6	3.3	n.a.	0.4	0.2	0.2
Cameroon	2.8	1.4	n.a.	6.9	n.a.	14.4	0.2	1.2	1.1	0.3	0.4	1.0	1.4	2.1	2.5	0.2	0.3	<0.1	0.1
Central African Republic	1.6	2.3	n.a.	2.9	n.a.	3.9	<0.1	0.3	0.3	<0.1	<0.1	0.1	0.2	0.5	0.5	0.1	<0.1	<0.1	<0.1
Chad	3.8	5.1					0.4	1.0	1.0	0.1	0.1	0.3	0.4	1.4	1.6	<0.1	<0.1	n.a.	n.a.
Congo	1.2	2.0	2.1	2.8	4.0	4.7	0.1	0.2	0.1	<0.1	<0.1	0.2	0.2	0.6	0.6	<0.1	0.1	<0.1	<0.1
Democratic Republic of the Congo	21.1	36.2	n.a.	33.4	n.a.	60.1	1.0	5.5	6.5	0.6	0.7	1.8	2.5	7.1	8.2	1.0	n.a.	0.3	0.4
Equatorial Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	<0.1	n.a.	n.a.	n.a.
Gabon	0.2	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.2	0.3	<0.1	n.a.	<0.1	<0.1
Sao Tome and Principe	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	<0.1	<0.1	<0.1
Southern Africa	**2.8**	**5.6**	**11.9**	**13.5**	**27.7**	**30.7**	**0.2**	**1.6**	**1.6**	**0.8**	**0.8**	**9.6**	**11.2**	**4.7**	**5.5**	**n.a.**	**0.4**	**0.2**	**0.2**
Botswana	0.5	0.7	0.4[c,d]	0.5[c,d]	1.0[c,d]	1.2[c,d]	n.a.	0.1	0.1	<0.1	<0.1	0.2	0.2	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Eswatini	<0.1	0.1	0.3	0.4	0.7	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Lesotho	0.3	0.5	n.a.	0.6[c]	n.a.	1.1[c]	<0.1	0.1	0.1	<0.1	<0.1	0.2	0.2	0.1	0.2	<0.1	<0.1	<0.1	<0.1
Namibia	0.4	0.5	0.7[c,d]	0.8[c,d]	1.2[c,d]	1.4[c,d]	n.a.	0.1	0.1	<0.1	<0.1	0.2	0.2	0.1	0.2	<0.1	n.a.	<0.1	<0.1
South Africa	1.6	3.8	10.0	11.3	23.7	26.3	0.2	1.4	1.3	0.7	0.7	9.0	10.4	4.2	4.8	n.a.	0.4	0.2	0.2
Western Africa	**37.9**	**57.8**	**38.1**	**85.5**	**149.7**	**226.4**	**4.5**	**19.5**	**20.2**	**1.3**	**1.8**	**11.9**	**15.9**	**39.6**	**47.3**	**2.6**	**4.3**	**2.0**	**2.1**
Benin	1.0	0.9	n.a.	n.a.	n.a.	n.a.	0.1	0.6	0.6	<0.1	<0.1	0.4	0.5	1.3	1.5	0.1	0.2	<0.1	<0.1
Burkina Faso	2.4	2.9	1.8[c,d]	3.1[c,d]	7.6[c,d]	9.7[c,d]	0.3	1.0	0.9	0.1	0.1	0.4	0.5	2.0	2.5	0.2	0.4	<0.1	<0.1
Cabo Verde	<0.1	<0.1	n.a.	<0.1[c]	n.a.	0.2[c]	n.a.	<0.1[f]	<0.1[f]	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	<0.1	n.a.	n.a.	n.a.
Côte d'Ivoire	3.7	3.8					0.2	1.0	0.7	0.1	0.1	0.9	1.2	2.6	3.2	0.1	0.2	0.1	0.1

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
Gambia	0.3	0.3	0.5	0.6	1.1	1.3	<0.1	0.1	0.1	<0.1	<0.1	0.1	0.1	0.3	0.3	<0.1	<0.1	<0.1	<0.1
Ghana	2.5	1.8	2.1[c,d]	2.6[c,d]	13.7[c,d]	15.3[c,d]	0.3	0.8	0.6	0.1	0.1	1.3	1.7	2.9	2.7	0.4	0.4	0.1	0.1
Guinea	n.a.	n.a.	5.1	6.3	8.3	9.5	0.2	0.6	0.6	0.1	0.1	0.3	0.4	1.3	1.5	0.1	0.1	n.a.	n.a.
Guinea-Bissau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.1	0.1	<0.1	<0.1	0.1	0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Liberia	1.2	1.9	n.a.	1.8	n.a.	4.0	<0.1	0.2	0.2	<0.1	<0.1	0.2	0.2	0.4	0.5	<0.1	n.a.	n.a.	n.a.
Mali	1.7	2.0					0.3	1.0	0.9	<0.1	0.1	0.5	0.7	2.0	2.6	0.1	0.3	n.a.	n.a.
Mauritania	0.3	0.4	0.2[c,d]	0.3[c,d]	1.1[c,d]	1.8[c,d]	0.1	0.2	0.2	<0.1	<0.1	0.2	0.3	0.4	0.5	<0.1	0.1	n.a.	n.a.
Niger	n.a.	n.a.					0.5	1.8	2.2	<0.1	0.1	0.3	0.5	1.8	2.4	0.2	n.a.	n.a.	n.a.
Nigeria	9.9	29.4	11.9[c,d]	43.0[c,d]	66.1[c,d]	116.0[c,d]	2.2	11.1	12.0	0.7	0.9	6.1	8.2	20.9	25.5	0.9	1.8	n.a.	n.a.
Senegal	1.9	1.2	2.1	2.2[c]	5.7	6.7[c]	0.2	0.5	0.5	<0.1	0.1	0.5	0.7	1.8	2.1	0.2	0.2	<0.1	0.1
Sierra Leone	2.6	2.0	2.2[c,d]	2.5[c,d]	5.6[c,d]	6.6[c,d]	0.1	0.4	0.3	<0.1	0.1	0.3	0.3	0.8	0.9	0.1	0.1	<0.1	<0.1
Togo	1.6	1.7					0.1	0.3	0.3	<0.1	<0.1	0.2	0.3	0.8	0.9	0.1	0.2	<0.1	<0.1
Sub-Saharan Africa (including Sudan)	**188.7**	**237.3**	**203.0**	**283.7**	**528.5**	**674.9**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**35.3**	**45.9**	**n.a.**	**n.a.**	**11.3**	**16.1**	**5.1**	**5.2**
ASIA*	**543.6**	**378.0**	**321.7**	**426.8**	**840.5**	**1.085.3**	**31.9**	**103.6**	**79.0**	**18.2**	**18.7**	**181.7**	**231.3**	**351.9**	**380.7**	**28.9**	**32.7**	**13.3**	**12.8**
Central Asia	**6.3**	**2.3**	**1.1**	**2.3**	**6.3**	**10.9**	**0.2**	**1.1**	**0.8**	**0.6**	**0.5**	**6.6**	**8.1**	**5.2**	**5.3**	**0.5**	**0.7**	**<0.1**	**<0.1**
Kazakhstan	1.1	n.r.	n.a.	<0.1[c,d]	n.a.	0.4[c,d]	0.1	0.2	0.1	0.2	0.2	2.2	2.6	1.3	1.3	0.1	0.1	<0.1	<0.1
Kyrgyzstan	0.5	0.5	n.a.	<0.1[c,d]	n.a.	0.4[c,d]	<0.1	0.1	0.1	0.1	<0.1	0.5	0.6	0.5	0.6	0.1	0.1	<0.1	<0.1
Tajikistan	n.a.	n.a.					0.1	0.3	0.2	0.1	<0.1	0.6	0.7	0.6	0.8	0.1	0.1	<0.1	<0.1
Turkmenistan	0.2	0.2	n.a.	n.a.	n.a.	n.a.	<0.1	0.1	0.1	<0.1	<0.1	0.6	0.7	0.4	0.4	<0.1	0.1	<0.1	<0.1
Uzbekistan	3.9	n.r.	0.6	1.3	3.5	6.5	0.1	0.5	0.3	0.3	0.2	2.8	3.5	2.4	2.2	0.2	0.3	<0.1	<0.1
Eastern Asia*	**107.4**	**n.r.**	**16.8**	**28.9**	**99.7**	**138.3**	**1.5**	**7.4**	**4.6**	**6.7**	**7.4**	**61.1**	**77.5**	**67.1**	**64.4**	**5.6**	**4.0**	**0.9**	**0.9**
China	95.4	n.r.					1.6	6.4	3.9	6.2	6.9	53.8	68.7	56.1	54.0	4.9	3.4	0.9	0.8
China, mainland	94.3	n.r.					n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
Taiwan Province of China	1.0	0.8					n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.7	1.7	n.a.	n.a.	n.a.	n.a.
China, Hong Kong SAR	n.r.	n.r.					n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Macao SAR	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	8.1	10.9	n.a.	n.a.	n.a.	n.a.	<0.1	0.4	0.3	<0.1	<0.1	1.1	1.3	2.1	2.2	0.2	0.3	n.a.	n.a.
Japan	n.r.	n.r.	0.5	0.8	3.3	4.3	n.a.	0.4	0.3	0.1	0.1	3.9	4.6	5.3	4.8	n.a.	n.a.	0.1	0.1
Mongolia	0.7	0.1	0.1	0.2	0.6	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.4	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Republic of Korea	n.r.	n.r.	0.2[c]	0.3	2.4[c]	2.6	n.a.	0.1	<0.1	0.2	0.2	1.7	2.0	1.8	1.6	n.a.	n.a.	<0.1	<0.1
Eastern Asia (excluding China, mainland)	**11.9**	**13.3**	**1.2**	**1.9**	**9.3**	**11.0**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**0.2**	**0.2**
South-eastern Asia	**95.8**	**46.7**	**15.0**	**18.7**	**100.7**	**116.7**	**4.6**	**17.2**	**15.3**	**3.3**	**4.2**	**22.2**	**29.5**	**41.7**	**47.4**	**3.8**	**5.2**	**1.5**	**1.4**
Brunei Darussalam	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Cambodia	2.3	1.0	2.6	2.2	7.6	7.4	0.2	0.6	0.5	<0.1	<0.1	0.3	0.4	1.9	2.1	0.3	0.2	<0.1	<0.1
Indonesia	43.5	17.6	1.8[c,d]	1.9[c,d]	15.5[c,d]	16.8[c,d]	2.5	8.1	7.5	1.9	2.6	9.1	12.2	18.3	22.3	2.0	2.3	0.5	0.5
Lao People's Democratic Republic	1.3	0.4	n.a.	0.6	n.a.	2.1	0.1	0.3	0.2	<0.1	<0.1	0.2	0.2	0.6	0.8	0.1	0.1	<0.1	<0.1
Malaysia	0.8	1.0	2.4	2.4	5.3	6.0	0.3	0.4	0.5	0.1	0.2	2.6	3.3	2.4	2.8	n.a.	0.2	<0.1	<0.1
Myanmar	13.6	4.1	n.a.	1.0	n.a.	12.0	0.3	1.5	1.1	0.1	0.1	1.5	2.1	5.7	6.3	0.2	0.5	0.1	0.1
Philippines	12.9	10.1	3.3[c,d]	4.3[c,d]	42.1[c,d]	46.1[c,d]	0.6	3.6	3.0	0.4	0.4	3.2	4.1	4.2	3.5	0.8	n.a.	0.5	0.5
Singapore	n.a.	n.a.	<0.1	<0.1	0.2	0.3	n.a.	<0.1	<0.1	<0.1	<0.1	0.2	0.3	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Thailand	7.8	5.7	2.9	5.9	10.4	20.8	0.3	0.6	0.4	0.3	0.3	4.1	5.4	4.1	4.2	0.1	0.2	<0.1	<0.1
Timor-Leste	0.3	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	n.a.	n.a.
Viet Nam	13.0	6.5	0.4	0.5[c,d]	5.8	6.2[c,d]	0.4	1.9	1.8	0.3	0.5	1.0	1.4	4.3	5.3	0.3	n.a.	0.1	0.1

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE [1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE [1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE [1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)
Southern Asia	**315.9**	**269.5**	**267.0**	**352.2**	**564.0**	**742.6**	**25.0**	**73.0**	**54.3**	**5.3**	**4.5**	**49.7**	**65.4**	**218.4**	**241.0**	**17.0**	**20.7**	**10.3**	**9.8**
Afghanistan	9.2	9.7	5.1	7.5[c,d]	15.5	24[c,d]	0.3	2.4	2.0	0.3	0.2	0.6	0.9	2.5	3.8	n.a.	0.7	n.a.	n.a.
Bangladesh	19.7	15.9	20.7	17.1	50.4	52.0	1.4	5.7	4.3	0.3	0.3	2.7	3.7	14.9	16.8	1.9	1.9	0.9	0.9
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
India	247.8	208.6					20.1	52.3	36.1	3.0	2.2	25.2	34.3	171.5	187.3	11.2	13.9	n.a.	n.a.
Iran (Islamic Republic of)	3.6	4.6	7.5	7.2	37.7	35.2	n.a.	0.4	0.5	0.5[f]	0.7[f]	12.6	14.8	5.1	5.5	0.7	n.a.	n.a.	n.a.
Maldives	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Nepal	4.3	1.4	2.8	3.4	8.0	10.4	0.3	1.2	0.8	<0.1	<0.1	0.5	0.7	2.6	3.2	0.4	0.4	0.1	0.1
Pakistan	28.2	27.9					1.9	10.7	10.3	1.2	1.0	7.5	10.2	19.8	22.4	1.9	2.7	n.a.	n.a.
Sri Lanka	2.9	1.4					0.3	0.3	0.3	<0.1	<0.1	0.6	0.8	1.8	1.8	0.3	0.3	<0.1	<0.1
Southern Asia (excluding India)	**68.1**	**60.9**	**64.2**	**73.9**	**199.6**	**219.5**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**24.5**	**31.1**	**n.a.**	**n.a.**	**5.7**	**6.8**	**n.a.**	**n.a.**
Western Asia	**18.3**	**40.3**	**21.8**	**24.7**	**69.7**	**76.8**	**1.0**	**4.7**	**3.7**	**2.4**	**2.2**	**42.4**	**51.4**	**19.6**	**22.5**	**1.8**	**1.8**	**0.6**	**0.6**
Armenia	0.4	0.1	<0.1	<0.1[c,d]	0.5	0.4[c,d]	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Azerbaijan	0.4	n.r.	<0.1	<0.1	0.6	0.9	n.a.	0.1	0.1	0.1	0.1	1.2	1.4	0.9	0.9	<0.1	n.a.	<0.1	<0.1
Bahrain	n.a.	n.a.					n.a.	<0.1[f]	<0.1[f]	<0.1[f]	<0.1[f]	0.3	0.3	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Cyprus	<0.1	n.r.					n.a.	n.a.	n.a.	n.a.	n.a.	0.2	0.2	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Georgia	0.2	0.3	0.3	0.4	1.3	1.6	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	0.7	0.3	0.2	<0.1	<0.1	<0.1	<0.1
Iraq	6.4	14.7					0.2	0.9	0.6	0.4	0.5	4.7	6.1	2.3	2.8	0.2	0.3	n.a.	n.a.
Israel	n.r.	n.r.	0.1[c,d]	0.2[c,d]	0.9[c,d]	1.2[c,d]	n.a.	n.a.	n.a.	n.a.	n.a.	1.3	1.4	0.2	0.3	n.a.	n.a.	<0.1	<0.1
Jordan	0.3	1.0					n.a.	0.1	0.1	0.1	0.1	1.5	2.0	0.6	1.0	0.1	0.1	<0.1	<0.1
Kuwait	n.r.	n.r.	0.2	0.2	0.5	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	1.1	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Lebanon	0.5	0.6					n.a.	0.1	0.1	0.1	0.1	1.1	1.5	0.4	0.5	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)
Oman	0.2	0.4	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	0.1	<0.1	<0.1	0.6	0.9	0.2	0.3	n.a.	<0.1	<0.1	<0.1
Palestine	n.a.	n.a.	n.a.	0.2[c]	n.a.	1.3[c]	<0.1	0.1	0.1	0.1	0.1	n.a.	n.a.	0.3	0.4	<0.1	0.1	<0.1	<0.1
Qatar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1[f]	<0.1[f]	<0.1[f]	<0.1[f]	0.6	0.8	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Saudi Arabia	1.1	1.3					n.a.	0.2	0.1	0.2	0.2	6.4	8.1	1.9	2.3	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.7	0.6	0.5	0.3	3.0	3.0	1.7	1.5	0.2	n.a.	n.a.	n.a.
Turkey	n.r.	n.r.					0.1	n.a.g	n.a.[g]	n.a.[g]	n.a.[g]	15.1	17.8	n.a.	n.a.	0.6	0.5	0.2	0.1
United Arab Emirates	0.4	0.4					n.a.	n.a.	n.a.	n.a.	n.a.	2.2	2.5	0.4	0.5	n.a.	n.a.	<0.1	<0.1
Yemen	5.6	13.2	n.a.	n.a.	n.a.	n.a.	n.a.	1.8	1.5	0.1	0.1	1.8	2.5	3.7	4.6	n.a.	n.a.	n.a.	n.a.
Central Asia and Southern Asia	**322.2**	**271.8**	**268.2**	**354.4**	**570.3**	**753.5**	**25.2**	**74.1**	**55.1**	**5.9**	**4.9**	**56.4**	**73.5**	**223.5**	**246.3**	**17.4**	**21.4**	**10.4**	**9.9**
Eastern Asia and South-eastern Asia*	**203.2**	**65.8**	**31.7**	**47.6**	**200.4**	**255.0**	**6.0**	**24.6**	**20.1**	**9.9**	**11.6**	**83.3**	**107.0**	**108.8**	**111.9**	**9.5**	**8.7**	**2.5**	**2.5**
Western Asia and Northern Africa	**33.8**	**56.3**	**43.9**	**46.9**	**134.0**	**149.4**	**2.9**	**10.5**	**10.0**	**5.5**	**6.0**	**72.6**	**87.0**	**37.2**	**41.4**	**4.1**	**4.2**	**1.3**	**1.3**
LATIN AMERICA AND THE CARIBBEAN	**51.8**	**49.8**	**50.3**	**73.3**	**174.2**	**225.8**	**0.7**	**6.7**	**5.8**	**3.9**	**3.9**	**90.8**	**106.0**	**29.6**	**29.6**	**3.5**	**n.a.**	**0.9**	**0.9**
Caribbean	**7.6**	**6.9**	**n.a.**	**16.3**	**n.a.**	**29.2**	**0.1**	**0.5**	**0.4**	**0.2**	**0.2**	**6.3**	**7.3**	**3.0**	**3.1**	**0.2**	**0.2**	**<0.1**	**<0.1**
Antigua and Barbuda	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Bahamas	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Barbados	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.0	<0.1	n.a.	n.a.	n.a.
Cuba	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.1	0.1	2.0	2.2	0.6	0.5	0.1	<0.1	<0.1	<0.1
Dominica	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Dominican Republic	1.7	0.9					n.a.	0.1	0.1	0.1	0.1	1.6	1.9	0.7	0.7	<0.1	<0.1	<0.1	<0.1

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
Grenada	n.a.	n.a.					n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Haiti	5.1	5.3					<0.1	0.3	0.3	<0.1	<0.1	1.2	1.5	1.3	1.4	0.1	0.1	n.a.	n.a.
Jamaica	0.2	0.2					<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.1	0.2	<0.1	n.a.	<0.1	<0.1
Puerto Rico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.2	0.1	n.a.	n.a.	n.a.	n.a.
Saint Kitts and Nevis	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Saint Lucia	n.a.	n.a.	<0.1[c]	n.a.	<0.1[c]	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	n.a.	n.a.	n.a.
Saint Vincent and the Grenadines	<0.1	<0.1					n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Trinidad and Tobago	0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Central America	**11.6**	**15.8**	**10.9**	**15.1**	**49.5**	**55.1**	**0.1**	**2.9**	**2.7**	**1.1**	**1.0**	**26.1**	**30.8**	**6.7**	**7.0**	**0.7**	**1.1**	**0.3**	**0.3**
Belize	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.0	<0.1	<0.1	<0.1	<0.1
Costa Rica	0.2	0.2	<0.1[c,d]	0.1[c,d]	0.6[c,d]	0.8[c,d]	<0.1	<0.1	<0.1	<0.1	<0.1	0.8	0.9	0.2	0.2	<0.1	n.a.	<0.1	<0.1
El Salvador	0.6	0.5	0.9	0.9	2.7	3.0	<0.1	0.1	0.1	<0.1	<0.1	0.9	1.0	0.2	0.2	<0.1	0.1	<0.1	<0.1
Guatemala	2.5	2.9	2.6	3.4	6.9	8.7	<0.1	0.9	0.9	0.1	0.1	1.6	2.0	0.4	0.3	0.2	0.2	<0.1	<0.1
Honduras	1.7	1.3	1.3[c,d]	1.4[c,d]	3.8[c,d]	4.4[c,d]	n.a.	0.2	0.2	0.1	0.1	0.9	1.2	0.4	0.5	0.1	n.a.	<0.1	<0.1
Mexico	4.7	9.2	4.4[c]	7.4[c,d]	31.2[c]	33.2[c,d]	0.2	1.4	1.3	0.8	0.7	20.6	24.0	5.1	5.3	0.3	0.6	0.2	0.2
Nicaragua	1.3	1.3					n.a.	0.1	0.1	<0.1	<0.1	0.8	0.9	0.2	0.3	<0.1	n.a.	<0.1	<0.1
Panama	0.7	0.3					n.a.	0.1	0.1	<0.1	<0.1	0.5	0.6	0.2	0.2	n.a.	n.a.	<0.1	<0.1
South America	**32.6**	**27.0**	**24.9**	**41.9**	**97.4**	**141.4**	**0.4[a]**	**3.4**	**2.8[a]**	**2.6**	**2.6[a]**	**58.4**	**67.9**	**19.9**	**19.5**	**2.8**	**n.a.**	**0.6**	**0.6**
Argentina	1.4	1.7	2.5	5.7	8.3	16.0	0.1	0.3	0.3	0.5	0.5	7.6	8.6	1.3	1.3	0.2	n.a.	<0.1	<0.1
Bolivia (Plurinational State of)	2.5	1.5					<0.1	0.2	0.2	0.1	0.1	1.1	1.4	0.7	0.7	0.2	0.1	<0.1	<0.1
Brazil	12.1	n.r.	3.9	7.5	37.5	49.6	n.a.	0.9	0.9	1.0	1.1	28.4	33.3	10.1	9.2	1.1	n.a.	0.3	0.2
Chile	0.5	0.6	0.5[c,d]	0.8[c,d]	1.9[c,d]	3.4[c,d]	<0.1	<0.1	<0.1	0.1	0.1	3.4	3.8	0.4	0.4	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)	(millions)
Colombia	4.8	4.4					0.1	0.5	0.4	0.2	0.2	6.4	7.6	2.8	2.9	n.a.	0.3	<0.1	<0.1
Ecuador	3.1	2.2	1.0[c,d]	2.0[c,d]	3.4[c,d]	5.7[c,d]	0.1	0.4	0.4	0.1	0.2	1.8	2.2	0.7	0.8	n.a.	n.a.	<0.1	<0.1
Guyana	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Paraguay	0.6	0.7					<0.1	0.1	<0.1	0.1	0.1	0.7	0.9	0.4	0.4	<0.1	<0.1	<0.1	<0.1
Peru	5.2	2.8	4.1	6.2	11.3	15.5	<0.1	0.6	0.3	0.3	0.2	3.5	4.1	1.6	1.8	0.4	0.4	<0.1	<0.1
Suriname	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	0.0	<0.1	n.a.	<0.1	<0.1
Uruguay	0.1	n.r.	0.2	0.2	0.7	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	0.7	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Venezuela (Bolivarian Republic of)	2.2	7.8					n.a.	0.4	0.2	0.2	0.2	4.6	5.1	1.6	1.8	n.a.	n.a.	<0.1	<0.1
OCEANIA	**2.3**	**2.6**	**1.1**	**1.4**	**4.4**	**5.4**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**7.0**	**8.1**	**1.3**	**1.6**	**n.a.**	**n.a.**	**<0.1**	**<0.1**
Australia and New Zealand	**n.r.**	**n.r.**	**0.8**	**1.0**	**3.0**	**3.8**	**n.a.**	**<0.1**	**<0.1[a]**	**0.2**	**0.3**	**5.7**	**6.5**	**0.5**	**0.6**	**n.a.**	**n.a.**	**<0.1**	**<0.1**
Australia	n.r.	n.r.	0.7	0.8	2.6	3.1	n.a.	<0.1	<0.1	0.2	0.3	4.7	5.4	0.4	0.5	n.a.	n.a.	<0.1	<0.1
New Zealand	n.r.	n.r.	0.1	0.2	0.5	0.7	n.a.	n.a.	n.a.	n.a.	n.a.	1.0	1.1	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Oceania excluding Australia and New Zealand	**2.0**	**2.4**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**0.1**	**0.6**	**0.6**	**0.1**	**0.1**	**1.3**	**1.6**	**0.8**	**1.0**	**0.2**	**0.2**	**<0.1**	**<0.1**
Melanesia	**1.9**	**2.4**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**0.5**	**0.6**	**0.1**	**0.1**	**1.1**	**1.3**	**0.8**	**0.9**	**0.1**	**0.2**	**<0.1**	**<0.1**
Fiji	<0.1	<0.1	n.a.	<0.1[c]	n.a.	0.1[c]	n.a.	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	n.a.	n.a.	n.a.	n.a.
New Caledonia	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	1.8	2.2	n.a.	n.a.	n.a.	n.a.	n.a.	0.5	0.5	0.1	0.1	0.8	1.0	0.6	0.8	0.1	0.1	n.a.	n.a.
Solomon Islands	<0.1	0.1	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	<0.1	n.a.	n.a.
Vanuatu	<0.1	<0.1	n.a.	<0.1[c]	n.a.	<0.1[c]	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	n.a.	<0.1	<0.1
Micronesia	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**0.1**	**0.1**	**<0.1**	**0.0**	**<0.1**	**n.a.**	**<0.1**	**<0.1**
Kiribati	<0.1	<0.1	n.a.	<0.1[c]	n.a.	<0.1[c]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	n.a.	n.a.	n.a.

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE [1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE [1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE [1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	0.0	<0.1	<0.1	n.a.	n.a.
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	0.0	<0.1	n.a.	n.a.	n.a.
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Polynesia	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**0.2**	**0.2**	**<0.1**	**0.0**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
French Polynesia	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Samoa	<0.1	<0.1	n.a.	<0.1[c]	n.a.	<0.1[c]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	n.a.	n.a.	<0.1	<0.1	n.a.	n.a.
Tokelau (Associate Member)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	n.a.	n.a.	<0.1[c]	n.a.	<0.1[c]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	n.a.	n.a.	n.a.
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	0.0	<0.1	n.a.	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**n.r.**	**n.r.**	**14.8**	**12.7**	**100.3**	**89.3**	**n.a.**	**2.8[a]**	**2.4[a]**	**5.9[a]**	**5.2[a]**	**216.2**	**237.2**	**33.7**	**36.2**	**n.a.**	**n.a.**	**0.9**	**0.9**
Northern America**	**n.r.**	**n.r.**	**3.6**	**3.0**	**35.4**	**28.6**	**<0.1**	**0.6**	**0.7**	**2.0**	**2.0**	**87.8**	**98.7**	**8.1**	**9.8**	**1.1**	**1.5**	**0.3**	**0.3**
Bermuda	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	n.r.	n.r.	0.2[c]	0.3[c]	1.8[c]	2.2[c]	n.a.	n.a.	n.a.	0.2	0.2	7.6	8.6	0.7	0.9	n.a.	n.a.	<0.1	<0.1
Greenland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States of America	n.r.	n.r.	3.4[c]	2.7[c]	33.6[c]	26.5[c]	<0.1	0.6	0.6	1.8	1.7	80.2	90.1	7.4	8.9	1.0	1.4	0.3	0.3

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE [1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE [1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE [1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
Europe	**n.r.**	**n.r.**	**11.1**	**9.7**	**64.9**	**60.7**	**n.a.**	**2.1[a]**	**1.8[a]**	**3.9[a]**	**3.2[a]**	**128.4**	**138.4**	**25.5**	**26.5**	**n.a.**	**n.a.**	**0.5**	**0.5**
Eastern Europe	**n.r.**	**n.r.**	**4.3**	**4.3**	**32.9**	**33.5**	**n.a.**	**1.3[a]**	**1.1[a]**	**2.3[a]**	**1.6[a]**	**53.0**	**55.8**	**14.1**	**14.0**	**n.a.**	**n.a.**	**0.2**	**0.2**
Belarus	n.r.	n.r.					n.a.	<0.1	<0.1	0.1	<0.1	1.8	1.9	0.5	0.4	<0.1	n.a.	<0.1	<0.1
Bulgaria	0.4	0.2	0.1	0.2	1.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	1.4	1.5	0.4	0.4	n.a.	n.a.	<0.1	<0.1
Czechia	n.r.	n.r.	<0.1	<0.1	0.6	0.4	n.a.	<0.1	<0.1	<0.1	<0.1	2.1	2.3	0.5	0.5	n.a.	n.a.	<0.1	<0.1
Hungary	n.r.	n.r.	0.1	0.1	1.1	0.8	n.a.	n.a.	n.a.	n.a.	n.a.	2.0	2.1	0.5	0.4	n.a.	n.a.	<0.1	<0.1
Poland	n.r.	n.r.	0.7	0.2	3.4	2.2	n.a.	<0.1	<0.1	0.1	0.1	6.7	7.2	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1
Republic of Moldova	n.a.	n.a.	<0.1	0.2	0.8	1.1	n.a.	<0.1	<0.1	<0.1	<0.1	0.6	0.6	0.3	0.3	<0.1	n.a.	<0.1	<0.1
Romania	n.r.	n.r.	1.1	0.6	3.8	2.7	n.a.	0.1	0.1	0.1	0.1	3.4	3.6	1.1	1.0	n.a.	n.a.	<0.1	<0.1
Russian Federation	n.r.	n.r.	1.0	0.4[c]	11.9	8.8[c]	n.a.	n.a.	n.a.	n.a.	n.a.	25.7	26.9	7.3	7.2	n.a.	n.a.	0.1	0.1
Slovakia	0.3	0.2	<0.1	<0.1	0.3	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.9	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Ukraine	n.r.	n.r.	0.9	1.1			n.a.	0.5	0.3	0.7	0.4	8.5	8.8	1.6	1.8	0.1	n.a.	<0.1	<0.1
Northern Europe	**n.r.**	**n.r.**	**1.8**	**1.1**	**6.9**	**5.2**	**n.a.**	**0.2[a]**	**0.2a**	**0.5[a]**	**0.5[a]**	**19.0**	**21.2**	**2.5**	**2.8**	**n.a.**	**n.a.**	**<0.1**	**<0.1**
Denmark	n.r.	n.r.	<0.1	<0.1	0.3	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.9	0.1	0.2	n.a.	n.a.	<0.1	<0.1
Estonia	n.r.	n.r.	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Finland	n.r.	n.r.	0.1	0.1	0.5	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	0.9	1.0	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Iceland	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Ireland	n.r.	n.r.	0.2	0.2	0.4	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.9	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Latvia	n.r.	n.r.	<0.1	<0.1	0.2	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	0.4	0.4	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Lithuania	n.r.	n.r.	<0.1	<0.1	0.4	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	0.6	0.6	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Norway	n.r.	n.r.	<0.1	<0.1	0.2	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	1.0	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Sweden	n.r.	n.r.	<0.1	0.1	0.4	0.5	n.a.	n.a.	n.a.	n.a.	n.a.	1.4	1.6	0.3	0.3	n.a.	n.a.	<0.1	<0.1
United Kingdom of Great Britain and Northern Ireland	n.r.	n.r.	1.2	0.5	4.1	2.6	n.a.	n.a.	n.a.	n.a.	n.a.	12.9	14.6	1.4	1.7	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (CONTINUED)

REGIONS/ SUBREGIONS/ COUNTRIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) AFFECTED BY WASTING	NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE STUNTED		NUMBER OF CHILDREN (UNDER 5 YEARS OF AGE) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (18 YEARS AND OLDER) WHO ARE OBESE		NUMBER OF WOMEN OF REPRODUCTIVE AGE (15–49) AFFECTED BY ANAEMIA		NUMBER OF INFANTS 0–5 MONTHS OF AGE EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06	2018–20[4]	2014–16	2018–20	2014–16	2018–20	2020[5]	2012	2020[6]	2012	2020[6]	2012	2016	2012	2019	2012[7]	2019[8]	2012	2015
	(millions)	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*	*(millions)*
Southern Europe	**n.r.**	**n.r.**	**2.6**	**2.8**	**15.1**	**13.7**	**n.a.**	**0.3[a]**	**0.3[a]**	**0.6[a]**	**0.5[a]**	**25.6**	**27.5**	**4.8**	**5.0**	**n.a.**	**n.a.**	**0.1**	**<0.1**
Albania	0.3	0.1	0.3	0.3	1.1	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Andorra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Bosnia and Herzegovina	n.r.	n.r.	<0.1	<0.1	0.3	0.3	n.a.	<0.1	<0.1	<0.1	<0.1	0.5	0.5	0.2	0.2	<0.1	n.a.	<0.1	<0.1
Croatia	n.r.	n.r.	<0.1	<0.1	0.3	0.5	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.8	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Greece	n.r.	n.r.	0.3	0.2[c,e]	1.7	0.9[c,e]	n.a.	<0.1	<0.1	0.1	0.1	2.1	2.2	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Italy	n.r.	n.r.	0.7	0.7	5.2	4.0	n.a.	n.a.	n.a.	n.a.	n.a.	9.3	10.1	1.6	1.7	n.a.	n.a.	<0.1	<0.1
Malta	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Montenegro	<0.1	n.r.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	0.0	<0.1	n.a.	<0.1	<0.1
North Macedonia	0.1	<0.1	<0.1	0.1	0.3	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.4	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Portugal	n.r.	n.r.	0.4	0.3	1.5	1.2	<0.1	<0.1	<0.1	<0.1	<0.1	1.6	1.8	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Serbia	n.r.	0.3	0.2	0.2	1.0	1.1	<0.1	<0.1	<0.1	0.1	<0.1	1.4	1.5	0.5	0.5	<0.1	<0.1	<0.1	<0.1
Slovenia	n.r.	n.r.	<0.1	<0.1	0.3	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	0.3	0.3	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Spain	n.r.	n.r.	0.5	0.9	3.3	4.1	n.a.	n.a.	n.a.	n.a.	n.a.	8.7	9.1	1.4	1.4	n.a.	n.a.	<0.1	<0.1
Western Europe	**n.r.**	**n.r.**	**2.4**	**1.5**	**10.0**	**8.3**	**n.a.**	**0.3[a]**	**0.2[a]**	**0.5[a]**	**0.6[a]**	**30.8**	**33.9**	**4.1**	**4.8**	**n.a.**	**n.a.**	**0.1**	**0.1**
Austria	n.r.	n.r.	<0.1	<0.1	0.5	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	1.3	1.5	0.2	0.3	n.a.	n.a.	<0.1	<0.1
Belgium	n.r.	n.r.	n.a.	0.1	n.a.	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	2.0	0.3	0.3	n.a.	n.a.	<0.1	<0.1
France	n.r.	n.r.	1.0	0.4	4.4	3.7	n.a.	n.a.	n.a.	n.a.	n.a.	10.0	10.9	1.2	1.5	n.a.	n.a.	<0.1	<0.1
Germany	n.r.	n.r.	0.8	0.6	3.3	2.9	<0.1	<0.1	0.1	0.1	0.2	14.0	15.3	1.7	2.0	n.a.	n.a.	<0.1	<0.1
Luxembourg	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Netherlands	n.r.	n.r.	0.3	0.2	1.0	0.8	n.a.	<0.1	<0.1	<0.1	<0.1	2.5	2.8	0.4	0.5	n.a.	n.a.	<0.1	<0.1
Switzerland	n.r.	n.r.	0.1	<0.1	0.4	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	1.2	1.3	0.2	0.2	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (CONTINUED)

NOTES:
[1] Regional estimates were included when more than 50 percent of population was covered. To reduce the margin of error, estimates are presented as three-year averages.
[2] FAO estimates of the number of people living in households where at least one adult has been found to be food insecure.
[3] Country-level results are presented only for those countries for which estimates are based on official national data (see note c) or as provisional estimates, based on FAO data collected through the Gallup© World Poll, for countries whose national relevant authorities expressed no objection to their publication. Note that consent to publication does not necessarily imply validation of the estimate by the national authorities involved and that the estimate is subject to revision as soon as suitable data from official national sources are available. Global, regional and subregional aggregates are based on data collected in approximately 150 countries.
[4] The estimates for the year 2020 are the middle of the projected range.
[5] For regional estimates, values correspond to the model predicted estimates for the year 2020. For countries, the latest data available from 2014 to 2020 are used.
[6] The collection of household survey data on child height and weight were limited in 2020 due to the physical distancing measures required to prevent the spread of COVID-19. Only four national surveys included in the database were carried out (at least partially) in 2020. The estimates on child stunting, wasting and overweight are therefore based almost entirely on data collected before 2020 and do not take into account the impact of the COVID-19 pandemic.
[7] Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2005 to 2012 are used.
[8] Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2014 to 2019 are used with the exception of China where the latest data are from the year 2013.
* Wasting under 5 years of age and low birthweight regional aggregates exclude Japan.
** The Northern America wasting estimates are derived applying mixed-effect models with subregions as fixed effects; data were available only for the United States of America, preventing the estimation of standard errors (and confidence intervals). Further details on the methodology are described in De Onis, M., Blössner, M., Borghi, E., Frongillo, E.A. & Morris, R. 2004. Estimates of global prevalence of childhood underweight in 1990 and 2015. *Journal of the American Medical Association*, 291(21): 2600–2606. Model selection is based on best fit.
[a] Consecutive low population coverage; interpret with caution.
[b] The Central Agency for Public Mobilization & Statistics (CAPMAS) reports an estimate of severe food insecurity of 1.3 percent for 2015, based on HIECS data, using the WFP consolidated approach for reporting indicators of food security. Note that the two estimates are not directly comparable due to different definitions of "severe food insecurity".
[c] Based on official national data.
[d] For years when official national data are not available, the estimates are projected using FAO data. See Annex 1B for further details.
[e] Based on official national data collected in 2019 and 2020 through EU-SILC.
[f] Most recent input data are from before 2000, interpret with caution.
[g] Pending review.
[h] 2020 estimate only.
<0.1 = less than 100 000 people.
n.a. = data not available.
n.r. = data not reported as the prevalence is less than 2.5 percent.

ANNEX 1B METHODOLOGICAL NOTES FOR THE FOOD SECURITY AND NUTRITION INDICATORS

UNDERNOURISHMENT

Definition: Undernourishment is defined as the condition of an individual whose habitual food consumption is insufficient to provide, on average, the amount of dietary energy required to maintain a normal, active and healthy life.

How it is reported: The indicator is reported as a prevalence and is denominated as "prevalence of undernourishment" (PoU), which is an estimate of the percentage of individuals in the total population that are in a condition of undernourishment. National estimates are reported as three-year moving averages, to control for the low reliability of some of the underlying parameters, such as the year-to-year variation in food commodity stocks, one of the components of the annual FAO Food Balance Sheets for which complete, reliable information is very scarce. Regional and global aggregates, on the other hand, are reported as annual estimates, on account of the fact that possible estimation errors are expected not to be correlated across countries.

Methodology: To compute an estimate of the prevalence of undernourishment in a population, the probability distribution of habitual dietary energy intake levels (expressed in kcal per person per day) for the average individual is modelled as a parametric probability density function (pdf), f(x).[290,291] The indicator is obtained as the cumulative probability that the habitual dietary energy intake (x) is below the minimum dietary energy requirements (MDER) (i.e. the lowest limit of the range of energy requirements for the population's representative average individual) as in the formula below:

$$PoU = \int_{x<MDER} f(x|\theta)dx,$$

where θ is a vector of parameters that characterizes the pdf. The distribution is assumed to be lognormal, and thus fully characterized by only two parameters: the mean dietary energy consumption (DEC), and its coefficient of variation (CV).

Data source: Different data sources are used to estimate the different parameters of the model.

Minimum dietary energy requirement (MDER): Human energy requirements for an individual in a given sex/age class are determined on the basis of normative requirements for basic metabolic rate (BMR) per kilogram of body mass, multiplied by the ideal weights that a healthy person of that sex/age class may have, given his or her height, and then multiplied by a coefficient of physical activity level (PAL) to take into account physical activity.[ar] Given that both healthy BMIs and PALs vary among active and healthy individuals of the same sex and age, a *range* of energy requirements applies to each sex and age group of the population. The MDER for the average individual in the population, which is the parameter used in the PoU formula, is obtained as the weighted average of the lower bounds of the energy requirement ranges for each sex and age group, using the shares of the population in each sex and age group as weights.

Information on the population structure by sex and age is available for most countries in the world and for each year from the UN Department of Economic and Social Affairs (DESA) Population Prospects, revised every two years. This edition of *The State of Food Security*

ar A person is considered healthy if his or her body mass index (BMI) indicates neither underweight nor overweight. Human energy requirement norms per kilogram of body mass are given in FAO and WHO (2004).[86]

and Nutrition in the World uses the 2019 revision of the World Population Prospects.[168]

Information on the median height in each sex and age group for a given country is derived from a recent demographic and health survey (DHS) or from other surveys that collect anthropometry data on children and adults. Even if such surveys do not refer to the same year for which the PoU is estimated, the impact of possible small intervening changes in median heights over the years on PoU estimates is expected to be negligible.

Dietary energy consumption (DEC): Ideally, data on food consumption should come from nationally representative household surveys (such as Living Standard Measurement Surveys or Household Incomes and Expenditure Surveys). However, only very few countries conduct such surveys on an annual basis. Thus, in FAO's PoU estimates for global monitoring, DEC values are estimated from the dietary energy supply (DES) reported in the Food Balance Sheets (FBS), compiled by FAO for most countries in the world (see FAO, 2021).[5]

Since the last edition of this report, the new FBS domain on FAOSTAT has been updated up to 2018. At the time of this report, the FBS series were updated for the following 56 countries with the largest number of undernourished people or total population, bringing them up to date through 2019: Afghanistan, Algeria, Angola, Bangladesh, Bolivia (Plurinational State of), Burkina Faso, Cambodia, Cameroon, Central African Republic, Chad, China (mainland), Colombia, Congo, Côte d'Ivoire, Democratic People's Republic of Korea, Democratic Republic of the Congo, Ecuador, Eswatini, Ethiopia, Guatemala, Haiti, Honduras, India, Indonesia, Iran (Islamic Republic of), Iraq, Kenya, Lao People's Democratic Republic, Liberia, Madagascar, Malawi, Mali, Mexico, Mongolia, Mozambique, Myanmar, Nepal, Nigeria, Pakistan, Papua New Guinea, Peru, Philippines, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sri Lanka, Sudan, Thailand, Togo, United Republic of Tanzania, Uzbekistan, Venezuela (Bolivarian Republic of), Viet Nam and Yemen.

Estimates for the per capita average DES in 2020, compiled on the basis of the short-run market outlook exercises conducted by FAO to inform the World Food Situation,[6] are used to nowcast the 2020 value of DEC for each country, starting from the last available year in the FBS series.

Coefficient of variation (CV): When reliable data on food consumption are available from aforementioned nationally representative household surveys, the CV due to income (CV|y) that describes the distribution of average daily dietary energy requirement in the population can be estimated directly. Since the last edition of this report, 21 new surveys from the following 17 countries have been processed to update the CV|y: Afghanistan, Armenia, Bolivia, Botswana, Brazil, Burkina Faso, Ethiopia, Kiribati, Malawi, Mongolia, Namibia, Nigeria, Pakistan, Rwanda, Samoa, Solomon Islands and Uganda. That makes for a total of 101 surveys from 54 countries for which CV|y is based on national surveys.

When no suitable survey data are available, FIES data collected by FAO since 2014 are used to project the changes in the CV|y from 2015 (or from the year of the last food consumption survey) up to 2019, based on a smoothed (three-year moving average) trend in severe food insecurity. For the nowcast of CV|y for 2020, see **Annex 2**. Since 2014, FIES data provide evidence on recent changes in the extent of severe food insecurity that might closely reflect changes in the PoU. To the extent that such changes in PoU are not explained by changes in average food supplies, they can thus be used to infer the likely changes in the CV|y that might have occurred in the most recent year. Analysis of the combined set of historic PoU estimates reveals that, on average, and once differences in DEC and MDER have been controlled for, the CV|y explains about one-third of the differences in PoU across time and space. For each country for which FIES data are available, the CV|y is estimated by the amount that would generate one-third of a percentage point change in the PoU for each observed percentage point change in the prevalence of severe food insecurity. For all other countries, the CV|y is kept constant at the estimated 2017 value.

In the FAO PoU parametric approach, the CV due to body weight and lifestyle, a.k.a. CV due to requirement (CV|r), represents the variability of the distribution of dietary energy requirements of

a hypothetical average individual representative of a healthy population, which is also equal to the CV of the distribution of dietary energy intakes of a hypothetical average individual if the population is perfectly nourished. The distribution of dietary energy requirements of a hypothetical average individual can be assumed to be normal, thus its variability can be estimated if at least two percentiles and their values are known. As a result, given that we are interested in deriving the theoretical distribution of dietary energy requirements for healthy hypothetical average individuals to estimate the CV|r, the MDER and the average dietary energy requirement (ADER) can be used to approximate the 1st percentile and the 50th percentile of the distribution of energy requirements of the hypothetical average individual as they are built on the same principles of a weighted average from sex-age-physiological status groups.[7,8] Therefore, the value of CV|r is derived as the inverse cumulative standard normal distribution of the difference between the MDER and the ADER. Similar to the MDER, the ADER is estimated using the average of the minimum and the maximum values of the PAL category "Active or moderately active lifestyle".

The total CV is then obtained as the geometric mean of the CV|y and the CV|r:

$$CV = \sqrt{(CV|y)^2 + (CV|r)^2}$$

Challenges and limitations: While formally the state of being undernourished or not is a condition that applies to individuals, given the data usually available on a large scale, it is impossible to reliably identify which individuals in a certain group are actually undernourished. Through the statistical model described above, the indicator can only be computed with reference to a population or a group of individuals for which a representative sample is available. The prevalence of undernourishment is thus an estimate of the percentage of individuals in that group that are in such condition and cannot be further disaggregated.

Due to the probabilistic nature of the inference and the margins of uncertainty associated with estimates of each of the parameters in the model, the precision of the PoU estimates is generally low. While it is not possible to formally compute margins of error around PoU estimates, these are expected to likely exceed 5 percent in most cases. For this reason, FAO does not consider PoU estimates that result to be lower than 2.5 percent as sufficiently reliable to be reported.

References:

FAO. 1996. Methodology for assessing food inadequacy in developing countries. *In* FAO. *The Sixth World Food Survey*, pp. 114–143. Rome.
FAO. 2003. *Proceedings: Measurement and Assessment of Food Deprivation and Undernutrition: International Scientific Symposium*. Rome.
FAO. 2014. *Advances in hunger measurement: traditional FAO methods and recent innovations*. FAO Statistics Division Working Paper No. 14–04. Rome.
Naiken, L. 2002. *Keynote paper: FAO methodology for estimating the prevalence of undernourishment*. Paper presented at the Measurement and Assessment of Food Deprivation and Undernutrition International Scientific Symposium, Rome, 26–28 June 2002. Rome, FAO.
Wanner, N., Cafiero, C., Troubat, N. & Conforti, P. 2014. *Refinements to the FAO methodology for estimating the prevalence of undernourishment indicator.* Rome, FAO.

FOOD INSECURITY AS MEASURED BY THE FOOD INSECURITY EXPERIENCE SCALE (FIES)

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

Using sophisticated statistical techniques based on the Rasch measurement model, the information obtained in a survey is validated for internal consistency and converted into a quantitative measure along a scale of severity, ranging from

low to high. Based on their responses to the FIES-SM items, the individuals or households interviewed in a nationally representative survey of the population are assigned a probability of being in one of three classes: food secure or only marginally insecure, moderately food insecure and severely food insecure as defined by two globally set thresholds. Based on FIES data collected over three years from 2014 to 2016, FAO has established the FIES reference scale, which is used as the global standard for experience-based food-insecurity measures, and to set the two reference thresholds of severity.

SDG Indicator 2.1.2 is obtained as the cumulated probability to be in the two classes of moderate and severe food insecurity. A separate indicator (FI_{sev}) is computed by considering only the severe food-insecurity class.

How it is reported: In this report, FAO provides estimates of food insecurity at two different levels of severity: moderate or severe food insecurity ($FI_{mod+sev}$) and severe food insecurity (FI_{sev}). For each of these two levels, two estimates are reported:

- the **prevalence (%) of individuals** in the population living in households where at least one adult was found to be food insecure;
- the estimated **number of individuals** in the population living in households where at least one adult was found to be food insecure.

Data source: Since 2014, the eight-question FIES survey module has been applied in nationally representative samples of the adult population (defined as aged 15 or older) in more than 140 countries included in the Gallup© World Poll (GWP), covering 90 percent of the world population. In 2020, interviews were conducted by telephone given the high risk of community transmission from conducting face-to-face data collection during the COVID-19 pandemic. By evaluating Dual Frame coverage (i.e. the proportion of the adult population that is covered by a combination of landline and mobile phones), countries with a minimum of 70 percent coverage were included as part of the 2020 World Poll though Computer Assisted Telephone Interviewing (CATI). In most countries, samples include about 1 000 individuals, with larger samples of 9 350 individuals in India (where a combination of CAPI and CATI was implemented) and 5 500 in mainland China. In 2020, additional oversampling was applied in 5 countries: Bangladesh (3 000), Egypt (2 000), Russian Federation (4 000), Turkey (2 000) and Viet Nam (2 000).

Additionally to the GWP, in 2020 FAO collected data in 20 countries through Geopoll® with the specific objective of assessing food insecurity during the COVID-19 pandemic. The countries covered were: Afghanistan, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, El Salvador, Ethiopia, Guatemala, Haiti, Iraq, Liberia, Mozambique, Myanmar, Niger, Nigeria, Sierra Leone, Somalia, South Africa and Zimbabwe. For all these countries, the 2020 assessment was based on Geopoll data.

For Afghanistan, Angola, Armenia, Botswana, Burkina Faso, Cabo Verde, Canada, Chile, Costa Rica, Ecuador, Fiji, Ghana, Greece, Grenada, Honduras, Indonesia, Israel, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Lesotho, Malawi, Mauritania, Mexico, Morocco, Namibia, Niger, Nigeria, Palestine, Philippines, Republic of Korea, Russian Federation, Saint Lucia, Samoa, Senegal, Seychelles, Sierra Leone, South Sudan, Sudan, Tonga, Uganda, United Republic of Tanzania, United States of America, Vanuatu, Viet Nam and Zambia, national government survey data were used to calculate the prevalence estimates of food insecurity by applying FAO's statistical methods to adjust national results to the same global reference standard, covering approximately a quarter of the world population. Countries are considered for the year/years when national data are available, informing the regional and subregional aggregates assuming a constant trend in the period 2014–2020, or integrating the remaining years with GWP or Geopoll data in case they were compatible. Exceptions to this rule are: Armenia, Botswana, Burkina Faso, Chile, Costa Rica, Ecuador, Ghana, Honduras, Indonesia, Israel, Malawi, Namibia, Niger, Nigeria, Sierra Leone, Uganda and Zambia. In these cases, the following procedure was followed:

- Use national data collected in one year to inform the corresponding year.

- For the remaining years, apply the smoothed trend coming from the data collected by FAO through the Gallup© World Poll to the national data to describe evolution over time. Smoothed trend is computed by taking the mean of the rates of change between consecutive three-year averages.

The motivation behind this procedure was the strong evidence found in support of the trend suggested by data collected by FAO (for instance, evolution of poverty, extreme poverty, employment, food inflation, among others), allowing to provide a more updated description of the trend in the period 2014–2020.

In Indonesia, Kazakhstan, Kyrgyzstan, Mauritania, Nicaragua, Paraguay, Rwanda, Seychelles, Sudan and United Republic of Tanzania, due to lack of data in 2020, the corresponding subregional trend between 2019 and 2020 was used to inform 2020.

Methodology: The data were validated and used to construct a scale of food-insecurity severity using the Rasch model, which postulates that the probability of observing an affirmative answer by respondent i to question j is a logistic function of the distance, on an underlying scale of severity, between the position of the respondent, a_i, and that of the item, b_j.

$$Prob(X_{i,j} = \text{Yes}) = \frac{\exp(a_i - b_j)}{1 + \exp(a_i - b_j)}$$

By applying the Rasch model to the FIES data, it is possible to estimate the probability of being food insecure ($p_{i,L}$) at each level of severity of food insecurity L (moderate or severe, or severe), for each respondent i, with $0 < p_{i,L} < 1$.

The prevalence of food insecurity at each level of severity (FI_L) in the population is computed as the weighted sum of the probability of being food insecure for all respondents (i) in a sample:

$$FI_L = \Sigma p_{i,L} w_i$$

where w_i are post-stratification weights that indicate the proportion of individuals or households in the national population represented by each record in the sample.

As only individuals aged 15 or more are sampled in the GWP, the prevalence estimates directly produced from these data refer to the population 15 years and older. To arrive at the **prevalence and number of individuals (of all ages) in the population**, an estimate is required of the number of people living in the households where at least one adult is estimated to be food insecure. This involves a multistep procedure detailed in Annex II of the *Voices of the Hungry Technical Report* (see link in the "References" section, below).

Regional and global aggregates of food insecurity at moderate or severe, and severe levels, $FI_{L,r}$, are computed as:

$$FI_{L,r} = \frac{\Sigma_c FI_{L,c} \times N_c}{\Sigma_c N_c}$$

where r indicates the region, $FI_{L,c}$ is the value of FI at level L estimated for country c in the region and N_c is the corresponding population size. When no estimate of FI_L is available for a country, it is assumed to be equal to the population-weighted average of the estimated values of the remaining countries in the same region. A regional aggregate is produced only if the countries for which an estimate is available cover at least 50 rather than 80 percent of the region's population.

Universal thresholds are defined on the FIES global standard scale (a set of item parameter values based on results from all countries covered by the GWP in 2014–2016) and converted into corresponding values on local scales. The process of calibrating each country's scale against the FIES global standard can be referred to as **equating**, and permits the production of **internationally comparable** measures of food-insecurity severity for individual respondents, as well as comparable national prevalence rates.

The problem stems from the fact that, when defined as a *latent* trait, the severity of food insecurity has no absolute reference against which it could be evaluated. The Rasch model enables identification of the relative position that the various items occupy on a scale that is denominated in logit units, but whose "zero" is arbitrarily set, usually to correspond to the

mean estimated severity. This implies that the zero of the scale changes in each application. To produce comparable measures over time and across different populations requires establishing a common scale to use as a reference, and finding the formula needed to convert measures across different scales. As it is the case for converting measures of temperature across difference measuring scales (such as Celsius and Fahrenheit), this requires the identification of a number of "anchoring" points. In the FIES methodology, these anchoring points are the severity levels associated with the items whose *relative* position on the scale of severity can be considered equal to that of the corresponding items on the global reference scale. The "mapping" of the measures from one scale to the other is then obtained by finding the formula that equates the mean and the standard deviations (SD) of the common items' severity levels.

Challenges and limitations: When food-insecurity prevalence estimates are based on FIES data collected in the GWP, with national sample sizes of about 1 000 in most countries, confidence intervals rarely exceed 20 percent of the measured prevalence (that is, prevalence rates of 50 percent would have margins of error of up to plus or minus 5 percent). Confidence intervals are likely to be much smaller, however, when national prevalence rates are estimated using larger samples and for estimates referring to aggregates of several countries. To reduce the impact of year-to-year sampling variability, country-level estimates are presented as three-year averages, computed as averages of all available years in the considered triennia.

References:

Gallup. 2020. Gallup Keeps Listening to the World Amid the Pandemic. In: *Gallup* [online]. [Cited 25 May 2021]. https://news.gallup.com/opinion/gallup/316016/gallup-keeps-listening-world-amid-pandemic.aspx

FAO. 2016. *Methods for estimating comparable rates of food insecurity experienced by adults throughout the world*. Rome. (also available at www.fao.org/3/a-i4830e.pdf).

FAO. 2018. Voices of the Hungry. In: *FAO* [online]. Rome. [Cited 28 April 2020]. www.fao.org/in-action/voices-of-the-hungry

STUNTING, WASTING AND OVERWEIGHT IN CHILDREN UNDER 5 YEARS OF AGE

Definition of stunting (children under 5 years of age): Height/length (cm) for age (months) < -2 SD of the WHO Child Growth Standards median. Low height-for-age is an indicator that reflects the cumulative effects of undernutrition and infections since and even before birth. It may be the result of long-term nutritional deprivation, recurrent infections and lack of water and sanitation infrastructures.

How it is reported: The percentage of children aged 0–59 months who are below -2 SD from the median height-for-age of the WHO Child Growth Standards.

Definition of wasting: Weight (kg) for height/length (cm) < -2 SD of the WHO Child Growth Standards median. Low weight-for-height is an indicator of acute weight loss or a failure to gain weight and can be consequence of insufficient food intake and/or an incidence of infectious diseases, especially diarrhoea.

How it is reported: The percentage of children aged 0–59 months who are below -2 SD from the median weight-for-height of the WHO Child Growth Standards.

Definition of overweight: Weight (kg) for height/length (cm) > +2 SD of the WHO Child Growth Standards median. This indicator reflects excessive weight gain for height generally due to energy intakes exceeding children's energy requirements.

How it is reported: The percentage of children aged 0–59 months who are above +2 SD from the median weight-for-height of the WHO Child Growth Standards.

Data source: UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition

Methodology:

Country-level estimates

The UNICEF/WHO-World Bank Group Joint Child Malnutrition Estimates (JME) country dataset

The UNICEF/WHO-World Bank Group JME dataset of country estimates requires the collection of national data sources that contain information on child malnutrition – specifically, data on the height, weight and age of children under 5, which can be used to generate national level prevalence estimates for stunting, wasting and overweight. These national-level data sources are mainly comprised of household surveys (e.g. Multiple Indicator Cluster Surveys, Demographic and Health Surveys). Some administrative data sources (e.g. from surveillance systems) are also included where population coverage is high. As of the latest review closure on 31 January 2021, the primary source dataset contained 997 data sources from 157 countries and territories, with nearly 80 percent of children living in countries with at least one data point within the past five years on stunting, wasting and overweight. This suggests that the global estimates are highly representative of the majority of children across the globe for the most recent period. The dataset contains the point estimate (and where available, the standard error), the 95 percent confidence bounds and the unweighted sample size. Where microdata are available, the JME uses estimates that have been recalculated to adhere to the global standard definition. Where microdata are not available, reported estimates are used, except in cases where adjustments are required to standardize for: (i) use of an alternate growth reference from the 2006 WHO Growth Standards; (ii) age ranges that do not include the full 0–59-month age group; and (iii) data sources that were only nationally representative for populations residing in rural areas. Further details related to data source compilation, re-analysis of microdata, and data source review are described elsewhere.[9]

The JME country dataset serves different purposes for different indicators. For wasting, the JME country dataset serves as the country estimates themselves (i.e. the wasting prevalence in the JME country dataset from a household survey for a country in a given year is the wasting prevalence reported for that country in that year). For stunting and overweight, the JME country dataset is used to generate country-modelled estimates which serve as the official JME estimates (i.e. the stunting prevalence from a household survey for a given country in a given year is not reported as the prevalence for that country in that year; rather, it feeds into the modelled estimates described in the next section below).

Country-level model for stunting and overweight estimates

The technical details of the statistical models are provided elsewhere.[9] Briefly, for both stunting and overweight, prevalence was modelled at logit (log-odds) scale using a penalized longitudinal mixed-model with a heterogeneous error term. The quality of the models was quantified with model-fit criteria that balance the complexity of the model with the closeness of the fit to the observed data. The proposed method has important characteristics, including non-linear time trends, regional trends, country-specific trends, covariate data and a heterogeneous error term. All countries with data contribute to estimates of the overall time trend and the impact of covariate data on prevalence. For overweight, the covariate data consisted of linear and quadratic socio-demographic index (SDI),[as] and data source type. The same covariates were used for stunting, plus an additional covariate of the average health system access over the previous five years.

Annual country-level modelled estimates from 2000 to 2020[at] on stunting and overweight were disseminated by the JME in 2021 for 155 countries with at least one data point (e.g. from a household survey) included in the JME country dataset described above. Modelled country estimates were also produced for an additional 49 countries, used solely for

as SDI is a summary measure that identifies where countries or other geographic areas sit on the spectrum of development. Expressed on a scale of 0 to 1, SDI is a composite average of the rankings of the income per capita, average educational attainment, and fertility rates of all areas in the Global Burden of Disease study.

at The collection of household survey data on child height and weight were limited in 2020 due to the physical distancing measures required to prevent the spread of COVID-19. Only four national surveys included in the JME database were carried out (at least partially) in 2020. The JME estimates on child stunting, wasting and overweight are therefore based almost entirely on data collected before 2020 and do not take into account the impact of the COVID-19 pandemic. However, one of the covariates used in the country stunting and overweight models takes the impact of COVID-19 partially into account.

generation of regional and global aggregates. Modelled estimates for these 49 countries are not shown because they did not have any household surveys in the JME country dataset or because the modelled estimates remained pending final review at the time of publication. The results for the 204 countries can be used to calculate estimates and uncertainty intervals for any group of countries aggregated. The uncertainty intervals are important in monitoring trends, especially for countries with sparse data and where primary data sources present large primary data source sampling errors. When only sparse data are available in the most recent period, the inclusion of a survey can affect a substantial change in the predicted trajectory. For this reason, uncertainty intervals are needed to enhance trend interpretability in terms of the caution level employed. The uncertainty intervals for the new JME method have been tested and validated with various data types.

Regional and global estimates

Regional and global wasting estimates are only presented for the most recent year, 2020, unlike stunting and overweight estimates for which an annual time series is available from 2000 to 2020.[au] This is because the JME are based on national-level country prevalence data, which come from cross-sectional surveys (i.e. a snapshot at one point in time) that are collected infrequently (every three to five years) in most countries. Since stunting and overweight are relatively stable over the course of a calendar year, it is reasonable to track changes in these two conditions over time with these data, whereas wasting is an acute condition that can change frequently and rapidly. An individual child can be affected by wasting more than once in a calendar year (i.e. can recover but then become wasted again in the same year), and the risk of wasting in many contexts can be driven by seasonal variations, which can result in seasonal spikes in prevalence. For example, wasting prevalence, in some contexts, may double between the post-harvest season (often associated with higher food availability and weather patterns that are less likely to cause disease) and the pre-harvest season (often associated with food shortages, heavy rains and related diseases that can affect nutrition status). Given that country surveys can be collected during any season, the prevalence estimate from any survey may be at a high or low; or it may fall somewhere in between if data collection spanned across several seasons. Thus, the prevalence of wasting captures the situation of wasting at a specific point in time and not over an entire year. Variations in seasons across surveys make it difficult to draw inferences on trends. The lack of methods to account for seasonality and incident cases of wasting are the main reasons why the JME does not present annual trends for this form of malnutrition.

Generation of regional and global estimates

Different methods were applied to generate regional and global estimates for stunting and overweight compared to wasting, as described below. In short, results from the new country-level model were used to generate the regional and global estimates for stunting and overweight, while the JME subregional multi-level model was used to generate the global and regional estimates for wasting.

Stunting and overweight

Global and regional estimates for all years from 2000 to 2020[av] were derived as the respective country averages weighted by the countries' under-five population from The United Nations World Population Prospects, 2019 Revision, using model-based estimates for 204 countries. This includes 155 countries with national data sources (e.g. household surveys) included in the JME country dataset described above. It also includes 49 countries with modelled estimates generated for development of regional and global aggregates, but for which country modelled estimates are not shown because they did not have any household surveys in the JME country dataset or because the modelled estimates remained pending final review at the time of publication. Confidence intervals were generated based on bootstrapping methodology.

Wasting

The wasting prevalence data from national data sources described in the above section about the JME country dataset were used to generate the

au See footnote at.

av See footnote at.

regional and global estimates for the year 2020[aw] using the JME subregional multi-level model, applying population weights for children under 5 years of age from the United Nations World Population Prospects, 2019 Revision.

Challenges and limitations: The recommended periodicity for countries to report on stunting, overweight and wasting is every three to five years; however, for some countries, data are available less frequently. While every effort has been made to maximize the comparability of statistics across countries and over time, country data may differ in terms of data collection methods, population coverage and estimation methods used. Survey estimates come with levels of uncertainty due to both sampling errors and non-sampling errors (technical measurement errors, recording errors, etc.). Neither of the two sources of error has been fully taken into account for deriving estimates at country or regional and global levels.

For the prevalence of wasting, as surveys are generally carried out during a specific period of the year, the estimates can be affected by seasonality. Seasonal factors related to wasting include food availability (e.g. pre-harvest periods) and disease (rainy season and diarrhoea, malaria, etc.), while natural disasters and conflicts can also show real shifts in trends that would need to be treated differently than a seasonal variation. Hence, country year estimates for wasting may not necessarily be comparable over time. Consequently, only estimates from the most recent year (2020[ax]) are provided.

References:

de Onis, M., Blössner, M., Borghi, E., Morris, R. & Frongillo, E.A. 2004. Methodology for estimating regional and global trends of child malnutrition. *International Journal of Epidemiology*, 33(6): 1260–1270. https://doi.org/10.1093/ije/dyh202
GBD 2019 Risk Factors Collaborators. 2020. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 396(10258): 1223–1249. https://doi.org/10.1016/s0140-6736(20)30752-2
UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition
UNICEF, WHO & World Bank. 2021. *Technical notes from the background document for country consultations on the 2021 edition of the UNICEF-WHO-World Bank Joint Malnutrition Estimates. SDG Indicators 2.2.1 on stunting, 2.2.2a on wasting and 2.2.2b on overweight*. New York, USA, UNICEF. (also available at data.unicef.org/resources/jme-2021-country-consultations).
WHO. 2014. *Comprehensive Implementation Plan on maternal, infant and young child nutrition*. Geneva, Switzerland. www.who.int/nutrition/publications/CIP_document/en
WHO. 2019. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide*. Geneva, Switzerland. (also available at www.who.int/publications/i/item/9789241516952).

EXCLUSIVE BREASTFEEDING

Definition: Exclusive breastfeeding for infants <6 months of age is defined as receiving only breastmilk and no additional food or drink, not even water. Exclusive breastfeeding is a cornerstone of child survival and is the best food for newborns, as breastmilk shapes the baby's microbiome, strengthens the immune system and reduces the risk of developing chronic diseases.

Breastfeeding also benefits mothers by preventing postpartum haemorrhage and promoting uterine involution, decreasing risk of iron-deficiency anaemia, reducing the risk of various types of cancer and providing psychological benefits.

How it is reported: Percentage of infants aged 0–5 months who are fed exclusively on breastmilk with no additional food or drink, not even water, in the 24 hours preceding the survey.[10]

Data source: UNICEF. 2020. Infant and young child feeding. In: *UNICEF* [online]. New York, USA. [Cited 19 April 2021] . data.unicef.org/topic/nutrition/infant-and-young-child-feeding

aw See footnote at.

ax See footnote at.

Methodology:

$$\frac{\textit{Infants 0–5 months of age who received only breastmilk during the previous day}}{\textit{Infants 0–5 months of age}}$$

This indicator includes breastfeeding by a wet nurse and feeding expressed breastmilk.

The indicator is based on a recall of the previous day's feeding to a cross-section of infants 0–5 months of age.

In 2012, the regional and global exclusive breastfeeding estimates were generated using the most recent estimate available for each country between 2005 and 2012. Similarly, 2019 estimates were developed using the most recent estimate available for each country between 2014 and 2019. Global and regional estimates were calculated as weighted averages of the prevalence of exclusive breastfeeding in each country, using the total number of births from the World Population Prospects, 2019 revision (2012 for the baseline and 2019 for the current) as weights. Estimates are presented only where the available data are representative of at least 50 percent of corresponding regions' total number of births, unless otherwise noted.

Challenges and limitations: While a high proportion of countries collect data for exclusive breastfeeding, data are lacking in high-income countries in particular. The recommended periodicity of reporting on exclusive breastfeeding is every three to five years. However, for some countries, data are reported less frequently, meaning changes in feeding patterns are often not detected for several years after the change occurs.

Regional and global averages may be affected depending on which countries had data available for the periods considered in this report.

Using the previous day's feeding as a basis may cause the proportion of exclusively breastfed infants to be overestimated, as some infants who may have been given other liquids or foods irregularly may not have received these on the day before the survey.

References:

UNICEF. 2020. Infant and young child feeding: exclusive breastfeeding. In: *UNICEF Data: Monitoring the Situation of Children and Women* [online]. New York, USA. [Cited 19 April 2021]. data.unicef.org/topic/nutrition/infant-and-young-child-feeding

WHO. 2014. *Comprehensive Implementation Plan on maternal, infant and young child nutrition*. Geneva, Switzerland. www.who.int/nutrition/publications/CIP_document/en

WHO. 2019. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide*. Geneva, Switzerland. (also available at www.who.int/publications/i/item/9789241516952).

WHO and UNICEF. 2021. *Indicators for assessing infant and young child feeding practices: definitions and measurement methods.*

LOW BIRTHWEIGHT

Definition: Low birthweight is defined as a weight at birth of less than 2 500 g (less than 5.51 lbs), regardless of gestational age. A newborn's weight at birth is an important marker of maternal and foetal health and nutrition.[11]

How it is reported: The percentage of newborns weighing less than 2 500 g (less than 5.51 lbs) at birth.

Data source: UNICEF & WHO. 2019. UNICEF-WHO joint low birthweight estimates. In: *United Nations Children's Fund* [online]. New York, USA and Geneva, Switzerland. [Cited 28 April 2020]. www.unicef.org/reports/UNICEF-WHO-low-birthweight-estimates-2019, www.who.int/nutrition/publications/UNICEF-WHO-lowbirthweight-estimates-2019

Methodology: Nationally representative estimates of low birthweight prevalence can be derived from a range of sources, broadly defined as national administrative data or representative household surveys. National administrative data are those coming from national systems including Civil Registration and Vital Statistics (CRVS) systems, national Health Management Information Systems (HMIS) and birth registries. National household surveys which contain information about birthweight as well as key related indicators

including maternal perception of size at birth (MICS, DHS) are also an important source of low birthweight data especially in contexts where many births are unweighted and/or data heaping is a problem. Prior to entry into the country dataset, country data are reviewed for coverage and quality and adjusted where the source is a household survey. Administrative data are categorized as (i) high coverage, if representing ≥90 percent of live births; (ii) medium coverage, if representing between 80 and 90 percent of live births; or (iii) not included, if covering <80 percent of live births. To be included in the dataset, survey data need to have:

i. a birthweight in the dataset for at minimum 30 percent of the sample;
ii. a minimum of 200 birthweights in the dataset;
iii. no indication of severe data heaping – this means that: a) ≤55 percent of all birthweights can fall on the three most frequent birthweights (i.e. if 3 000 g, 3 500 g and 2 500 g were the three most frequent birthweights, when added together, they have to make up ≤55 percent of all birthweights in the dataset); b) ≤10 percent of all birthweights are ≥4 500 g; c) ≤5 percent of birthweights fall on tail ends of 500 g and 5 000 g; and
iv. undergone an adjustment for missing birthweights and heaping.[12]

Modelling methods were applied to the accepted (and for household survey data, accepted and adjusted) country data to generate annual country estimates from 2000 to 2015, with methods varying by availability and type of input data as follows:

- b-spline: data for countries with ≥8 data points from higher coverage administrative sources ≥1 point prior to 2005 and ≥1 point more recent than 2010 are smoothed with b-spline regression to generate annual low birthweight estimates. A b-spline regression model was used to predict the standard error and calculate 95 percent confidence intervals for the country-level low birthweight estimates. These low birthweight estimates follow very closely those included in the countries' own administrative reports.
- Hierarchical regression: data for countries not meeting requirements for b-spline but with ≥1 low birthweight data point from any source meeting inclusion criteria are fitted into a model using covariates to generate annual low birthweight estimates, as well as uncertainty ranges, using a bootstrap approach. The model includes natural log of neonatal mortality rate; the proportion of children underweight (weight-for-age z score below -2 SD from median weight for age of reference population); data type (higher quality administrative, lower quality administrative, household survey); UN region (e.g. Southern Asia, Caribbean); and a country-specific random effect. These low birthweight estimates may vary substantially from estimates reported by countries in administrative and survey reports, especially given that the household survey estimates are adjusted for missing birthweights and heaping, while survey reports often present a low birthweight estimate just for the children with a birthweight and with no adjustment for data heaping.
- No estimate: countries for which low birthweight input data were not available and/or did not meet inclusion criteria are indicated in the database as "no estimate". A total of 54 countries in the current country database were reported as having "no estimate". Despite not presenting an estimate for these individual 54 countries, annual low birthweight estimates were derived for them using the hierarchical regression methods detailed above but used only to input into regional and global estimates.

Modelled annual country estimates are used to generate regional and global estimates from 2000–2015. Global estimates are derived by summing the estimated number of live births weighing less than 2 500 g for 195[ay] countries with an estimate in the United Nations regional grouping for each year, and then dividing by all live births in each year in those 195 countries. Regional estimates are similarly derived, based on countries in each regional grouping. To obtain the global and regional level estimates of uncertainty, 1 000 low birthweight point

ay While the world comprises 202 countries (as per the full set of countries in the regional grouping with the largest set of countries – i.e. the UNICEF regional grouping), seven countries did not have low birthweight input data or covariate data. It was therefore not possible to generate any estimates for these seven countries and they are not included in the regional and global estimates.

estimates were made for each country for each year using either b-spline (by randomly sampling from a normal distribution plotted using the calculated standard error) or hierarchical regression approach (using a bootstrap approach). The country low birthweight estimates for each of the 1 000 samples were summed at worldwide or regional level and the 2.5th and 97.5th centiles of the resulting distributions were used as the confidence intervals.

Challenges and limitations: A major limitation of monitoring low birthweight globally is the lack of birthweight data for many of the world's children. There is a notable bias among the unweighted, with those born to poorer, less-educated, rural mothers being less likely to have a recorded birthweight when compared to their richer, urban counterparts with more highly educated mothers.[13] As the characteristics of the unweighted are risk factors for having a low birthweight, estimates that do not well represent these children may be lower than the true value. Furthermore, poor quality of available data with regard to excessive heaping on multiples of 500 g or 100 g exists in the majority of available data from LMICs[13] and can further bias low birthweight estimates. The methods applied to adjust for missing birthweights and heaping for survey estimates in the current database[295] are meant to address the problem; however, there were a total of 54 countries for which it was not possible to generate a reliable birthweight estimate. In addition, the confidence limits of the regional and global estimates may be artificially small given that about half of the modelled countries had a country-specific effect generated at random for each bootstrap prediction, some of which were positive and others negative, making the relative uncertainty at the regional and global level tend to be less than that at the individual country level.

References:

Blanc, A. & Wardlaw, T. 2005. Monitoring low birth weight: An evaluation of international estimates and an updated estimation procedure. *Bulletin World Health Organization*, 83(3): 178–185.
Blencowe, H., Krasevec, J., de Onis, M., Black, R.E., An, X., Stevens, G.A., Borghi, E., Hayashi, C., Estevez, D., Cegolon, L., Shiekh, S., Ponce Hardy, V., Lawn, J.E. & Cousens, S. 2019. National, regional, and worldwide estimates of low birthweight in 2015, with trends from 2000: a systematic analysis. *The Lancet Global Health*, 7(7): e849–e860.

ADULT OBESITY

Definition: BMI ≥ 30.0 kg/m^2. The body mass index (BMI) is the ratio of weight-to-height commonly used to classify the nutritional status of adults. It is calculated as the body weight in kilograms divided by the square of the body height in metres (kg/m^2). Obesity includes individuals with BMI equal to or higher than 30 kg/m^2.

How it is reported: Percentage of population over 18 years of age with BMI ≥ 30.0 kg/m^2 standardized by age and weighted by sex.[14]

Data source: WHO. 2020. Global Health Observatory (GHO) data repository. In: *World Health Organization* [online]. Geneva, Switzerland. [Cited 28 April 2020]. apps.who.int/gho/data/node.main.A900A?lang=en (1 698 population-based studies with more than 19.2 million participants aged 18 years or older, measured in 186 countries).[15]

Methodology: A Bayesian hierarchical model was applied to selected population-based studies that had measured height and weight in adults aged 18 years and older to estimate trends from 1975 to 2014 in mean BMI and in the prevalence of BMI categories (underweight, overweight and obesity). The model incorporated nonlinear time trends and age patterns; national versus subnational and community representativeness; and whether data covered both rural and urban areas versus only one of them. The model also included covariates that help predict BMI, including national income, proportion of population living in urban areas, mean number of years of education and summary measures of availability of different food types for human consumption.

Challenges and limitations: Some countries had few data sources and only 42 percent of included sources reported data for people older than 70 years.

References:
NCD Risk Factor Collaboration (NCD-RisC). 2016. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *The Lancet*, 387(10026): 1377–1396.
WHO. 2019. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide*. Geneva, Switzerland. (also available at www.who.int/publications/i/item/9789241516952).

ANAEMIA IN WOMEN OF REPRODUCTIVE AGE

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

How it is reported: Percentage of women of reproductive age (15 to 49 years old) with haemoglobin concentration below 110 g/L for pregnant women and below 120 g/L for non-pregnant women.

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

Methodology: The preferable source of data is population-based surveys. Data were taken from the Micronutrients Database of the WHO Vitamin and Mineral Information System (VMNIS). This database compiles and summarizes data on the micronutrient status of populations from various other sources, including data collected from the scientific literature and through collaborators, including WHO regional and country offices, United Nations organizations, ministries of health, research and academic institutions, and non-governmental organizations. In addition, anonymized individual-level data are obtained from multi-country surveys, including demographic and health surveys, multiple indicator cluster surveys, reproductive health surveys and malaria indicator surveys.

The 2021 edition of anaemia estimates in women of reproductive age, by pregnancy status, included 489 data sources spanning 1995–2020. Adjustments of data on blood haemoglobin concentrations for altitude and smoking were carried out whenever possible. Biologically implausible haemoglobin values (<25 g/L or >200 g/L) were excluded. A Bayesian hierarchical mixture model was used to estimate haemoglobin distributions and systematically address missing data, non-linear time trends, and representativeness of data sources. Briefly, the model calculates estimates for each country and year, informed by data from that country and year themselves, if available, and by data from other years in the same country and in other countries with data for similar time periods, especially countries in the same region. The model borrows data, to a greater extent, when data are non-existent or weakly informative, and to a lesser extent for data-rich countries and regions. The resulting estimates are also informed by covariates that help predict blood haemoglobin concentrations (e.g. socio-demographic index, meat supply [kcal/capita], mean BMI for women and log of under-five mortality for children).[299] The uncertainty ranges (credibility intervals) reflect the major sources of uncertainty, including sampling error, non-sampling error due to issues in sample design/measurement, and uncertainty from making estimates for countries and years without data.

Challenges and limitations: Despite a high proportion of countries having nationally representative survey data available for anaemia, there is still a lack of reporting on this indicator, especially in high-income countries. As a result, the estimates may not capture the full variation across countries and regions, thus tending to "shrink" towards global means when data are sparse.

References:

Stevens, G.A., Finucane, M.M., De-Regil, L.M., Paciorek, C.J., Flaxman, S.R., Branca, F., Peña-Rosas, J.P., Bhutta, Z.A. & Ezzati, M. 2013. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. *The Lancet Global Health*, 1(1): e16–e25.
WHO. 2014. *Comprehensive Implementation Plan on maternal, infant and young child nutrition*. Geneva, Switzerland.
WHO. 2021. Nutrition Landscape Information System (NLiS) Country Profile. In: *WHO* [online]. Geneva, Switzerland. [Cited 10 May 2021]. www.who.int/data/nutrition/nlis/country-profile
WHO. 2021. Vitamin and Mineral Nutrition Information System (VMNIS). In: *WHO* [online]. Geneva, Switzerland. [Cited 10 May 2021]. www.who.int/teams/nutrition-food-safety/databases/vitamin-and-mineral-nutrition-information-system
WHO. 2021. WHO Global Anaemia estimates, 2021 Edition. In: *The Global Health Observatory | WHO* [online]. Geneva, Switzerland. [Cited 10 May 2021]. www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children ■

ANNEX 2
METHODOLOGIES CHAPTER 2

A. Methodology for 2020 PoU nowcasts

As in previous editions of this report, due to lack of detailed information on the most recent values of each of the elements that contribute to computing the PoU and NoU (see **Annex 1B**), estimates referring to the most recent year are nowcasted; in other words, they are predictions of the very recent past.

However, 2020 was unique in many respects due to the COVID-19 pandemic, which imposed unprecedented restrictions on people's ability to work and move. This demanded special considerations when nowcasting the values of the PoU, especially with respect to estimating the likely change in the CV and to modelling the way in which inequality in access to food contributes to rates of undernourishment. Both aspects required special treatment.

Estimating changes in FI_{sev} from 2019 to 2020

While it was possible to nowcast the values of DEC in 2020 using the traditional approach based on information provided by the Markets and Trade Division of FAO, used to inform FAO Agricultural Outlooks, it was necessary to modify this traditional approach used to nowcast the CV. Normally, changes in CV|y (the component of the CV associated with differences in households' economic conditions) are derived from differences in three-year averages of the prevalence of severe food insecurity based on the FIES (FI_{sev}) that are not explained by changes in food supplies. Use of the three-year average addressed the need to control for possible excess sampling variability in country-level estimates of the FI_{sev} (which, for most countries, is based on relatively small samples of FIES data) and is consistent with an assumption that CV|y follows a relatively stable trend. The exceptional nature of 2020 makes it difficult to maintain this last assumption. Because of that, in nowcasting the 2020 value of CV|y, the change between the 2017–19 average and the 2020 *annual* value of FI_{sev} was used.

Adjustments in the proportion of change in FI_{sev} that is attributed to CV|y

Another parameter that needed attention to nowcast the 2020 value of PoU is the percentage of change in FI_{sev} that is attributed to CV|y. Normally, this has been assumed to be equal to one-third, based on an econometric analysis of past values of PoU, DEC and CV|y. The exceptional nature of 2020 calls into question this regularity. As virtually no national HCES were collected in 2020, there will never be an empirical basis to determine how to properly modify it. The solution was to conduct a sensitivity analysis changing the percentage of change in FI_{sev} that is attributed to CV|y from a minimum of one-third to a maximum of one. The result is a range of possible values of CV|y, and hence of PoU, in 2020. For completeness, Table A2.1 presents the lower and upper bounds of the PoU in 2020 at global, regional and subregional levels.

B. Methodology for the analysis of the impact on food security of income loss induced by the COVID-19 pandemic

The objective of this analysis, presented in Section 2.1, was to estimate the impact on food insecurity, measured with the FIES, of income loss induced by the COVID-19 pandemic. This was possible because the following questions related to the impacts of the COVID-19 pandemic on employment and income were included in the same 2020 Gallup© World Poll as the FIES module:

- Have you experienced each of the following as a result of the COVID-19 situation?
  1. Temporarily stopped working at your job or business: Yes/No
  2. Lost your job or business: Yes/No
  3. Worked less hours at your job or business: Yes/No
  4. Received less money than usual from your employer or business: Yes/No

TABLE A2.1 RANGES OF PoU AND NoU NOWCASTED IN 2020

	PoU 2020 (percentage)		NoU 2020 (millions)	
	Lower bound	Upper bound	Lower bound	Upper bound
WORLD	**9.2**	**10.4**	**720.4**	**811.0**
AFRICA	**19.8**	**21.8**	**265.3**	**292.4**
Northern Africa	6.9	7.3	17.0	17.9
Sub-Saharan Africa	22.7	25.1	248.3	274.6
Eastern Africa	27.1	29.1	120.5	129.6
Middle Africa	31.5	32.1	56.6	57.7
Southern Africa	9.2	11.1	6.2	7.5
Western Africa	16.2	19.9	65.0	79.8
ASIA	**8.5**	**9.5**	**393.1**	**443.2**
Central Asia	3.2	3.7	2.4	2.8
Eastern Asia	< 2.5	< 2.5	n.r.	n.r.
South-eastern Asia	7.1	7.5	47.6	50.1
Southern Asia	14.6	16.9	282.9	328.7
Western Asia	15.0	15.3	41.9	42.7
Western Asia and Northern Africa	*11.2*	*11.5*	*58.8*	*60.5*
LATIN AMERICA AND THE CARIBBEAN	**8.2**	**10.1**	**53.8**	**66.1**
Caribbean	15.6	16.5	6.8	7.2
Latin America	7.7	9.7	47.0	58.9
Central America	9.5	11.7	17.1	21.0
South America	6.9	8.8	29.8	38.0
OCEANIA	**6.2**	**6.2**	**2.7**	**2.7**
NORTHERN AMERICA AND EUROPE	**< 2.5**	**< 2.5**	**n.r.**	**n.r.**

NOTES: n.r. = not reported, as the prevalence is less than 2.5 percent. For NoU, regional totals may differ from the sum of subregions, due to rounding and non-reported values. For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables inside the back cover.
SOURCE: FAO.

Respondents were adult men and women 15 years or older. Respondents who replied "I don't know/Refused/Not applicable or no job" to each of the questions above were excluded from the analysis. Thus, one may assume the results refer only to the population that was employed (working or own business) at the time the COVID-19 pandemic began.

A set of random effect logistic regression models was applied. As outcome (dependent) variables, the respondents' food insecurity status at moderate or severe level, and severe level only, were used as follows:

- Food insecurity status at moderate or severe level: dichotomous variable being 1 if the globally adjusted probability of being food insecure at moderate or severe level was greater than 0.5, otherwise 0;
- Food insecurity status at severe level: dichotomous variable being 1 if the globally adjusted probability of being food insecure at severe level was greater than 0.5, otherwise 0.

The two food insecurity variables were included in separate regression models to study the differential impact of the COVID-19 crisis on different levels of food insecurity.

As explanatory (independent) variables, responses to each of the questions 1 to 4 (temporarily stopped working; lost job; worked less hours; received less money) were included in a separate regression model. Moreover, education, employment status, gender, urban/rural area and world region were considered as controls. Interaction terms between variables 1 to 4 and income and employment were also included, as well as country random effects.

The econometric model implemented in the analysis is described in the following equation:

$$(1) \qquad Prob(Y_{il} = 1|\boldsymbol{\beta_l}, \boldsymbol{b_{i0l}}, \boldsymbol{X_i}) = \frac{\exp[\boldsymbol{p_{il}}]}{1+\exp[\boldsymbol{p_{il}}]}$$

where:

- $\boldsymbol{p_{ilc}} = (\beta_{0lc} + \boldsymbol{b_{i0lc}}) + \beta_{1lc}r_i + \beta_{2lc}c_i + \boldsymbol{\beta_{3lc}X_i} + \boldsymbol{\beta_{4lc}Z_i} * c_i$ is the linear predictor
- i indicates the respondent, l the level of food insecurity (l = moderate or severe, or severe only), c the COVID-19 employment variables (c = temporarily stopped working, or lost job, or worked less hours or received less money), c_i the value of the COVID-19 employment variables for individual i and r_i the region of the world (according to the M49 classification)
- Y_{il} is the dichotomous food insecurity status as described above
- $\boldsymbol{\beta_{lc}} = (\beta_{0lc}, \beta_{1lc}, \beta_{2lc}, \boldsymbol{\beta_{3lc}}, \boldsymbol{\beta_{4lc}})$ denotes the vector of fixed effects corresponding to intercept, region of the world, COVID-19 employment variables and a set of socio-economic characteristics for individual i (X_i, i.e. education, employment status, urban/rural area and gender), the interaction between c_i and Z_{it} (a subset of X_i, i.e. income and employment status)
- $\boldsymbol{b_{i0lc}}$ is the vector of country-specific random effects corresponding to intercept

Results were presented by computing $\exp(\beta_{2lc})$ as an estimate of the odds-ratio of the probability of being food insecure. The larger the odds ratio compared to 1, the higher the probability of being food insecure compared to the probability of not being food insecure due to the "yes" answer to a given question about income loss because of COVID-19 compared to "no".

C. Methodology for the cost and affordability of healthy diets

In Table 5, the cost and affordability of a healthy diet and the change of these indicators from 2017 to 2019 are reported by region, subregion and country income groups, following the latest World Bank classification of income for 2019. In FAO, IFAD, UNICEF, WFP and WHO (2020),[7] results were presented using the income classification for 2017. Therefore, as some countries changed their income status between these two years, the composition of countries by income groups may also have changed.

The cost of a healthy diet

A healthy diet provides not only adequate calories but also adequate levels of all essential nutrients and of each food group needed for a healthy and active life (see Section 2.1). The cost of a healthy diet is defined as the minimum cost of foods, using the least expensive available items in each country, that meet a set of dietary recommendations based on ten national Food Based Dietary Guidelines (FBDGs). The FBDGs explicitly recommend food quantities for each food group and provide a wide regional representation. A healthy diet also includes a more diverse intake of foods from several different food groups. Although it is not selected based on nutrient content but is determined by FBDGs, this diet meets on average 95 percent of nutrient needs, so it can therefore almost always be considered as nutrient adequate. This diet, however, is not specifically optimized to include environmental sustainability considerations.

The availability and prices of items in each food group needed for a healthy diet were obtained from the World Bank's International Comparison Program (ICP) as national averages for 2017. Item definitions are internationally standardized, allowing classification by food group and calculation of the least-costs to reach FBDG requirements in each country, representing an average across markets and throughout the year.[300] For a detailed description of the healthy diet and related methodology, see FAO, IFAD, UNICEF, WFP and WHO (2020).[7]

Affordability of a healthy diet

In this report, to determine affordability, the cost of a healthy diet is compared with country-specific income distributions that are derived from the World Bank PovcalNet database.[301] The resulting measures of affordability include the percentage and number of people who cannot afford a healthy diet in a given country, in 2019. A healthy diet is considered unaffordable when its cost exceeds 63 percent of the income in a country. The 63 percent accounts for a portion of income that can be credibly reserved for food, based on observations that the poorest segment of the population in low-income countries spend, on average, 63 percent of their income on food (World Bank Global Consumption Database).[301az]

Based on this threshold and comparing the cost of the diet with country income distributions, we obtain the percentage of the population for whom the cost of the diet is unaffordable. These proportions are then multiplied by the 2019 population in each country using the World Development Indicators (WDI)[292] of the World Bank, to obtain the number of people who cannot afford a specific diet in a given country. For a detailed description of the affordability indicators and related methodology, see **Annex 3** of FAO, IFAD, UNICEF, WFP and WHO (2020).[7]

Updating the cost of a healthy diet

The ICP is currently the only source of retail food price data for internationally standardized items, as part of the World Bank's larger effort to compute purchasing power parity exchange rates across all countries of the world. However, these data are only available once every three to five years, which does not allow for yearly global monitoring of diet costs to guide programmes and policies. In the absence of updated food price data, in this report, the method of updating the cost indicator between ICP publication years relies on Consumer Price Indices (CPIs) published by FAO. This dataset tracks change in monthly general and food CPIs at the national level with reference to a base year of 2015. The annual CPIs are computed as simple averages of the 12 monthly CPIs within a year. In particular, Food Consumer Price Indices (CPIs) data for food and non-alcoholic beverages are used to update the cost of a healthy diet in 2019 for all countries except Central African Republic and Guyana, for which the general CPI is used. The costs of a healthy diet in 2019 are estimated by using each country's 2017 actual cost multiplied by its ratio between food CPIs:

$$\text{Estimated 2019 Diet Cost} = \text{Actual 2017 Diet Cost} \times \text{(f)CPI2019} / \text{(f)CPI2017}$$

Applying the (food) CPIs, the cost of the healthy diet is first estimated in local currency units. To compare the cost across countries and political entities, the cost is converted into international dollars using the WDI purchasing power parity (PPP) private consumption conversion factors for 2019. For a detailed description of the methodology, see Yan *et al.* (forthcoming).[302]

The cost of the healthy diet was computed for 170 countries in 2017. This cost information was updated for 2019 for all countries except for Palestine, that has inconsistent PPP conversion factors, and Taiwan Province of China that has no information on CPIs nor on PPPs. Of the remaining 168 countries, there are 18 countries with missing 2019 PPP data, and 2 countries with missing 2019 CPIs data. For the 18 countries, PPP imputations were applied using an Autoregressive Integrated Moving Average Model with Explanatory Variable (ARIMAX) approach, which allows for one external covariate to be chosen between the per capita GDP and the per capita household consumption expenditure. To apply this methodology, the completeness of the series of both covariates has been ensured by applying the Holt-Winter smoothing methodology to fill the gaps, when needed. Thus, the ARIMAX model selects the covariate and the parameters that minimize the Bayesian Information Criterion (BIC). Finally, the model estimates the best specification and computes the predicted values.

For two additional countries with missing information on CPIs (Bermuda, and Turks and Caicos Islands), cost imputations were applied using the average diet cost in the subregion (s) of the country (i) with missing information:

$$\text{Imputed 2018 Diet Cost} = (\text{2017 } \textit{Diet Cost}_i \,/\, \textit{Avg } \text{2017 } \textit{Diet Cost}_s) \times \textit{Avg } \text{2018 } \textit{Diet Cost}_s$$

az For methodology see Herforth *et al.* [2020].[8]

$$\text{Imputed 2019 Diet Cost} = \textit{Imputed } 2018\ \textit{Diet Cost}_i \,/\, \textit{Avg } 2018\ \textit{Diet Cost}_s) \times \textit{Avg } 2019\ \textit{Diet Cost}_s$$

Subregional cost averages in 2017 and 2018 were computed excluding from the computations the country with missing cost information.

A limitation of this method is that changes in the cost of a healthy diet between 2017 and 2019 depend on (food) CPIs and do not reflect commodity-specific changes in food prices, nor any differential changes in the price of different food groups, due to the lack of new item-level food price data for more nutritious food items. FAO is exploring how to expand the coverage of the FAO Food Price Monitoring and Analysis (FPMA) dataset to include a set of country-appropriate sentinel foods in non-staple food groups, such as fruits and vegetables, to allow more frequent and robust monitoring of the cost of a healthy diet.

Updating the affordability of a healthy diet

In this report, affordability was updated for year 2019. Through continuous updates based on incoming national surveys and data imputations, the income distributions for the 2017, 2018 and 2019 reference years have been updated in the PovcalNet database and are now available for almost all countries (except for India whose most recent income distribution is for 2017). The percent of people who cannot afford a healthy diet in 2019 was computed using the CPI-inflated cost of the diet described above, as well as the corresponding reference year of the 2019 income distributions available in PovcalNet. These proportions were multiplied by each country's population in 2019 using the WDI of the World Bank, to obtain the number of people who cannot afford the healthy diet in this year.

This affordability indicator is computed for 143 countries for 2017. This information was updated for all countries for year 2019, except for Palestine. For this country, the affordability indicator for 2019 was calculated using cost information for 2017 and population figures for 2019.[ba]

ba For a detailed description of the methodology see Yan *et al.* (forthcoming).[302]

D. Methodology for projections of PoU to 2030

To project PoU values to 2030, we project the three fundamental variables that enter in the PoU formula (DEC, CV and MDER) separately, based on different inputs, depending on the scenario considered.

The main source of information is the output of the MIRAGRODEP recursive, dynamic CGE model, which provides series of projected values, at country level, for:

- real per capita GDP (GDP_Vol_pc)
- Income Gini coefficient (gini_income)
- An index of real food price (Prices_Real_Food)
- Extreme poverty headcount rate (that is, the percentage of the population with real daily income below USD 1.9) (x190_ALL)
- Daily per capita food consumption (DES_Kcal)

The MIRAGRODEP model was calibrated to the pre-COVID situation of the world economy in 2018, and used to generate projections of macroeconomic fundamentals into 2019–2030 under two scenarios: a reference scenario, aimed at capturing the impact of COVID as reflected in the latest available update of the IMF World Economic Outlook (WEO) published in April 2021, and a no-COVID scenario, based on the October 2019 edition of WEO, which is the last one before the pandemic. A more detailed description of the MIRAGRODEP model, as well as the assumptions used to build the reference scenario and the no-COVID scenario, can be found in Laborde and Torero (forthcoming).[303]

In addition, we use the median variant projections of total population (both sexes), its composition by gender and age, and the crude birth rate as provided by the 2019 World Population Prospects.

Projections of DEC

To project the series of DEC we use the following formula:

$$DEC_t = [DES_Kcal_t + DES_{2018} - DES_Kcal_{2018}] \times (1 - WASTE_t)$$

In other words, we take the model projected series of DES_Kcal and adjust its level so that the

TABLE A2.2 REGRESSION COEFFICIENTS FROM THREE MODELS ESTIMATED ON HISTORIC CVy VALUES (2000–2019)

		Regression model coefficients (standard error in parentheses)		
Regressors	Variable used to project	Pooled OLS	Robust regression	Random effect
Real GDP per capita	GDP_vol_pc *	-0.0366 (0.0790)	-0.0358 (0.0742)	-0.0689 (0.0662)
Income Gini coefficient	Gini_income *	0.1095 (0.0748)	0.1650 (0.0703)	0.1266 (0.0816)
Real Food CPI	Prices_Real_Food *	0.1359 (0.0710)	0.0686 (0.0667)	0.1598 (0.0698)
Poverty headcount	X190_ALL *	0.2622 (0.1288)	0.2794 (0.1210)	0.2654 (0.1475)
Crude birth rate	cbr **	0.3806 (0.1281)	0.3301 (0.1204)	0.4029 (0.1491)
Total population	pop **	-0.2002 (0.0735)	-0.1696 (0.0690)	-0.2070 (0.1161)
Constant		0.0000 (0.0694)	-0.1110 (0.0652)	0.0533 (0.0976)
N	* from MIRAGORDEP	112	112	112
r^2	** from WPP	0.4893	0.4943	0.4883
r^2 adjusted		0.4601	0.4654	
r^2 between				0.562

SOURCE: FAO.

value for 2018 matches the actual value. (This is necessary as the MIRAGRODEP model has been calibrated to the 2018 values of an old FBS series.)

Projections of MDER

To project the MDER, we simply compute it based on the data on the composition of the population by sex and age as projected by the 2019 WPP (medium variant).

Projections of the CV

As always, the total CV is computed as $CV = \sqrt{(CV_y^2 + CV_r^2)}$ where the two components refer to variability due to differences across households, based on their income level, and variability across individuals based on differences in sex, age, body mass and physical activity level.

CVr is simply computed based on WPP population projected data (similarly to what we do for the MDER), while CVy is computed using a linear combination of relevant macroeconomic and demographic variables, based on the estimated coefficients from a multiple regression of historic CVy, and fed with the projections from the MIRAGRODEP model and WPP.

$$\widehat{CVy}_t = \alpha + \beta_1 GDP_vol_pc_t + \beta_2\, gini_income_t + \beta_3 Prices_Real_Food_t + \beta_4\, x190_ALL_t + \beta_5\, cbr_t + \beta_6\, pop_t$$

To estimate the coefficients used in the above formula, we considered alternative models, as summarized in Table A2.2, which yield very similar predictions.

The series of CVy values predicted by the formula separately for each country for the years 2021–2030 is then calibrated to the observed 2019 historic data, similarly to what is done for the DES:

$$CVy_t = \widehat{CVy}_t + \left(CVy_{2019} - \widehat{CVy}_{2019}\right), \forall t = T, \ldots, 2030$$

with T = 2021 for the reference scenario, and T = 2020 for the no-COVID one.

E. Methodology for assessment of progress against nutrition targets at the regional and global level

These methodological notes pertain to results presented in Table 7, Figures 10 and 11 in Section 2.3 of the report.

For Table 7, progress was assessed against the 2030 nutrition targets established by UNICEF/WHO[26] and an adapted version of rules from the WHO-UNICEF Technical Expert Advisory Group on Nutrition Monitoring[304] for all indicators except adult obesity, where 2030 targets or progress assessment rules have not been

established. For adult obesity, the 2025 target of "no increase between baseline (2012) and 2025" was used.

To determine which progress assessment category to use for each indicator and each region, first, two distinct annual rates of reduction (AARR)[bb] were calculated: (i) the AARR required for the region to reach the 2030 target; and (ii) the actual AARR that the region has experienced to date. The value of the actual AARR experienced to date was then used to determine which progress assessment category the region is assigned, while also considering the required AARR. See Table A2.3 for AARR ranges and prevalence thresholds applied for each category and for each indicator, briefly:

- **On track:** regions with an **actual AARR that is greater than the required AARR** are categorized as being **"on track" (green)** to achieve the target. A static threshold for the latest prevalence, as noted for each indicator in Table A2.3, is also used to categorize regions as being "on track"; for example, any region for which the most recent (2020) overweight prevalence is below 3 percent is considered "on track", even if its actual AARR is less than its required AARR.
- **Off track:** regions with an **actual AARR that is less than the required AARR** and for which the latest prevalence is above the "on track" static threshold noted in Table A2.3 are considered **"off track"**. The "off track" category is broken down into different sub-categories depending on the indicator. For the four indicators of child stunting, child overweight, child wasting, and anaemia among women, there are three off track sub-categories: "off track – some progress" (yellow), "off track – no progress" (light red) and "off track – worsening" (dark red). For low birthweight and exclusive breastfeeding, the categories of "off track – no progress" (light red) and "off track – worsening" (dark red) are combined into one category of "off track – no progress or worsening" which is represented with an orange colour because there is insufficient variation in the progress to date to use the two categories for these indicators. For adult obesity, since the target is "no increase", for which the required AARR is ≥ 0, it is not possible to have a category of "off track – some progress" (yellow) or "off track – no progress" (light red) and therefore only "off track – worsening" (dark red) is used.
- **Assessment not possible**: For the five indicators based on country-modelled data (child stunting, child overweight, low birthweight, anaemia and adult obesity), an assessment is possible for all regions because a modelled estimate exists for all countries, meaning there are enough data to generate representative estimates for all regions and for all years. For indicators where country-modelled estimates are not available, namely child wasting and exclusive breastfeeding, assessment is not possible for regions where population coverage is < 50 percent (see notes 16 and 17 to Table A2.3).

The years of data used to calculate the actual AARR experienced to date at the regional level vary by indicator, as specified in the footnotes for Table A2.3. The actual AARRs for each region are calculated using a trendline comprised of all estimates available between 2012 (baseline) and the latest estimate for each indicator, except for exclusive breastfeeding for which modelled estimates are not available and which is calculated using only two estimates: the baseline (2012) and the latest year available (2019). The required AARR is calculated using the baseline prevalence for the region in 2012 and the target prevalence as noted in the 2030 Maternal Infant and Young Child Nutrition targets[26] (e.g. for child overweight, the required is AARR is 3.41 percent per year at the global level, which is the annual rate of change needed to go from the 2012 baseline prevalence of 5.6 percent to the targeted 3.0 percent in 2030).

For Figure 10, the actual AARRs calculated for each indicator and for each region for Table 7 were used in the formula below to generate a projected estimate for 2030 if the current trend from the actual AARR were to continue. A dotted line was then drawn between the latest estimate (end of the solid line in the graph) and the projected 2030 estimate.

bb See technical note on how to calculate AARR at: https://data.unicef.org/resources/technical-note-calculate-average-annual-rate-reduction-aarr-underweight-prevalence

TABLE A2.3 RULES FOR PROGRESS ASSESSMENT AGAINST THE GLOBAL NUTRITION TARGETS

Indicator	Stunting (< 5 years)	Overweight (< 5 years)	Wasting (< 5 years)	Low birthweight[1]	Exclusive breastfeeding[1,2] (< 6 months)	Anaemia (women of reproductive age)	Obesity[1] (adults)
2030 target	Reduce the number of children under 5 who are stunted by 50%	Reduce and maintain childhood overweight to less than 3%	Reduce and maintain childhood wasting to less than 3%	Reduce low birthweight prevalence by 30%	Reduce non-exclusive breastfeeding prevalence (< 6 months) to 30%	Reduce anaemia among women of reproductive age by 50%	**2025 target:** No increase in adult obesity prevalence between 2012 and 2025
On track	AARR > required[3] or prevalence < 3%[4]	AARR > required[5] or prevalence < 3%[6]	AARR > required[5] or prevalence < 3%[6]	AARR > required (i.e. 1.96)[7] or prevalence < 5%[8]	AARR > required[9] or prevalence < 30%[10]	AARR > required (i.e. 3.78)[11] or prevalence <5%[8]	AARR ≥ required (i.e. ≥ 0)[12] or prevalence < 5%[8]
Off track – some progress	AARR < required, but > 0.5	AARR < required, but > 1.5	AARR < required, but > 2.0	AARR < 1.96 but > 0.5	AARR < required, but > 0.8	AARR < 3.78 but > 0.5	AARR < 0.0
Off track – no progress	-0.5 ≤ AARR < 0.5	-1.5 ≤ AARR < 1.5	-2.0 ≤ AARR < 2.0	AARR < 0.5	AARR < 0.8	-0.5 ≤ AARR < 0.5	
Off track – worsening	AARR < -0.5	AARR < -1.5	AARR < -2.0			AARR < -0.5	
Assessment not possible	For regions: assessment is possible for all regions[13] For countries: assessment not possible when data are insufficient[14]	For regions: assessment is possible for all regions[13] For countries: assessment not possible when data are insufficient[14]	For regions: assessment not possible when regional population coverage < 50%[15] For countries: assessment not possible when data are insufficient [16]	For regions: assessment is possible for all regions[13] For countries: not applicable	For regions: assessment not possible when regional population coverage < 50%[17] For countries: not applicable	For regions: assessment is possible for all regions[13] For countries: not applicable	For regions: assessment is possible for all regions[13] For countries: not applicable

NOTES:
1. For low birthweight and exclusive breastfeeding the categories of "off track – no progress" (light red) and "off track – worsening" (dark red) are combined into one category of "off track – no progress or worsening" which is represented with an orange colour, because there is insufficient variation in current progress to split these categories for these indicators. For adult obesity, since the target is "no increase" for which the required AARR is ≥ 0, it is not possible to have a category of "off track – some progress" (yellow) or "off track – no progress" (light red) and therefore only "off track – worsening" (dark red) is used.
2. For exclusive breastfeeding, the actual target is to increase the prevalence of exclusive breastfeeding (< 6 months) to 70 percent by 2030; however, it has been revised here to reflect the prevalence of non-exclusive breastfeeding so that the concept of the AARR can be applied as it is for the other six targets.
3. The required AARR is based on the change in stunting prevalence corresponding to a 50 percent reduction in the number of children affected by stunting between 2012 and 2030, considering the population growth estimated by the United Nations World Population Prospects. Actual AARR is calculated using all years of data between 2012 and 2020.
4. Regions where the stunting prevalence point estimate or lower 95 percent confidence interval for the year 2020 is < 3 percent are considered on track.
5. The required AARR is based on the required change in overweight or wasting prevalence to reduce from the baseline (2012) prevalence to 3 percent by 2030. Actual AARR is calculated using all years of data between 2012 and 2020. Note that for wasting, unpublished trend estimates from the JME are used to generate the actual AARR.
6. Regions where the overweight or wasting prevalence point estimate for the year 2020 is < 3 percent are considered on track.
7. The required AARR is based on the change required to reduce the low birthweight prevalence by 30 percent between 2012 (baseline year) and 2030. The same AARR of 1.96 is required for all regions since the target requires a relative change (reduction by 30 percent) in the baseline value. Actual AARR is calculated using all years of data between 2012 and 2015.
8. Regions where the low birthweight prevalence point estimate for the year 2015, the anaemia prevalence point estimate for the year 2019 or the adult obesity prevalence point estimate for the year 2016 is < 5 percent, are considered on track.
9. The required AARR is based on the required change to decrease the non-exclusive breastfeeding prevalence to 30 percent between 2012 (baseline year) and 2030. Actual AARR is calculated using only two estimates for the years of 2012 and 2019, where the regional averages are population weighted using the most recent estimate for each country between 2005 and 2012 for the 2012 estimate, and between 2014 to 2019 for the 2019 estimate (except for China, where a 2013 estimate is used for 2019 aggregates).
10. Regions where the non-exclusive breastfeeding prevalence point estimate for the year 2019 is < 30 percent (i.e. where exclusive breastfeeding is ≥ 70 percent) are considered on track.
11. The required AARR is based on the change required to reduce the prevalence of anaemia among women of reproductive age by 50 percent between 2012 (baseline year) and 2030. The same AARR of 3.78 is required for all regions since the target requires a relative change (halving) of the baseline value. Actual AARR is calculated using all years of data between 2012 and 2019.
12. The required AARR is based on experiencing "no increase" between 2012 (baseline year) and 2030, which is an AARR of 0. Therefore, any region with a trend that has shown any increase between 2012 and 2016 is labelled as "off track – worsening". Actual AARR is calculated using all years of data between 2012 and 2016.
13. The global databases for the five indicators of stunting, overweight, low birthweight, anaemia among women of reproductive age, and adult obesity are based on country-level models which provide annual estimates for all countries for generation of regional and global estimates (i.e. annual estimates are even available for countries without any household survey data, even in cases where country-modelled estimates are not released to the public and used only for generation of global and regional estimates), thus making progress assessment possible for all regions.
14. Progress assessment against the child stunting and child overweight targets is not conducted for countries which did not have any input data (e.g. household survey data) to use in the country model which were more recent than the year 2000, or for which modelled estimates remain pending final review.
15. Progress assessment is not possible for wasting for regions where population coverage is < 50 percent. Population coverage is calculated by dividing the sum of the population of children under 5 for countries with at least one data point from household surveys between 1990 and 2020 by the total population of children under 5 for all countries in the region. Since wasting estimates are generated with a subregional model, even one year of data between 1990 and 2020 counts towards the regional population coverage.
16. Progress assessment against the child wasting target is not conducted for countries which do not have at least two data points (e.g. household surveys) between 2005 and 2020, with at least one point being more recent than 2012.
17. Progress assessment is not possible for exclusive breastfeeding where the population coverage of country survey data for the region is < 50 percent for the 2012 and/or the 2019 estimate. For 2012, population coverage is calculated by dividing the sum of the population of children under 5 for countries with at least one data point from household surveys between 2005 and 2012 by the total population of children under 5 for all countries in the region. For 2019, population coverage is calculated by dividing the sum of the population of children under 5 for countries with at least one data point from household surveys between 2014 and 2019 (except for China, where an estimate from a 2013 survey is used) by the total population of children under 5 for all countries in the region.
SOURCE: This table was made using information from: (i) WHO & UNICEF. 2017. *Methodology for monitoring progress towards the global nutrition targets for 2025 – technical report;* and (ii) WHO & UNICEF. 2017. *The extension of the 2025 Maternal, Infant and Young Child nutrition targets to 2030.* Geneva, Switzerland and New York, USA, WHO and UNICEF.

Projected estimate in 2030 if current trends continue = j * (1-a ^(2030–2012))

where:

J = Baseline (2012) prevalence estimate
a = Actual AARR

For Figure 11, progress assessment at the country level is reported for child stunting, child overweight and child wasting. The methods applied for the country assessments for these indicators largely follow those applied for the regional assessments in Table 7, described in the previous paragraphs and in Table A2.3. For the two indicators for which country modelled estimates are available, namely child stunting and child overweight, the only variation between the assessment methods at the regional and country levels relate to designation of countries for which progress assessment is not possible. At the country level, progress assessment against the stunting and overweight targets is not conducted for countries which did not have any input data (e.g. household survey data) to use in the country model post-2000, or for which modelled estimates remain pending final review. For wasting, since a country-level model is not available, the calculation of the AARR is done using all available country data (e.g. from household surveys) between 2005 and 2020 in the 2021 JME country dataset for countries with at least two data points, of which at least one was more recent than 2012. Therefore, assessment against the wasting target is not possible for countries that do not have at least two data points between 2005 and 2020, with at least one point being more recent than 2012. ■

ANNEX 3
COUNTRY EXPOSURE TO THE DRIVERS AND PoU CHANGE POINT ANALYSIS IN CHAPTER 3

A. Occurrence of the three drivers

Occurrence of conflict

Refers to the total number of violent conflicts – caused by internal or intrastate conflicts – in each of the five subperiods (from 2000 to 2019), while the frequency is denoted by the percentage of time, i.e. the number of years in each five-year subperiod when a country experienced a violent conflict (Figure 15A).

Data sources: The Uppsala Conflict Data Program (UCDP) dataset[305] on the number of violent conflicts.

Methodology: Information on conflicts has been updated from *The State of Food Security and Nutrition in the World 2017*[1] (see **Annex 2** for additional details) to cover most recent years. See Holleman *et al.* (2017).[2]

Occurrence of climate extremes

Exposure to climate extremes refers to the percentage of countries that experienced at least one typology of climate extremes (drought, flood, heat spell, storm) in each subperiod from 2000 to 2020 that includes three subperiods of five years: 2000–2004; 2005–2009; 2010–2014; and one subperiod of six years: 2015–2020. High exposure refers to countries that reported three or four different types of climate extremes during a given subperiod (Figure 15B). Frequency is denoted by the percentage of time, i.e. the number of years in each subperiod when a country experienced at least one typology of climate extremes.

Data sources: Drought information is based on the European Centre for Medium-Range Weather Forecasts (ECMWF)[323] for years 2001–2005 (ERA5), and on the Anomaly Hotspots of Agriculture Production (ASAP)[324] for years 2006–2020. Flood information is based on the Climate Hazards Group Infrared Precipitation with Stations (CHIRPS).[325] Heat spell information is based on the European Centre for Medium-Range Weather Forecasts (ECMWF)[323] (ERA5). Storm information is based on the Centre for Research on the Epidemiology of Disasters (EM-DAT).[326]

Methodology: The four typologies of climate extremes have been updated from *The State of Food Security and Nutrition in the World 2018*[3] (see **Annex 2** for additional details) to cover most recent years. See Holleman *et al.* (2020).[4]

Occurrence of economic downturns

Refers to the percentage of countries reporting a negative per capita GDP growth between two successive years (annual % change) during the period 2011–2021, with sub-Saharan Africa, Latin America and Western Asian countries being disproportionately affected (Figure 15C).

Data sources: IMF World Economic Outlook (WEO) time series (April 2021)[327] on per capita annual GDP.

B. PoU change point analysis of the three drivers

Increasing change points in the prevalence of undernourishment are identified for low- and middle-income countries when a subsequent increasing tendency in the PoU time series occurs. Specifically, the condition to identify an increasing change point at time *t*, is an increasing PoU trend from *t-2* up to *t+2*. A PoU time series in years 2008–2020 is used to identify increasing change points in PoU between 2010 and 2018. The PoU time series has been revised in 2020. In particular, a discontinuity in the methodology used to estimate the dietary energy consumption (DEC) has been introduced during years 2009–2010 in the revised version of the PoU series, instead of years 2013–2014 used in the previous version. This has implied a shift in the identification of years when an increasing PoU change point occurred in the current analysis, compared to the analysis conducted in *The State of Food Security and Nutrition in the World 2018*.[3]

- An increasing PoU change point associated with conflict is identified for any year between 2010 and 2018 when a country experiences an increasing PoU change point along with a conflict in at least one of the two subperiods (2010–2014 or 2015–2019) while suffering from 500 or more battle deaths during that subperiod (Figure 17).
- An increasing PoU change point associated with climate extremes is identified in the year when a country reports an increasing change point along with the occurrence of at least one of these extremes: i) a severe ASAP drought warning of the most severe rank (from 1 to 4); ii) a heat spell; iii) a flood; iv) a storm (Figure 17).
- An increasing PoU change point associated with economic slowdowns and downturns is identified when an economic slowdown or downturn is reported in one of the two years before the occurrence of the PoU change point, for instance during 2015–2016 or 2016–2017 if the PoU change point occurs in 2017 (Figure 17).

Methodology: The PoU change point analysis has been updated from *The State of Food Security and Nutrition in the World 2018* (see **Annex 3** for additional details)[3] to cover most recent years. See Holleman *et al.* (2020).[4] ■

ANNEX 4
COUNTRY GROUP DEFINITIONS AND LISTS OF COUNTRIES AFFECTED BY DRIVERS IN CHAPTER 3

The analysis of Chapter 3 is focused on 133 low- and middle-income countries and territories for which relevant information on the key drivers of food insecurity is available. Following the latest World Bank classification of income, of the 133 countries, 29 are low-income, 50 are lower-middle-income and 54 are upper-middle-income. Of the 133 countries, 110 low- and middle-income countries have information on the prevalence of undernourishment for years 2010–2019.

A. Definition of country groups

Protracted crisis

The 2020 edition of this report defines protracted crisis situations as "characterized by recurrent natural disasters and/ or conflict, longevity of food crises, breakdown of livelihoods and insufficient institutional capacity to react to the crises." There are three criteria used to define a country with a protracted crisis situation: (i) longevity of the crisis; (ii) humanitarian aid flow to the country; and (iii) the country's economic and food security status. Specifically, the list of countries with a protracted crisis situation includes those that meet the following three criteria:

1. The country is a low-income food-deficit country (LIFDC), as defined by FAO in 2018.
2. The country has faced a shock – either natural or human-induced – for four consecutive years between 2016 and 2019, or for eight of ten years between 2010 and 2019, and is reported in the list of countries requiring external assistance for food.[306]
3. The country received more than 10 percent of total official development assistance (ODA) in the form of humanitarian assistance between 2009 and 2017.[307]

For 2020, there are 22 countries that meet the above three criteria.

B. Definition of countries affected by drivers (years 2010–2019)

Countries affected by conflict

Refers to low- and middle-income countries and territories affected by conflict for at least one subperiod of five consecutive years and having suffered 500 or more battle deaths during that subperiod. The timeframe spans from 2000 to 2019, with four periods of five years: 2000–2004; 2005–2009; 2010–2014; 2015–2019. Of the 133 low- and middle-income countries, there are 40 low- and middle-income countries that meet these criteria.

Data sources: The Uppsala Conflict Data Program (UCDP) dataset[305] on the number of violent conflicts.

Methodology: Information on conflicts has been updated from *The State of Food Security and Nutrition in the World 2017*[1] (see **Annex 2** for additional details) to cover most recent years. See Holleman *et al.* (2017).[2]

Countries affected by climate extremes

Refers to low- and middle-income countries that experience a combination of high exposure to climate extremes (i.e. drought, flood, heat spell, storm) and vulnerability to climate factors. High exposure is defined when a country experiences three or four different typologies of climate extremes during the two subperiods of 2010–2014 or 2015–2019 or, alternatively, when extremes occur for at least 7 years in 2010–2019. Climate-related vulnerability is identified when at least one of the following conditions occurs: i) a country shows a high and statistically significant association between cereal production or imports and at least one climate factor (temperature, precipitation and vegetation growth) during years 2001–2020; ii) a country is highly dependent on agriculture, measured by 60 percent or more

people employed in the agriculture sector in 2019; iii) a country shows an increasing PoU change point in correspondence with a severe ASAP drought warning. Of the 133 low- and middle-income countries, there are 75 low- and middle-income countries that meet these criteria.

Data sources: Drought information is based on the Anomaly Hotspots of Agriculture Production (ASAP).[324] Flood information is based on the Climate Hazards Group Infrared Precipitation with Stations (CHIRPS).[325] Heat spell information is based on the European Centre for Medium-Range Weather Forecasts (ECMWF)[323] (ERA5). Storm information is based on the Centre for Research on the Epidemiology of Disasters (EM-DAT).[326]

Methodology: Information on countries affected by climate extremes has been updated from *The State of Food Security and Nutrition in the World 2018*[3] (see **Annex 2** for definition of exposure and vulnerability to climate extremes) to cover most recent years. See Holleman *et al.* (2020).[4]

Countries affected by economic downturns

Refers to low- and middle-income countries that experience an economic downturn in one of the two years before the occurrence of an increasing PoU change point, and during the period 2010–2018. Specifically, a PoU change point characterized by an increasing tendency *between t-2* and *t+2* is identified at time *t*, and it should occur in correspondence with an economic downturn reported at time *t*, or at time *t-1*. Of the 133 low- and middle-income countries, there are 24 low- and middle-income countries that meet these criteria.

Data sources: IMF World Economic Outlook (WEO) time series (April 2021)[327] on per capita annual GDP.

Methodology: For the PoU change point analysis, see *The State of Food Security and Nutrition in the World 2018* (see **Annex 3** for additional details)[3] and Holleman *et al.* (2017).[2]

Countries with high income inequality

Refers to low- and middle-income countries that report a Gini index that is higher than the median value of the income inequality distribution, given information available during years 2010–2018. Of the 133 low- and middle-income countries, there are 54 low- and middle-income countries that meet these criteria.

Data sources: World Development Indicators of the World Bank.[292]

C. Definition of countries affected by multiple drivers (years 2010–2019)

Countries affected by multiple drivers are those experiencing a combination of two or more drivers during years 2010–2019. Of the 133 low- and middle-income countries, 41 are affected by the following combinations of multiple drivers: conflict and climate extremes (23 countries), conflict and economic downturns (4 countries), climate extremes and economic downturns (9 countries), and all three drivers (5 countries).

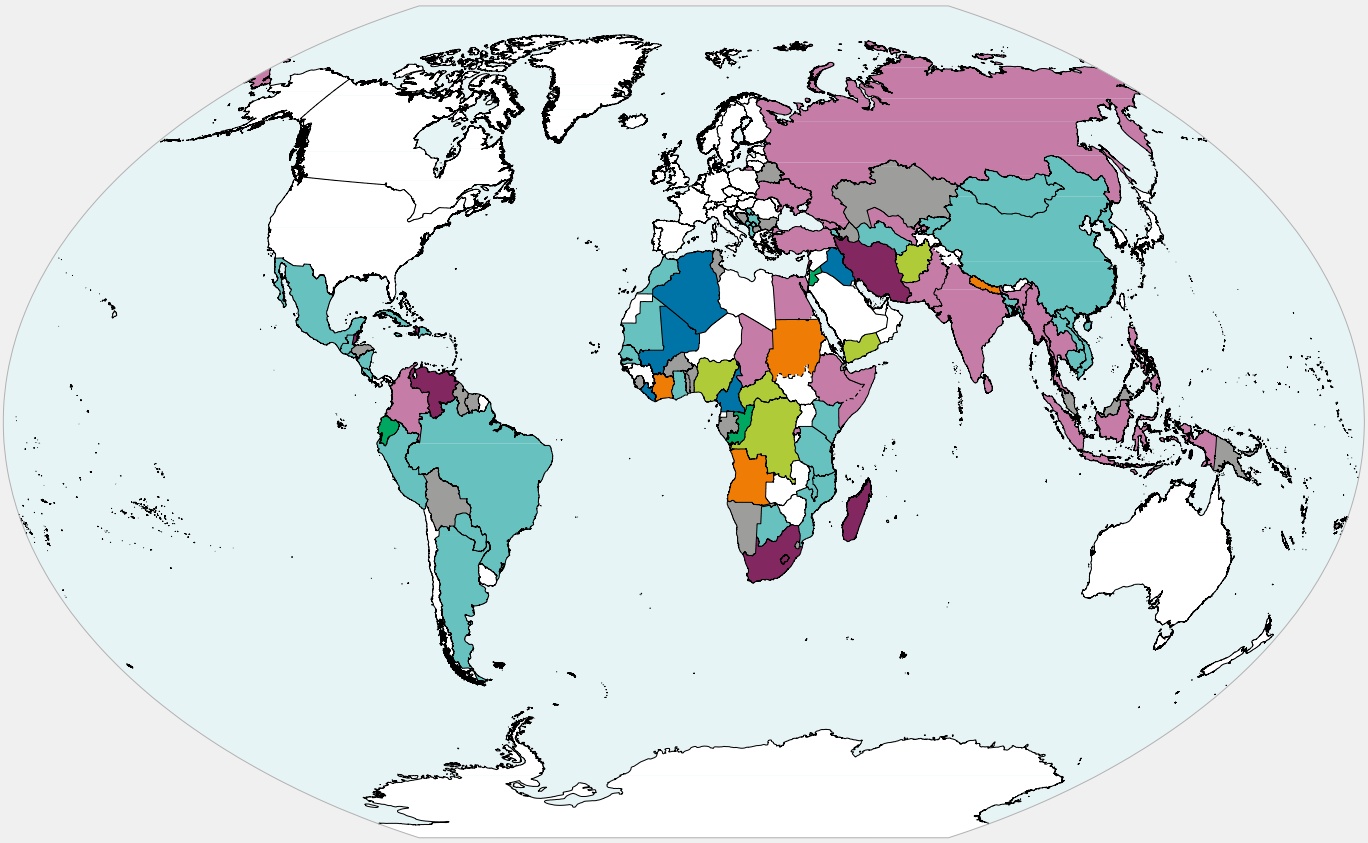
For the analysis in Chapter 3, however, there are 110 countries (of the 133) with available information on the prevalence of undernourishment, of which 36 countries are affected by multiple drivers. For the three regions analysed in Figure 23 (Africa, Asia, and Latin America and the Caribbean), around 36 percent (34 of 95) of low- and middle-income countries affected by drivers suffered from multiple drivers.

Furthermore, given the 110 countries, eight mutually exclusive groups denoting countries affected by different drivers are created. These are ordered by severity of PoU:

1. Conflict, climate extremes and economic downturns (5)
2. Climate extremes and economic downturns (9)
3. Conflict (5)
4. Economic downturns (6)
5. Conflict and climate extremes (18)
6. Conflict and economic downturns (4)
7. None of the three drivers (29)
8. Climate extremes (34)

Figure A4.1 shows countries grouped by the eight categories denoting different combinations of drivers and Table A4.1 provides the country list. Since the association between multiple drivers and undernourishment is the key objective of Chapter 3, Figure A4.1 and Table A4.1 report information for the 110 countries with available PoU. ■

FIGURE A4.1 COUNTRIES BY COMBINATION OF DRIVERS



COMBINATIONS OF DRIVERS

- No data
- Climate extremes
- Climate extremes – Economic downturns
- Conflict
- Conflict – Climate extremes
- Conflict – Climate extremes – Economic downturns
- Conflict – Economic downturns
- Economic downturns
- None

NOTES: Of the 110 low- and middle-income countries, the figure shows eight mutually exclusive categories of low- and middle-income countries affected by different combinations of drivers (conflict, climate extremes and economic downturns). The final boundary between the Republic of the Sudan and the Republic of South Sudan has not been yet determined. The final status of the Abyei area, Jammu and Kashmir, and the Malvinas Islands have not yet been determined. The boundaries shown on this map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries. Dashed lines on maps represent approximate border lines for which there may not yet be full agreement.
SOURCES: Violent conflict data based on Uppsala University. 2021. Uppsala Conflict Data Program (UCDP). In: *UCDP* [online]. Uppsala, Sweden. [Cited 10 June 2021]. ucdp.uu.se; for years 2000–2005 updated drought provided by EU-JRC using data from the European Commission. 2021. Anomaly Hotspots of Agricultural Production (ASAP). In: *ASAP* [online]. Brussels. [Cited 10 June 2021]. mars.jrc.ec.europa.eu/asap; updated flood data provided by UCT using Climate Hazards Center of the University of California – Santa Barbara. 2021. CHIRPS: Rainfall estimates from rain gauge and satellite observations. In: *CHIRPS* [online]. Santa Barbara, USA. [Cited 10 June 2021]. www.chc.ucsb.edu/data/chirps; updated heat spell data provided by UCT using data from the European Centre for Medium-Range Weather Forecasts (ECMWF). 2021. Datasets. In: *ECMWF* [online]. Reading, United Kingdom. [Cited 10 June 2021]. www.ecmwf.int/en/forecasts/datasets; updated storm data based on Centre for Research on the Epidemiology of Disasters (CRED). 2021. EM-DAT: the international disasters database. In: *EM-DAT* [online]. Brussels. [Cited 10 June 2021]. public.emdat.be; annual per capita GDP based on IMF. 2021. World Economic Outlook Database - April 2021. In: *IMF* [online]. Washington, DC. [Cited 10 June 2021]. www.imf.org/en/Publications/WEO/weo-database/2021/April

TABLE A4.1 LIST OF COUNTRIES BY COMBINATION OF DRIVERS

A. Countries affected by no driver (N=29)	B. Countries affected by conflict (N=5)	C. Countries affected by climate extremes (N=34)	D. Countries affected by economic downturns (N=6)
Low-income	Low-income	Low-income	Lower-middle-income
Burkina Faso	Liberia	Democratic People's Republic of Korea	Congo*
Sierra Leone	Mali	Malawi*	Kiribati
Togo*	Lower-middle-income	Mozambique*	Vanuatu
Lower-middle-income	Algeria	Lower-middle-income	Upper-middle-income
Benin*	Cameroon*	Bangladesh	Dominica
Bolivia (Plurinational State of)*	Upper-middle-income	Cambodia	Ecuador*
Cabo Verde*	Iraq	El Salvador	Jordan
Comoros*		Ghana*	
Djibouti*		Kenya*	
Eswatini*		Kyrgyzstan	
Honduras*		Lao People's Democratic Republic	
Papua New Guinea		Mauritania	
Sao Tome and Principe*		Mongolia	
Solomon Islands		Morocco*	
Timor-Leste		Nicaragua*	
Tunisia		Senegal*	
Upper-middle-income		United Republic of Tanzania*	
Azerbaijan		Viet Nam	
Belarus		Upper-middle-income	
Bosnia and Herzegovina		Albania	
Bulgaria*		Argentina	
Fiji		Armenia	
Gabon		Botswana*	
Guyana		Brazil*	
Kazakhstan		China	
Malaysia*		Costa Rica*	
Namibia*		Cuba	
North Macedonia		Dominican Republic*	
Samoa*		Guatemala*	
St. Vincent and the Grenadines		Jamaica	
Suriname		Mexico*	
		Montenegro*	
		Paraguay*	
		Peru*	
		Serbia	
		Turkmenistan	

TABLE A4.1 (CONTINUED)

E. Countries affected by conflict and climate extremes (N=18)	F. Countries affected by conflict and economic downturns (N=4)	G. Countries affected by climate extremes and economic downturns (N=9)	H. Countries affected by conflict, climate extremes and economic downturns (N=5)
Low-income	Low-income	Low-income	Low-income
Chad*	Sudan	Gambia	Afghanistan
Ethiopia	Lower-middle-income	Haiti*	Central African Republic
Rwanda*	Angola*	Madagascar*	Democratic Republic of the Congo*
Somalia	Côte d'Ivoire*	Lower-middle-income	Yemen
Lower-middle-income	Nepal	Lesotho*	Lower-middle-income
Egypt		Upper-middle-income	Nigeria
India		Belize	
Myanmar		Iran (Islamic Republic of)*	
Pakistan		Lebanon	
Philippines*		South Africa*	
Sri Lanka*		Venezuela (Bolivarian Republic of)	
Ukraine			
Uzbekistan			
Upper-middle-income			
Colombia*			
Georgia			
Indonesia			
Russian Federation			
Thailand			
Turkey*			

NOTES: The table shows the list of 110 low- and middle-income countries with information on PoU that are affected by different combinations of drivers (conflict, climate extremes and economic downturns). Countries highlighted in yellow denote low-income food-deficit countries (LIFDCs), while the asterisk denotes countries with high income inequality.
SOURCES: World Bank. 2021. World Development Indicators. In: *World Bank* [online]. Washington, DC. [Cited 24 April 2020]. datatopics.worldbank.org/world-development-indicators for poverty and Gini index data; see sources of Figure A4.1 for drivers (conflict, climate extremes, economic downturns).

ANNEX 5
COUNTRY GROUP DEFINITIONS FOR THE ANALYSIS OF FOOD INSECURITY AND DRIVERS IN 2020

Given the exceptional situation related to the COVID-19 pandemic in 2020, Chapter 3 presents a separate analysis of the drivers of food insecurity in 2019–2020 along with more specific definitions.

A. Countries with a high increase in food insecurity from 2019 to 2020

Defined as low- and middle-income countries that report an increase in the prevalence of undernourishment from 2019 to 2020 that is higher than the increase experienced in the two previous years, from 2017 to 2019. Of the 107 countries with information available on PoU in 2019–2020, 66 countries report a higher increase in PoU in 2019–2020 compared to 2017–2019 (Figure 19).

B. Countries affected by economic downturns

Defined as low- and middle-income countries that report a negative GDP per capita growth in year 2020.

Data sources: IMF World Economic Outlook (WEO) time series (April 2021)[327] on per capita annual GDP.

C. Countries affected by conflict

Refers to low- and middle-income countries and territories that meet one of two criteria:

1. Countries affected by conflict for at least one subperiod of five consecutive years and having suffered 500 or more battle deaths during that subperiod. We consider the two most recent periods of five year to define countries affected by conflict in 2020: 2010–2014 and 2015–2019.
2. Countries in a food crisis situation where conflict is the main driver of acute food insecurity. There are 23 countries and territories with conflict/insecurity as the main driver in 2020: Afghanistan, Bangladesh, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Egypt (Syrian refugees), Iraq, Jordan (Syrian refugees), Lebanon (Syrian refugees), Libya, Mali, Niger, Nigeria, Pakistan, Palestine, South Sudan, Syrian Arab Republic, Turkey (Syrian refugees), Uganda, Ukraine, Yemen.

In Figure 19, countries affected by conflict are identified using one of the two criteria; in Figure 24, they are identified using only the second criterion.

Data sources: The Uppsala Conflict Data Program (UCDP) dataset[305] on the number of violent conflicts. *Global Report on Food Crises* (2021)[75] for the countries where conflict is the main driver of food insecurity.

D. Countries affected by climate extremes or climate-related disasters

Refers to low- and middle-income countries and territories that meet one of two criteria:

1. Countries exposed to at least one typology of climate extremes (drought, flood, heat spell) in year 2020.
2. Countries that experience any of the following climate-related disasters in 2020: extreme temperatures, floods and storms, based on the EM-DAT datasets of medium- and large-scale disasters. Exposure to climate-related disasters is defined when in a given country/year one of the three disasters has produced at least one of the following effects: i) deaths of ten or more people; ii) 100 or more people affected/

injured/homeless; iii) declaration by the country of a state of emergency or an appeal for international assistance.

Data source: For year 2020, drought information is based on the Anomaly Hotspots of Agriculture Production (ASAP);[324] flood information is based on the Climate Hazards Group Infrared Precipitation with Stations (CHIRPS);[325] heat spell information is based on the European Centre for Medium-Range Weather Forecasts (ECMWF)[323] (ERA5). Information on climate-related disasters (extreme temperatures, floods and storms) is based on the Centre for Research on the Epidemiology of Disasters (EM-DAT).[326]

Methodology: Information on countries affected by climate extremes has been updated from *The State of Food Security and Nutrition in the World 2018*[3] (see **Annex 2** for definition of exposure and vulnerability to climate extremes) to cover most recent years. See Holleman *et al.* (2020).[4]

E. Definition of countries affected by multiple drivers in 2020

Due to the extraordinary nature of the economic recession related to the COVID-19 pandemic, there were economic downturns in most of the countries in the world in 2020. Of the 107 countries with available information on PoU and GDP per capita growth in 2019 and 2020, 66 countries experienced an increase in PoU from 2019 to 2020 that was higher than the PoU increase from 2017 to 2019. Of these, 60 are affected by one or more combination of drivers, including more severe forms of climate extremes (climate-related disasters) and conflict (food crisis countries where conflict is the main driver of acute food insecurity). Figure 19 presents a breakdown of countries affected by different combinations of drivers. Of the 66 countries, 8 country groups are affected by different combinations of drivers, and one group is not affected by drivers. These are:

1. Economic downturns (11)
2. Economic downturns and climate-related disasters (19)
3. Economic downturns, conflict (food crisis) and climate-related disasters (5)
4. Economic downturns, conflict and climate-related disasters (5)
5. Economic downturns and conflict (food crisis) (2)
6. Economic downturns and climate extremes (15)
7. Economic downturns, conflict (food crisis) and climate extremes (2)
8. Economic downturns, conflict and climate extremes (1)
9. No economic downturns (6)

Countries affected by economic downturns combined with more extreme forms of climate extremes (climate-related disasters) and/or conflict (food crisis) show the highest increases in PoU between 2019 and 2020. Of the 107 countries, there were 49 countries that meet this criteria in 2020. Figure 24 presents increases in PoU between 2019 and 2020 for five country groups:

1. Economic downturns (49)
2. Economic downturns and conflict (food crisis) (7)
3. Economic downturns and climate-related disasters (35)
4. All three drivers - economic downturns, climate-related disasters and conflict (food crisis) (7)
5. Countries without economic downturns (9). ■

ANNEX 6
GLOSSARY

Acute food insecurity
Food insecurity found in a specified area at a specific point in time and of a severity that threatens lives or livelihoods, or both, regardless of the causes, context or duration. Has relevance in providing strategic guidance to actions that focus on short-term objectives to prevent, mitigate or decrease severe food insecurity.[308]

Affordability
Affordability refers to the ability of people to buy foods in their local environment. In this report, cost refers to what people have to pay to secure a healthy diet, while affordability refers to the cost relative to a person's income, minus other required expenses.

Animal source foods
All types of meat, poultry, fish, eggs, milk, cheese and yoghurt, and other dairy products.

Chronic food insecurity
Food insecurity that persists over time mainly due to structural causes. Can include seasonal food insecurity found in periods with non-exceptional conditions. Has relevance in providing strategic guidance to actions that focus on the medium- and long-term improvement of the quality and quantity of food consumption for an active and healthy life.[308]

Climate
Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years.[309]

Climate change
Climate change refers to a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.[309]

Climate extreme (extreme weather or climate event)
The occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. For simplicity, both extreme weather events and extreme climate events are referred to collectively as "climate extremes".[310]

Climate resilience
An approach to building and/or strengthening resilience (see resilience definition below) that addresses current or expected climate variability and changing average climate conditions.

Climate shocks
Climate shocks include not only those disturbances in the usual pattern of rainfall and temperatures but also complex events like droughts and floods. Equivalent to the concept of a natural hazard or stress, they are exogenous events that can have a negative impact on food and nutrition security, depending on the vulnerability of an individual, a household, a community, or systems to the shock.[311,312,313,314]

Climate variability
Refers to variations in the mean state and other statistics (standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).[309]

Conflict
Conflict as used in this report is defined as struggles between interdependent groups that have either actual or perceived incompatibilities with respect to needs, values, goals, resources or intentions. This definition includes (but is broader than) armed conflict – that is, organized collective violent confrontations between at least two groups, either state or non-state actors. This report focuses on conflicts that threaten or entail violence or destruction, including where fragility raises the risk of damaging conflicts and where protracted crises persist.

Diet quality
Comprised of four key aspects: variety and/or diversity (within and across food groups),

adequacy (sufficiency of nutrients or food groups compared to requirements), moderation (foods and nutrients that should be consumed with restraint) and overall balance (composition of macronutrient intake). Exposure to food safety hazards is another important quality aspect.

Dietary energy requirements
The amount of dietary energy required by an individual to maintain body functions, health and normal activity. Dietary energy requirements are dependent upon age, sex, body size and level of physical activity. Additional energy is required to support optimal growth and development in children and in women during pregnancy, and for milk production during lactation, consistent with the good health of mother and child.

Drought
A period of abnormally dry weather lasting long enough to cause a serious hydrological imbalance.[309]

Early warning system (EWS)
The set of capacities needed to generate and disseminate timely and meaningful warning information so that individuals, communities and organizations threatened by a hazard can prepare prompt and appropriate action to reduce the possibility of harm or loss.[309,310,315]

Economic downturn
Refers to a period of decline in economic activity or negative growth as measured by the growth rate in real GDP. It is a synonym for economic recession, a temporary or short-term downturn in economic growth, usually occurring over at least two consecutive quarters of decline. In the analyses and figures presented in this report, an economic downturn is identified using the year as a period of reference.

Economic shock
An unexpected or unpredictable event that is external to the specific economy and can either harm or boost it. A global financial crisis causing bank lending or credit to fall, or an economic downturn in a major trading partner of a country reflect demand-side shocks that can have multiple effects on spending and investment. A steep rise in oil and gas prices, natural disasters that result in sharp falls in production, or conflict that disrupts trade and production, are examples of supply-side shocks.

Economic slowdown
Refers to economic activity that is growing at a slower pace compared with the previous period. An economic slowdown occurs when real GDP growth declines from one period of time to another but it is still positive. In the analyses and figures presented in this report, an economic slowdown is identified using the year as the period of reference, although it is usually measured in quarters of a year.

Energy-dense foods
Food with a high content of calories (energy) with respect to its mass or volume.

Exposure
The presence of people; livelihoods; species or ecosystems; environmental functions, services and resources; infrastructure; or economic, social or cultural assets in places and settings that could be adversely affected.[309]

Extreme poverty
Refers to the percentage of the population living on less than USD 1.90 a day (2011 PPP prices) in a country in a given year.

Extreme weather or climate event
The occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. Many weather and climate extremes are the result of natural **climate variability**, and natural decadal or multi-decadal variations in the climate provide the backdrop for anthropogenic **climate changes**. Even if there were no anthropogenic changes in climate, a wide variety of natural weather and climate extremes would still occur.

Flood
The overflowing of the normal confines of a stream or other body of water, or the accumulation of water over areas not normally submerged. Floods include river (fluvial) floods, flash floods, urban floods, pluvial floods, sewer floods, coastal floods and glacial lake outburst floods.[309]

Food Insecurity Experience Scale (FIES)
An experience-based food security scale used to produce a measure of access to food at different levels of severity that can be compared across contexts. It relies on data obtained by asking people, directly in surveys, about the occurrence of conditions and behaviours that are known to reflect constrained access to food.

Food security
A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Based on this definition, four food security dimensions can be identified: food availability, economic and physical access to food, food utilization and stability over time. The concept of food security is evolving to recognize the centrality of agency and sustainability. See below for the definition of these two additional elements.

Food security dimensions
In this report, food security dimensions refer to the four traditional dimensions of food security:

a. Availability – This dimension addresses whether or not food is actually or potentially physically present, including aspects of production, food reserves, markets and transportation, and wild foods.
b. Access – If food is actually or potentially physically present, the next question is whether or not households and individuals have sufficient physical and economic access to that food.
c. Utilization – If food is available and households have adequate access to it, the next question is whether or not households are maximizing the consumption of adequate nutrition and energy. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, dietary diversity and intra-household distribution of food, clean water, sanitation and healthcare. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.
d. Stability – If the dimensions of availability, access and utilization are sufficiently met, stability is the condition in which the whole system is stable, thus ensuring that households are food secure at all times. Stability issues can refer to short-term instability (which can lead to acute food insecurity) or medium- to long-term instability (which can lead to chronic food insecurity). Climatic, economic, social and political factors can all be a source of instability.

The report also refers to two additional dimensions of food security that are proposed by the High Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS); however, they are not formally agreed upon by FAO or others, and there is not a negotiated agreed language. However, due to their relevance in the context of this report, they are included here. These two additional dimensions of food security are reinforced in conceptual and legal understandings of the right to food, and are currently referred to and defined as follows:

e. Agency refers to the capacity of individuals or groups to make their own decisions about what foods they eat; what foods they produce; how that food is produced, processed and distributed within food systems; and their ability to engage in processes that shape food system policies and governance.[58]
f. Sustainability refers to the long-term ability of food systems to provide food security and nutrition in a way that does not compromise the economic, social and environmental bases that generate food security and nutrition for future generations.[58]

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

Fragility
Fragility is defined as the combination of exposure to risk and insufficient coping capacities of the state, system and/or communities to manage, absorb or mitigate those risks. The new OECD fragility framework is built on five dimensions of fragility – economic, environmental, political, societal and security – and measures each through the accumulation and combination of risks and capacity. See OECD (2016).[89]

Hazard
A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.[316] Natural hazard is synonymous with "climate shock" in this report.

Healthcare
The organized provision of medical care to individuals or a community. This includes services provided to individuals or communities by health service providers for the purpose of promoting, maintaining, monitoring or restoring health.

Healthy diet
A balanced, diverse and appropriate selection of foods eaten over a period of time. A healthy diet protects against malnutrition in all its forms as well as NCDs, and ensures that the needs for macronutrients (proteins, fats and carbohydrates including dietary fibres) and essential micronutrients (vitamins, minerals and trace elements) are met specific to a person's gender, age, physical activity level and physiological state. For diets to be healthy: 1) daily needs of energy and micronutrients should be met, but energy intake should not exceed needs; 2) consumption of fruits and vegetables should be at least 400 g per day; 3) intake of fats should be no more than 30 percent of total energy intake, with a shift in fat consumption away from saturated fats to unsaturated fats and the elimination of industrial trans fats; 4) intake of free sugars should be less than 10 percent of total energy intake or, preferably, no more than 5 percent; 5) intake of salt should be less than 5 g per day. A healthy diet for infants and young children is similar to that for adults, but the following elements are also important: 1) infants should be breastfed exclusively during the first 6 months of life; 2) infants should be breastfed continuously until 2 years of age and beyond; 3) from 6 months of age, breastmilk should be complemented with a variety of adequate, safe and nutrient-dense foods. Salt and sugars should not be added to complementary foods.

Heat spell
A period of abnormally and uncomfortably hot weather.[309]

Hidden costs
In this report, "hidden costs" of diets relate to costs to human health and/or to the environment associated with food production and consumption that are not accounted for in food prices and the cost of a diet. In the case of human health, these hidden costs are usually "paid for" by the people who must live with the consequences of eating foods that harm human health, such as energy-dense foods high in fats, sugars and/or salt that could lead to coronary heart disease and/or diabetes. These hidden costs also include costs to health systems in treating non-communicable diseases as a result of poor eating habits. In the case of the environment, these hidden costs affect the world as a whole and relate to the environmental impacts associated with food production and consumption. These environmental impacts relate to land, energy and water use of food production and consumption, as well as impacts related to climate change in terms of greenhouse gas (GHG) emissions and loss of food biodiversity. See FAO, IFAD, UNICEF, WFP and WHO (2020).[7]

Hunger
Hunger is an uncomfortable or painful physical sensation caused by insufficient consumption of dietary energy. In this report, the term hunger is synonymous with chronic undernourishment and is measured by the prevalence of undernourishment (PoU).

Macronutrients
Macronutrients are needed in larger quantities (in gram range) and are the major source of energy and bulk (volume) in our diets. They include carbohydrates, protein and fats. They are a main source of dietary energy, which is measured in

calories. Getting sufficient energy is essential for everyone in order to maintain body growth, development and good health. Carbohydrates, protein and fats, in addition to providing energy, each have very specific functions in the body and must be supplied in sufficient amounts to carry out those functions.

Malnutrition
An abnormal physiological condition caused by inadequate, unbalanced or excessive intake of macronutrients and/or micronutrients. Malnutrition includes undernutrition (child stunting and wasting, and vitamin and mineral deficiencies) as well as overweight and obesity.

Micronutrients
Micronutrients include vitamins and minerals and are required in very small (micro) but specific amounts. Vitamins and minerals in foods are necessary for the body to grow, develop and function properly, and are essential for our health and well-being. Our bodies require a number of different vitamins and minerals, each of which has a specific function in the body and must be supplied in different, sufficient amounts.

Moderate food insecurity
Refers to the level of severity of food insecurity, based on the Food Insecurity Experience Scale, at which people face uncertainties about their ability to obtain food and have been forced to reduce, at times during the year, the quality and/or quantity of food they consume due to lack of money or other resources. It thus refers to a lack of consistent access to food, which diminishes dietary quality, disrupts normal eating patterns, and can have negative consequences for nutrition, health and well-being.

Nutrition transition
As incomes rise and populations become more urban, diets high in complex carbohydrates and fibre give way to more energy-dense diets high in fats, sugars and/or salt. These global dietary trends are accompanied by a demographic transition with a shift towards increased life expectancy and reduced fertility rates. At the same time, disease patterns move away from infectious and nutrient-deficiency diseases towards higher rates of childhood obesity, coronary heart disease and some types of cancer.

Nutritional status
The physiological state of an individual that results from the relationship between nutrient intake and requirements and the body's ability to digest, absorb and use these nutrients.

Nutritious foods
Refers to those foods that tend to be high in essential nutrients such as micronutrients, as well as proteins, unrefined fibre-rich carbohydrates and/or unsaturated fats. They are low in sodium, free sugars, saturated fats and trans fats.

Overweight and obesity
Defined as body weight that is above normal for height as a result of an excessive accumulation of fat. It is usually a manifestation of expending less energy than is consumed. In adults, overweight is defined as a BMI of 25 kg/m^2 or more, and obesity as a BMI of 30 kg/m^2 or more. In children under five years of age, overweight is defined as weight-for-height greater than 2 standard deviations above the WHO Child Growth Standards median, and obesity as weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards median.

Prevalence of undernourishment
An estimate of the proportion of the population that lacks enough dietary energy for a healthy, active life. It is FAO's traditional indicator used to monitor hunger at the global and regional level, as well as SDG Indicator 2.1.1.

Resilience
Resilience is the ability of individuals, households, communities, cities, institutions, systems and societies to prevent, resist, absorb, adapt, respond and recover positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning and without compromising long-term prospects for sustainable development, peace and security, human rights and well-being for all.[317]

Risk
The probability or likelihood of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk to food insecurity is the probability of food insecurity resulting from interactions between a

natural or human-induced hazard/shock/stress and vulnerable conditions.

Severe food insecurity
The level of severity of food insecurity at which people have likely run out of food, experienced hunger and, at the most extreme, gone for days without eating, putting their health and well-being at grave risk, based on the Food Insecurity Experience Scale.

Staple food
A staple food is one that is eaten regularly, and in such quantities as to constitute the dominant part of the diet and supply a major proportion of total dietary energy.

Stunting
Low height-for-age, reflecting a past episode or episodes of sustained undernutrition. In children under five years of age, stunting is defined as height-for-age less than -2 standard deviations below the WHO Child Growth Standards median.

Undernourishment
Undernourishment is defined as the condition in which an individual's habitual food consumption is insufficient to provide the amount of dietary energy required to maintain a normal, active, healthy life. For the purposes of this report, hunger is defined as being synonymous with chronic undernourishment.

Undernutrition
The outcome of poor nutritional intake in terms of quantity and/or quality, and/or poor absorption and/or poor biological use of nutrients consumed as a result of repeated instances of disease. It includes being underweight for one's age, too short for one's age (stunted), dangerously thin for one's height (suffering from wasting) and deficient in vitamins and minerals (micronutrient deficiency).

Vulnerability
Refers to the conditions determined by physical, social, economic and environmental factors or processes that increase the susceptibility of an individual, community, assets or systems to the impacts of hazards.[316] Vulnerability to food insecurity is the range of conditions that increases the susceptibility of a household to the impact on food security in case of a shock or hazard.

Wasting
Low weight-for-height, generally the result of weight loss associated with a recent period of inadequate dietary energy intake and/or disease. In children under five years of age, wasting is defined as weight-for-height less than -2 standard deviations below the WHO Child Growth Standards median.

Weather
Weather describes conditions of the atmosphere over a short period of time (minutes to days), whereas climate is how the atmosphere behaves over relatively longer periods of time (the long-term average of weather over time). The difference between weather and climate is a measure of time (see above definitions for climate, climate change, climate variability and climate extremes).[318] ■

NOTES

1 Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP) & World Health Organization (WHO). 2017. *The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security*. Rome, FAO. (also available at www.fao.org/3/a-I7695e.pdf).

2 Holleman, C., Jackson, J., Sánchez, M. V & Vos, R. 2017. *Sowing the seeds of peace for food security – Disentangling the nexus between conflict, food security and peace*. Rome, FAO. (also available at www.fao.org/3/a-i7821e.pdf).

3 FAO, IFAD, UNICEF, WFP & WHO. 2018. *The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition*. Rome, FAO. (also available at www.fao.org/3/I9553EN/i9553en.pdf).

4 Holleman, C., Rembold, F., Crespo, O. & Conti, V. 2020. *The impact of climate variability and extremes on agriculture and food security - An analysis of the evidence and case studies*. Background paper for The State of Food Security and Nutrition in the World 2018. Rome, FAO. (also available at https://doi.org/10.4060/cb2415en).

5 FAO, IFAD, UNICEF, WFP & WHO. 2019. *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Rome, FAO. (also available at www.fao.org/3/ca5162en/ca5162en.pdf).

6 Holleman, C. & Conti, V. 2019. *Role of income inequality in shaping outcomes on individual food insecurity. Background paper for The State of Food Security and Nutrition in the World 2019*. Rome, FAO. (also available at https://doi.org/10.4060/cb2036en).

7 FAO, IFAD, UNICEF, WFP & WHO. 2020. *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO. (also available at https://doi.org/10.4060/ca9692en).

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

9 Springmann, M. 2020. *Valuation of the health and climate-change benefits of healthy diets. Background paper for The State of Food Security and Nutrition in the World 2020*. FAO Agricultural Development Economics Working Paper 20-03. Rome, FAO. (also available at https://doi.org/10.4060/cb1699en).

10 Lakner, C., Yonzan, N., Gerszon Mahler, D., Castaneda Aguilar, R.A. & Wu, H. 2021. Updated estimates of the impact of COVID-19 on global poverty: looking back at 2020 and the outlook for 2021. In: *World Bank Blogs* [online]. Washington, DC. [Cited 6 May 2021]. https://blogs.worldbank.org/opendata/updated-estimates-impact-covid-19-global-poverty-looking-back-2020-and-outlook-2021

11 Purnamasari, R. & Ali, R. 2020. *High-frequency monitoring of household: Summary of Results from Survey Round 1, 1–7 May 2020*. Indonesia COVID-19 Observatory Brief No. 3. Washington, DC, World Bank. (also available at https://openknowledge.worldbank.org/handle/10986/34740).

12 Egger, D., Miguel, E., Warren, S.S., Shenoy, A., Collins, E., Karlan, D., Parkerson, D., Mobarak, A.M., Fink, G., Udry, C., Walker, M., Haushofer, J., Larreboure, M., Athey, S., Lopez-Pena, P., Benhachmi, S., Humphreys, M., Lowe, L., Meriggi, N.F., Wabwire, A., Davis, C.A., Pape, U.J., Graff, T., Voors, M., Nekesa, C. & Vernot, C. 2021. Falling living standards during the COVID-19 crisis: Quantitative evidence from nine developing countries. *Science Advances*, 7(6): eabe0997.

13 Gentilini, U., Almenfi, M., Blomquist, J., Dale, P., De la Flor Giuffra, L., Desai, V., Fontenez, M.B., Galicia, G., Lopez, V., Marin, G., Mujica, I.V., Natarajan, H., Newhouse, D., Palacios, R., Quiroz, A.P., Rodriguez Alas, C., Sabharwal, G. & Weber, M. 2021. *Social Protection and Jobs Responses to COVID-19: A Real-Time Review of Country Measures*. "Living Paper" Version 15 (May 14, 2021). Washington, DC.

14 Oxfam. 2020. *Shelter from the storm: The global need for universal social protection in times of COVID-19*. Oxford, UK, Oxfam.

15 FAO. 2021. World Food Situation. In: *FAO* [online]. Rome. [Cited 25 May 2021]. www.fao.org/worldfoodsituation/en

16 FAO & WFP. 2020. *FAO-WFP early warning analysis of acute food insecurity hotspots. October 2020*. Rome. (also available at https://doi.org/10.4060/cb1907en).

17 Boero, V., Cafiero, C., Gheri, F., Kepple, A.W., Rosero Moncayo, J., Viviani, S. 2021. *Access to food in 2020. Results of twenty national surveys using the food insecurity experience scale (FIES).* Rome. https://doi.org/10.4060/cb5623en.

18 FAO. 2018. Voices of the Hungry. In: *Food and Agriculture Organization of the United Nations* [online]. Rome. [Cited 28 April 2020]. www.fao.org/in-action/voices-of-the-hungry

19 FAO. 2020. *Using the Food Insecurity Experience Scale (FIES) to monitor the impact of COVID-19*. Rome. (also available at https://doi.org/10.4060/ca9205en).

20 FAO. 2020. *Gendered impacts of COVID-19 and equitable policy responses in agriculture, food security and nutrition*. Rome, FAO. (also available at https://doi.org/10.4060/ca9198en).

21 WHO. 2020. Global Health Observatory (GHO) data - NCD mortality and morbidity. In: *WHO* [online]. [Cited 20 May 2020]. www.who.int/gho/ncd/mortality_morbidity

22 WHO. 2018. *Healthy diet factsheet*. Geneva, Switzerland. (also available at www.who.int/who-documents-detail/healthy-diet-factsheet394).

23 FAO & WHO. 2019. *Sustainable healthy diets: guiding principles*. Rome, FAO.

24 Laborde, D., Herforth, A., Headey, D. & de Pee, S. forthcoming. *COVID-19 pandemic leads to greater depth of unaffordability of healthy and nutrient adequate diets in low- and middle-income countries.*

25 Laborde, D., Martin, W. & Vos, R. 2021. Impacts of COVID-19 on global poverty, food security, and diets: Insights from global model scenario analysis. *Agricultural Economics*, 52: 375–390.

26 WHO & UNICEF. 2017. *The extension of the 2025 Maternal, Infant and Young Child nutrition targets to 2030*. Geneva, Switzerland and New York, USA, WHO and UNICEF. (also available at www.who.int/nutrition/global-target-2025/discussion-paper-extension-targets-2030.pdf).

27 United Nations (UN). 2019. *Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators*. Statistical Commission Fifty-first session 3–6 March 2020. New York, USA. (also available at https://unstats.un.org/unsd/statcom/51st-session/documents/2020-2-SDG-IAEG-E.pdf).

28 WHO. 2013. *Global action plan for the prevention and control of noncommunicable diseases 2013-2020*. Geneva, Switzerland.

29 UNICEF & WHO. 2019. *UNICEF-WHO Low birthweight estimates: Levels and trends 2000–2015*. New global, regional and national estimates of low birthweight. Geneva, Switzerland, WHO. (also available at www.unicef.org/reports/UNICEF-WHO-low-birthweight-estimates-2019).

30 Christian, P., Lee, S.E., Angel, M.D., Adair, L.S., Arifeen, S.E., Ashorn, P., Barros, F.C., Fall, C.H.D., Fawzi, W.W., Hao, W., Hu, G., Humphrey, J.H., Huybregts, L., Joglekar, C. V., Kariuki, S.K., Kolsteren, P., Krishnaveni, G. V., Liu, E., Martorell, R., Osrin, D., Persson, L.A., Ramakrishnan, U., Richter, L., Roberfroid, D., Sania, A., Kuile, F.O.T., Tielsch, J., Victora, C.G., Yajnik, C.S., Yan, H., Zeng, L. & Black, R.E. 2013. Risk of childhood undernutrition related to small-for-gestational age and preterm birth in low- and middle-income countries. *International Journal of Epidemiology*, 42(5): 1340–1355.

31 Jornayvaz, F.R., Vollenweider, P., Bochud, M., Mooser, V., Waeber, G. & Marques-Vidal, P. 2016. Low birth weight leads to obesity, diabetes and increased leptin levels in adults: The CoLaus study. *Cardiovascular Diabetology*, 15(73).

32 UNICEF, WHO & World Bank. 2021. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2021 edition)* [online]. https://data.unicef.org/resources/jme-report-2021, www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, https://datatopics.worldbank.org/child-malnutrition

33 Fore, H.H., Dongyu, Q., Beasley, D.M. & Ghebreyesus, T.A. 2020. Child malnutrition and COVID-19: the time to act is now. *The Lancet*, 396(10250): 517–518.

34 WHO. 2020. Healthy diet. In: *WHO* [online]. Geneva, Switzerland. [Cited 6 May 2021]. www.who.int/news-room/fact-sheets/detail/healthy-diet

35 WHO. 2019. *Commercial foods for infants and young children in the WHO European Region*. A study of the availability, composition and marketing of baby foods in four European countries. Copenhagen, WHO.

NOTES

36 WHO. 2021. WHO Global Anaemia estimates, 2021 Edition. In: *The Global Health Observatory | Anaemia in women and children* [online]. Geneva, Switzerland. [Cited 26 May 2021]. www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children

37 UN. 2020. *Policy Brief: The Impact of COVID-19 on Food Security and Nutrition*. New York, USA. (also available at www.un.org/sites/un2.un.org/files/sg_policy_brief_on_covid_impact_on_food_security.pdf).

38 WFP & World Bank. 2020. YEMEN mVAM Bulletin no.52 (Mar - Apr 2020). In: *WFP* [online]. Rome. [Cited 6 May 2021]. dataviz.vam.wfp.org/yemen-mvam-bulletin-52-apr-2020

39 International Food Policy Research Institute (IFPRI). 2021. *2021 Global food policy report: Transforming food systems after COVID-19*. Washington, DC. (also available at https://ebrary.ifpri.org/digital/collection/p15738coll2/id/134343).

40 UNICEF. 2020. *Impactos primários e secundários da COVID-19 em crianças e adolescentes. Relatório de análise - 1a Onda*. Brasília.

41 León, K. & Arguello, J.P. 2021. Effects of the COVID-19 pandemic on adolescent and youth nutrition and physical activity. In: *UNICEF* [online]. New York, USA. [Cited 26 May 2021]. www.unicef.org/lac/en/effects-of-covid-19-pandemic-on-adolescent-and-youth-nutrition-and-physical-activity

42 UNICEF. 2021. Tracking the situation of children during COVID-19. In: *UNICEF* [online]. New York, USA. [Cited 6 May 2021]. data.unicef.org/resources/rapid-situation-tracking-covid-19-socioeconomic-impacts-data-viz

43 WHO. 2020. At least 80 million children under one at risk of diseases such as diphtheria, measles and polio as COVID-19 disrupts routine vaccination efforts, warn Gavi, WHO and UNICEF. In: *WHO* [online]. Geneva, Switzerland. [Cited 26 May 2021]. www.who.int/news/item/22-05-2020-at-least-80-million-children-under-one-at-risk-of-diseases-such-as-diphtheria-measles-and-polio-as-covid-19-disrupts-routine-vaccination-efforts-warn-gavi-who-and-unicef

44 Olofin, I., McDonald, C.M., Ezzati, M., Flaxman, S., Black, R.E., Fawzi, W.W., Caulfield, L.E., Danaei, G., Adair, L., Arifeen, S., Bhandari, N., Garenne, M., Kirkwood, B., Mølbak, K., Katz, J., Sommer, A., West, K.P. & Penny, M.E. 2013. Associations of suboptimal growth with all-cause and cause-specific mortality in children under five years: a pooled analysis of ten prospective studies. *PLoS ONE*, 8(5).

45 WHO. 2020. *The impact of the COVID-19 pandemic on noncommunicable disease resources and services: results of a rapid assessment*. Geneva, Switzerland.

46 WHO. 2021. *Second round of the national pulse survey on continuity of essential health services during the COVID-19 pandemic.* Geneva, Switzerland.

47 Osendarp, S., Akuoku, J., Black, R., Headey, D., Ruel, M., Scott, N., Shekar, M., Walker, N., Flory, A., Haddad, L., Laborde, D., Stegmuller, A., Thomas, M., Heidkamp, R. (on behalf of the Standing Together for Nutrition Consortium). 2021. The COVID-19 crisis is expected to have dramatic indirect effects on maternal and child undernutrition in low and middle income countries. *Nature Food (in press)*.

48 WHO. 2020. Obesity significantly increases chances of severe outcomes for COVID-19 patients. In: *WHO* [online]. Geneva, Switzerland. [Cited 26 May 2021]. www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/10/obesity-significantly-increases-chances-of-severe-outcomes-for-covid-19-patients

49 WHO. 2017. *The double burden of malnutrition*. Geneva, Switzerland. (also available at http://apps.who.int/iris/bitstream/handle/10665/255413/WHO-NMH-NHD-17.3-eng.pdf?ua=1).

50 Hawkes, C., Ruel, M.T., Salm, L., Sinclair, B. & Branca, F. 2020. Double-duty actions: seizing programme and policy opportunities to address malnutrition in all its forms. *The Lancet*, 395(10218): 142–155.

51 Wells, J.C., Sawaya, A.L., Wibaek, R., Mwangome, M., Poullas, M.S., Yajnik, C.S. & Demaio, A. 2020. The double burden of malnutrition: aetiological pathways and consequences for health. *The Lancet*, 395(10217): 75–88.

52 WHO. 2017. *Double-duty actions for nutrition: policy brief*. Geneva, Switzerland.

53 FAO & WHO. 2017. United Nations Decade of Action on Nutrition 2016–2025: work programme. Rome and Geneva, Switzerland. (also available at www.un.org/nutrition/sites/www.un.org.nutrition/files/general/pdf/work_programme_nutrition_decade.pdf).

54 FAO & WHO. 2020. United Nations Decade of Action on Nutrition 2016–2025: Mid-term Review Foresight paper. Rome and Geneva, Switzerland. (also available at www.un.org/nutrition/sites/www.un.org.nutrition/files/general/pdf/nutrition_decade_mtr_background_paper_en.pdf).

55 IFPRI. 2011. The MIRAGRODEP Model. In: *IFPRI* [online]. Washington, DC. [Cited 26 May 2021]. www.ifpri.org/publication/miragrodep-model

56 Cuesta, J., Godwin, M., Shusterman, J. & Chavez, C. 2018. *The Long-term Effect of Humanitarian Emergencies on Adolescents: Existing evidence, gaps and considerations for research and practitioners*. Innocenti Discussion Papers no. 2018-03, UNICEF Office of Research - Innocenti. Florence, Italy, UNICEF.

57 Parsons, K. & Hawkes, C. 2018. *Connecting food systems for co-benefits: how can food systems combine diet-related health with environmental and economic policy goals?* Copenhagen, WHO. (also available at www.euro.who.int/en/about-us/partners).

58 High Level Panel of Experts on Food Security and Nutrition (HLPE). 2020. *Food security and nutrition: building a global narrative towards 2030.* Rome. (also available at www.fao.org/3/ca9731en/ca9731en.pdf).

59 Branca, F., Lartey, A., Oenema, S., Aguayo, V., Stordalen, G.A., Richardson, R., Arvelo, M. & Afshin, A. 2019. Transforming the food system to fight non-communicable diseases. *BMJ*, 364: l296.

60 Rockström, J., Edenhofer, O., Gaertner, J. & DeClerck, F. 2020. Planet-proofing the global food system. *Nature Food*, 1(1): 3–5.

61 Bodirsky, B.L., Dietrich, J.P., Martinelli, E., Stenstad, A., Pradhan, P., Gabrysch, S., Mishra, A., Weindl, I., Le Mouël, C., Rolinski, S., Baumstark, L., Wang, X., Waid, J.L., Lotze-Campen, H. & Popp, A. 2020. The ongoing nutrition transition thwarts long-term targets for food security, public health and environmental protection. *Scientific Reports*, 10(1): 19778.

62 Global Panel on Agriculture and Food Systems for Nutrition. 2020. *Future food systems: for people, our planet, and prosperity*. London.

63 EAT-Lancet Commission. 2019. *Food, planet, health: healthy diets from sustainable food systems. Summary report of the EAT-Lancet Commission*. London, The Lancet.

64 Baker, P., Santos, T., Neves, P.A., Machado, P., Smith, J., Piwoz, E., Barros, A.J.D., Victora, C.G. & McCoy, D. 2021. First-food systems transformations and the ultra-processing of infant and young child diets: The determinants, dynamics and consequences of the global rise in commercial milk formula consumption. *Maternal & Child Nutrition*, 17(2).

65 Von Braun, J., Afsana, K., Fresco, L., Hassan, M. & Torero, M. 2021. *Food Systems – Definition, Concept and Application for the UN Food Systems Summit*. A paper from the Scientific Group of the UN Food Systems Summit. New York, USA, UN. (also available at www.un.org/sites/un2.un.org/files/food_systems_concept_paper_scientific_group_-_draft_oct_26.pdf).

66 IPES-Food. 2017. *Unravelling the food–health nexus: addressing practices, political economy, and power relations to build healthier food systems*. The Global Alliance for the Future of Food and IPES-Food. (also available at www.ipes-food.org/_img/upload/files/Health_FullReport(1).pdf).

67 Kraak, V.I., Swinburn, B., Lawrence, M. & Harrison, P. 2014. An accountability framework to promote healthy food environments. *Public Health Nutrition*, 17(11): 2467–2483.

68 HLPE. 2017. *Nutrition and Food Systems*. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome. (also available at www.fao.org/3/a-i7846e.pdf).

NOTES

69 Herforth, A. 2016. *Impact Assessment of Policies to support Healthy Food Environments and Healthy Diets: Implementing the Framework for Action of the Second International Conference on Nutrition*. UNSCN Discussion Paper. Rome, UNSCN. (also available at www.unscn.org/en/resource-center/UNSCN-Publications?idnews=1279).

70 Ivanic, M. & Martin, W. 2018. Sectoral Productivity Growth and Poverty Reduction: National and Global Impacts. *World Development*, 109: 429–439.

71 Fuglie, K., Gautam, M., Goyal, A. & Maloney, W.F. 2020. *Harvesting Prosperity – Technology and Productivity Growth in Agriculture*. Washington, DC, World Bank.

72 FAO. 2015. *Designing nutrition-sensitive agriculture investments: Checklist and guidance for programme formulation*. Rome.

73 FAO. 2019. *The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction*. Rome. (also available at www.fao.org/3/ca6030en/ca6030en.pdf).

74 Azcona, G., Bhatt, A. & Kapto, S. 2020. The COVID-19 boomerang effect: New forecasts predict sharp increases in female poverty. In: *UN Women* [online]. New York, USA. [Cited 5 May 2021]. https://data.unwomen.org/features/covid-19-boomerang-effect-new-forecasts-predict-sharp-increases-female-poverty

75 Global Network Against Food Crisis & Food Security Information Network (FSIN). 2021. *Global Report on Food Crises 2021*. Rome. (also available at www.fsinplatform.org/sites/default/files/resources/files/GRFC 2021 050521 med.pdf).

76 FAO. 2020. *Migrant workers and the COVID-19 pandemic*. Rome. (also available at https://doi.org/10.4060/ca8559en).

77 World Bank. 2021. Defying Predictions, Remittance Flows Remain Strong During COVID-19 Crisis. In: *World Bank* [online]. Washington, DC. [Cited 1 June 2021]. www.worldbank.org/en/news/press-release/2021/05/12/defying-predictions-remittance-flows-remain-strong-during-covid-19-crisis

78 FAO. 2020. *Food Outlook – Biannual report on global food markets – November 2020*. Rome. (also available at https://doi.org/10.4060/cb1993en).

79 FAO. 2021. *COVID-19 and territorial markets: evidence from the United Republic of Tanzania*. Rome. (also available at https://doi.org/10.4060/cb4141en).

80 FAO. 2020. *Mitigating risks to food systems during COVID-19: reducing food loss and waste*. Rome. (also available at https://doi.org/10.4060/ca9056en).

81 FAO & WFP. 2021. *Hunger Hotspots. FAO-WFP early warnings on acute food insecurity: March to July 2021 outlook*. Rome.

82 Vos, R., Martin, W. & Laborde, D. 2020. How much will global poverty increase because of COVID-19? In: *IFPRI* [online]. Washington, DC. [Cited 5 May 2021]. www.ifpri.org/blog/how-much-will-global-poverty-increase-because-covid-19

83 GBD 2019 Risk Factors Collaborators. 2020. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 396(10258): 1223–1249.

84 FAO. 2020. Database. In: *Monitoring and Analysing Food and Agricultural Policies (MAFAP)* [online]. Rome. [Cited 1 June 2021]. www.fao.org/in-action/mafap/data

85 Pernechele, V., Balié, J. & Ghins, L. 2018. *Agricultural policy incentives in sub-Saharan Africa in the last decade (2005–2016) – Monitoring and Analysing Food and Agricultural Policies (MAFAP) synthesis study*. FAO Agricultural Development Economics Technical Study No. 3. Rome, FAO. (also available at www.fao.org/3/I8997EN/i8997en.pdf).

86 Independent Group of Scientists appointed by the Secretary-General. 2019. *Global Sustainable Development Report 2019: the future is now – science for achieving sustainable development*. New York, USA, UN. (also available at https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf).

87 United Nations High Commissioner for Refugees (UNHCR). 2020. *Global trends - Forced displacement in 2020*. Copenhagen. (also available at www.unhcr.org/60b638e37/unhcr-global-trends-2020).

88 UNHCR. 2021. Refugee Statistics. In: *UNHCR* [online]. [Cited 6 May 2021]. www.unhcr.org/refugee-statistics

89 OECD. 2016. *States of Fragility 2016: understanding violence*. States of Fragility. Paris. (also available at www.oecd-ilibrary.org/development/states-of-fragility-2016_9789264267213-en).

90 UN. 2018. *World Economic Situation and Prospects 2018*. New York, USA.

91 United Nations Conference on Trade and Development (UNCTAD) & FAO. 2017. *Commodities and Development Report 2017: commodity markets, economic growth and development*. New York, USA, UNCTAD.

92 International Federation of Red Cross and Red Crescent Societies (IFRC). 2020. *World Disasters Report 2020: come heat or high water - tackling the humanitarian impacts of the climate crisis together*. Geneva, Switzerland. (also available at https://media.ifrc.org/ifrc/wp-content/uploads/2020/11/20201116_WorldDisasters_Full.pdf).

93 Centre for Research on the Epidemiology of Disasters (CRED) & UN Office for Disaster Risk Reduction (UNDRR). 2020. *The human cost of disasters – an overview of the last 20 years (2000-2019)*. Brussels and Geneva. Switzerland, CRED and UNDRR.

94 Baker, P., Machado, P., Santos, T., Sievert, K., Backholer, K., Hadjikakou, M., Russell, C., Huse, O., Bell, C., Scrinis, G., Worsley, A., Friel, S. & Lawrence, M. 2020. Ultra-processed foods and the nutrition transition: global, regional and national trends, food systems transformations and political economy drivers. *Obesity Reviews*, 21(12).

95 See endnote 65.

96 HLPE. 2019. *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*. Rome.

97 FAO. forthcoming. *Country examples of best practices in addressing drivers of food insecurity and malnutrition towards the transformation of food systems*. Rome.

98 FAO. 2021. Call for best practices in transforming food systems for affordable healthy diets and addressing key drivers of food insecurity and malnutrition. In: *Global Forum on Food Security and Nutrition (FSN Forum)* [online]. Rome. [Cited 27 May 2021]. www.fao.org/fsnforum/activities/discussions/SOFI_transforming_food_systems

99 Development Initiatives. 2020. *2020 Global Nutrition Report: action on equity to end malnutrition*. Bristol, UK. (also available at https://globalnutritionreport.org/reports/2020-global-nutrition-report).

100 UNICEF. 2019. *The State of the World's Children 2019. Children, food and nutrition: growing well in a changing world*. New York, USA. (also available at www.unicef.org/media/63016/file/SOWC-2019.pdf).

101 Johns Hopkins University & The Global Alliance for Improved Nutrition. 2021. Food Systems Dashboard. In: *Food Systems Dashboard* [online]. Baltimore, USA and Geneva, Switzerland. [Cited 21 June 2021]. https://foodsystemsdashboard.org

102 Integrated Food Security Phase Classification (IPC). 2021. Home. In: *IPC* [online]. Rome. [Cited 21 June 2021]. www.ipcinfo.org/ipc-country-analysis

103 WFP. 2021. Fill the Nutrient Gap. In: *WFP* [online]. Rome. [Cited 21 June 2021]. www.wfp.org/fillthenutrientgap

104 WHO. 2021. World Health Statistics. In: *WHO* [online]. Geneva, Switzerland. [Cited 1 June 2021]. www.who.int/data/gho/publications/world-health-statistics

105 IPC. 2021. *IPC Acute Malnutrition Analysis, January 2020 – March 2021, Yemen*. Aden. (also available at www.ipcinfo.org/ipcinfo-website/alerts-archive/issue-34).

106 FAO. 2019. When growing vegetables is no longer safe. In: *FAO* [online]. Rome. [Cited 21 June 2021]. www.fao.org/fao-stories/article/en/c/1202553

107 FAO & Famine Early Warning Systems Network (FEWS Net). 2019. *More than 1.5 million people in Somalia still facing acute food security crisis or worse outcomes*. Mogadishu and Washington, DC, FAO and FEWS Net. (also available at www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/FSNAU-FEWS NET_Somalia_Post-Deyr-Technical-Release_2019FebJune.pdf).

108 FAO. 2020. *Nutrition-sensitive cash+ in Somalia*. Rome. (also available at www.fao.org/3/ca9824en/ca9824en.pdf).

109 WFP. 2021. The EU and WFP partner to improve nutrition in the Central Sahel by strengthening local food systems. In: *WFP* [online]. Rome. [Cited 21 June 2021]. www.wfp.org/news/eu-and-wfp-partner-improve-nutrition-central-sahel-strengthening-local-food-systems

110 UN. 2020. *Discussion starter Action Track 3: Boost nature-positive food production at scale*. New York, USA. (also available at www.un.org/sites/un2.un.org/files/unfss-at3-discussion_starter-dec2020.pdf).

111 Hodson, E., Niggli, U., Kitajima, K., Lal, R. & Sadoff, C. 2021. *Boost nature positive production - A paper on Action Track 3*. The Scientific Group of the UN Food Systems Summit. New York, USA, UN. (also available at https://sc-fss2021.org/wp-content/uploads/2020/12/3-Action_Track_3_Scientific_Group_draft_Dec-12-2020.pdf).

112 FAO, Alliance of Bioversity International & International Center for Tropical Agriculture (CIAT). forthcoming. *Indigenous Peoples' food systems: insights on sustainability and resilience from the front line of climate change*. Rome, FAO.

113 Charles, A., Kalikoski, D. & Macnaughton, A. 2019. *Addressing the climate change and poverty nexus: a coordinated approach in the context of the 2030 agenda and the Paris agreement*. Rome, FAO.

114 FAO. 2021. *Making climate-sensitive investments in agriculture – Approaches, tools and selected experiences*. Rome. (also available at https://doi.org/10.4060/cb1067en).

115 Carter, M.R. 2021. *Climate risk & food insecurity: what role for insurance?*. Transforming food systems for affordable healthy diets and addressing key drivers of food insecurity and malnutrition. Webinar, 12 April 2021. Rome, FAO.

116 FAO. 2021. *Protecting livelihoods – Linking agricultural insurance and social protection*. Rome. (also available at https://doi.org/10.4060/cb2690en).

117 Lipper, L., Thornton, P., Campbell, B.M., Baedeker, T., Braimoh, A., Bwalya, M., Caron, P., Cattaneo, A., Garrity, D., Henry, K., Hottle, R., Jackson, L., Jarvis, A., Kossam, F., Mann, W., McCarthy, N., Meybeck, A., Neufeldt, H., Remington, T., Sen, P.T., Sessa, R., Shula, R., Tibu, A. & Torquebiau, E.F. 2014. Climate-smart agriculture for food security. *Nature Climate Change*, 4(12): 1068–1072.

118 Ricciardi, V., Wane, A., Sidhu, B.S., Godde, C., Solomon, D., McCullough, E., Diekmann, F., Porciello, J., Jain, M., Randall, N., Mehrabi, Z., Goode, C., Solomon, D., McCullough, E., Diekmann, F., Porciello, J., Jain, M., Randall, N. & Mehrabi, Z. 2020. A scoping review of research funding for small-scale farmers in water scarce regions. *Nature Sustainability*, 3(10): 836–844.

119 FAO. 2018. *One million cisterns for the Sahel*. Dakar. (also available at www.fao.org/3/ca0882en/ca0882en.pdf).

120 IFAD. 2021. *Kiribati Outer Islands: Food and Water project supervision report*. Rome.

121 Barbier, E.B. & Hochard, J.P. 2018. Land degradation and poverty. *Nature Sustainability*, 1(11): 623–631.

122 Garg, K.K., Singh, R., Anantha, K.H., Singh, A.K., Akuraju, V.R., Barron, J., Dev, I., Tewari, R.K., Wani, S.P., Dhyani, S.K. & Dixit, S. 2020. Building climate resilience in degraded agricultural landscapes through water management: a case study of Bundelkhand region, Central India. *Journal of Hydrology*, 591: 125592.

123 Kuhnlein, H., Eme, P. & Fernández de Larrinoa, Y. 2019. Indigenous food systems: contributions to sustainable food systems and sustainable diets. *In* B. Burlingame & S. Dernini, eds. *Sustainable diets: linking nutrition and food systems*, pp. 64–78. Wallingford, UK, CABI. (also available at www.cabi.org/cabebooks/ebook/20183377461).

124 Kuhnlein, H.V., Erasmus, B. & Spigelski, D. 2009. *Indigenous Peoples' Food Systems: the many dimensions of culture, diversity and environment for nutrition and health*. Rome, FAO. (also available at www.fao.org/documents/card/es/c/250ee74b-9c3f-5dc1-8086-6e0b78b22795).

125 FAO. 2015. *Voluntary guidelines for securing sustainable small-scale fisheries*. Rome. (also available at www.fao.org/3/i8347en/I8347EN.pdf).

126 Autoridad Nacional de Acuicultura y Pesca (AUNAP). 2018. *Por la cual se establece la reglamentación de la actividad pesquera en los Lagos de Tarapoto, Departamento de Amazonas*. Resolución de la AUNAP. Bogotá. (also available at www.aunap.gov.co/wp-content/uploads/2017/06/Resolución-Por-medio-de-la-cual-se-reglamenta-la-actividad-pesquera-en-los-Lagos-de-Tarapoto-Departamento-de-Amazonas-1.pdf).

127 Powell, B., Thilsted, S.H., Ickowitz, A., Termote, C., Sunderland, T. & Herforth, A. 2015. Improving diets with wild and cultivated biodiversity from across the landscape. *Food Security*, 7(3): 535–554.

128 Trujillo, C. & Trujillo, F. 2019. *Acuerdos de pesca responsable para el buen uso de los Lagos de Tarapoto*. Fundación Omacha. (also available at http://omacha.org/wp-content/uploads/2019/06/acuerdos_tarapoto.pdf).

129 Bélanger, J. & Pilling, D. 2019. *The State of the World's Biodiversity for Food and Agriculture*. Rome, FAO. (also available at https://doi.org/10.4060/CA3129EN).

130 International Monetary Fund (IMF). 2021. *World Economic Outlook: managing divergent recoveries*. Washington, DC.

131 Davila, F., Bourke, R.M., McWilliam, A., Crimp, S., Robins, L., van Wensveen, M., Alders, R.G. & Butler, J.R.A. 2021. COVID-19 and food systems in Pacific Island Countries, Papua New Guinea, and Timor-Leste: opportunities for actions towards the sustainable development goals. *Agricultural Systems*, 191: 103137.

132 WFP. 2020. *State of School Feeding Worldwide 2020*. Rome.

133 WFP. 2020. *A chance for every child-partnering to scale-up school health and nutrition for human capital. WFP School Feeding Strategy 2020 - 2030*. Rome.

134 FAO, UNICEF & WFP. 2020. *Mitigating the effects of the COVID-19 pandemic on food and nutrition of schoolchildren*. Rome, WFP.

135 WHO. 2021. *Action framework for developing and implementing public food procurement and service policies for a healthy diet*. Geneva, Switzerland.

136 FAO & WFP. 2018. *Home-Grown school feeding resource framework. Technical Document*. Rome. (also available at www.fao.org/3/ca0957en/CA0957EN.pdf).

137 Gee, E., Borelli, T., Moura de Oliveira Beltrame, D., Neves Soares Oliveira, C., Coradin, L., Wasike, V., Manjella, A., Samarasinghe, G., Güner, B., Tan, A., Özbek, K., Ay, S.T., Karabak, S., Güzelsoy, N.A. & Hunter, D. 2020. The ABC of mainstreaming biodiversity for food and nutrition: concepts, theory and practice. *In* E. Gee, T. Borelli & D. Hunter, eds. *Biodiversity, Food and Nutrition. A new agenda for sustainable food systems*, pp. 82–184. London, Routledge.

138 Swensson, L.F.J. 2020. *Aligning public procurement rules and practices to support the implementation of Home-Grown School Feeding (HGSF) initiatives: the case of Ethiopia*. Policy Support on Public Food Procurement for Government - led Home Grown School Food initiatives. Rome, FAO.

139 WHO. forthcoming. *Food systems delivering better health: a new narrative to guide policy and practice for better human, ecosystem and animal health and well-being*. Geneva, Switzerland.

140 WHO. 2021. World Health Day 2021. Building a fairer, healthier world for everyone. In: *WHO* [online]. Geneva, Switzerland. [Cited 21 June 2021]. www.who.int/westernpacific/news/events/detail/2021/04/07/western-pacific-events/world-health-day-2021

141 Tirivayi, N., Knowles, M. & Davis, B. 2016. *The interaction between social protection and agriculture: a review of evidence*. Rome, FAO.

142 Janzen, S.A., Carter, M.R. & Ikegami, M. 2020. Can insurance alter poverty dynamics and reduce the cost of social protection in developing countries? *Journal of Risk and Insurance*, 88(2): 293–324.

143 WHO. 2018. *Guideline: fortification of rice with vitamins and minerals as a public health startegy*. Geneva, Switzerland.

144 WHO. 2016. *Guideline: fortification of maize, flour and corn meal with vitamins and minerals*. Geneva, Switzerland.

145 WHO. 2014. *Guideline: fortification of food-grade salt with iodine for the prevention and control of iodine deficiency disorders*. Geneva, Switzerland.

146 WHO. 2009. *Recommendations on wheat and maize flour fortification meeting report: interim consensus statement*. Geneva, Switzerland.

NOTES

147 Reardon, T. 2015. The hidden middle: the quiet revolution in the midstream of agrifood value chains in developing countries. *Oxford Review of Economic Policy*, 31(1): 45–63.

148 Ilie, E.T. & Kelly, S. 2021. *The role of small and medium agrifood enterprises in food systems transformation: the case of rice processors in Senegal*. FAO Agricultural Development Economics Technical Study No. 10. Rome, FAO.

149 FAO. 2020. *COVID-19 and its impact on agri-food systems, food security and nutrition: implications and priorities for the Africa region*. FAO Regional Conference for Africa, thirty-first session, 26-28 October 2020. Rome. (also available at www.fao.org/3/ne079en/ne079en.pdf).

150 FAO. 2021. *Leveraging small and medium-sized enterprises in Kenya*. Rome. (also available at www.fao.org/3/cb3657en/cb3657en.pdf).

151 Dixie, G. & Sweeney, E. 2021. *Lessons learned from the transformation of food systems in Southeast Asia though public-private-producer partnerships*. Working paper for internal use (unpublished).

152 Garbero, A., Improta, M. & Gonçalves, S. 2019. *Impact assessment report: Smallholder Commercial Agriculture Project and Participatory Smallholder Agriculture and Artisanal Fisheries Development Programme, São Tomé e Príncipe*. Rome, IFAD. (also available at www.ifad.org/documents/38714170/41116204/ST_PAPAFPA+PAPAC_IA+report.pdf/a388494d-8231-a372-ffd7-7925f972f988).

153 FAO. 2019. *Milan Urban Food Policy Pact Monitoring Framework*. Rome. (also available at www.fao.org/3/ca6144en/CA6144EN.pdf).

154 Abu Hatab, A., Cavinato, M.E.R., Lindemer, A. & Lagerkvist, C.-J. 2019. Urban sprawl, food security and agricultural systems in developing countries: a systematic review of the literature. *Cities*, 94: 129–142.

155 FAO. 2020. *Agricultural Transformation and the Urban Food Agenda*. FAO Committee on Agriculture. Twenty-seventh Session 28 September - 2 October 2020. Rome. (also available at https://doi.org/10.1007/s10887-015-9121-4).

156 See endnote 155.

157 Poulsen, M.N., McNab, P.R., Clayton, M.L. & Neff, R.A. 2015. A systematic review of urban agriculture and food security impacts in low-income countries. *Food Policy*, 55: 131–146.

158 Rodríguez, A. & Santandreu, A. 2019. *Informe de síntesis, dinámica y planificación del sistema agroalimentario en la ciudad–región Quito*. Quito, RUAF Foundation, FAO, Daniel and Nina Carasso Foundation and IWMI – CGIAR WLE.

159 Jácome, D., Santandreu, A., Paredes, D., Rodríguez, A. & Pinto, N. 2020. *Quito's resilient agrifood system*. ISOCARP Review 15. Quito, ISOCARP.

160 FAO. 2020. *FAO COVID-19 Response and Recovery Programme: Economic inclusion and social protection to reduce poverty: Pro-poor COVID-19 responses for an inclusive post-pandemic economic recovery*. Rome. (also available at https://doi.org/10.4060/cb0282en).

161 Cistulli, V., Heikkilä, M. & Vos, R. 2016. Global dimensions of malnutrition: Territorial perspectives on food security and nutrition policies. *In* OECD, ed. *OECD Regional Outlook 2016*, pp. 281–294. Paris, OECD. (also available at www.oecd-ilibrary.org/urban-rural-and-regional-development/oecd-regional-outlook-2016/global-dimensions-of-malnutrition-territorial-perspectives-on-food-security-and-nutrition-policies_9789264260245-13-en).

162 Kafle, K., Songsermsawas, T. & Winters, P. 2021. *Impacts of agricultural value chain development in a mountainous region: evidence from Nepal*. IFAD Research Series 65. Rome, IFAD. (also available at www.ifad.org/documents/38714170/42926104/research_65.pdf/74dee600-7e5e-98ea-944d-d5d10bbc0eae?t=1620738318823).

163 See endnote 20.

164 Quisumbing, A.R., Rubin, D., Manfre, C., Waithanji, E., van den Bold, M., Olney, D., Johnson, N. & Meinzen-Dick, R. 2015. Gender, assets, and market-oriented agriculture: learning from high-value crop and livestock projects in Africa and Asia. *Agriculture and Human Values*, 32(4): 705–725.

165 FAO. 2011. *The State of Food and Agriculture 2010-11. Women in agriculture: closing the gap for development*. Rome. (also available at www.fao.org/3/i2050e/i2050e.pdf).

166 Heckert, J., Olney, D.K. & Ruel, M.T. 2019. Is women's empowerment a pathway to improving child nutrition outcomes in a nutrition-sensitive agriculture program? Evidence from a randomized controlled trial in Burkina Faso. *Social Science & Medicine*, 233: 93–102.

167 United Nations Population Fund (UNFPA). 2014. *The State of World Population 2014. The power of 1.8 billion adolescents, youth and the transformation of the future*. New York, USA. (also available at www.unfpa.org/sites/default/files/pub-pdf/EN-SWOP14-Report_FINAL-web.pdf).

168 United Nations Department of Economic and Social Affairs (UNDESA). 2019. World Population Prospects. In: *UNDESA* [online]. New York, USA. [Cited 25 May 2021]. https://population.un.org/wpp

169 International Labour Organization (ILO). 2020. *World Employment and Social Outlook: trends 2020*. Geneva, Switzerland.

170 FAO, Technical Centre for Agricultural and Rural Cooperation (CTA) & IFAD. 2014. *Youth and agriculture: key challenges and concrete solutions*. Rome, FAO. (also available at www.fao.org/3/i3947e/i3947e.pdf).

171 Betcherman, G. & Khan, T. 2015. *Youth employment in sub-Saharan Africa: Taking stock of the evidence and knowledge gaps*. Ottawa, International Development Research Centre (IDRC).

172 FAO. 2020. *Africa's youth in agrifood systems: innovation in the context of COVID-19*. Rome. (also available at www.fao.org/3/cb0539en/CB0539EN.pdf).

173 Deotti, L. & Estruch, E. 2016. *Addressing rural youth migration at its root causes: a conceptual framework*. Rome, FAO. (also available at www.fao.org/3/i5718e/i5718e.pdf).

174 IFAD. 2019. *2019 Rural Development Report: creating opportunities for rural youth*. Rome. (also available at www.ifad.org/en/web/knowledge/-/publication/2019-rural-development-report).

175 Cunningham, K., Ploubidis, G.B., Menon, P., Ruel, M., Kadiyala, S., Uauy, R. & Ferguson, E. 2015. Women's empowerment in agriculture and child nutritional status in rural Nepal. *Public Health Nutrition*, 18(17): 3134–3145.

176 Quisumbing, A.R., Sproule, K., Martinez, E.M. & Malapit, H. 2021. Do tradeoffs among dimensions of women's empowerment and nutrition outcomes exist? Evidence from six countries in Africa and Asia. *Food Policy*, 100: 102001.

177 Cavatassi, R. & Mallia, P. 2018. *Impact assessment report: Tajikistan Livestock and Pasture Development Project (LPDP)*. Rome, IFAD.

178 IFAD. 2012. *President's report. Proposed loan and grant to the Republic of Indonesia for the Coastal Community Development Project*. Rome.

179 Cavatassi, R., Mabiso, A. & Brueckmann, P. 2019. *Impact assessment report: Republic of Indonesia Coastal Community Development Project (CCDP)*. Rome, IFAD. (also available at www.ifad.org/documents/38714170/41248489/IN_CCDP_IA+report.pdf/0663268b-3f06-bee7-970a-9312ee70da93).

180 Bandiera, O., Buehren, N., Burgess, R., Goldstein, M., Gulesci, S., Rasul, I. & Sulaiman, M. 2018. *Women's empowerment in action: evidence from a randomized control trial in Africa*. Washington, DC, World Bank. (also available at https://openknowledge.worldbank.org/handle/10986/28282).

181 YAPASA. 2017. Home. In: *YAPASA* [online]. Lusaka. [Cited 7 May 2021]. www.yapasa.org

182 FAO. 2019. *Youth in motion for climate action! - A compilation of youth initiatives in agriculture to address the impacts of climate change*. Rome. (also available at www.fao.org/3/ca5746en/ca5746en.pdf).

183 Kadiyala, S., Aurino, E., Cirillo, C., Srinivasan, C.S. & Zanello, G. 2019. *Rural Transformation and the double burden of malnutrition among rural youth in developing countries*. Rome, IFAD.

184 Harris, J.L., Pomeranz, J.L., Lobstein, T. & Brownell, K.D. 2009. A Crisis in the marketplace: how food marketing contributes to childhood obesity and what can be done. *Annual Review of Public Health*, 30(1): 211–225.

185 Mallarino, C., Gómez, L.F., González-Zapata, L., Cadena, Y. & Parra, D.C. 2013. Advertising of ultra-processed foods and beverages: Children as a vulnerable population. *Revista de Saude Publica*, 47(5): 1006–1010.

186 WHO. 2017. *Guidance on ending the inappropriate promotion of foods for infants and young children. Implementation manual*. Geneva, Switzerland. (also available at www.who.int/nutrition/publications/infantfeeding/manual-ending-inappropriate-promotion-food).

187 WHO. 2012. *A Framework for Implementing on the Marketing of Foods and Non-Alcoholic Beverages to Children*. Geneva, Switzerland. (also available at https://apps.who.int/iris/bitstream/handle/10665/80148/9789241503242_eng.pdf?sequence=1&isAllowed=y).

188 WHO. 2021. Code and subsequent resolutions. In: *WHO* [online]. Geneva, Switzerland. [Cited 21 June 2021]. www.who.int/nutrition/netcode/resolutions

189 Rubinstein, A., Elorriaga, N., Garay, O.U., Poggio, R., Caporale, J., Matta, M.G., Augustovski, F., Pichon-Riviere, A. & Mozaffarian, D. 2015. Eliminating artificial trans fatty acids in Argentina: estimated effects on the burden of coronary heart disease and costs. *Bulletin of the World Health Organization*, 93(9): 614–622.

190 WHO. 2018. Argentina regulating trans fats and monitoring heart health. In: *WHO* [online]. Geneva, Switzerland. [Cited 7 May 2021]. www.who.int/news-room/feature-stories/detail/argentina-regulating-trans-fats-and-monitoring-heart-health

191 Korean Ministry of Food and Drug Safety. 2008. *Special Act on Safety Management of Children's Dietary Lifestyle*. Act No. 12391. (also available at https://extranet.who.int/nutrition/gina/sites/default/files/KOR 2008 Special act on safety management of children%27s dietary lifestyle.pdf).

192 WHO. 2009. Special Act on Safety Control of Children's Dietary Life. In: *Global database on the Implementation of Nutrition Action (GINA)* [online]. Geneva, Switzerland. [Cited 7 May 2021]. https://extranet.who.int/nutrition/gina/en/node/22937

193 World Cancer Research Fund International (WCRF). 2018. *Building momentum: lessons on implementing a robust sugar sweetened beverage tax*. London. (also available at www.wcrf.org/wp-content/uploads/2021/04/PPA-Building-Momentum-Report-WEB.pdf).

194 WCRF. 2021. NOURISHING and MOVING policy databases. In: *World Cancer Research Fund International* [online]. London. [Cited 7 May 2021]. https://policydatabase.wcrf.org/level_one?page=nourishing-level-one#step2=1%23step3=336

195 WHO. 2017. *Tackling NCDs: 'Best buys' and other recommended interventions for the prevention and control of noncommunicable diseases*. Geneva, Switzerland.

196 WHO. 2014. Kuwaitis lower blood pressure by reducing salt in bread. In: *WHO* [online]. Geneva, Switzerland. [Cited 7 May 2021]. www.who.int/features/2014/kuwait-blood-pressure

197 Al Jawaldeh, A., Rafii, B. & Nasreddine, L. 2018. Salt intake reduction strategies in the Eastern Mediterranean Region. *Eastern Mediterranean Health Journal*, 24(12): 1172–1180.

198 Garde, A., Byrne, S., Gokani, N. & Murphy, B. 2018. *A child rights-based approach to food marketing: a guide for policy makers*. New York, USA, UNICEF. (also available at www.unicef.org/csr/files/A_Child_Rights-Based_Approach_to_Food_Marketing_Report.pdf).

199 Cruz, L. 2020. *Legal guide on school food and nutrition*. Rome, FAO. (also available at https://doi.org/10.4060/ca9730en).

200 FAO. 2019. *School Food and Nutrition Framework*. Rome. (also available at www.fao.org/3/ca4091en/CA4091EN.pdf).

201 WHO. 2010. *Set of recommendations on the marketing of foods and non-alcoholic beverages to children*. Geneva, Switzerland.

202 WHO. 1981. *International Code of Marketing of Breast-milk Substitutes*. Geneva, Switzerland.

203 Ministry of Law Justice and Company Affairs of the Government of India. 2003. *The Infant Milk Substitutes, Feeding Bottles and Infant Foods (Regulation of Production, Supply and Distribution) Act, 1992 as amended in 2003*. Act. 41 of 1992. (also available at legislative.gov.in/sites/default/files/A1992-41.pdf).

204 Agência Nacional de Vigilância Sanitária (Anvisa). 2006. *Lei No 11.265, de 3 de janeiro de 2006. Regulamenta a comercialização de alimentos para lactentes e crianças de primeira infância e também a de puericultura correlatos*. Brasília. (also available at http://portal.anvisa.gov.br/documents/33916/388704/Lei%2BN%25C2%25BA%2B11265.pdf/9933e31b-83e6-4e69-bb1a-747470719b98).

205 Agência Nacional de Vigilância Sanitária (Anvisa). forthcoming. *Decreto No 8.552 de 3 de novembro de 2015. Regulamenta a Lei no 11.265, de 3 de janeiro de 2006, que dispõe sobre a comercialização de alimentos para lactentes e crianças de primeira infância e de produtos de puericultura correlatos*. Brasilia.

206 Philippine Commission on Women of the Republic of Philippines. 1986. *Executive Order No. 51: National Code of Marketing of Breastmilk Substitutes, Breastmilk Supplement and Other Related Products*. (also available at https://pcw.gov.ph/executive-order-no-51-national-code-of-marketing-of-breastmilk-substitutes-breastmilk-supplement-and-other-related-products).

207 Biblioteca del Congreso Nacional de Chile. 2012. *Ley 20.606 - Sobre composición nutricional de los alimentos y su publicidad*. Valparaiso, Chile. (also available at www.bcn.cl/leychile/navegar?idNorma=1041570).

208 Bosi, T., Erguder, T., Breda, J. & Jewell, J. 2018. *Monitoring food marketing to children in Turkey*. Ankara, WHO. (also available at www.euro.who.int/en/countries/turkey/publications/monitoring-food-marketing-to-children-in-turkey-2018).

209 Piwoz, E.G. & Huffman, S.L. 2015. The impact of marketing of breast-milk substitutes on WHO-recommended breastfeeding practices. *Food and Nutrition Bulletin*, 36(4): 373–386.

210. **WHO**. 2020. Global Health Observatory (GHO) data repository. In: *WHO* [online]. Geneva, Switzerland. [Cited 28 April 2020]. http://apps.who.int/gho/data/node.main.A900A?lang=en

211 Dillman Carpentier, F.R., Correa, T., Reyes, M. & Taillie, L.S. 2020. Evaluating the impact of Chile's marketing regulation of unhealthy foods and beverages: pre-school and adolescent children's changes in exposure to food advertising on television. *Public Health Nutrition*, 23(4): 747–755.

212 Massri, C., Sutherland, S., Källestål, C. & Peña, S. 2019. Impact of the food-labeling and advertising law banning competitive food and beverages in Chilean public schools, 2014–2016. *American Journal of Public Health*, 109(9): 1249–1254.

213 Taillie, L.S., Reyes, M., Colchero, M.A., Popkin, B. & Corvalán, C. 2020. An evaluation of Chile's law of food labeling and advertising on sugar-sweetened beverage purchases from 2015 to 2017: a before-and-after study. *PLOS Medicine*, 17(2): e1003015.

214 WHO. 2017. *NetCode Toolkit: Monitoring the marketing of breast-milk substitutes: protocol for ongoing monitoring systems*. Geneva, Switzerland, WHO. (also available at www.who.int/nutrition/publications/infantfeeding/netcode-toolkit-monitoring-systems).

215 Baker, P., Friel, S., Schram, A. & Labonte, R. 2016. Trade and investment liberalization, food systems change and highly processed food consumption: a natural experiment contrasting the soft-drink markets of Peru and Bolivia. *Globalization and Health*, 12(1): 24.

216 Global Food Research Program. 2019. Peru. In: *Global Food Research Program* [online]. Chapel Hill, USA. [Cited 7 May 2021]. https://globalfoodresearchprogram.web.unc.edu/where-we-work/peru

217 Friel, S., Hattersley, L., Snowdon, W., Thow, A.-M., Lobstein, T., Sanders, D., Barquera, S., Mohan, S., Hawkes, C., Kelly, B., Kumanyika, S., L'Abbe, M., Lee, A., Ma, J., Macmullan, J., Monteiro, C., Neal, B., Rayner, M., Sacks, G., Swinburn, B., Vandevijvere, S. & Walker, C. 2013. Monitoring the impacts of trade agreements on food environments. *Obesity Reviews*, 14: 120–134.

218 Barlow, P., McKee, M., Basu, S. & Stuckler, D. 2017. The health impact of trade and investment agreements: a quantitative systematic review and network co-citation analysis. *Globalization and Health*, 13(1): 13.

219 FAO & WHO. 2014. *Conference Outcome Document: Framework for Action*. Second International Conference on Nutrition. Rome, 19–21 November 2014. ICN2 2014/3 Corr.1. Rome. (also available at www.fao.org/3/a-mm215e.pdf).

220 Thow, A.M., Annan, R., Mensah, L. & Chowdhury, S.N. 2014. Development, implementation and outcome of standards to restrict fatty meat in the food supply and prevent NCDs: learning from an innovative trade/food policy in Ghana. *BMC Public Health*, 14(1): 249.

NOTES

221 Annan, R.A., Apprey, C., Oppong, N.K., Petty-Agamatey, V., Mensah, L. & Thow, A.M. 2018. Public awareness and perception of Ghana's restrictive policy on fatty meat, as well as preference and consumption of meat products among Ghanaian adults living in the Kumasi Metropolis. *BMC Nutrition*, 4(1): 2.

222 Bell, C., Latu, C., Coriakula, J., Waqa, G., Snowdon, W. & Moodie, M. 2020. Fruit and vegetable import duty reduction in Fiji to prevent obesity and non-communicable diseases: a case study. *Public Health Nutrition*, 23(1): 181–188.

223 Latu, C., Moodie, M., Coriakula, J., Waqa, G., Snowdon, W. & Bell, C. 2018. Barriers and facilitators to food policy development in Fiji. *Food and Nutrition Bulletin*, 39(4): 621–631.

224 FAO. forthcoming. *The State of Food and Agriculture 2021*. Rome.

225 Folberth, C., Khabarov, N., Balkovič, J., Skalský, R., Visconti, P., Ciais, P., Janssens, I.A., Peñuelas, J. & Obersteiner, M. 2020. The global cropland-sparing potential of high-yield farming. *Nature Sustainability*, 3(4): 281–289.

226 GBD 2017 Diet Collaborators. 2019. Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*, 393(10184): 1958–1972.

227 WHO. 2015. *The burden of foodborne diseases is substantial*. Geneva, Switzerland. (also available at https://apps.who.int/iris/bitstream/handle/10665/327488/WHO-FOS-FZD-15.3-eng.pdf?sequence=1&isAllowed=y).

228 World Bank. 2018. *One Health – Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface*. Washington, DC. (also available at https://documents1.worldbank.org/curated/en/961101524657708673/pdf/122980-REVISED-PUBLIC-World-Bank-One-Health-Framework-2018.pdf).

229 WHO, FAO & World Organisation for Animal Health (OIE). 2019. *Taking a Multisectoral, One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries*. (also available at www.fao.org/3/ca2942en/CA2942EN.pdf).

230 WHO. 2019. *Essential nutrition actions: mainstreaming nutrition through the life-course*. Geneva, Switzerland.

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

232 FAO. 2017. *FAO social protection framework: promoting rural development for all*. Rome. (also available at www.fao.org/3/i7016e/i7016e.pdf).

233 World Bank. 2020. *Poverty and Shared Prosperity 2020: reversals of fortune*. Washington, DC, World Bank. (also available at http://hdl.handle.net/10986/34496).

234 Borkowski, A., Santiago, J., Correa, O., Bundy, D.A.P., Burbano, C., Hayashi, C., Lloyd-Evans, E., Neitzel, J. & Reuge, N. 2021. *COVID-19: Missing More Than a Classroom The impact of school closures on children's nutrition*. Florence, Italy, UNICEF. (also available at www.unicef-irc.org/publications/1176-covid-19-missing-more-than-a-classroom-the-impact-of-school-closures-on-childrens-nutrition.html).

235 WFP & Economic Policy Research Institute (EPRI). 2020. *COVID-19 Policy Brief: Why does food security and nutrition matter in social protection responses to systemic shocks in the Southern African region?* Rome, WFP.

236 WFP. 2020. *Supporting national social protection responses to the socioeconomic impact of COVID-19. Outline of a WFP offer to governments*. Rome.

237 FAO, UNICEF, WFP & WHO. 2021. *Asia and the Pacific Regional Overview of Food Security and Nutrition 2020: Maternal and child diets at the heart of improving nutrition*. Bangkok, FAO. (also available at https://doi.org/10.4060/cb2895en).

238 Daidone, S., Davis, B., Handa, S. & Winters, P. 2019. The household and individual-level productive impacts of cash transfer programs in Sub-Saharan Africa. *American Journal of Agricultural Economics*, 101(5): 1401–1431.

239 Kangasniemi, M., Knowles, M. & Karfakis, P. 2020. *The role of social protection in inclusive structural transformation*. Rome, FAO. (also available at www.fao.org/3/ca7333en/CA7333EN.pdf).

240 FAO. 2017. *The State of Food and Agriculture 2017. Leveraging food systems for inclusive rural transformation.* Rome.

241 Hendriks, S., Soussana, J.-F., Cole, M., Kambugu, A. & Zilberman, D. 2021. *Ensuring access to safe and nutritious food for all through transformation of food systems. A paper on Action Track 1*. The Scientific Group of the UN Food Systems Summit. (also available at https://sc-fss2021.org/wp-content/uploads/2021/04/Action_Track_1_paper_Ensuring_Access.pdf).

242 FAO. 2020. *Outline of the strategic framework 2022-31 and outline of the medium term plan 2022-25*. Rome.

243 Herrero, M., Thornton, P.K., Mason-D'Croz, D., Palmer, J., Bodirsky, B.L., Pradhan, P., Barrett, C.B., Benton, T.G., Hall, A., Pikaar, I., Bogard, J.R., Bonnett, G.D., Bryan, B.A., Campbell, B.M., Christensen, S., Clark, M., Fanzo, J., Godde, C.M., Jarvis, A., Loboguerrero, A.M., Mathys, A., McIntyre, C.L., Naylor, R.L., Nelson, R., Obersteiner, M., Parodi, A., Popp, A., Ricketts, K., Smith, P., Valin, H., Vermeulen, S.J., Vervoort, J., van Wijk, M., van Zanten, H.H., West, P.C., Wood, S.A. & Rockström, J. 2021. Articulating the effect of food systems innovation on the Sustainable Development Goals. *The Lancet Planetary Health*, 5(1): e50–e62.

244 Herrero, M., Thornton, P.K., Mason-D'Croz, D., Palmer, J., Benton, T.G., Bodirsky, B.L., Bogard, J.R., Hall, A., Lee, B., Nyborg, K., Pradhan, P., Bonnett, G.D., Bryan, B.A., Campbell, B.M., Christensen, S., Clark, M., Cook, M.T., de Boer, I.J.M., Downs, C., Dizyee, K., Folberth, C., Godde, C.M., Gerber, J.S., Grundy, M., Havlik, P., Jarvis, A., King, R., Loboguerrero, A.M., Lopes, M.A., McIntyre, C.L., Naylor, R., Navarro, J., Obersteiner, M., Parodi, A., Peoples, M.B., Pikaar, I., Popp, A., Rockström, J., Robertson, M.J., Smith, P., Stehfest, E., Swain, S.M., Valin, H., van Wijk, M., van Zanten, H.H.E., Vermeulen, S., Vervoort, J. & West, P.C. 2020. Innovation can accelerate the transition towards a sustainable food system. *Nature Food*, 1(5): 266–272.

245 Delaney, A., Evans, T., McGreevy, J., Blekking, J., Schlachter, T., Korhonen-Kurki, K., Tamás, P.A., Crane, T.A., Eakin, H., Förch, W., Jones, L., Nelson, D.R., Oberlack, C., Purdon, M. & Rist, S. 2018. Governance of food systems across scales in times of social-ecological change: a review of indicators. *Food Security*, 10(2): 287–310.

246 WHO. 2018. *Global Nutrition Policy Review 2016-2017: country progress in creating enabling policy environments for promoting healthy diets ad nutrition*. Geneva, Switzerland.

247 Termeer, C.J.A.M., Drimie, S., Ingram, J., Pereira, L. & Whittingham, M.J. 2018. A diagnostic framework for food system governance arrangements: The case of South Africa. *NJAS - Wageningen Journal of Life Sciences*, 84: 85–93.

248 Grow Asia. 2021. Our Network. In: *Grow Asia* [online]. Singapore. [Cited 10 May 2021]. www.growasia.org/our-network

249 Barrett, C.B., Benton, T., Fanzo, J., Herrero, M., Nelson, R.J., Bageant, E., Buckler, E., Cooper, K., Culotta, I., Fan, S., Gandhi, R., James, S., Kahn, M., Lawson-Lartego, L., Liu, J., Marshall, Q., Mason-D'Croz, D., Mathys, A., Mathys, C., Mazariegos-Anastassiou, V., Miller, A., Misra, K., Mude, A.G., Shen, J., Sibanda, L.M., Song, C., Steiner, R., Thornton, P. & Wood, S. 2020. *Socio-technical innovation bundles for agri-food systems transformation. Report of the International Expert Panel on Innovations to Build Sustainable, Equitable, Inclusive Food Value Chains*. Ithaca, USA and London, Cornell Atkinson Center for Sustainability and Springer Nature.

250 FAO. 2021. Hand-In-Hand Geospatial Platform. In: *FAO* [online]. Rome. [Cited 1 June 2021]. www.fao.org/hih-geospatial-platform

251 Reardon, T. & Vos, R. 2020. Food supply chains: business resilience, innovation and adaptation. *In* IFPRI, ed. *2021 Global Food Policy Report: transforming food systems after COVID-19*, pp. 64–74. Washington, DC, IFPRI.

252 Béné, C., Bakker, D., Rodriguez, M.C., Even, B., Melo, J. & Sonneveld, A. 2021. *Impacts of COVID-19 on people's food security: foundations for a more resilient food system*. Montpellier, France, CGIAR.

253 FAO. 2018. Solar powered irrigation: climate-friendly, reliable and affordable. In: *FAO* [online]. Rome. [Cited 19 May 2021]. www.fao.org/neareast/news/view/en/c/1158041

254 Parsons, K. & Hawkes, C. 2019. *Brief 5: Policy coherence in food systems*. Rethinking food policy: a fresh approach to policy and practice. London, Centre for Food Policy. (also available at www.city.ac.uk/__data/assets/pdf_file/0018/504621/7643_Brief-5_Policy_coherence_in_food_systems_WEB_SP.pdf).

255 French Agricultural Research Centre for International Development (CIRAD). 2018. *Fostering territorial perspective for development: towards a wider alliance*. Paris. (also available at https://collaboratif.cirad.fr/alfresco/s/d/workspace/SpacesStore/70a168a9-f36c-4aeb-b8ea-a6f49b17084d/TP4D_vENG.pdf.).

256 Agencia de Renovación del Territorio. 2020. *Informe de seguimiento a la implementación de los PDET*. Bogotá.

257 United Nations Convention to Combat Desertification (UNCCD). 2020. *The Great Green Wall implementation status and way ahead to 2030*. Bonn, Germany. (also available at https://catalogue.unccd.int/1551_GGW_Report_ENG_Final_040920.pdf).

258 Cernansky, R. 2021. New funds could help grow Africa's Great Green Wall. But can the massive forestry effort learn from past mistakes? *Science*. February 11, 2021.

259 UN. 2018. *The World's Cities in 2018 – Data Booklet (ST/ESA/ SER.A/417)*. New York, USA, United Nations, Department of Economic and Social Affairs, Population Division. (also available at www.un.org/en/events/citiesday/assets/pdf/the_worlds_cities_in_2018_data_booklet.pdf).

260 Milan Urban Food Policy Pact. 2020. *Milan Urban Food Policy Pact* [online]. Milan, Italy. [Cited 1 June 2021]. www.milanurbanfoodpolicypact.org

261 Batini, N., Serio, M. Di, Fragetta, M., Melina, G. & Waldron, A. 2021. *Building back better: how big are green spending multipliers?* Washington, DC, IMF. (also available at www.imf.org/en/Publications/WP/Issues/2021/03/19/Building-Back-Better-How-Big-Are-Green-Spending-Multipliers-50264).

262 Resilient Food Systems. 2021. Kenya - Upper Tana Nairobi Water Fund (UTNWF). In: *Resilient Food Systems Knowledge Center* [online]. Nairobi. [Cited 7 May 2021]. https://knowledgecentre.resilientfoodsystems.co/kc/country-projects/kenya

263 Cavatassi, R., Alfani, F., Paolantonio, A. & Mallia, P. 2018. *Mexico Community-based Forestry Development Project in Southern States (DECOFOS). Impact assessnent report.* Rome, IFAD. (also available at www.ifad.org/documents/38714170/41096508/MX_DECOFOS_IA+report.pdf/d6815458-8f90-39b0-793a-cfbf9cb82211?t=1557928269000).

264 World Bank & UNICEF. 2020. *Assessment of COVID-19 Impact on Poverty and Vulnerability in Iraq*. (also available at www.unicef.org/iraq/media/1181/file/Assessment of COVID-19 Impact on Poverty and Vulnerability in Iraq.pdf).

265 See endnote 264.

266 Government of Iraq. 2020. The White Paper for Economic Reforms: vision and key objectives. In: *Government of Iraq* [online]. Baghdad. [Cited 1 June 2021]. https://gds.gov.iq/iraqs-white-paper-for-economic-reforms-vision-and-key-objectives

267 FAO. 2020. *Socio-Economic & Food Security Survey 2018*. Jerusalem. (also available at www.fao.org/3/cb0721en/CB0721EN.pdf).

268 FAO. 2021. While peace awaits, do not let crises compromise the way forward. In: *FAO* [online]. Rome. [Cited 21 June 2021]. www.fao.org/neareast/news/view/en/c/1369949

269 FAO. 2020. *National agrifood systems and COVID-19 in Palestine. Effects, policy responses, and long-term implications*. Rome. (also available at www.fao.org/3/cb1340en/CB1340EN.pdf).

270 Community Protection Approach (CPA). 2019. *Toolkit Operalizing the Humanitarian Development Nexus in the oPt*. Jerusalem. (also available at https://cpainitiative.org/wp-content/uploads/2019/11/Nexus-Collection-Vol.4-Operationalizing-the-Humanitarian-Development-Nexus-in-the-oPt.-Lesson-from-the-Ground.pdf).

271 Ministry of Agriculture of the Palestinian Authority. 2019. *National food and nutrition security policy 2019-2030 (final draft)*. Ramallah.

272 Ministry of Agriculture of the Palestinian Authority. 2019. *National Investment Plan for food and nutrition security and sustainable agriculture 2020-2022 (NIP 2020-22)*. Ramallah.

273 Global-Hub on Indigenous Peoples' Food Systems. forthcoming. *The White/Wiphala paper on Indigenous Peoples' Food Systems*. Rome, FAO.

274 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). 2019. *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Bonn, Germany. (also available at https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf).

275 FAO & Centre for Indigenous Peoples' Nutrition and Environment (CINE). 2013. *Indigenous Peoples' food systems & well-being interventions & policies for healthy communities*. Rome, FAO.

276 FAO. 2020. *COVID-19 and indigenous peoples*. Rome. (also available at www.fao.org/3/ca9106en/CA9106EN.pdf).

277 IPBES. 2020. *Workshop report on biodiversity and pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services*. Bonn, Germany. (also available at www.ipbes.net/sites/default/files/2020-12/IPBES Workshop on Biodiversity and Pandemics Report_0.pdf).

278 See endnote 274.

279 Sobrevila, C. 2008. *The role of indigenous peoples in biodiversity conservation: the natural but often forgotten partners (English)*. Washington, DC, World Bank. (also available at http://documents.worldbank.org/curated/en/995271468177530126/The-role-of-indigenous-peoples-in-biodiversity-conservation-the-natural-but-often-forgotten-partners).

280 Gundersen, C. 2008. Measuring the extent, depth, and severity of food insecurity: An application to American Indians in the USA. *Journal of Population Economics*, 21(1): 191–215.

281 FAO. forthcoming. *Indigenous youth as agents of change*. Rome.

282 FAO. 2020. FAO launches the Global-Hub on Indigenous Peoples' Food Systems. In: *FAO* [online]. Rome. [Cited 10 June 2021]. www.fao.org/indigenous-peoples/news-article/en/c/1311821

283 FAO. 2021. Mujeres indígenas resguardan y mejoran maíces criollos. In: *FAO* [online]. Rome. [Cited 21 June 2021]. www.fao.org/index.php?id=82904

284 FAO. 2021. Community-based forest monitoring in indigenous territories in Panama. In: *FAO* [online]. Rome. [Cited 21 June 2021]. www.fao.org/indigenous-peoples/our-work/monitoring-forests

285 IFAD & Bioversity International. 2021. *How to do – Crop selection for diet quality and resilience*. Nutrition-sensitive agriculture - Note no. 1. Rome.

286 IFAD & Bioversity International. 2021. *How to do – Promote neglected and underutilized species for domestic markets*. Nutrition-sensitive Agriculture - Note no. 3. Rome.

287 IFAD & Bioversity International. 2021. *How to do – Mainstreaming NUS in national policy for nutrition outcomes*. Nutrition-sensitive Agriculture - Note no. 5. Rome.

288 Agriculture and Agri-Food Canada. 2019. *Food Policy for Canada: everyone at the table*. Ottawa. (also available at https://multimedia.agr.gc.ca/pack/pdf/fpc_20190614-en.pdf).

289 Mamo, D. 2020. *The Indigenous World 2020*. Copenhagen, IWGIA. (also available at https://iwgia.org/images/yearbook/2020/IWGIA_The_Indigenous_World_2020.pdf).

290 FAO. 1996. Methodology for assessing food inadequacy in developing countries. *In* FAO, ed. *The Sixth World Food Survey*, pp. 114–143. Rome. (also available at www.fao.org/3/w0931e/w0931e.pdf).

291 FAO. 2014. *Advances in hunger measurement: traditional FAO methods and recent innovations*. FAO Statistics Division Working Paper 14-04. Rome. (also available at www.fao.org/3/i4060e/i4060e.pdf).

292 World Bank. 2021. World Development Indicators. In: *World Bank* [online]. Washington, DC. [Cited 24 April 2020]. datatopics.worldbank.org/world-development-indicators

293 FAO. 2014. *Advances in hunger measurement: traditional FAO methods and recent innovations*. FAO Statistics Division Working Paper 14-04. Rome.

294 UNICEF. 2019. Infant and young child feeding: exclusive breastfeeding, predominant breastfeeding. In: *United Nations Children's Fund* [online]. New York, USA. [Cited 20 May 2021]. https://data.unicef.org/topic/%0Anutrition/infant-and-young-child-feeding

295 Blencowe, H., Krasevec, J., de Onis, M., Black, R.E., An, X., Stevens, G.A., Borghi, E., Hayashi, C., Estevez, D., Cegolon, L., Shiekh, S., Ponce Hardy, V., Lawn, J.E. & Cousens, S. 2019. National, regional, and worldwide estimates of low birthweight in 2015, with trends from 2000: a systematic analysis. *The Lancet Global Health*, 7(7): e849–e860.

296 Blanc, A.K. & Wardlaw, T. 2005. Monitoring low birth weight: An evaluation of international estimates and an updated estimation procedure. *Bulletin of the World Health Organization*, 83(3): 178–185.

297 See endnote 210.

298 NCD Risk Factor Collaboration (NCD-RisC). 2016. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *The Lancet*, 387(10026): 1377–1396.

299 WHO. 2019. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide*. Geneva, Switzerland. (also available at www.who.int/publications/i/item/9789241516952).

300 World Bank. 2021. International Comparison Program (ICP). In: *World Bank* [online]. Washington, DC. [Cited 6 May 2021]. www.worldbank.org/en/programs/icp

301 World Bank. 2021. Global Consumption Database – Food and Beverages. In: *World Bank* [online]. Washington, DC. [Cited 6 May 2021]. datatopics.worldbank.org/consumption/sector/Food-and-Beverages

302 Bai, Y., Ebel, A., Herforth, A. & Masters, W.A. 2021. *Methodology to update costs and affordability of healthy diets in the gap years of the International Comparison Program, 9 April*. Working paper for internal use (unpublished).

303 Laborde, D. & Torero Cullen, M. forthcoming. *A modelling framework for food systems: Defining a common baseline*. Document prepared for the UN Food Systems Summit 2021 Scientific Group.

304 WHO & UNICEF. 2017. *Methodology for monitoring progress towards the global nutrition targets for 2025*. Technical report by the WHO-UNICEF Technical Expert Advisory Group on Nutrition Monitoring (TEAM). Geneva, Switzerland and New York, USA.

305 Uppsala University. 2021. Uppsala Conflict Data Program. In: *UCDP* [online]. Uppsala, Sweden. [Cited 26 May 2021]. https://ucdp.uu.se

306 FAO. 2021. GIEWS - Global Information and Early Warning System. In: *FAO* [online]. Rome. [Cited 26 May 2021]. www.fao.org/giews

307 Development Initiatives. 2020. Home. In: *Development Initiatives* [online]. Bristol, UK. [Cited 26 May 2021]. https://devinit.org

308 IPC Global Partners. 2019. *Integrated Food Security Phase Classification Technical Manual Version 3.0. Evidence and Standards for Better Food Security and Nutrition Decisions*. Rome.

309 Agard, J., Schipper, E.L.F., Birkmann, J., Campos, M., Dubeux, C., Nojiri, Y., Olsoon, L., Osman-Elasha, B., Pelling, M., Prather, M., Rivera-Ferre, M.G., Ruppel, O.C., Sallenger, A., Smith, K.R., Clair, A.L.S., Mach, K.J., Mastrandrea, M.D. & Eren Bilir, T. 2014. Glossary. *In* IPCC, ed. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J.*, pp. 1757–1776. Cambridge, UK and New York, USA, Cambridge University Press. (also available at www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-AnnexII_FINAL.pdf).

310 Intergovernmental Panel on Climate Change (IPCC). 2012. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. C.B. Field, V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor & P.M. Midgley, eds. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.). Cambridge, UK and New York, USA, Cambridge University Press. (also available at www.ipcc.ch/site/assets/uploads/2018/03/SREX_Full_Report-1.pdf).

311 Chambers, R. & Conway, G.R. 1992. *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. IDS Discussion Paper 296. Brighton, UK, Institute of Development Studies (IDS). (also available at www.ids.ac.uk/publications/sustainable-rural-livelihoods-practical-concepts-for-the-21st-century).

312 Dercon, S., Hoddinott, J. & Woldehanna, T. 2005. Shocks and consumption in 15 Ethiopian villages, 1999–2004. *Journal of African Economies*, 14(4): 559–585.

313 WFP. 2009. *Comprehensive Food Security & Vulnerability Analysis (CFSVA) Guidelines - First Edition, 2009*. Rome. (also available at www.wfp.org/publications/comprehensive-food-security-and-vulnerability-analysis-cfsva-guidelines-first-edition).

314 FAO. 2016. *Managing climate risk using climate-smart agriculture*. Rome.

315 United Nations Office for Disaster Risk Reduction (UNDRR). 2009. *2009 UNISDR terminology on disaster risk reduction*. Geneva, Switzerland (also available at www.preventionweb.net/publications/view/7817).

316 UN. 2016. *Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*. New York, USA, UN. (also available at www.preventionweb.net/files/50683_oiewgreportenglish.pdf).

317 UN. 2017. *Report of the High-Level Committee on Programmes at its thirty-fourth session. Annex III. CEB/2017/6 (6 November 2017)*. New York, USA. (also available at https://digitallibrary.un.org/record/3844899).

318 American Meteorological Society (AMS). 2015. Weather - Glossary of Meteorology. In: *AMS* [online]. Boston, USA. [Cited 26 May 2021]. https://glossary.ametsoc.org/wiki/Weather

319 World Bank. 2021. GDP per capita growth (annual %) - Latin America & Caribbean | Data. In: *World Bank* [online]. [Cited 26 May 2021]. https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG?end=2019&locations=ZJ&start=1961

320 FAO. 2020. *Consumer price indices and food inflation. FAOSTAT analytical brief 3*. Rome.

321 FAO. 2021. *The State of Food and Agriculture: Agriculture Food Systems Transformation: from Strategy to Action*. FAO Conference – Forty-second session. 14–18 June 2021. (also available at www.fao.org/3/nf243en/nf243en.pdf).

322 Jones, A.D. 2017. Critical review of the emerging research evidence on agricultural biodiversity, diet diversity, and nutritional status in low- and middle-income countries. *Nutrition Reviews*, 75(10): 769–782.

323 European Centre for Medium-Range Weather Forecasts (ECMWF). 2021. Datasets. In: *ECMWF* [online]. Reading, UK. [Cited 10 June 2021]. www.ecmwf.int/en/forecasts/datasets

324 European Commission. 2021. Anomaly Hotspots of Agricultural Production (ASAP). In: *ASAP* [online]. Brussels. [Cited 10 June 2021]. mars.jrc.ec.europa.eu/asap

325 Climate Hazards Center of the University of California - Santa Barbara. 2021. CHIRPS: Rainfall estimates from rain gauge and satellite observations. In: *CHIRPS* [online]. Santa Barbara, USA. [Cited 10 June 2021]. www.chc.ucsb.edu/data/chirps

326 Centre for Research on the Epidemiology of Disasters (CRED). 2021. EM-DAT: the international disasters database. In: *EM-DAT* [online]. Brussels. [Cited 10 June 2021]. public.emdat.be

327 IMF. 2021. World Economic Outlook Database - April 2021. In: *IMF* [online]. Washington, DC. [Cited 10 June 2021]. www.imf.org/en/Publications/WEO/weo-database/2021/April

NOTES ON GEOGRAPHIC REGIONS IN STATISTICAL TABLES IN CHAPTER 2 AND ANNEXES 1 AND 2

Countries revise their official statistics regularly for past periods as well as for the latest reporting period. The same holds for statistics presented in this report. Whenever this happens, estimates are revised accordingly. Therefore, users are advised to refer to changes in estimates over time only within the same edition of *The State of Food Security and Nutrition in the World* and refrain from comparing data published in editions for different years.

Geographic regions

This publication follows the composition of geographic regions as presented by the Statistics Division of the United Nations Secretariat primarily for use in its publications and databases (https://unstats.un.org/unsd/methodology/m49). The assignment of countries or areas to specific groupings is for statistical convenience and does not imply any assumption regarding political or other affiliation of countries or territories by the United Nations. Please refer to the list below for the country composition of each region in Annexes 1 and 2 tables as well as in Tables 1–4 in Section 2.1.

Countries, areas and territories for which there were insufficient or unreliable data for conducting the assessment are not reported and not included in the aggregates. Specifically:

- **Northern Africa:** In addition to the countries listed in the table, PoU and food insecurity based on the FIES include an estimate for Western Sahara. Child wasting, stunting and overweight, low birthweight, adult obesity, exclusive breastfeeding and anaemia estimates exclude Western Sahara.
- **Eastern Africa:** With respect to the M49 classification, it excludes British Indian Ocean Territory, French Southern and Antarctic Territories, Mayotte, and Réunion.
- **Western Africa:** With respect to the M49 classification, it excludes Saint Helena.
- **Asia and Eastern Asia:** With respect to the M49 classification, low birthweight and child wasting aggregates exclude Japan.
- **Caribbean:** With respect to the M49 classification, it excludes Anguilla; Aruba; Bonaire, Sint Eustatius and Saba; British Virgin Islands; Cayman Islands; Curaçao; Guadeloupe; Martinique; Montserrat; Saint Barthélemy; Saint Martin (French Part); Sint Maarten (Dutch part); and Turks and Caicos Islands. Adult obesity, child wasting, low birthweight and exclusive breastfeeding exclude Puerto Rico and the United States Virgin Islands.
- **South America:** With respect to the M49 classification, it excludes Bouvet Island, Falkland Islands (Malvinas), French Guyana, and South Georgia and the South Sandwich Islands.
- **Australia and New Zealand:** With respect to the M49 classification, it excludes Christmas Island, Cocos (Keeling) Islands, Heard and McDonald Islands, and Norfolk Island.
- **Melanesia:** With respect to the M49 classification, anaemia, child wasting, stunting and overweight, low birthweight and exclusive breastfeeding estimates exclude New Caledonia.
- **Micronesia:** With respect to the M49 classification, adult obesity, anaemia, child wasting, low birthweight and exclusive breastfeeding estimates exclude Guam, Northern Mariana Islands and US Minor Outlying Islands. Aggregates for child stunting and overweight exclude only US Minor Outlying Islands.
- **Polynesia:** With respect to the M49 classification, it excludes Pitcairn Islands, and Wallis and Futuna Islands. Adult obesity, child wasting, low birthweight and exclusive breastfeeding estimates exclude American Samoa, French Polynesia and Tokelau (Associate Member). Aggregates for child stunting and overweight exclude only French Polynesia.
- **Northern America:** With respect to the M49 classification, it excludes Saint Pierre and Miquelon. Adult obesity, anaemia, low birthweight and exclusive breastfeeding aggregates also exclude Bermuda and Greenland. Aggregates for wasting are based only on data for the United States of America.
- **Northern Europe:** With respect to the M49 classification, it excludes Åland Islands, Channel Islands, Faroe Islands (Associate Member), Isle of Man, and Svalbard and Jan Mayen Islands.
- **Southern Europe:** With respect to the M49 classification, it excludes Gibraltar, Holy See, and San Marino. However, anaemia, child stunting, overweight and low birthweight estimates include San Marino.
- **Western Europe:** With respect to the M49 classification, it excludes Liechtenstein and Monaco. However, child stunting, overweight, anaemia and low birthweight estimates include Monaco.

Other groupings

Least Developed Countries, Land Locked Developing Countries and Small Island Developing States groupings include the countries as presented by the Statistics Division of the United Nations (https://unstats.un.org/unsd/methodology/m49).

Small Island Developing States: Estimates for child stunting, wasting and overweight, adult obesity, exclusive breastfeeding and low birthweight exclude French Polynesia, Anguilla, Aruba, Bonaire, Sint Eustatius and Saba, British Virgin Islands, Curaçao, Montserrat, New Caledonia, Sint Maarten (Dutch part). In addition, estimates for child wasting, adult obesity, exclusive breastfeeding and low birthweight also exclude American Samoa and Puerto Rico.

High-income, upper-middle-income, lower-middle-income and low-income countries include the countries as presented by the World Bank classification for the 2020–2021 fiscal year (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519).

Low-income food-deficit countries (2018): Afghanistan, Bangladesh, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic People's Republic of Korea, the Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, the Gambia, Ghana, Guinea, Guinea-Bissau, Haiti, India, Kenya, Kyrgyzstan, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Nicaragua, the Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, the Sudan, the Syrian Arab Republic, Tajikistan, Togo, Uganda, the United Republic of Tanzania, Uzbekistan, Viet Nam, Yemen and Zimbabwe.

Composition of geographic regions

AFRICA

Northern Africa: Algeria, Egypt, Libya, Morocco, Sudan, Tunisia and Western Sahara.

Sub-Saharan Africa

Eastern Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania, Zambia and Zimbabwe.

Middle Africa: Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, and Sao Tome and Principe.

Southern Africa: Botswana, Eswatini, Lesotho, Namibia and South Africa.

Western Africa: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo.

ASIA

Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

Eastern Asia: China, Democratic People's Republic of Korea, Japan, Mongolia and Republic of Korea.

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

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

Western Asia: Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates and Yemen.

LATIN AMERICA AND THE CARIBBEAN

Caribbean: Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.

Latin America

Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama.

South America: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela (Bolivarian Republic of).

OCEANIA

Australia and New Zealand: Australia and New Zealand.

Oceania excluding Australia and New Zealand

Melanesia: Fiji, New Caledonia, Papua New Guinea, Solomon Islands and Vanuatu.

Micronesia: Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru and Palau.

Polynesia: American Samoa, Cook Islands, French Polynesia, Niue, Samoa, Tokelau, Tonga and Tuvalu.

NORTHERN AMERICA AND EUROPE

Northern America: Bermuda, Canada, Greenland and United States of America.

Europe

Eastern Europe: Belarus, Bulgaria, Czechia, Hungary, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia and Ukraine.

Northern Europe: Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Lithuania, Norway, Sweden, and United Kingdom of Great Britain and Northern Ireland.

Southern Europe: Albania, Andorra, Bosnia and Herzegovina, Croatia, Greece, Italy, Malta, Montenegro, North Macedonia, Portugal, Serbia, Slovenia and Spain.

Western Europe: Austria, Belgium, France, Germany, Luxembourg, Netherlands and Switzerland.

THE STATE OF THE WORLD

2021 THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

TRANSFORMING FOOD SYSTEMS FOR FOOD SECURITY, IMPROVED NUTRITION AND AFFORDABLE HEALTHY DIETS FOR ALL

In recent years, several major drivers have put the world off track to ending world hunger and malnutrition in all its forms by 2030. The challenges have only grown with the COVID-19 pandemic and related containment measures. This report presents the first global assessment of food insecurity and malnutrition for 2020 and offers some indication of what hunger might look like by 2030, in a scenario further complicated by the enduring effects of the COVID-19 pandemic. It also includes new estimates of the cost and affordability of healthy diets, which provide an important link between the food security and nutrition indicators and the analysis of their trends. Altogether, the report highlights the need for a deeper reflection on how to better address the global food security and nutrition situation.

To understand how hunger and malnutrition have reached these critical levels, this report draws on the analyses of the past four editions, which have produced a vast, evidence-based body of knowledge of the major drivers behind the recent changes in food security and nutrition. These drivers, which are increasing in frequency and intensity, include conflicts, climate variability and extremes, and economic slowdowns and downturns – all exacerbated by the underlying causes of poverty and very high and persistent levels of inequality. In addition, millions of people around the world suffer from food insecurity and different forms of malnutrition because they cannot afford the cost of healthy diets. From a synthesized understanding of this knowledge, updates and additional analyses are generated to create a holistic view of the combined effects of these drivers, both on each other and on food systems, and how they negatively affect food security and nutrition around the world.

In turn, the evidence informs an in-depth look at how to move from silo solutions to integrated food systems solutions. In this regard, the report proposes transformative pathways that specifically address the challenges posed by the major drivers, also highlighting the types of policy and investment portfolios required to transform food systems for food security, improved nutrition and affordable healthy diets for all. The report observes that, while the pandemic has caused major setbacks, there is much to be learned from the vulnerabilities and inequalities it laid bare. If taken to heart, these new insights and wisdom can help get the world back on track towards the goal of ending hunger, food insecurity and malnutrition in all its forms. To that end, this global report provides a clear diagnostic to put in place the policies needed.

ISBN 978-92-5-134325-8 ISSN 2663-8061

9 789251 343258

CB4474EN/1/07.21